Part II.—Reviews.

Der Aufbau des Organismus: Einführung in die Biologie unter besonderer Berücksichtigung der Erfahrungen am kranken Menschen. By KURT GOLDSTEIN. The Hague, 1934.

In this book, written during the leisure forced upon him by his expulsion from Germany, Goldstein has collected the ideas already expressed in his publications since the Great War and extended them systematically into a general biology. We have here an original structure of thought, the importance of which for the biology of the future can hardly be overestimated.

By founding his biological ideas on observations obtained from the sick patient—as the sub-title indicates—Goldstein has deliberately chosen an opposite direction to that which proceeds from the more simple form of life to the more complicated. He starts with man, and tries to approach the understanding of life from its highest form. No conception, he says, has become more problematic to him in the course of his studies than the idea of simplicity. Man is the living being we understand best. Observation and analysis of experience of disease processes may sometimes furnish better insight into the activities of the organism than observation of the normal. There is no difference in principle between observation of disease processes and experimental studies, since experiment and disease are equally interferences with the normal processes of life. Thus, as we shall see later, the conception of illness plays a paramount part in Goldstein's ideas. But he does not confine himself to the consideration of morbid events; these serve him rather as a background for the reality and "essence" (*Wesen*) of the living organism.

At the start, the author lays the foundation for his biological thought by discussing observations on brain injuries. He criticizes the artificiality of the common conception of symptoms and the too easy assumption of defects. "Symptoms are answers which the organism gives according to the questions asked by the investigator." The latter, however, has generally framed his questions according to theories which have been introduced prematurely and taken over from heterogeneous fields. Thus a theoretically limited selection has been made of the manifold phenomena to be investigated. One sees that Goldstein's, as every new doctrine, claims freedom from theoretical prejudices. Like many others, he also denies others the value of testing by results, and stresses the importance of observing the way in which they are produced and the total situation which leads to them.

Goldstein holds that there is a "general fundamental disturbance of function" alike in principle in all cerebral lesions—a conclusion similar to that arrived at by several other modern authors. As a general formulation he proposes that "the patient has lost the ability to deal with the possible and the imaginable, as opposed to the actual and real. The process of disorganization is shown first in the more differentiated and more exact (elaborate) performances and leads to a more amorphous general behaviour". Last to

be destroyed are the functions of greatest value for the continued existence of the organism. There are in this connection two scales of value, harmoniously interwoven in the normal: there are functions which have a value for mere existence, and others which are valued by the organism as being the very essence of its individuality. In the sick patient functions having only the latter value are destroyed early.

Of fundamental importance for the understanding of Goldstein's ideas is the contrast he draws between "ordered" and "catastrophic" behaviour (*geordnetes und katastrophales Verhalten*). Ordered behaviour is characterized by constancy, by right adaptation to circumstances (*Richtigkeit*), adequacy and congruity in the make-up of the individual. In the reduced state of disease the organism makes more or less efficient attempts to keep this up in order to avoid the catastrophic reaction. The latter was first observed and described by Goldstein in cerebral lesions, and is now applied to similar modes of behaviour throughout the living world. Catastrophic reaction means psychic and somatic concussion, produced when the limit of individual capacity is passed and there is inability to fulfil what is required; subjectively it is felt as helplessness, constraint, want of freedom and anxiety (*Angst*). When the catastrophic reaction has taken place, ordered behaviour is hindered for some time by its after-effect, and the fit passes into a state of bewilderment and total inactivity.

This very important tendency of the sick organism to seek to avoid catastrophic reactions explains numerous features in the behaviour of patients with brain injuries. They exhibit a search for quiet, for regular and monotonous occupation on a small scale; they avoid all experiments and new experiences; they are afraid of emptiness, e.g., in space; they tend to narrow their environment. All this is done and completed without deliberation or effort of will. The patient's remaining energy is re-distributed according to certain laws, one of which is that total performance is preserved even at the expense of loss of partial functions.

This review of the first chapter of Goldstein's book would be misleading if it gave the impression of an enumeration of new conceptions and laws of disintegration. On the contrary, everything is derived from concrete observation of patients. Thus this part of the book, which contains the origin of Goldstein's biology and his doctrine in a nutshell, is of interest and importance to neurologists and psychiatrists.

