BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 24 1951

PSYCHIATRY OF CEREBRAL DISEASES*

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The title of this paper is a challenge to the psychiatry of eighty to a hundred years ago and to the old materialistic medicine. At that time every mental disease was supposed to be a cerebral disease. This older point of view was particularly stressed by Griesinger, in Zurich, ninety years ago. He felt quite certain that psychoses without cerebral pathology did not exist, but there were some psychoses the cerebral pathology of which had not been investigated as yet.

If I speak of the psychiatry of cerebral diseases, and if I separate it from the psychiatry of diseases with intact cerebral structure, I have no intention of taking part in a philosophical discussion on the relation of mind and body. I approve, of course, of the modern concept of psychosomatic medicine, which considers both—structure and function, body and mind—as equivalent and inseparable expressions of life itself. My paper, however, is not based on theoretical and controversial philosophies. It is based on the concrete and certain fact that up to the present day we have had to deal on the one side with mental diseases which have a cerebral pathology, and on the other side with mental diseases which, so far as our present knowledge goes, do not. It is also based on the conviction that for practical, diagnostic, and therapeutic reasons it is good to consider the differences of psychopathology of the mental conditions with and without cerebral pathology. In this modest unphilosophical sense we are allowed to speak to-day of the psychiatry of cerebral diseases.

Until the beginning of this century most brain pathologists were psychopathologists, and the reverse was equally true. Since then increasing specialization in medicine has gone far in separating brain pathology and psychopathology. The progress of our knowledge in regard to the correlation between psychopathology and brain pathology has been hindered to a regrettable extent as a result of this separation. We must become conscious of the fact that modern medicine is in need of better and more detailed knowledge of the psychiatry of cerebral diseases. It is handicapped in its progress by the neglect of this discipline by two generations of psychiatrists.

Diagnostic Aims in Psychopathology

The importance of the above statement may be demonstrated by a few examples.

* Lecture given at the National Hospital, Queen Square, London, on February 13, 1951.

The progress of medicine, of neurosurgery, and of antibiotic therapy in particular has given a tremendous practical value to the early diagnosis of brain diseases. Psychopathological alterations are one of the earliest and most important signs of brain diseases. Understood in the right way, they are of the greatest diagnostic importance. There exists, however, in modern psychiatry a marked tendency to undervalue the psychopathological diagnosis. It is a sound reaction to the unsound habit of earlier psychiatrists of building up nosological systems on a mere speculative basis, and of busying themselves with the differential diagnosis of unnatural and hypothetical disease entities in which there was no practical sense.

The sound tendency, however, to break with a speculative psychopathological diagnosis must not lead to the neglect of the real diagnostic values of psychopathology. If the psychopathological study of a patient can demonstrate whether he is suffering from a brain disease or not, psychopathological findings cannot be ignored. In many cases they will prove to be even more important than neurological, pneumoencephalographic, electro-encephalographic, or spinal fluid findings. I feel that it is one of the important tasks of psychiatry to teach the psychopathological differential diagnosis between mental derangements with and without brain pathology. We are still in need of much more research work in order to simplify and improve the principles of such a differential diagnosis.

The question whether the cerebral localization theory, which was proved to be so useful in neurology, can be applied to psychopathology has often been discussed theoretically—with exiguous results. Many prominent psychiatrists have renounced any further consideration of this difficult question. The dramatic emergence of psychosurgery within the last twelve years, however, demonstrates the practical importance of such a question. Faced with the possibility of treating mental diseases by artificial localized cerebral lesions, we ought to study the effect of localized brain lesions more thoroughly. As the technique of brain surgery improves, our patients and we ourselves want to know what can be done with such an improved technique. Our patients are threatened with all kinds of useless surgical trials if we do not co-operate in studying these questions with modern methods.

There is still another point. The progress of our knowledge of the physiology of the adrenals and the

teachings of Selye regarding the adaptation syndrome have stressed the importance of endocrinological psychiatry. There seem to be few endocrinopathological syndromes, however, which cannot be elicited by lesions of the nervous system. Vice versa, endocrinological derangements have constant functional effects on the nervous system, and probably at times even structural ones. The interrelationship of neurological and endocrinological functional and structural systems is close and warrants a consideration of the psychiatry of endocrinological and cerebral psychopathology at the same time.

