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HEREDITY AND CONSTITUTION IN THE AETIOLOGY OF PSYCHIC DISORDERS*

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The significance of heredity and constitution in psychic diseases is not limited to those groups of mental disorders which, in the narrower sense, are usually termed "hereditary diseases," but reaches far beyond them. Conversely, the diversity of causes in hereditary diseases is by no means exhausted by what we call heredity and constitution.

The Three Main Groups of Psychoses

Let us, to begin with, concentrate on these hereditary diseases in the narrower sense of the term—that is to say, mainly on the three main groups of the manic-depressive, the schizophrenic, and the epileptic diseases. If in these cases we base our investigations only on the psychoses themselves, then the genetical tables will be reminiscent of completion-test texts. We find strong evidence of the workings of heredity; we find psychoses of a similar nature repeatedly cropping up in family trees. But that alone does not suffice to explain why they take their particular position in the tables, why they appear in one place and disappear in another. An essential advance in our knowledge has been due to the fact that these psychoses are not inherited intermittently as an isolated special factor by themselves, but that the relations between the various cases of psychosis in a family can, to a certain extent, become discernible, phenotypically, as variations of the personality. To-day, therefore, we no longer study hereditary diseases merely under the aspect of the relations of psychosis to psychosis, but to an ever-growing extent within the great framework of the psycho-physical constitution as a whole, thus bringing personality and psychosis into close relationship.

We had, first of all, ascertained that subjects who develop schizophrenia, manic-depressive disturbances, or epilepsy have no random psychic make-up. In fact, each of these hereditary diseases develops on the foundation of certain personalities and families of a definite coloration. These families have a larger proportion of personalities of a peculiar shade who, without being ill themselves, do exhibit a biological make-up, both in bodily characteristics and in the finer traits of character and temperament, which approaches the characteristics of personality we find in mental invalids. According to their classification in their respective hereditary diseases we term them schizoid, cycloid, or epileptoid psychopathies. Thus each of these hereditary diseases is surrounded by a sphere of certain specifically characteristic hereditary constitutions and characters. Once these constitutions have been recognized the hereditary diseases no longer appear as chance phenomena. A complicated network of relations is unfolded before us which leads from certain healthy temperaments through certain nervous and psychopathic forms of con-

stitution, and on to the gravest forms of hereditary diseases. Within this network one may regard the hereditary diseases proper as points of utmost concentration of a specifically directed form of degeneration. Thus, lastly, the hereditary diseases do not spring only from the propagation of those afflicted by them, but probably to a far greater extent through the medium of schizoid, cycloid, and epileptoid kin, and through combinations of inheritance. There are two ways of visualizing this genesis: either as a strong accumulation of homogeneous factors, as occurs in inbreeding (for instance, in the single or repeated mating of highly schizoid partners), or by way of an endogenous or exogenous lesion, in itself uncharacteristic, which is added to such a combination, whereupon at this genetic stage the hereditary disease is developed which is appropriate to the constitutional make-up of the particular family—that is to say, in an epileptoid family epilepsy, in a schizoid family schizophrenia, and so on. This latter form of origin is the more probable.

Physique and its Relation to Temperament

With these first principles well established we next proceed to make a more exact study of the forms of human constitution, including healthy subjects. As it happens, one can dispense with the intermediate link of the hereditary diseases altogether, and simply investigate the forms of human physique in direct relation to their psychology and their types of physiological responses. We then discover that the temperaments which we had termed "cyclothyme," after our primary survey of the hereditary manic-depressive disorders, are simply the normal temperaments of people with pyknosomatic physique, whilst the schizothyme temperaments occur in the first place in the leptosomatic types. The temperaments of athleticosomatics actually show some affinity with certain personality types in the epileptic group, to which they contribute a considerable contingent, but a uniform relationship cannot be directly established. Such temperaments can, however, be well differentiated and described in a direct manner in healthy subjects. We have termed the temperaments of the athleticosomatics viscous temperaments. Many smaller physique-groups also have their temperamental characteristics—for instance, the eunuchoid type, the pituitary type, and the infantile type, to whose relation to the hysterical group we shall refer later. The three main normal temperament groups, which have been differentiated in accordance with their physical habitus, lend themselves to direct observation and to methods of investigation by questionnaire, but especially to the experimental psychological approach. Thus one arrives at certain simple psychological building-stones of the structure of human personality which, for the moment, cannot be further reduced, and which correspond

* One of three lectures given at the Tavistock Clinic in April.

with physique. We call these "radical forms of the personality." We are now working with these radicals, to which we are beginning to reduce the temperamental types and from which, again, the great temperamental groups can be correspondingly built up.

