Part I.—Original Articles.

THE EIGHTEENTH MAUDSLEY LECTURE: SCIENCE AND PSYCHIATRY.

By F. GOLLA, M.A., M.B.Oxon., F.R.C.P.,
Professor of the Pathology of Mental Disorder in the University of London.

Delivered before the Royal Medico-Psychological Association, November 25, 1937.

WHEN you did me the very great honour of calling on me to deliver the Maudsley Lecture, I was told that it had been decided that these lectures should be devoted alternately to scientific psychiatry and to subjects of general popular interest, and that the subject of my lecture was to be scientific. I decided that with a year's notice the active preparation of the lecture might well be postponed for eleven months, and that during this gestation period I might hope to fix on one of the many aspects of pathological or physiological science of sufficient interest to justify a not too technical exposition to a mainly clinical audience.

So long as I thought of the various lines of inquiry that must present themselves to anyone conversant with the problems of pathology, my task of selection appeared to be only difficult because of their multiplicity. When, however, I considered how far any such methods would be capable of dealing with anything other than the mere fringe of the problems with which every psychiatrist is daily brought into contact, I began to have a certain uneasiness about the universal validity of scientific method. Certain doubts that I have long entertained as a physiologist as to the possibility of a purely scientific interpretation of biological phenomena were intensified when the abstract statement of the problems of physiological science was exchanged for the full-blooded immediacy of the study of disorders of conduct. I am not doubting the validity of pathological methods, nor yet the certainty of an enormous extension of their use in the investigation of diseases where a disturbance of bodily function leads to disordered action or destruction of the nervous system manifesting itself by disordered conduct. In the study of the pathology of these conditions we are at the beginning of a new era, an era whose development is unduly delayed by the reluctance of many psychiatrists to recognize

the necessity for an intensive examination of bodily functions in every case in their wards.

As with increasing years one slips into one's anecdotage, it becomes increasingly hard to resist the temptation to reiterate one's illustrations, and I am afraid I may too often repeat a story of the first lecture on psychiatry that I attended. It was on general paralysis, and I still have the note-book in which I recorded how general paralysis was a disease due to stress, how engine-drivers and busy barristers were particularly prone to it, how work and anxiety could nearly always be traced as a determining cause, how the lecturer had always noticed that such patients had voluptuous wives or animal husbands, how alcohol was sometimes a contributory cause and sometimes also mere physical exertion. A short time previously the diagnostic reactions of syphilitic infection had been established, and following on this a few months later the work of Mott and others deprived my lecture notes of other than historical value. No one now bothers much about the mental symptoms of the general paralysis patient; indeed, as one concerned with the after-treatment of the malaria-induced remissions, I am not sure that such cases are sufficiently studied in their psychological aspects. Now what has happened in the case of general paralysis will undoubtedly happen in the case of many other psychoses. Pathological science will establish the ætiological factor, and when it has furnished such an account of the bodily disturbance in any case as will adequately account for the disorder of conduct, the path will be indicated for the appropriate treatment.

There is more than enough evidence to justify such a prophecy in the results that have already been published by workers in those laboratories that have the good fortune to participate in clinical investigations. Progress is, it is true, slow, and it is to some extent rendered slower by the prevalent habit of regarding the type of mental syndrome as a morbid entity in its own right, and attempting to assign a common pathogenetic factor to all patients exhibiting a like disorder of conduct, or vice versa. A mental hospital may in some respects be compared with an institution to which only cases of high temperature are admitted, and where the only means of investigation is that afforded by the thermometer. A close study of the temperature charts might allow the tentative definition of some morbid entities, such as pneumonia, but we can hardly doubt that in the long run a classification based on a single symptom would lead the pathologist very far astray. Observation of the lack of uniformity of response to such a simple poison as alcohol should make us very diffident in accepting a psychological classification as a basis for investigation. It is quite true that a physician possessing great experience and clinical acumen is often able to classify his cases of disordered conduct with an accuracy that allows him to forecast the course of the malady of a given patient with some degree of certainty, and hence one may premise the possibility of a rough form of classification based not only on a psychological examination, but a

consideration of the past history. Few psychiatrists, however, would claim more than an approximate accuracy for any such systems. It should be unnecessary to emphasize such a very obvious point were it not that both the laboratory worker and the clinician so often forget it in the course of their investigations, and distrust a pathological sign because it is not necessarily found in the majority of cases belonging to the same group in their scheme of classification. If, then, we avoid all questions of classification, it may be broadly stated that in a very large number of psychotics it can be shown that the disorder of conduct is either secondary to or concomitant with general disturbances of bodily function. We are, indeed, reluctantly re-learning a fact that was very apparent to our forefathers—the truism that we think and act with the whole organism. That we had to a great extent forgotten this truth is a natural consequence of our preoccupation with the central nervous system, owing to the great increase of our knowledge of nervous physiology and anatomy. In this connection it may be salutary to remember that Aristotle—no mean psychologist—believed that the only function of the brain was to cool the blood coming from the lungs.