The adaptation syndrome can be provoked by both physical and mental stress; it leads to endocrinological, emotional, and neurological sequelae. Even in animals the nervous system is involved together with the endocrine system in the reaction to stress. The nervous influence is even more differentiated and important in man. The new working hypothesis of medicine, in connexion with the discovery of the adaptation syndrome, is in need of a synthesis of the psychopathology of endocrine and cerebral functions.

These examples may suffice to demonstrate the urgent need to consider again the neglected psychiatry of brain diseases. In the near future we should come to definite and generally acknowledged conclusions in regard to fundamental questions, such as: What is the role of the psychopathological findings in the diagnosis of cerebral diseases? What is the psychopathology of acute and chronic, of general and localized, brain lesions? What is the interrelationship of cerebral and endocrinological psychiatry?

I wish to present first some recent research work done at our Zurich Clinic. Then I shall try to formulate a working hypothesis in regard to some fundamental and primary questions of the psychiatry of cerebral diseases.

Psychopathology of Brain Tumours

The first study I want to mention concerns the psychopathology of brain tumours. This study has been carried out by Wanner (1950), Walther (1951), and Blickestorfer (1951). It is different from many former studies of brain tumours, because they did not look for their cases in psychiatric hospitals; they considered every case which had been admitted to the Zurich Neurosurgical Clinic, quite independently of the presence or absence of any mental derangement. They have made a very thorough personal study of 67 tumour patients, in whom the exact pathology had been established by operation or at necropsy. They studied 600 further tumour patients on the basis of the routine psychiatric examination. Special attention was paid to the premorbid personality. In 121 unselected cases a systematic genealogical investigation was carried out and 1,380 close relatives of the tumour cases were studied. We got for the first time an exact family picture of tumour cases with different psychopathological findings and could compare them with each other and with the family picture of patients with functional psychoses.

Of the 600 tumour patients 70% had psychopathological derangements and 30% were not psychologically altered.

The first interesting finding concerns the fact that most of the psychopathological pictures are very uniform. There is no such variety of clinical pictures as is suggested by a part of the literature. These studies show

clearly that the literature has often selected the rare, exceptional, and puzzling psychopathological pictures. The older literature does not sufficiently stress the fact that most tumour patients with mental symptoms—namely, 83%—always display the same two psychopathological syndromes: a *clouding of consciousness* in the acute episodes and an *amnesic syndrome* in the chronic stages.

Clouding of Consciousness and the Amnesic Syndrome

Clouding of consciousness was present at times in 37% of the tumour cases with psychopathological findings. Most frequently we have to deal only with very mild forms. The patients are somewhat sleepy and indifferent, attention cannot be fixed in a normal degree, and mood is frequently changed without psychological reasons. Under stress or in an active stage of the tumour, these mild changes pass over into somnolence, more severe twilight states, delirious states, or coma. As a rule, they revert after a rest to the former condition if the underlying somatic condition is not progressive.

A chronic amnesic syndrome is observed in 38% of the tumour cases with psychopathological findings (the same frequency as the acute alterations of consciousness). "Amnesic syndrome" is, of course, a poor label for the syndrome in question. It is true that the impairment of retention and of memory (involving recent events more than remote ones) are important symptoms. However, the old name gives the impression that amnesic symptoms are the only or the most important ones. This is not the case. The whole personality is impaired, not only the memory and retention. There is damage to the train of thought; the number of ideas on which the patient relies in his arguing becomes scanty; intellectual processes are influenced in too high a degree by moods and impulses; concepts become vague and generalized; or the patient grasps only a single detail of a situation, neglecting other important ones. There is also a tendency to perseveration, to confabulation, and to increased fatigability. The emotions become too labile, and responsive only to what is readily understood. Furthermore, there is a general loss of interest combined with a diminished ability to deal with a variety of ideas and observations.

In its insufficient comprehensiveness, therefore, "amnesic syndrome" is a misnomer; but there is no better generally accepted name. Some schools use the term "Korsakoff syndrome"; but this is confusing, too, because what Korsakoff described 64 years ago is quite another nosological conception. Forty years ago our Clinic called this syndrome "psycho-organic syndrome"; this was at a time when it was not known that many other organically caused psychosyndromes existed. For this reason the term is not a good one. The same is true of the term "chronic organic reaction type." It is regrettable that this organically caused, frequent, and important syndrome, familiar to every psychiatrist, does not have a generally intelligible name. The lack of a generally accepted name contributes to the difficulties in mutual understanding between different psychiatric schools.

