of Asklepios scarcely anything is known, whereas of Imhotep there remains at least one striking architectural memorial as well as numerous epigraphical and papyric inscriptions, statuettes, and mural representations,³ all pointing to a distinguished and well-spent life, devoted in part to public service and in part to the healing of the sick. In selecting Imhotep as its tutelary deity the medical profession would erect on its pedestal of honour a most distinguished Egyptian who for many centuries before our era had been worshipped as the deity of medicine.

REFERENCES.

- ¹ W. A. Jayne: *The Healing Gods of Ancient Civilizations*, 1925.
² Cf. J. F. Champollion: *Monuments de l'Égypte et de la Nubie*, 1835-45, I, Plate lxxviii.
³ For further details see *Imhotep, the Vizier and Physician of King Zoser, and afterwards the Egyptian God of Medicine*, by J. B. H.

THE STUDY OF MENTAL ABNORMALITY.

PROLEGOMENA TO THE ESTABLISHMENT OF A NATIONAL
LABORATORY FOR THIS PURPOSE.

BY

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IN the *British Medical Journal* of January 14th, 1928, there appeared a plea by Professor R. J. A. Berry of Melbourne in favour of a national laboratory for the study of mental abnormality. This project deserves encouragement from all interested in the welfare of the Empire, and it is to be hoped that before many years elapse the proposal may have aroused sufficient interest to make its realization a reasonable expectation. For some reason the study of mental abnormality has conspicuously failed to fire the imagination or enlist the support of the British public. This fact is all the more remarkable in view of the appeal which this study appears to make to the citizens of the United States. There the subject is not only held to be important, but receives practical support; here neither general interest nor support is forthcoming. In consequence there is no institution in this country really comparable to the Psychopathic Hospital in Boston. It is true that in London, through the generosity of the Commonwealth Fund, the problems of mental reactions in children are about to be attacked on a large scale, but even here the impetus appears to originate in the United States.

In view of this unsatisfactory state of affairs Professor Berry's plea comes none too soon, and ought to be a trumpet call to others who share his desire to see a national disgrace removed. While, however, the establishment of a national laboratory for the study of mental abnormality is an urgent need, the proposal would be incomplete without further discussion of the lines upon which it ought to be established. Many who have read Professor Berry's plea will agree with me that the basis upon which he would have it established is too narrow to ensure its being of optimum value to the community. It is true that, when he deplores the lack of co-operative effort between non-correlated specialties in the past and advocates unity of study in the future, he lends an apparent atmosphere of breadth to his proposals. To discover how essentially narrow they are, however, we have only to ask how this unity of study is to be achieved. Though it is never explicitly stated, the general trend of Professor Berry's paper leaves the reader no doubt as to the answer which he would give. Towards the end of his paper he makes the following definite statement:

"The first place to seek for mental abnormality of all kinds, and certainly those which are commonly classified as antisocial, are the cells of the human cerebral cortex, and this study demands co-operative national effort. That there has not hitherto been any co-operative effort to study the mental abnormalities appears to be due to a lack of appreciation of the simplicity of the great principles underlying the construction of the vertebrate neuraxis."

He represents the study of the nervous system at the present day as being illogically divided between neurology and the psychological sciences on an anatomical basis; neurology is represented as concerning itself with the

receptor and effector neurons, psychology and psychiatry as concerning themselves with the internuncial neurons in their normal and abnormal functioning respectively. He then goes on to make this statement:

"To divide a functional entity, like the neuraxis of man, into a series of watertight, non-correlated specialties appears to be unscientific and calculated to breed error. It is rather unity of study which is so essential."

As the earlier and greater part of Professor Berry's paper is devoted to the interpretation of human conduct in terms of neurons and their development, it would seem that he believes unity to be best attained by substituting for all the partial, non-correlated specialties the study of the physiology of the nervous system. It is presumably to this study alone that, in Professor Berry's view, the proposed national laboratory is to be devoted. It is with the object of drawing attention to the dangers of a spurious attempt at comprehensiveness in the study of mental abnormality, and in the hope that discussion will favour the adoption of a genuine comprehensiveness, that I submit the following observations.