Diagnosis of the Endogenous Psychoses

If we now pass from the general biological approach to the consideration of special psychopathological problems we find that the diagnostics of the endogenous psychoses are beginning to be considerably transformed in the light of these recently acquired additions to our knowledge. However, the three principal types of hereditary psychic disease, the schizophrenic, manic-depressive, and epileptic, are retained as before. In fact they become paradigms of certain fundamental hereditary characteristics in the human personality which obtain equally in the realm of normal biology.

But as soon as we consider clinical diagnostics in particular we find that the three great morbid clinical pictures, in their present very comprehensive form, contain extremely heterogeneous elements. If, for example, a pyknosomatic subject develops a schizophrenia-like psychosis his schizophrenia will on the whole differ essentially from the schizophrenia of a leptosomatic. Usually it will have a differently coloured semeiology, a different age of onset, and a different development and prognosis. The pyknosomatic who happens to trespass into the schizophrenic field usually develops his illness later in life and exhibits more periodic or paranoid forms, which are less destructive to the personality. Further, the prognosis in his case is altogether more favourable. The athleticosomatic, eunuchoid, obese, and other types also exhibit specific varieties of schizophrenia.

In the light of constitutional biology even so simple a picture as that of depression reveals a rich abundance of heterogeneous patterns. When a schizoid personality develops a depressive state then its coloration, its more subtle psychological structure, its accompanying bodily symptoms, tempo, and curve of development, differ so widely from those occurring in a cyclothyme-pyknosomatic subject that one almost shrinks from describing both by the term "depression." In this case, in fact, the common term may serve to obscure rather than illuminate the issue. In any case nowadays one can hardly bring oneself to include a melancholia which is overloaded with schizoid constitutional features in the manic-depressive group if the term "circular," or "manic-depressive," is to retain any true biological meaning.

So when we now study the relation between constitution and hereditary disease we shall no longer—as formerly of necessity—concern ourselves purely statistically with the relative correspondence; for instance, of leptosomatic physique or athleticosomatic physique with schizophrenic, manic-depressive, or epileptic psychosis. As it happens, even these summary statistics, computed from the international material of numerous research workers and covering over 8,000 cases, reveal a clear and positive correlation. But the degree of disparity in the results of the various investigators hardly tends to point to genuine discrepancies in their material, but rather to reveal how many or how few heterogeneous factors bearing on psychosis the various investigators have included in their clinical diagnoses, which may be perfectly correct according to older psychiatric standards.

However, we can now venture to reconstruct the system of hereditary psychic disorders step by step, analysing their finer structure under the aspect of

psychophysical constitutional biology. This diagnostic method, which is based on true constitutional biology and which at the same time takes stock of exogenous causal factors, is of course far more complicated. It leads to a larger number of overlapping types and subgroups, but both prognostically and therapeutically it is much more reliable and successful.

This new psychiatric approach to the problem of hereditary mental disorders, which is influenced by constitutional-biological considerations, is of far-reaching significance to pure science, characterology, and clinical diagnosis; it also affects the prognostic and therapeutic aspects of clinical psychiatry. From the point of view of eugenics, in its negative (that is, its eliminatory) aspects, this extension of our knowledge of constitution does not materially affect our fundamental position—namely, that as a rule the carriers of serious hereditary disorders, both in their own interests and in those of society, should have no offspring. This principle holds good whether we choose to classify hereditary diseases under a few main heads (as did Kräpelin), or whether we prefer to differentiate them more thoroughly with the aid of constitutional biology. For more subtle eugenic problems, however, especially when we are called upon to advise both the healthy and those who exhibit psychopathic traits either in their person or their inheritance as to suitable marital partners and the likelihood of their producing healthy stock, our knowledge of constitutional biology cannot be sufficiently thorough and detailed. Great tasks are yet awaiting us in this field, and constitutional biology will be called upon to play a decisive part.