Clouding of consciousness in brain-tumour patients—leading in the severe cases to somnolence, delirious states, or to coma—as a syndrome fits into the acute exogenous reaction type of Bonhoeffer or into the acute organic reaction type, as English authors have called it.

It is of the same nature as the cloudiness, somnolence, delirium, and coma in cases of concussion, of brain intoxication, or of severely impaired cerebral blood circulation. It is, on the other hand, quite different in nature from acute schizophrenic, manic-depressive, or hysterical episodes or of other acute mental conditions without organic cerebral derangement.

A similar statement holds true, of course, for the amnesic syndrome: it is no different in chronic tumour cases from what it is in other forms of chronic diffuse cerebral damage, such as chronic alcoholism, other chronic intoxications, the simple form of general paresis, senile and arteriosclerotic dementia, etc. On the other hand, the amnesic syndrome of brain-tumour cases is entirely different in kind from the syndromes in chronic mental diseases without known cerebral pathology, such as, particularly, schizophrenic deterioration or a neurotic personality development. We come to the conclusion that *the psychopathology of the great majority of mental derangements in tumour cases is characteristic of an acute or chronic mental condition of cerebral origin, but is not characteristic of brain tumour as such*. It is similar to mental conditions due to other cerebral diseases.

Neither clouding of consciousness nor the amnesic psychosyndrome is specific for brain lesions of any particular localization. This holds true in our material for brain tumours: both syndromes are found with tumours of all localizations, and the differences in the frequency with which they are shown with tumours of one part of the brain or another are slight and statistically not significant.

We must face the fact, therefore, that clouding of consciousness and the amnesic syndrome, which comprise 83% of the mental alterations due to brain tumour, have no meaning in regard to the locality of the tumour.

Symptomatic Epilepsy and the So-called Frontal Psychosyndrome

What about the remaining psychopathological syndromes in brain-tumour cases?

The third mental condition, much less common than the two just mentioned, is a symptomatic epilepsy. General convulsions or petit mal occurred in 8% of the 600 tumour cases. In regard to epilepsy, our study reveals only what has been known for a long time: epileptic seizures may complicate nearly all brain tumours in almost any site. There is, however, a difference in frequency in different localizations; they are rare in cerebellar tumours and most frequent in the tumours of the parietal and temporal lobes.

A clear-cut so-called frontal psychosyndrome occurred in our material only three times. (It is characterized by a change in impulsiveness and of mood, without real defects of memory or intellect; the impulsiveness can be diminished and dullness can prevail, with slowness of intellectual processes; on the other hand, the mood can be elated, with the tendency to make silly puns and jokes; in any case, there is an impairment of more differentiated interests, of morality, tact, and social responsibility.) In all three cases it was associated, as expected, with a frontal tumour. This small number, however, is not conclusive. In other series of patients I have often found a psychosyndrome similar to the frontal psychosyndrome, although there was no frontal lesion, but brain damage in another locality—for in-

stance, a diencephalic lesion. The so-called frontal syndrome is, according to my experience, not characteristic of a frontal lesion, but occurs also in most other brain lesions if they are localized.

The uncinate fits and dreamy states described by Jackson seem to be more reliable regarding localization. They occurred 17 times among our 600 tumour cases, mostly with temporal localization; but we have also observed characteristic fits and dreamy states in one case of frontal tumour. The most reliable localizing sign seems to be real sleeping spells (which have to be clearly distinguished from mere sleepiness). They occurred six times in our material; in each case the tumour had damaged the hypothalamus or the brain stem in its neighbourhood.

Symptoms which have a definite localizing significance are, of course, aphasia, apraxia, and agnosia, which occurred in nearly 10% of our patients. They are, however, more of a neurological than a psychological nature.

These observations make it clear that the psychosyndrome in brain tumour is in most cases independent of the locality of the tumour. In less than 5% of the cases—namely, in those with sleeping spells and uncinate fits—has the psychopathology a fairly reliable significance regarding localization. Epileptic fits and the so-called frontal psychosyndrome give a hint, but only an unreliable one.