We have unequivocal evidence of the nature of the causes of a number of psychotic conditions. Some of these have been shown to be consequent on bacteriological infections, some to senile degenerative processes, others to definite forms of drug and food poisoning. The time, however, has not yet come when we can even guess at the pathogenesis of the large number of psychoses which exhibit some concomitant bodily symptoms. Little by little, however, the indications furnished by the physiological pathology of such cases are becoming more precise. This is especially true of those cases in which alternating states of normality and mental disturbance make it possible for the patient, during a remission, to act as a control to his own state when in the acute phase. Perhaps the most striking results in such cases are those obtained by the laborious metabolic investigations of Gjessing. His observations very strongly point to a toxic disturbance of endocrine origin being responsible for the relapses in the group of cases that he studied. Small as are the variations from certain normal metabolic functions exhibited by many cases of psychoses, such variations become sufficiently obvious when the patient is submitted to some stress involving those particular functions. This method of investigating the reaction to stress, whether induced by drugs or physical conditions, has been the governing idea in those researches that have been carried out on this subject at the Central Pathological Laboratory. Work of this nature is in its infancy, and it is not yet possible further to define those cases of psychosis that exhibit concomitant bodily symptoms, but enough has been done to make it highly probable that in a very large number of such cases the mental disturbance is only a symptom of a very profound and general bodily disorder. It is impossible to give a guess as to what proportion of psychotics fall within this group, but nothing can excuse failure to make a thorough investigation of

the bodily condition in every case. Such cases, however, represent but a small portion of the clinical material dealt with by the psychiatrist, for the psychiatrist is concerned with every form of abnormal conduct.

Conduct is the observable totality of the reactions of the organism to tensions occurring in the environment, and, as Mercier used to say, we have no right to infer diseases of the mind from disorders of conduct. We do not even know whether a disease of the mind is a possibility. The subject-matter of psychiatry is the study of the reactions of the personality as objectified by conduct to abnormal conditions arising in the personal environment. The personal environment is only empirically limited by the range of the personality under consideration; it is theoretically co-extensive with the known universe and practically with the patient's social and physical contacts. The internal environment may be defined as that corresponding to the bodily organism, and the external environment as all that lies outside the body. Disorder of the bodily or internal environment, as in the cases that we have just been considering, may dominate the clinical picture to such an extent that the disordered conduct reaction to the external environment has little practical interest. The work of the psychiatrist is, however, mainly concerned with cases where maladjustment of the reactions of the personality to the extracorporeal or external environment is the predominating feature. It is not, however, possible in such cases to ignore the fact that the nervous system, as part of the internal environment, must itself be intrinsically affected by strains in the external environment that are of such a nature as to impair the normal response. It might appear, therefore, that the psychosis or neurosis is objectively the sum of the disordered conduct reactions, and the disorder of conduct is to be described in terms of tensions and reactions that take place in the whole system of both internal and external relations that are pertinent to the personality.

Although the necessity for such a holistic account is sufficiently obvious, there is a tendency among psychiatrists to stultify its utility by attempting a further differentiation between excitatory states primarily arising in the internal environment and those whose origin is to be sought in the external environment. The former are dubbed physiogenic and the latter psychogenetic factors in mental disease. The harm done is not, perhaps, very great when such terms are used without any metaphysical implication, but when we are tempted to be indulgent to a convenient laxity of expression it is well to remember the weaker brethren. A confused remnant of Cartesian dualism still obtains among some psychotherapists, who seem to have a hazy notion that it offers a sure defence against the materialistic interpretations of the neurologists.

An account of the psychotic personality in terms of a detailed description of all the actions and reactions would omit all mention of the self as a central unifying factor. Such an account would be consistent with the Humian view

of the self as a bundle of perceptions. Such an account would have been subscribed to by William James. In his *Principles of Psychology*, when dealing with "The Consciousness of Self", he says: "In its widest possible sense a man's self is the sum total of all that he can call his, not only his body and his psychic powers, but his clothes and his house, his wife and his children, his ancestors and friends, his reputation and works, his land and horses and yacht and bank account." Comprehensive though James's account of the empirical self may be, it is yet rather like a rendering of Hamlet with the Danish prince omitted. Observe how James starts with a personal nominative pronoun, and then follows a possessive pronoun—"a man's self is the sum total of all that he can call his"—and then the pronouns drop out and we have a list of faculties and things. The subjective self or the sense of personal identity is thus eliminated completely by Hume and less successfully by James. Instead of the Kantian doctrine of a transcendental unit of apperception that is logically implied in all thinking, James tells us that what we call "self" is simply an inference drawn from the phenomena presented to us. I am not prepared in this address to discuss the reality of the subjective self, strongly though I feel on the matter, but I would like to emphasize that the central motif of many psychoses is a disturbance of the sense of personal identity. I have only laboured the point because it is typical of the difficulties that we will meet at every turn if we insist on a scientific description of personality. A scientific account of the subjective self is obviously impossible, and yet, if we agree to eliminate the conception of a subjective self, certain of our psychiatrical problems cannot be stated in an intelligible form. Be this as it may, it does not vitally affect the main proposition of my thesis.