I. The functional entity to be studied in problems of mental abnormality is not the neuraxis of man, but man himself as a psycho-physical organism. If it is unscientific to study the receptor and effector neurons in isolation from the internuncial neurons and vice versa, it is at least equally unscientific to isolate the neuraxis from the rest of the organism. The neuraxis has definite functions to fulfil, but it is no more a real functional entity than the liver. The neuraxis may, indeed, be considered for purposes of science in relative isolation—as, indeed, neurology does consider it; but, if we desire to establish a comprehensive science, the functional entity with which we shall concern ourselves will not be the neuraxis, but the organism. That the neuraxis is meaningless apart from the rest of the body is evident when we ask ourselves what significance the neuraxis has for mental abnormality in isolation from the endocrine organs. Professor Berry has made the interesting statement that "75 per cent. of those antisocial reactions against which society seeks to protect itself, and known as 'crimes,' are directed against the person or the property—sex and acquisition." But what meaning can we ascribe to crimes of sex in terms of a neuraxis conceived apart from the gonads? What significance have crimes against property, or the steps taken by society to prevent them, if we regard the neuraxis in isolation from the pituitary and adrenal glands?—the former intimately associated, as it is, with the disposition of self-assertion, and the latter, as Cannon has shown, with the dispositions of self-preservation, attack and defence. Further, if the neuraxis is physiologically meaningless in isolation from the rest of the body, it has even less meaning when divorced from psychological processes. Antisocial reactions are completely unintelligible in terms of brain cells alone. They can only be adequately understood if we introduce the psychological conceptions of instinct, motive, and purpose. The crime of rape is not simply the failure of a few pyramidal cells to inhibit the functions of the infragranular cortex; it is also the behaviour of an organism whose sexual impulses have not been subordinated to the social sentiments in the process of development. Of these two ways of conceiving it the latter is the more significant and the more fruitful. If, then, we are seeking a real functional entity on which to base a comprehensive science of human behaviour, whether normal or abnormal, there is only one such entity to be found—the entity which behaves, and this is nothing short of the human psycho-physical organism.

II. Since the functional entity in all behaviour is the psycho-physical organism, it follows that neither physiology nor psychology, nor any other science that considers but one aspect of the organism, can claim to offer a comprehensive study of either normal or abnormal reactions. In actuality no such unifying science exists; if it did, it would partake of the nature of biology. Doubtless such a science will eventually be elaborated; but in the meantime there are insufficient data for this establishment. Such data can only be accumulated at the present stage of knowledge by allowing the various biological sciences to work unrestrictedly in their own fields, and to compare their various findings with one another. This being so, division of the field between the various special sciences is not a matter for regret. On the contrary, the advance of modern knowledge has been characterized by a multiplication of partial sciences. Only by restriction of the

field can advance in knowledge take place. The history of science is the history of the birth of new sciences. The finitude of the human mind necessitates increasing specialization as knowledge accumulates. Even two thousand years ago it was only possible for Aristotle to cover the whole ground of human knowledge because he was the greatest genius in history. To-day it would be impossible even for him to compass the field of human behaviour, which, for purposes of study, is divided between various partial sciences. Comprehensive study of human reactions is not to be obtained by substituting for the individual sciences, like neurology and psychology, one single science, but by correlating the results of individual sciences with one another. The study of mental abnormality is therefore most likely to be furthered by allowing physiology, neurology, psychiatry, psychology, and other biological sciences to pursue their own goals independently, and by then attempting to relate the various results obtained in each field with one another. To attempt to obtain comprehensiveness in the study of mental abnormality by allowing the physiology of the nervous system to usurp the fields of the other biological sciences would be a procedure at once retrograde and barren of results. To devote a laboratory to such an attempt would be of little value to the community.