Non-organic Syndromes

Symptoms of a non-organic nature—schizophrenic, manic-depressive, hysterical, or neurotic pictures—are very rare in tumour cases, apart from those which have been selected from mental hospitals. They occurred in less than 5% of our material. In this respect the literature, which describes depressions or so-called symptomatic schizophrenia and other seemingly functional states in brain tumours, is unrepresentative.

The small number of non-organic syndromes in our material of unselected brain tumours demonstrates that our present psychopathological knowledge is exact enough to differentiate in a great number of cases troubles of neuropathological origin from those without neuropathology. But what is the nature of the rare schizophrenic or manic-depressive pictures in brain tumours? A study of genetics has answered this question. Among the relatives of tumour cases with schizophrenic symptomatology are many more schizophrenics and schizoids than in the average population; and, likewise, among the relatives of tumour cases with manic or depressive symptomatology are many more manic or depressive patients. It will also often be found that tumour patients with schizophrenic or depressive symptomatology displayed schizophrenic or depressive episodes long before a brain tumour developed. The families of tumour patients with cloudiness or with the amnesic syndrome, on the other hand, have exactly the same incidence of psychoses as the average population.

The genetic studies therefore reveal two facts: the brain tumour does not cause manic-depressive or schizophrenic reactions, but clear-cut organic reactions; it may, however, be complicated by schizophrenic or depressive reactions which have to a large degree other than neurological causes.

We further considered why cloudiness or the amnesic syndrome occurs in more than half of the tumour cases

but not in the remainder. With regard to the cloudy states, these are closely connected with the speed of growth of the tumour, with intracranial pressure, and with the general physical condition of the patient. This statement is much less true for the amnesic syndrome. The frequency of that syndrome was found to depend mostly on the patient's age. The amnesic syndrome never occurred in tumour cases in children and in adolescents under 20 years; and in patients aged 20-40 it occurred in only 3.5%. On the other hand, it occurred in 36% of the cases in the age group 40-60 and in 57% of the cases over 70.

Some Questions and Answers

The present state of our knowledge of the psychiatry of brain tumours permits of definite answers to definite questions from the neurosurgeon.

1. What is the meaning of the psychopathological findings regarding diagnosis of brain tumours?—*Answer*: They permit, if present, of a fairly certain diagnosis of the presence of an abnormal process in the brain, but do not help to answer the question whether this brain process is a tumour or not.

2. Do the psychopathological findings permit diagnostic conclusions to be made regarding the locality of a brain tumour?—*Answer*: As a rule they do not; in only a very small minority of cases may the psychopathological findings give an uncertain hint of its locality.

3. Do the psychological findings allow diagnostic conclusions to be made regarding the intracranial pressure?—*Answer*: Cloudiness, twilight states, somnolence, and coma are fairly regular sequelae of increasing or very high intracranial pressure; the same mental conditions, however, might also be caused by other complications of the brain tumour, such as general cachexia, circulatory disturbances, etc.

4. What is the diagnostic meaning of schizophrenic, manic-depressive, or neurotic pictures without psycho-organic features in suspected or certain brain tumours?—*Answer*: They are highly dependent upon non-cerebral causes, and allow no diagnostic conclusions to be made in regard to the existence, the locality, or the nature of a brain tumour.

Objections can be made against any attempt to draw more general conclusions. It is hard to decide, for instance, whether the mental symptoms in a tumour case are due to the localized damage, to the effect of the tumour on the circulation, to the water metabolism of the whole brain, or to the intracranial pressure. We greatly need to study many varied cerebral diseases of another kind. In our clinic we have particularly studied Friedreich's disease, myotonic dystrophy, chronic cerebral intoxications, cerebral forms of leukaemic diseases, and different pituitary diseases. We have also tried to arrive at a survey of the very wide literature. Recent experience of psychosurgery, the knowledge of which has been so wonderfully elucidated by English authors, plays a particularly important part.

Psychopathology of Cerebral Disease

What are the factors which determine the psychopathological picture of any cerebral disease? There have to be considered the quality, the extent, the locality, and the speed of the cerebral disease; the physiological functions involved, like the circulation, the pressure, the metabolism; then the constitution and the momentary disposition as well as the psychodynamic development

of the patient. Some of these factors have been overemphasized for long periods, while others were neglected.