The proposition that I wish to put forward is this: Scientific method alone is incapable of dealing with the totality of the personality, and in so far as we attempt to describe psychological processes in terms of scientific epistemology we will arrive at definitely false conclusions.

To avoid any misunderstanding, let me recapitulate. We are agreed that in the case of many toxic and organic forms of insanity the technical methods of applied science will sufficiently explain the pathogenesis, so that in many such cases further psychological investigation is hardly a necessity from the therapeutic point of view. I hope also that we are agreed that thorough physical investigation is essential in every case of disordered conduct, and that we see grounds for the belief that very many more types of bodily conditioned disorder of conduct will ultimately become known. On the other hand, there are numerous cases of maladjusted personality in which not only have pathological methods failed to demonstrate any causal agency, but in which consideration of the patient's history and external environment makes it certain that no primary pathological disturbance of the internal environment of a causal nature is likely to be discovered. It is the possibility of a description of such cases in terms of science that I am disputing.

In the first place, we may inquire in what terms of physical science those who maintain the adequacy of scientific method propose to describe psychological states. If such a scientific description is to be attempted, it will obviously deal with processes in so far as they affect the physical state of the internal environment—that is, of the central nervous system in the first place and of the general bodily mechanisms in the second. We need hardly spend time on an inquiry as to the possibility of such a description by mechanics in the strict sense. It is obvious that in biology we are not in a position to apply the concepts of pure mechanics. These, as Broad tells us, imply that the phenomena under discussion obey either Lagrange's equations or some substitute which approximates indefinitely to them for ordinary velocities. Such a mechanical explanation is only applicable to microscopic phenomena, and is palpably untrue if applied to macroscopic phenomena. Or, to put the argument in another form, we may quote the following dicta of Whitehead: "It cannot be too clearly understood that the various physical laws which appear to apply to the behaviour of atoms are not mutually consistent as at present formulated. The appeal to mechanism on behalf of biology was, in its origin, an appeal to well-attested, self-consistent physical concepts as expressing the basis of natural phenomena. But at present there is no such system of concepts."

It seems, then, that when we talk of a mechanical description we do not mean fundamentally a mechanical description at all, but one in terms of physical and chemical concepts, and these physical and chemical concepts are again to be expressed in terms of neural mechanisms. Now, though, as I have pointed out elsewhere, there are overwhelming difficulties in describing even a reflex function in terms of that of the isolated neurone, psychiatrists rush in where physiologists fear to tread. Basing their contentions on superficial resemblances between certain aspects of psychological phenomena and neural processes, we find them attempting to express psychology in terms of neuronic function. It is difficult for anyone with any intimate knowledge of neurophysiology to regard with tolerance attempts to find analogies between the activity of the isolated neurone and mental processes. Perhaps the culminating absurdity in this direction was reached by Rivers in his book on *Instinct and the Unconscious*, where the main arguments on the ætiology of war neuroses are based on the supposed analogy of an instinctive reaction to the alleged all-or-nothing response of an isolated neurone. Every student of physiology knows that the all-or-nothing law is of academic interest as a statement regarding the single nerve impulse, but, though the magnitude of the impulse does not vary with the strength of the stimuli, a graduation of effect of great sensitiveness is well effected by variation of the number and frequency of the responses. Dealing with neurology, I have criticized the conception of the functional activity of the nervous system as an integration of reflexes at some length on a previous occasion, and this is not the time to

reiterate arguments based on generally accepted facts. Suffice it to say: That the isolated reflex is an abstraction, and that no part of the nervous system enters into activity without profoundly modifying the excitability and activity of all the rest. That the repetition of a stimulus will never elicit precisely the same response, for the state of the nervous system is no longer the same after a stimulus and response. That the nervous system exhibits a degree of lability which will allow an enormous range of substitution of function. In fact, even on the neuro-physiological level we have to regard the nervous system as an organic whole and not as an integration of reflex arcs, each with an unalterable function.

If this be, on the whole, a true account of the position of neurophysiology, it must, *a fortiori*, be still more applicable to psychology. The classical experiments of Graham Brown demonstrating complete restitution of function in the chimpanzee after bilateral ablation of the motor cortex are as important for the comparative psychologist as for the neurophysiologist. Lashley started his investigations in 1916 as an uncompromising behaviourist, fully persuaded, as Hartmann puts its, that the conditioned response and the reflex arc would provide an adequate account of the adaptive conduct of organisms. His results obliged him to abandon these views completely. His ablations of the cerebral cortex in rats showed that the degree of deterioration in learning ability and retentiveness was proportional to the amount of brain tissue injured and independent of the area of the cortex affected.