Exogenous Contributory Factors

Our approach is still further widened owing to the fact that in dealing with inherited disorders we need to consider not only inheritance itself (although it is admittedly the chief causal factor, which therefore rightly governs our practical outlook in matters of eugenics), but also the various exogenous contributory causes, which may be reactive, infective, or toxic; endocrine factors must also be borne in mind. For if only 1 per cent. of the total causality is lacking, then the psychosis will not manifest phenotypically; and the subject of morbid inheritance will remain a latent carrier throughout his life. This "multidimensional" approach has its greatest bearings on therapeutics. As clinicians we no longer regard hereditary diseases in individual cases as the working of inexorable fate. If we tackle the contributory causes, such as have been mentioned above, a psychosis often lends itself to cure. These considerations are supported not only by clinical experience but also by theoretical genetics, as, for example, Luxemburger's work on the occurrence of schizophrenia in monozygotic twins, carried out at the Rüdin Institute.

Clinical observation shows us that even so simple a psychiatric picture as depression occurs only in a minority of cases solely as a result of hereditary factors comparable to the ringing of an alarm clock which is mechanically set to go off at a certain time. Even in cases of powerful morbid inheritance many contributory causes are, as a rule, required to bring the depressive predisposition to the surface. There are, for example, certain infectious diseases, such as ordinary influenza, which can activate depression in predisposed subjects. The weather, and ordinary climatic conditions, may give rise to violent shifts of mood; a southern gale can depress persons with certain constitutions to the verge of suicide. There are people who can only live in certain climates, who in other climates are continually subject to depression.

Incidentally, similar phenomena occur in the field of epilepsy. There are epileptoids who develop tropical frenzy on their first oversea trip and who from then onwards exhibit episodic disturbances of consciousness even at home. People with the depressive predisposition are especially susceptible to endocrine fluctuations. The climacteric releases a variety of depressive states; an appropriate endocrine treatment may remove them. Many women become depressed in pregnancy or parturition, and sometimes only in such circumstances. In early cerebral arteriosclerosis many pyknosomatic cyclothymes exhibit depressions which can be counteracted by vascular remedies. Powerful experiences and reactive causes may lead to depressions, especially when they occur coincidentally with physically determined depressive factors in a person who is constitutionally predisposed thereto. As the result of this refinement of the analysis of the causal factors in every variety of depression, which we owe to the multidimensional approach, and the consequent attempt to tackle causes therapeutically, the group of depressions which may be regarded as purely endogenous has diminished progressively. Strictly speaking, there is no antinomy and no defined borderline between hereditary and exogenous depressions; actually the various causes overlap to such an extent that one should often speak only of "mainly endogenous" or "mainly reactive" depressions. The evaluation of hereditary factors must, however, be taken into account whenever eugenic as opposed to simple therapeutic issues are involved.

Overlapping of Hereditary and Exogenous Causes

In epilepsy this overlapping of hereditary and exogenous causes is even more in evidence, and the role of severe external insults, such as cerebral trauma or alcohol, in the origin of epileptic fits is uncontested. Besides, reactive factors, psychophysical exhaustion, and endocrine disorders are by no means without importance in certain kinds of epilepsy. Here, again, one must beware of too sharp a distinction between "genuine" and "symptomatic" epilepsy. Even in the genuine cases "multidimensional" release mechanisms can frequently be traced; and, conversely, hereditary factors often contribute to the epilepsy following severe head injuries.

The hereditary factor is probably most important in schizophrenia; but even here Luxemburger's work on monozygotic twins points to the existence of contributory exogenous causal factors, apart from heredity, in about one-fourth of all cases. This aspect of the causal factors becomes far more complicated when we examine the border-zone of schizophrenia—for example, puerperal and infective psychoses with schizophrenic features or, on the psychogenic side, the so-called "schizophrenic reaction type." So far as the psychic causes are concerned it is worth noting that by no means all psychic traumata are equally likely to release psychoses in persons with a schizophrenic make-up. Thus the effect of factors threatening life—fright, fear, strain—is small on schizoid constitutions; otherwise one would have observed an enormous rise in schizophrenia during the war, which was by no means the case. Schizoids are comparatively immune from all these groups of experiences; probably this is in some way connected with their natural disposition towards a stoical attitude to life. On the other hand certain schizoid constitutions are highly susceptible to erotic and ecstatic religious influences. I have occasionally observed the acute onset of katatonia in which the religious note was consistently sounded immediately following revival meetings. Similarly, there exists what one might term "engagement-katatonia," which may follow

on intense erotic experiences of an ambivalent nature. It is noteworthy that these two types of experience may not only release acute katatonia but they also still further reveal the deep psychology of many schizophrenics. Both are closely interrelated, so that love thoughts may at a certain degree of intensity suddenly turn into religious ideas, or religious ecstasy may stimulate and inform an erotic experience.