The quality of the somatic process has been over-emphasized by many older psychiatric schools. They believed in well-circumscribed disease entities. It was thought that a specific kind of damage (for instance, a specific infection) leads to a specific somatic lesion which is accompanied by a specific psychopathological picture. Such a conception goes back to the old French school of Pinel and Esquirol, who were greatly influenced by Linnaeus's *Systema Naturae*. As Linnaeus had succeeded in grouping the plants and animals in species, an attempt was made to group psychopathological phenomena in definite disease entities. The nosology of Kraepelin was based on such a speculative conception.

We nowadays ought to realize that there are no specific disease entities and no combinations of specific symptoms with specific pathological processes. Senile dementia may show exactly the same psychopathology as an alcoholic deterioration, a simple form of general paresis, a post-commotional state, or a leukaemic disease with cerebral damage in an older man. The psychopathology of delirium tremens, which has been spoken of as a specific alcoholic psychosis, can be found in exactly the same form in a delirium caused, for instance, by psychotonic amines. I have observed it both in mescaline and in methylamphetamine intoxication. The so-called classic picture of general paresis is by no means characteristic of luetic encephalitis, as was believed by two or three generations of psychiatrists.

Everyone agrees to-day that other forms of general paresis, which are no more specific in their psychopathology, are much more frequent in general paresis than the classic manic form. Though less often mentioned, the contrary is also true: nowadays, as general paresis has become rarer, a great number of the cases with the typical textbook psychopathology of the manic general paresis are not due to general paresis. We have found a so-called parietic symptomatology in brain tumours, in Huntington's disease, in cerebral arteriosclerosis, etc. In our clinic more than half of the cases with a classic mental picture of manic general paresis have no paresis. It would be easy to give further examples demonstrating that it is time to drop the old belief in the existence of mental disease entities which regularly and exclusively accompany one specific physical disease. Each time, however, that a new pathological cerebral process becomes known much work is done in vain to determine a specific psychopathology. This was true, for instance, when the cerebral forms of Buerger's disease were described.

The speed factor has always been recognized as very important in the psychopathology of a cerebral process. Since the time of Bonhoeffer a distinction has been made between the acute and the chronic organic (or exogenous) reaction types. The difference is indeed obvious. In the more severe acute organic reaction types consciousness is affected and somnolence, coma, and delirious and cloudy states are frequent. The different amnesic symptoms, as observed in the chronic reaction types, also often appear in the acute types; but they are very varied in degree, coming and disappearing, and show even less correlation between each other than in the chronic states. In some cases, however, an acute Korsakoff psychosis (as caused, for instance, by a brain contusion) might be very similar in its manifestations

to a chronic Korsakoff psychosis. I have nothing essential to add to the well-known distinction between acute and chronic organic reaction types.

I would point out, however, that on the basis of our modern knowledge the influence of the localization of a brain lesion on the psychopathological picture should be considered in a somewhat different way from what is usual. There has been a tendency to underestimate the importance of the simple distinction between a diffuse brain process and a strictly localized one; on the other hand, the tendency to correlate a specific psychopathology with the exact localization of a brain lesion has certainly been overstressed.

Diffuse Brain Lesions

We still do not know for certain whether the different symptoms of the amnesic syndrome have anything to do with localization in the brain. There is much evidence that the amnesic syndrome generally is the expression of a very diffuse brain damage and has not much connexion with any particular localization.

We find diffuse brain damage in nearly all cases of amnesic psychosyndrome, and vice versa. I never could be convinced by such theories as those of Gamper and Gruenthal, who attribute the amnesic syndrome to a lesion of the corpora mammillaria. I think that the anatomical evidence is far from proving any dependence of the amnesic syndrome on a localized lesion. I also feel that the newer approaches to psychopathology have demonstrated that the amnesic syndrome is produced by an alteration of the whole personality in the sense of the *Gestalt* psychology and not by a sum of independent symptoms. It might seem to be possible to explain a single symptom such as a memory defect by a localized defect. It is hard to conceive, on the other hand, that such a general deterioration affecting the whole intellectual and emotional life and every single psychological reaction should be due to circumscribed brain damage extending over such a small area. Henri Ey has recently pointed out how much both the pathological and the psychological knowledge of modern times make it probable that the general personality deterioration which is seen in the amnesic syndrome is a sequel to damage to brain function as a whole. Our knowledge is not sufficient to formulate definite laws, but the present working hypothesis *should regard the amnesic syndrome as the manifestation of a diffuse chronic brain process.*

So far as we know, the psychopathological results of *circumscribed cerebral lesions* differ very much from those of diffuse brain lesions; they lead to alteration of the emotional response, to apathy, or to general irritability; they also can extinguish or strengthen one or another impulse, instinct, or interest, such as hunger, thirst, sexuality, aggressiveness, etc. They disturb the harmony between the different instincts; there are, for instance, quite often sudden uncontrolled moods or impulses which dominate the whole personality for a short while. On the other hand, there are no amnesic symptoms in localized brain diseases, and the patient's powers of judgment seem to be disturbed only by the emotional changes and not by primary intellectual damage.