The amputations of the frontal lobes in man by Dandy and the dramatic series of similar cases recently published by Jefferson should give little encouragement to those who hope for an eventual interpretation of mental activity in terms of the reflex arc and neural anatomy. It is true that the psychological observations of both Dandy and Jefferson have necessarily been superficial, but the testimony of husbands and friends which should outweigh any formal psychological examination is conclusive that no appreciable mental disturbance could be noticed.

The concept of the conditioned reflex has proved to be of very limited utility to the psychologist. It has naturally appealed to superficial thinkers as presenting a development of the reflex arc physiology that would enable us to express behaviour in terms of a mosaic of pattern reflexes which would exhibit every degree of complexity and excitability, but yet remain identifiable entities. These hopes have been but scurvily fulfilled. Even in the experimental animal the conditioned responses can only be elicited with even moderate certainty when the environment is so controlled as to render the animal subject to one stimulation system only. The moment that this artificially emptied environment is again filled up with all the multitudinous presentations that must impinge on the receptive mechanisms of even so relatively simple a nervous system as that of a dog, the conditioned reflex vanishes. It may be granted that the studies of Pavlov give us a picture of certain lowly mechanisms

that possibly enter into the complex whole of behaviour, but, even allowing to the conditioned reflex a much greater role than appears to be justified by observation, it must never be forgotten that we are still dealing with an abstraction, a piece of physiological behaviour artificially isolated from all competing reflexes.

If we allow that disorders of conduct cannot be intelligibly expressed in terms of neurophysiology alone, it might yet be argued that this is due to insufficiency of our scientific methods for investigating nervous function. It might seem possible that scientific methods could still be applied successfully to the investigation of the end-products of neural activity rather than to the neural process itself. That is to say, that the subject-matter of psychology should yield better to scientific treatment.

When an attempt is made to subject psychological material to scientific treatment, it is customary to describe the factors involved as mental mechanisms. The term "mental mechanisms", if it has any real meaning, can only imply a series of mental states which are subject to laws that are either identical with or very similar to those which govern the mechanisms of macroscopic entities. When we talk of laws of mechanical causation in physics, we are, of course, in a very different position from that which we have to assume in attempting to apply them to psychology. Even in physics these laws, as Russell points out, can only be expressed as a differential equation. This means that although you cannot tell what will happen in a finite time, you can say that, if you make the time shorter and shorter, what will happen will be more and more nearly according to such and such a rule. But of time as applied to the Heraclitian flux of mental states we know little, and any mental state preceding that under consideration has at least two systems of variables, one known to consciousness and the other not. If it be assumed that laws of mechanical causation govern the appearance and succession of mental states, it might be thought possible for us to analyse complex mental states back into their mental constituents. In other words, we should be able to entertain the possibility of psychic atomism against which James protested so effectively in 1890. To quote a famous passage from the *Principles*: "It is often convenient to formulate the mental facts in an atomistic sort of way, and to treat the higher states of consciousness as if they were all built out of unchanging simple ideas. It is convenient often to treat curves as if they were composed of small straight lines, and electricity and nerve force as if they were fluids. But in the one case, as in the other, we must never forget that we are talking symbolically, and that there is nothing in nature to answer our words." And he adds, as if foreseeing the psychoanalytic catastrophe that was so soon to threaten psychology: "A permanently existing idea, or *Vorstellung*, which makes its appearance before the footlights of consciousness at periodical intervals, is as mythical an entity as the Jack of Spades." Such a permanently existing group of ideas, or *Vorstellung*, is, I

presume, implied in the concept of a mental mechanism—a mechanism, in fact, that does not obey mechanical laws and conditions no mechanical event, that is, in essence an abstraction made for heuristic purposes from the flux of interrelated mental events. Psychological atomism, however, has reappeared again, not overtly, indeed, but it is implicit in attempts to describe the adjustment of a reflex response to the particular stimulus that released it.

This attempt to re-establish a form of reflex psychology, less rigid, it is true, than the earlier physiological statement, rests on a fallacy that was exposed as long ago as 1896 by Dewey in a celebrated paper entitled, "The Reflex Arc Concept in Psychology". He wrote: "The reflex arc idea is defective in that it assumes sensory stimulus and motor response as distinct psychical existences; while in reality they are always inside a co-ordination and have their significance purely from the part played in maintaining or reconstituting the co-ordination. What a sensation will be in particular in a given time will depend strictly upon the way in which an activity is being used. It has no fixed quality of its own." These words of Dewey are notable not only as an early and trenchant attack on psychological atomism, but because they impugn any attempt to express psychology in terms of physiology. Not only, then, is the physiological differentiation between stimulus and response psychologically untrue, but the psychological quality of a stimulus will be determined, not by its physical nature, but by the nature of the activity in which the reacting organism is engaged.