If we consider all these clinical facts in relation to the release of certain psychic-reactive and also toxic-infective cases of schizophrenia we find that they fit in well with the results of genetical research and that the secondary causes, which according to research on twins we must hold responsible for a substantial number of schizophrenic cases, are actually accessible to careful clinical observation.

A twofold task for psychic hygiene follows from these considerations. The first and foremost is to prevent by way of eugenics the inheritance of endogenous psychoses. But where this method fails the psychosis in the life of the hereditarily tainted individual can frequently be prevented from later appearance by prophylaxis; or it can be cured after its appearance if we devote careful study to the variety of the causal factors which, together with inheritance, are responsible for the onset of an unequivocal psychosis.

The Exogenous Psychoses

But if we want to realize the significance of constitution and heredity in its full scope we must turn for a moment to the seemingly opposite end of the scale of the psychic disorders—namely, the *exogenous* psychoses. In such disorders, which can be exemplified by general paralysis and alcoholic psychosis, a non-hereditary, non-constitutional noxa enters the organism from without and is unquestionably the main cause of the illness. Is the inherited constitution negligible in these cases? And can the many variations in the clinical picture and their mode of progress be explained simply by exogenous determinants—for instance, by the existence of different varieties of spirochaete? According to our more recent investigations this is definitely not the case. The hereditary constitution plays a considerable part, too, in disorders that primarily are determined exogenously, not only in the production of semeiological nuances but also by affecting the whole progress of the disease. For general paralysis and puerperal psychosis this fact has been established by my collaborators Westphal and Römer, and for alcoholic psychosis by Pohlisch.

In dealing with the alcoholic psychoses Pohlisch mainly stressed the constitutional differences found in those suffering from delirium tremens and alcoholic hallucinosis. These varying clinical forms are by no means due to different varieties of alcohol; they represent different types, different constitutions, which develop delirium or hallucinosis as the case may be. Among the deliriantes no fewer than 55 per cent. were found to be pyknosomatic and 64 per cent. were temperamentally markedly cyclothyme; only 1.8 per cent. showed asthenic physique, and only 3 per cent. were temperamentally schizothyme. With hallucinosis the ratio was reversed: schizoid temperaments were clearly predominant (almost three-fourths of all causes). Correspondingly, the delirium tremens series contained many socially well-adapted, efficient individuals without personal or hereditary character defects. Patients suffering from alcoholic hallucinosis, on the other hand, were frequently of the unstable, asocial, and nervous type—not far removed from schizophrenics.

Similarly it is probable that the alcoholic disorders which occur in persons with the epileptoid constitution could be shown to link up with epileptic psychosis proper.

It is important to realize in this connexion that the constitutional factor in the exogenous psychosis does not merely effect a slight variation of the symptomatic picture in accordance with the patient's personal peculiarities—this would follow as a matter of course—but that it is an essential determining factor in the very structure of the psychosis, a factor which does not merely colour the symptomatic picture but which determines the whole course and termination of the disease. The psychological reasons for taking to drink vary in accordance with a person's constitution; the alcoholic disorder with which he is faced is correspondingly different, and the prognosis is different. These considerations also affect our approach to the biological and eugenic aspects of alcoholism. Since, according to Pohlisch, alcoholic delirium, in contrast to the other alcoholic psychoses, seldom occurs as a familial disorder and frequently crops up in constitutionally healthy individuals, it should be regarded as of less serious import than the other psychoses when we are called upon to advise in matrimonial problems.