Three Fundamental Reaction Types

We have therefore to deal with three fundamental reaction types to cerebral diseases: (1) the acute organic

or exogenous reaction type; (2) the amnesic reaction type or the psychopathology of diffuse chronic cerebral lesion; and (3) the reaction type to chronic localized cerebral lesion.

The reason why the conception of a somewhat uniform type of reaction to chronic localized cerebral lesions has not been acknowledged in its diagnostic and theoretical importance is evident: for decades it was assumed that disease in a specific locality of the brain caused a specific psychopathology. It is amusing to study historically how the concepts of a frontal, a diencephalic, a temporal, etc., psychopathology were formed. The frontal psychosyndrome, for instance, was not named in this way on the basis of observations demonstrating that it is different from the psychosyndrome of brain-stem lesions. On the contrary, the psychopathology of frontal lesions was described on the speculative assumption that it had to be quite different from the psychopathology of any other localized brain lesion.

It is much more difficult to separate different psychosyndromes in different brain localizations than to separate different neurological syndromes. If we compare the two main psychosyndromes of local cerebral lesions—the frontal and the stem syndrome—we realize how similar they are and how difficult it is to distinguish them. Both lead to changes of emotions, of mood, of impulses and instinct, and any psychic symptom of the one can also be found in the other. It may be true that the identification of the frontal patient with his emotional changes goes much further than in the brain-stem patient. The frontal patient will often find his mental state quite natural, and is inclined to blame the environment and not his disease for his social difficulties; the post-encephalic patient, on the other hand, frequently realizes that he is under a morbid influence which is alien to his original personality, and he might call his emotional symptoms morbid and even compulsive. But nobody would dare to give a differential diagnosis of frontal or brain-stem lesions on the basis of the subjective attitude to the mental changes.

There is a common frame into which all the psychosyndromes observed in chronic localized brain lesions fit very well. Their similarities are more important than their dissimilarities, so far as they are known to-day. The existence of different psychosyndromes in different localized brain lesions can be overstressed; and it is well to work with the conception of one psychosyndrome in localized chronic brain lesions of any kind.

Even within the three fundamental syndromes of organic reaction types there are marked differences from case to case. To what are they due? There is much evidence to show that they depend to a large degree on the personal constitution. The family pictures of organic reaction types with schizophrenic or affective or neurotic colouring are statistically proved to be similar to the family pictures of schizophrenic, affective, or neurotic patients. We also found very interesting examples which demonstrated the pathoplastic influence of constitution: we found, for instance, extremely similar psychoses in brain tumour of quite different localization in siblings. Other studies concern the psychodynamics of organic reactions. If one knows thoroughly the personality of organic mental patients—formerly a matter of little interest—one will be excited to find how clearly the personality, with its conscious and unconscious impulses and fears and wishes, is projected in the morbid symptomatology.

The Age Factor

Another factor with an important influence on the organic psychopathology, and one which has been much neglected, is the age of the patient. I have mentioned before that in tumour cases memory for the recent past is much more often damaged in old than in young age groups. We studied the influence of age on the frequency of the amnesic syndromes also in other diseases, such as intoxications, head injuries, epilepsy, Friedreich's disease, and so on, and came to similar conclusions. Lutz, the chief of our children's department, has followed the question in children. Amnesic syndromes are extremely rare in children. If the child's memory is affected, for instance after a head injury, the impairment concerns the remote memory and not retention and recent memory. It looks as if a diffuse brain damage just increased the physiological peculiarities of memory. In the child the memory for remote events is normally very poor, while for the recent ones it is excellent.