It is recognition of the inadequacy of the reflex arc concept that has made the advent of *Gestalt* psychology, or configurationism, like a refreshing breeze in the dry-as-dust atmosphere of physiological psychology.

Speaking to an audience of psychiatrists I need not dwell on the foundations and implications of this doctrine. I will only remind you of Wertheimer's formulation of its basic doctrine in the following terms: "There exist natural circumstances in which what happens in the total is not conditioned by the nature of the parts or their mode of combination, but, on the contrary, what occurs in any part of this whole is determined by the inner structural basis of this entirely." This principle entails a fundamental break with the two doctrines of the older psychology that were at any rate superficially amenable to scientific treatment—that is, the mosaic theory and the associational theory. It implies, as Heidbreder points out, that neither the psychological nor the physiological process, neither the perception nor the neural excitation, can be conceived as a mere sum of parts; that the cerebral process, like the perception, must be a unified whole, and no more an integration of separate activities of distinct neural units than the perception is a composition of discrete sensations. Nowhere is all this made clearer than by considering the psychology of the apprehension of a melody. A melody is not only the sum of distinct tonal sensations, it is also a melody in its own right. As Ehrenfels puts it: "In order to apprehend a melody it is not enough to have an

impression of the momentarily sounding tone in consciousness, but when the tone is not the first one, it is necessary to have a few of the preceding tones simultaneously presented in memory." Now in spite of the attempts of Köhler to establish a physical basis for configurational psychology, or the almost extravagant efforts of Lewin to find a mathematical expression for the psychological tensions between the whole and the parts, we are, I think, no nearer the application of scientific method to this type of psychology. We may have successfully substituted for the reflex arc concept a descriptive psychology that is more satisfying, and that is largely a translation into psychological language of the holistic neurophysiology of Lashley and Goldstein. We can still, however, only apply scientific methods to our concept by analytical procedure that is inadmissible *ex hypothesi* in a psychology where the parts depend on the properties of an organized whole.

Hitherto we have been considering the epistemological problem in general terms, and the conclusions appear to be unfavourable to the application of scientific method. I propose now to test this impression by putting before you a concrete case of an occurrence which may form a fair test of the possibility of an elucidation in scientific terms. If the example that I am about to detail appears at first to be bizarre and at the same time rather trivial and pointless I must ask your indulgence, for as a matter of fact it was selected after much thought and for certain reasons which will become apparent in the course of discussion. Two small boys, school friends, about six years old, were taken to the pantomime. As was the custom in Victorian days, and may obtain for anything I know at present, the most important personage on the stage was a very attractive " principal boy " displaying the customary silk-covered expanse of nether limb, with the tightly-belted spangled doublet that was then *de rigueur*. After the play the little boy (A) confided to his friend (B) that certain of the most obvious signs of male erotic excitement had occurred to him during the performance. As even at that age he had begun to exhibit a penchant for the unremunerative curiosity which has since then, I am told, proved to be the cause of his undoing, he speculated on the causal connections of the phenomenon. Little boy (B) said that he had had the same experience, and had also noted a similar effect on a previous occasion of the same nature. Now it so happens that I am able to assert that little boy (A) was perfectly ignorant of any physical difference between the sexes ; he had never had or heard any conversation on the subject, or seen a female in other than the voluminous clothes of that epoch. Now in what terms of scientific analysis are we going to arrive at an understanding of this psychological event ? Note that we have to deal with the nature and mode of action of the stimulus, the organic response, the æsthetic and pleasurable excitement and, lastly, with the subsequent conduct, for before he went to bed that night he composed a short note to the fair lady, which he entrusted to a confidential footman for delivery. Whether we use the conceptions of

physical chemistry or think in terms of neurophysiology or invent any number of mental mechanisms, I think that you will agree that by none of these methods are we going to get any further. Atomistic psychology would have to deal separately with the stimulus and the various phases of the response. The stimulus, however, can obviously only be accepted as an unanalysable totality. No one could be so naïve as to resolve this charming vision into a number of units consisting of curves and spangles and satin-covered rotundities and peroxided hair, and to determine what precise number and combination of such items would constitute an effective stimulus. We would all agree that the small boy had an immediate, or, if you prefer it, an intuitive knowledge of much that was implicit in the presentation. But the response caused, as Dewey warned us, cannot be separated from the stimulus, and, moreover, the efficiency and quality of the perceived stimulus will be conditioned entirely by the type of response elicitable.