Influence of the Constitution

Constitution plays no less important a part in the determination of the reactive neuropsychoses, psychogenic conditions, psychoneuroses, hysteria, obsessional neurosis, and paranoid states. Although we are frequently able to cure them by psychotherapy we must never forget that successful psychotherapy just as often depends on problems of personality-structure as on experience and environment. The structure of personality is in its essence constitutional and inherited. In our treatment we exert a formative influence on it. Often external experience is not so much the real cause of a neurosis; it is rather a flame which ignites the inner typologically determined mass of conflicts within the personality. Practical psychotherapy has shown us that in the origin of the neuroses definite constitutional elements play a part—for instance, minor developmental arrests, especially those occurring during puberty and in the immediate post-pubertal period.

In hysteria, for example, the constitutional predisposition is by no means limited to what is generally termed "nervousness." Certainly all hysterics exhibit autonomic nervous anomalies; their reflex and semi-reflex reactions are highly labile and are easily deflected. But this is not the whole story so far as the specific hysterical predisposition is concerned: there are innumerable people with a labile autonomic nervous system, but few necessarily consult a doctor, and among them only a small number are hysterics.

Furthermore, in hysterics our methods of investigation reveal a mass of minute constitutional sexual anomalies which, if we regard the personality in cross-section as it were, appear as stigmata at the level of physique and character. These anomalies are perhaps even more conspicuous if we regard the personality, so to speak, lengthwise—that is, as a life curve—when they become clearly apparent as developmental checks and uneven rhythms in the pubertal and post-pubertal periods. It is these anomalies which form the other half of the constitutional predisposition to hysteria mentioned above. It is noteworthy, however, that extreme degrees of developmental arrests such as are associated with endocrine disorders and generalized infantilism do not as a rule give rise to hysteria; the more usual resultant picture is one of more generalized psychological inferiority uncomplicated by psychic conflicts. However, it is these *partial* "infantil-

isms" and "juvenilisms" which give rise to endopsychic tension and ambivalence and prepare the way for conflict formation, in that they weaken a person's resistance to the effects of traumatic experiences and situations.

These constitutionally predetermined irregularities of development are apt to lead to conflicts with the outside world and its demands that cannot be resolved in the way in which a normally constituted individual would take them—that is, in his stride. Hence the constitution creates its own conflicts in relation to experience, to which it then, in turn, reacts pathologically. Here again the diagnosis of inherited predisposition in neurosis by no means impedes our practical work and our therapeutic success. On the contrary, it increases our ability to recognize the chief foci of endopsychic conflict and the means by which they can be overcome. So far as mental hygiene is concerned prophylaxis by means of eugenic measures applies less to the neuroses. On the other hand, the recognition of the constitutional elements in psychogenic disorders offers wide possibilities for prophylactic treatment by way of the medical-educational training of the personality.

THE PHYSIOLOGICAL BASES OF NUTRITION *

BY

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It would not be fantastic to claim the greater parts of the fields of biochemistry, physiology, pathology, and clinical medicine as the legitimate province of the modern science of nutrition. As our knowledge of fundamental living processes increases, it can be seen more and more clearly how chemical and physical changes are not only responsible for determining the normal physical development and the maintenance of the organism in a state of equilibrium with its environment, but are equally associated with those special reactions to environmental stimuli which we recognize as signs of diseased states. This well-recognized conception implies that development, the maintenance of health, and the disturbance of health depend on the orderly or disorderly function of metabolic processes which can legitimately be held to imply, respectively, perfect or imperfect states of nutrition. It is conceivable, or rather probable, that with further advances in knowledge most of the diseased states which we now recognize will be definable in terms of definite disturbances of metabolism or nutrition. The scope of the B.M.A. Section of Nutrition would under these conditions be wide enough to cover a large part of the field of medicine; and indeed it is already capable of so doing, as the President of this Section was able to prove for us in his opening address last year. For practical convenience, however, at the present time it seems politic to limit the sphere of our interest mainly to those nutritional processes which are known to be more or less directly related to the intake or absorption of food. In regard to the subject under discussion to-day, for example, it would be within the scope of the title to include the physiology of respiration and excretion, muscular exercise, personal hygiene, and so on. Actually all the formal contributions to this discussion will be concerned with dietary constituents and their contribution to nutrition.

* Read in opening a discussion in the Section of Nutrition at the Annual Meeting of the British Medical Association, Belfast, 1937.