Brain damage exaggerates this difference. The opposite is true for older people. Age, however, is not the only factor which influences the frequency of the amnesic syndrome. There are rare cases of severe brain damage in old people without the amnesic syndrome and even rarer cases of the syndrome in childhood. There must be factors in the genesis of the amnesic syndrome which are still unknown.

Summarizing a working hypothesis in regard to the present state of organic psychiatry, I should therefore point out that we cannot believe any longer in the conception of Kraepelin and the old French schools, which tried to discover specific psychopathologies for special brain lesions. We cannot explain the mental symptomatology of cerebral diseases by considering their locality alone, as Gall, Meynert, Wernicke, and, later, Kleist tried to do. So far as is known, the psychopathology of cerebral disease is dependent to a large extent on (1) whether the brain disease is of a chronic or an acute nature; and (2) whether it affects the whole brain or a part of it. It is reasonable to distinguish three large psychopathological patterns or psychosyndromes: the acute organic syndrome, the chronic psychosyndrome due to a diffuse cerebral lesion, and the chronic psychosyndrome due to a localized cerebral lesion. The psychopathology of brain disease is further influenced by the age of the patient, his constitutional background, and his psychodynamics.

Such a conception not only seems to simplify the description of organic pathology but it is also useful in diagnosis and gives some hints for therapeutic research. It points out, for instance, that study of localization may perhaps be not the only research approach for further progress in psychosurgery. It seems to me that we are also much in need of studies on the extent to which the results of psychosurgery depend upon individual constitution and psychodynamic factors.

Endocrine Psychodynamics

For ten years now the endocrine psychosyndromes have been the favourite field of my personal research. The mental pictures of endocrine diseases depend much less upon the kind of gland affected than is generally supposed. It is true, of course, that many specific endocrine lesions have fairly regular emotional sequelae; as a rule, the sexual impulse is diminished by castration, and general activity is increased in hyper-

thyroidism and diminished in hypothyroidism, etc. However, even these rules are not without frequent exceptions. Many English authors, for instance, have stressed that hypothyroidism may be accompanied by other than the usual hypothyroid mental symptoms; hyperthyroidism may cause stupor, and castration may not diminish the sexual impulse, etc.

In pituitary and adrenocortical diseases the lack of co-ordination of the physical disease and its mental symptomatology is quite striking. The psychopathology of acromegaly and that of Cushing's disease are in many ways similar. It is even more surprising that the psychopathology of Cushing's syndrome and that of Addison's disease are by no means contradictory, but rather similar. In short, we have to deal with a similar independence of the psychosymptomatology of the localization in both endocrine and cerebral disease. In both cases constitution, psychodynamics, and other factors have an important influence on the psychopathology.

The general pattern of the chronic endocrine psychosyndromes is identical with that of the chronic psychosyndromes in localized cerebral lesions. As a matter of fact, there hardly exists any endocrine mental syndrome which cannot be observed also as a sequel to a localized brain lesion, and vice versa. This fact is in complete harmony with the common physiological knowledge that the endocrinological and nervous functions are dependent on each other. Parts of the endocrine system and parts of the nervous system form functional units. The final psychological effect is the same, whether such a functional unit is damaged in its endocrine or in its nervous aspects. It even seems to happen often that a lesion in the nervous system leads to a functional or even anatomical lesion in the endocrine system, and vice versa.

I feel that the knowledge of the interrelationship of psychosyndromes of endocrine origin and those of localized cerebral origin may give rise to interesting speculations. Psychosurgery may have resemblances to endocrine therapy. It is indeed curious to note how much, for instance, the development of an acromegaly is accompanied by exactly the same mental changes as those we observe in some patients after leucotomy. Surgery of the brain may in some cases be replaced by intervention at the endocrine level.

There is yet another aspect of the facts I have mentioned: a close interrelationship between emotional stress situations and endocrine functions. This has been known for a long time to hold true for Graves's disease, for instance, and has been displayed from a new angle by the doctrine of the adaptation syndrome. It seems, however, that endocrine changes lead to functional and structural nervous changes, and vice versa. The knowledge of the close interrelationship of cerebral and endocrine mental syndromes opens wide vistas in psychosomatic medicine. Endocrine function seems to be a bridge between the psychological stress situations and definite circumscribed cerebral functions and structures. Those considerations are, of course, still mere speculations, which might lead to illusions. They demonstrate, however, the interest which further clinical study of the psychopathology of organic diseases deserves.

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