In the study of this instance of childish experience and behaviour we find ourselves compelled to accept the whole situation as a unit that has neither history nor parts that can be submitted to analytical treatment. I have chosen this example rather than many other occasions exhibiting instinctive behaviour, firstly, because it has been possible for me to tell you what the conscious reaction was, and secondly, because it has been possible to eliminate verbal instruction and imitative behaviour. It is very difficult indeed to discover an instance of human instinctive behaviour that has not been affected by previous communication, by initiation or by repetition. The only such example that I have ever been able to cite with confidence is that of the nest-making instinct in pregnant women that I have described in my Croonian Lectures of some years ago. It may, perhaps, be of interest to repeat what I then said, since the example has attracted little attention: "Some years ago I observed what has always seemed to me to be a singularly interesting and beautiful instance of human behaviour that fulfils the postulates of an act, not necessarily rationally conditioned, performed for the first time, from which mimicry and verbal suggestion are excluded. A primipara about two days before the birth of her child worked very hard at tidying not only all the drawers of her bedroom, 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 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 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 were, as a rule, outside her province. I then asked a midwife if this procedure were 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 the arrangement of drawers and cupboards is seldom performed by the mistress, the phenomenon was all the more striking.* Later on, observing the behaviour of a primipara 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 future babies, of whose imminence she could obviously have no formulated idea. 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."

Lastly, let us take an example from the insect world. In order to be brief, I will take the observation of Fabre on the solitary wasp, Ammophila, which is so well known that it requires no elaboration in the telling. The female wasp, then, stings her caterpillar prey in the nerve centres along the ventral line of the body with such accuracy that paralysis and not death results. The eggs are laid in the paralysed host and the emerging grubs, which the wasp will never live to see, will find a conveniently quiescent but still living host to devour. It is true, of course, that the observations of the Peckhams have demonstrated that the accuracy of the sting is not infallible, sometimes it is so inaccurate that disaster overtakes both host and grub; but then all observation, whether in field or laboratory, teaches us that no natural process of living matter is ever absolute in its economy of effort and accuracy of performance.

We have here four examples of behaviour of the type that it is customary to characterize as instinctive. In both the case of the boy and that of the primipara we find the occurrence of a novel and unitary experience that has neither history nor parts that can be submitted to analytical treatment. Inasmuch as the experience admits of no analysis, the resulting conduct is primarily an immediate irrational response, however much it may be modified in the process of execution by other factors. That conduct is largely influenced throughout life by the occurrence of these instinctive reactions is so obvious that the point requires no emphasis. The traces left by such instinctive reactions will undergo modification and complication by their mutual interaction, and as a result of reflection and rationalization, but in the end conduct is largely built upon a basis of intuitions and instinctive

* Since this address was delivered I have been told that this tendency to tidy drawers and cupboards is described in some of the older works on obstetrics, *e.g.* in Pye-Chavasse's "Advice to a Wife".

reactions. By psychological investigatory methods we may be able to dissect out some of these subsequent accretions, but sooner or later we are bound to come upon the fundamental facts of intuition and instinctive reaction. Now the very word "intuition" is so repellent to many psychologists and most biologists as to occasion an emotional rejection. It is thought to imply either a state of mental confusion in those who use it or, worse still, a claim to have a private access to mystic knowledge. Though I yield to none in my admiration of Bergson, I cannot feel that he is guiltless in the matter. No one possesses a more lucid and compelling style and no one has made a greater use of the concept of intuition than he, and yet his exposition of intuition is often regarded as pure mysticism, not admitting of any further interpretation. No one has done more to clear up our ideas about intuition than Mr. H. H. Price, in his work on perception. He opposes, thus, intuitive to discursive consciousness: "In discursive consciousness," he says, "there is a passage of the mind from one related item to another related item, for instance, from a subject to a concept under which we classify it, or from premises to conclusion. Definite consciousness of the whole comes *after* consciousness of the parts. In intuitive consciousness, on the other hand, consciousness of the whole comes *before* definite consciousness of the parts. There is no passage of the mind; whatever we intuit is present all at once. We might say that intuitive consciousness is totalistic, not progressive or additive." I should like to try to put this in the language of non-technical empiricism. Taken at its simplest, an intuition may be an unanalysed totality of a complex of sense impressions. In such a simple case our power of resolving an intuition of a group of sense impressions will depend on how far we can utilize language for so doing. Inasmuch as language was originally designed to communicate information about the position and displacement of objects and so to furnish an almost immediate analysis of a group of visual impressions, we tend to forget that often our primary perception was that of an unanalysed whole, and it was to the whole that we reacted. Most other sensory complexes, olfactory ones for example, have never had any language attached and remain as simple primitive intuitions. Try to convey to anyone who has never smelt it all that the odour of asafœtida means to you. Taken in its more complex aspect an intuition is the immediate knowledge, not only of a complex of sense perceptions, but of their emotional values in their totality. If I may digress for a moment, I think that the real reason that so many people find an almost insuperable difficulty in grasping the significance of intuition lies in the extreme differences that exist between individuals in their power of apprehending the totality of a sensory and emotional complex. That this divergence exists becomes apparent the moment we discuss the question of appreciation of æsthetic values. The one person is able to apprehend by a single intuitive act the picture or the poem or the melody which the artist has created for him, and to appreciate the significance that appertains to it as a whole and is lost as soon