III. Assuming that the various sciences capable of throwing light upon the problems of mental abnormality are to be allowed to proceed unrestricted in their own fields, we must be careful to see that the various fields are properly delimited and the boundaries between them accurately drawn; otherwise clarity of thought is impossible, and confusion is the inevitable outcome. An allocation of the field such as that which Professor Berry believes to exist at the present day is above all to be avoided. If the boundaries were actually drawn where he believes them to be drawn there would be some justification for his advocacy of the physiology of the neuraxis as final arbiter in questions of abnormal human reactions. Fortunately the fields are not delimited in the manner which he represents. According to Professor Berry, neurology concerns itself with the receptor and effector neurons of the neuraxis, and psychology and psychiatry concern themselves with the internuncial neurons in their normal and abnormal aspects respectively. The unifying science whose cause he pleads would, on the other hand, concern itself with the whole neuraxis as a functional entity. The science which concerns itself with the neuraxis as a whole is, of course, the physiology of the nervous system. As regards the other sciences concerned, the boundaries are in reality drawn as follows. Neurology restricts its outlook, for clinical reasons, in two respects: it restricts itself to the neuraxis in isolation from the rest of the organism, and it further restricts itself to the consideration of the neuraxis in its anatomical aspects so far as these are affected by disease. Psychology takes as its subject matter not the internuncial neurons, but the psycho-physical organism as a whole. It restricts itself, however, to one aspect (not *part*) of the organism—namely, the normal behaviour of the organism so far as that can be interpreted in terms of mental process. Psychiatry resembles psychology in concerning itself with the behaviour of the organism interpreted in terms of mental process, but, being a clinical science, it has a narrower field, and, for practical reasons, restricts itself further to such abnormal behaviour as indicates a gross lack of adaptation to reality. Physiology (which, so far as it is neurological, Professor Berry would set up as *the* comprehensive science) resembles psychology in that it adopts as its subject matter the behaviour of the whole organism, but it differs from psychology in excluding those aspects of human behaviour which can be interpreted in terms of mental process, and restricting itself to those aspects which can be interpreted in physical and chemical terms only. Within the boundaries indicated each of the sciences concerned is entitled to complete autonomy, and is justified in attempting to push its conclusions as far as they can be carried without inconsistency. Any attempt, however, on the part of one of these sciences to usurp the field belonging to another is to be resisted in the interests of consistency and clarity of thought. To claim for the physiology of the nervous system the right to annex or even to establish a protectorate for the charge of the genuine science is to make a claim which will not bear examination. Any laboratory for the comprehensive study of mental abnormality which may be established in the future must therefore be prepared to admit to its precincts every science which is able to

make a significant contribution to the solution of the problems of the subject.

IV. Lastly, attention must be drawn to the futility of any scheme for the study of mental abnormality which fails to recognize the claims of the psychological sciences. There is an unfortunate tendency in some medical circles to depreciate the psychological in the interests of the physiological sciences. Since modern medicine is based upon physiology it is easy to see how this tendency arises, but the result is an unnecessary impoverishment of medicine. The belief that the first place to seek for mental abnormality is the cells of the cerebral cortex appears to be bound up with wrong conceptions of the provinces of the various sciences such as have already been discussed. It is, of course, quite legitimate for the physiologist to seek a solution of the problems of mental abnormality in terms of the cells of the cerebral cortex, if such a solution is consistent with other physiological facts; but it is equally legitimate for the psychological sciences to seek a solution of these problems in terms of mental processes. Both attempts are legitimate; but a survey of the last twenty-five years suggests that the remarkable advance which has taken place in the understanding of mental abnormality during that period has derived its impetus mainly from the side of the psychological sciences. Certain contributions have undoubtedly been made by neurological physiologists. The work of Pavlov and his followers may be cited as evidence of work in the physiological field which has thrown light upon the problems of human reactions, and theories of the psycho-neuroses have been elaborated which make the "conditioned reflex" the basis of their explanations; but the conception of conditioned reflexes only explains human conduct in a superficial way, and, in any case, it really offers no explanations that have not already been elaborated in terms of psychological conceptions. The work of Pierre Janet and Henry Head might also be legitimately cited as having received its inspiration from the direction of neurological physiology. The great value of Janet's conception of dissociation and of Head's work upon the problems of sensation and of aphasia is indisputable, but it is a question how far this is not to be attributed to the fact of their bringing psychological conceptions to bear upon the problems before them. This is particularly noticeable in the case of Head's researches on aphasia, which have thrown a flood of light upon a field rendered barren and obscure by a succession of workers dealing with narrow anatomical and physiological ideas. In the case of Janet the influence of psychological conceptions is also noteworthy, and the further interesting fact appears that not only the value, but the limitations, of the dissociation theory depend upon his psychological ideas. The limits of Janet's views are the limits of his sensationist psychology. It is the abandonment of sensationist psychology and the adoption of a dynamic psychology that has led in recent years to such advance in the understanding of mental abnormality. For this application of dynamic psychology to the facts of mental abnormality credit is mainly due to the psycho-analytic school.