as it is resolved into its parts. The other person has no such facility; he tries to construct the whole by a synthesis of the parts which he is able to observe and, as a consequence, must always miss the true significance of the work. This second type may be a person of greater intellectual ability than the first, but no amount of analytical power will help him to apprehend truths that seem obvious to the other. I cannot help thinking that in studying a system of psychology or philosophy, if we could have a preliminary acquaintance with the mental type of the thinker, it would often make the comprehension of his thesis a much easier task. If, then, intuition is to be understood as the immediate apprehension of the totality of the situation, instinctive action may be defined as the total response to the intuition.

Thus far our inquiry into the value of scientific methods in enabling us to comprehend personality has been uniformly unfavourable to science. In order to dispose finally of the objection that this is due to imperfections in our scientific knowledge, it may be well to inquire what are the credentials that science can offer as to its ever being fit for the task, even if every imaginable perfection in its methods be conceded. The results of this inquiry may be briefly summarized.

Firstly, science is abstract; it is a process of analysis and classification, and that means that science cannot deal with anything as a concrete whole. Analysis means the splitting up of the individual thing or person into its elements. But we come to the paradoxical conclusion that though science is too abstract to allow us to grasp by its means the concrete whole, each of its abstractions may yet be too general for individual application. Science is concerned with laws, that is, generalizations as to the frequency of the occurrence of an observed fact. Indeed, unless a law be of general application, it must cease to have any compulsive authority. Science, then, is too particular for the concrete whole and too abstract for the individual.

It might be urged that if we could gather together enough scientific data we could ultimately know a personality. The palpable untruth of this dictum will be apparent to every one of us if we think of some person whom we know very well and intimately. It is true that we cannot in the present state of science enumerate all the ascertainable scientific facts about him or her, but we can reckon enough of them to make us feel sure that however complete the assembly, this would not give us the personality that we know. Science, as MacMurray reminds us, is description but not knowledge, for knowledge is of the total presentation and the total is always more than the sum of the parts. Neither can we take comfort in the belief that science explains things. Science never can explain anything. All that it can do is to help us to show the relation of unfamiliar facts to familiar facts, and thus to satisfy our desire to orientate ourselves by familiar symbols when we find ourselves among strange and unfamiliar presentations. It is true that science has lately shown increasingly a perverted tendency to explain things by describing the familiar in terms

of the unfamiliar, material objects in terms of pointer readings, but again no mathematical expression is going to help us to explain an individual person or thing. I am not sure that an explanation is always an impossibility, but only that it is not to be obtained by a process of description, which is all that we have a right to expect of science. Explanation, if it be possible, must always involve a transcendent principle. Thus, the success of a religious system will depend on its power to offer an explanation, and it may well be that this is the direction from which we have most to hope in our attempts to comprehend personality.

If we were to allow the possibility of an intuitive knowledge of certain primary mental events, and to agree that it is possible to describe and classify their subsequent modifications and internal relations and accretions, we should still be far from any form of knowledge that will allow us to predict the course of future conduct or to understand history. Our power to do so depends on the qualification of all experience by the conceptions of value and of purpose.

By value I mean, of course, not necessarily ethical or æsthetic qualities, but that quality which determines the inception and form of activity that is in accord with the general tendency of the organism. Used in this sense value is not necessarily a quality of human activity or even of a living organism ; its assumption is equally necessary to account for the activity of any physical entity, and it is not a concept that can be deduced from science. It is a quality that is imparted by the whole to the parts, but is not pre-existent in the parts. That is to say that modern knowledge which obtains its data from sense experience alone cannot, as Hume long ago pointed out, provide the data for the interpretation of activity. Value, inasmuch as it is a universal qualification of activity, belongs as much to physics as to biology. The Newtonian physics, as Whitehead tells us, left nature without meaning or value. By introducing stresses, in particular the law of gravitation, Newton demonstrated the systematic aspect of nature. " But," to quote Whitehead, " he left all the factors of the system—more particularly mass and stress—in the position of detached facts devoid of any reason for their compresence. He thus illustrated a great philosophic truth that a dead Nature can give no reasons. All ultimate reasons are in terms of animal value. A dead Nature aims at nothing. It is the essence of life that it exists for its own sake as the intrinsic reaping of value." Now these conclusions are of great importance, because, if they be true—and their truth seems inescapable—they constitutue a final demonstration that organized problems cannot be solved in terms of mechanics. In the case of our own problem, which is the interpretation of human personality, value and its correlate, subjective aim, cannot of course be known in terms of scientific deduction, but it is implicit in any holistic account of behaviour. I am not sure that the terms " value " and " subjective aim " are not better applied to the stimulus and the subject respectively. I should like to illustrate what I mean by an example taken

from the simpler organic events, for the concept of value can be applied to both the physical and organic worlds as well as to the psychological. The activity of eating is conditioned by the food possessing the appropriate quality or value. The act of eating is qualified by the subjective aim to content and to allay specific somatic sensation. Both of these qualities are interdependent, for stimulus value must obviously depend on the subjective aim—that is, the nature and intensity of subjective desire—and the subjective aim must equally be conditioned by the value of the stimulus. Purpose is the quality implicit in the subsequent development of the action or, if you prefer it, its consequence. The immediate datum of the experience of our own activity is that of a desire or purpose to accomplish a certain action, physical or mental, and there may be qualifying that desire an image of the resulting attainment. Purpose is the driving force and value, and subjective aim its qualification. As each phase of activity in a process of conduct is unfolded, we find that it is tinged with awareness of purpose, but such awareness may only envisage the purpose to attain the realization of the next phase. With repetition of a particular act, or perhaps from preoccupation with other matters, we often find that a purposive action is unaccompanied by awareness of its purpose unless at some stage we interrogate ourselves, and by an intellectual effort bring the present purposeful nature of our activities into the field of consciousness. This generally happens when some obstacle or interruption occurs in the chain of purposive activity. Purpose, then, may be conscious or not according to whether opposition to our conduct calls into being conscious examination of purpose with a resultant reinforcement or modification. Purpose does not, like Aristotelian teleology, deal with final ends, nor can it do so, for finality is unknown and the future uncreated. It is, however, implicit if we believe in a rational universe, and without that act of faith discussion is impossible.

We are dealing here with epistemological questions, and have every right to decline to consider cosmological implications. If, however, you find that such considerations lead you inescapably to a theistic hypothesis, you will find yourself in such respectable scientific company as that of Haldane, Whitehead and Needham.

Our task is nearly ended ; we have found a way from the dead world of science to the living world of purpose and values where ethical, æsthetic and religious considerations do not need to be deliberately excluded in the interests of a highly abstract account of conduct, whether normal or psychotic. I am aware that I shall make few converts among my own generation. When the grosser forms of the older religious superstitions and the authority of its priesthood decayed before science and historical exegesis, mankind celebrated its freedom by taking to itself a new superstition in the shape of scientific materialism, and a new priesthood of professors just as arrogant and intolerant as their predecessors. We are naturally superstitious and timid, but there are

signs that the younger generation is becoming not a little impatient of a *Weltanschauung* that strips life of all its interest, and that in abstraction falsifies the nature of the abstract. After all, it is not as if anyone really believed in the scientific account. As Joad puts it: "No one really believes that there is no ground for causation and inference, that the qualities of things do not, in fact, belong to them, that the faces of those we love consist exclusively of electrical charges, that the world is meaningless and offers no basis for religion or justification for ethics. Nobody, in fact, believes that matter in motion is all." That scientific men should subscribe to such a creed whilst constantly denying their professions by their attitude towards life is an intellectual scandal; but when they happen to be psychiatrists and proceed to advise souls in distress by the light of a system which claims that it will ultimately succeed in expressing mental events in physical terms and meanwhile purports to abstract, analyse and combine psychological processes in terms of mental mechanics, then they become somewhat of a public danger. Science has plenty of good work to do for psychiatry, and if I have been too violent in attacking what I conceive to be misapplied science, it is because I feel so strongly that, with the wonderful possibilities which the pathology of mental diseases offers us, we can ill afford to see its efforts diverted into paths for which it is not adapted.

The continuity of mental processes does not allow of their representation as states of mind, their inter-relatedness does not allow of their separation in terms of psychological atomism. The intuitive and instinctive basis of conduct does not permit of analytical expression. The determination of behaviour by value and purpose negatives mechanical determinism. Mal-adjusted personalities in whom the trouble is not initially attributable to gross bodily pathological changes have to be envisaged as conditioned either by an external environment that makes too strenuous demands on the general organism, or as due to discord between the purposive activity implied in all personal conduct, and the values imposed by the universe considered not only in its social but its ethical and æsthetic aspects. The task of the psychiatrist who tries to effect some readjustment in these cases calls for a very high degree of culture and experience, insight and spiritual sensibility. We may be thankful that among the ranks of psychiatrists there are so many who possess these gifts, and exercise them in spite of every discouragement and lack of appreciation. Let us see to it that they may be able to hand down the great humanistic tradition to successors who are not only scientists, but men and women of culture and spiritual insight.