The liability to errors, which an attempt to understand human behaviour purely in terms of brain cells involves, may be illustrated by a statement in Professor Berry's paper. Discussing the effect of environmental stimuli upon brain growth, he says:

"If, for example, the acoustic exteroceptive stimuli be completely cut off, the child becomes a deaf-mute, with a thinner acoustic cortex and a correspondingly diminished general intelligence."

In this statement it is assumed that a failure of development of the acoustic cortex necessarily implies a corresponding diminution of general intelligence. This is just the sort of assumption to which an exclusive preoccupation with "brain cells" is liable to lead. It may be true, or it may not be true, but proof or disproof of such assumptions is only possible when the psychologist is permitted to produce his evidence also.

Reference may here be made to an investigation of the general intelligence of deaf-mute children which is at present being conducted at the George Combe Psychological Laboratory of Edinburgh University by Dr. Drever and his workers. Though the results of this investigation are still incomplete, and thus not available for publication, those so far obtained would seem to emphasize the surprisingly slight degree to which the general intelligence

of deaf-mutes is affected by their disability. Mental defect is certainly not a feature of deaf-mutism, though mental defectives naturally occur among deaf-mutes as they do among hearing children. As judged by the performance tests used in this investigation (language tests being impossible), the deaf children scored remarkably high; they proved to be retarded by less than one year of mental age, as compared with a control group of hearing children. In view of the enormous disability which a deaf-mute suffers both as regards deprivation of valuable cortex and loss of the main channel for the acquisition of human knowledge, it is a striking fact that his general intelligence should seem to be so little affected. At any rate, the results of such investigations indicate the danger of pronouncing upon questions of mental reactions, normal or abnormal, if brain cells alone are studied and psychological factors neglected.

Many instances could be quoted of problems for which consistent explanations of a psychological nature have been offered, but upon which the study of the supragranular cortex can throw little light. What explanation can be offered in terms of brain cells for the fact that a hysterical patient suffers from, for example, a fear of open places; an obsessional case from, for example, a compulsion to wash his hands every time he touches a door-handle; and a paranoiac from a delusion of persecution? Perhaps all depends upon which part of the supragranular cortex is affected by some hypothetical pathological process; but no one knows what the pathological process is, which neurons are affected, or what connexion there is between these hypothetical lesions and the symptoms. Any explanation of this sort is completely barren. Yet, for the differences between the symptoms of hysteria, obsessional neurosis, and paranoia psychological explanations have been offered which, whatever criticisms may be passed upon them, introduce order and intelligibility into a difficult and obscure field.

In conclusion, the hope may be expressed that, when the national laboratory for the study of mental abnormality comes to be founded, it will be founded upon a basis broader than the study of the neuraxis and its neurons. Moreover, every precaution ought to be taken to provide facilities for the inclusion of every science that is capable of throwing light upon the problems at issue—not excluding the physiology of the nervous system. It is in the hope that Professor Berry's most valuable suggestion for a national laboratory to study mental abnormality may not be prejudiced by too narrow a conception of its functions that the above observations are submitted to the medical profession.

New Zealand.

[FROM OUR OWN CORRESPONDENT.]

Hospitals and Preferential Treatment of Friendly Societies.

THE public hospitals in New Zealand are not voluntary hospitals; they are supported financially mainly by Government taxes and local rates, and are "nationalized." The larger hospitals, however, have honorary staffs. The cost of treatment in hospital averages at least 17s. a day, but adult patients are charged usually 9s. a day, although only a small proportion meet their obligations. So many bad debts are incurred that as a matter of expediency hospital boards are contracting with friendly societies—better known as lodges—for a flat rate for lodge members of 4s. 6d. a day for adults and half that sum for children. This and similar arrangements are contrary to the principle, apparently now outworn, that patients are admitted into public hospitals only because they are ill and because they are not able to pay for private medical attention and nursing. It would appear that lodges are able to bargain for discounts because of their great numerical strength. The lodges object to their surgeons sending members into hospital when they might be treated at home, but members of the honorary staffs receive no remuneration for treating these patients in hospital, and the taxpayers and ratepayers feel the strain. The sick and funeral funds of the combined lodges in New Zealand in one year have shown a surplus of nearly £200,000. In the year 1925, the last for which

the records are complete, the accumulated capital of the friendly societies in New Zealand was £3,136,237, an average per member of over £34.

Iron Starvation in Ruminants.

A deficiency disease of special interest, and commonly known as "bush sickness," has been successfully investigated, chiefly by Mr. B. C. Aston, head of the chemical division of the Department of Agriculture. This disease has been proved to be non-transmissible, occurring in ruminant stock only when pastured on certain land on the central volcanic plateau of the North Island of New Zealand. The soil affected has been formed from pumice deposited from air and not from water. An analysis of the blood of an animal in an advanced stage of the disease shows a great deficiency of iron, but the animal can be restored to health by being given Parrish's syrup or iron and ammonium citrate, or the pastures may be top-dressed with sulphate of iron. A non-ruminant, such as a horse, may continue healthy for many years on the same food and water on which a cow will sicken and die in from six to nine months. An official report on the subject states: "The pasture is composed chiefly of red and white clovers and cocksfoot. Animals taken away for a change to healthy country and then brought back still in poor store condition may now be fattened on the pasture upon which they originally became sick. The bones of an animal dead of bush sickness show no signs of malnutrition. The facts indicate that the disease cannot be referred to chronic poisoning, and that a deficiency in some essential element in the food is the real cause. The abundance of clovers and the excellence of the diseased animal's bones preclude the possibility that the bone-forming elements, calcium and phosphorus, are deficient in the pasture. Feeding tests have eliminated all other essential elements except iron, which is found to be abnormally low in the affected soils, and in the pasture grown on them."

Post-graduate Training for Nurses.

A post-graduate course for nurses, of six months' duration, for which a diploma will be issued, has been recently established by the Department of Health in conjunction with the University and the Wellington Hospital. Various hospital boards are awarding bursaries to enable nurses to attend the course, on condition that they enter into a bond to return to the service of the boards for a stated period. The course is intended for nurses who have completed three years' training in a general hospital and are registered in New Zealand. Its object is to prepare nurses to fill positions as administrators, tutor sisters, ward sisters, and public health nurses, and it includes principles of education and methods of teaching.

India.

Cholera in the Punjab.

ALTHOUGH there were only 87 deaths from cholera in the Punjab during 1926, as compared with 3,049 in the preceding year, some interesting details in connexion with this disease are reported by Lieut.-Colonel W. H. C. Forster, I.M.S., director of public health for the Province, in his annual report. In the first place, since there were no imported cases an estimate was obtained of the cholera possibilities latent in the Punjab itself. It was noticeable that the incidence of cases during the year was scattered about the Province, and did not follow the line of infection customary in the case of epidemics which have so frequently followed the entrance into the Punjab of infected persons from Hardwar. The small total mortality is held to supply further proof of the rule enunciated by Colonel Forster—that cholera and plague are not epidemic in the same year. Since the cholera season begins in April, when plague is at its maximum, the rule gives a convenient and reliable basis on which to forecast the occurrence of cholera in non-epidemic form. Thus, in 1926, plague was severely epidemic and the occurrence of cholera was