It is followed by an attack on the doctrine which conceives of the organism as a structure of reflexes. Similar attacks are familiar in theoretical biology to-day. Goldstein's criticisms are directed in the first place to the theories which introduce higher secondary factors in order to explain direction in the interaction of reflexes (Sherrington, Weiss, Uexküll, Bethe). After having demonstrated that such assumptions are unsatisfactory, he gives succinctly his own view of the function of the nervous system. According to him the nervous system of man is a network, like that of the lowest animals; in other words, it is an apparatus always working as a whole. It never rests, but is in a state of permanent excitation. Every stimulus is followed by a change of the distribution of excitation in the whole system.

The stimulus provokes a reaction at a certain topos; but in addition to this "near effect" (*Nahewirkung*), changes in distant parts occur. Both together produce the "figure-ground formation". The more precise the *Gestalt* formation required, the more difficult it is. Definite anatomical structures are adapted to definite stimuli—at least in higher animals; consequently there is, for instance, with the special sense organs and their central

connections, a functional " near effect " besides the local effect in its stricter sense. Anatomical structure is important for the distribution of energy, but less so than the stimulus itself and the total situation of the organism at the outset (*Ausgangs-situation*). An essential condition of a normal functioning of the organism is that it shall be able to equalize the effect of the initial stimulus and to maintain itself in equilibrium.

If there is a lesion, the functions of the central nervous system are entirely altered. The next chapter is devoted to the analysis of these modified functions. Chiefly, the effort of " isolation " leads to unselected responsiveness to stimuli, lack of differentiation, abnormal topical distribution of the excitation, and " lability " of the reactions (i.e., uncertainty and fluctuation in figure-ground formation). Goldstein thinks that traces of all these abnormal types of reaction can be demonstrated in the normal, but that they show themselves unmistakably only in the presence of a lesion. With the aid of this concept of " isolation ", Goldstein builds up a new conception of the partial functions, especially the reflexes : " The special qualities and characteristics of the reflexes can be explained as consequences of formal changes in the course of the excitation in isolated parts of the system." Thus the reflex is not a scientific abstraction, but a special response of definite meaning to the whole organism. It must be understood in the situation in which it occurs. It is a reaction to danger, particularly to the danger of " catastrophe ". Imminence of " catastrophe " causes isolation of separate parts of the system and local reflex defence reaction. These, however, are unusual events, and can never lead to an understanding of the normal.

The diagnostic value of reflexes is not contested, but only regarded as a result of empirically established correlations. Light is thrown on some methodological points in considering the nature of reflex behaviour, e.g., the difference in essence between movements of flexion and extension of striped muscle and phasic reactions symptomatic of breakdown in the central connections, e.g., nystagmus. Finally, the author points out the unproductiveness of all theories involving negative factors like " disinhibition ". There is nothing negative in nature. " Cognition dealing with factors is always positive in character."

In a similar way the author discusses shortly " conditioned reflexes ", " phenomena in cortical stimulation ", " instincts " and " biochemistry " as partial aspects of the organism. But it is just these apparent digressions which lead to the most voluminous chapter of the book, in which the theory of the organism as a whole (*Ganzheitstheorie des Organismus*) is systematically worked out.

Goldstein rounds off his theory with illustrations of all these fundamental ideas from the normal and abnormal physiology of men and animals. He stresses the point that the changes in the whole by which every stimulus is accompanied have nothing to do with " irradiation ". This spreading-out of similar effects, beyond the special place concerned, is a rare and quite unnatural happening. The changes in the whole differ from the changes on the spot ; but one is related to the other and they form a firmly joined unity. How this unity is built up and what the factors are which bind it together are important questions which the author tries to answer here. The significance of the stimulus to the organism in the momentary situation is decisive in the development of the unity and its special content. Consequently the effect of a stimulus is different if the significance changes. All interference from outside leads to modifications which again depend on this essential significance.

Only one performance is possible at the same moment of time because of the participation of the whole organism in every event. Goldstein shows that this theory throws light on observations which were inexplicable as long as they were thought of in terms of reflexes.

In regard to the circumstances in which activity in parts can happen, he adds to the two cases already mentioned (experiments and disease) the deliberate "isolations" intentionally produced in psychological experiments in men. This seems rather remarkable in view of his relation to *Gestalt* psychology, with which he has had and still has some association, though he detaches himself from it in a later chapter of this work.

The idea of the relative independence of activity from the anatomical structure is also further developed. Experiments of transplantation and extirpation of extremities in animals, which have been so much discussed in recent biological writings, prove the preponderance of function over structure in significance to the whole organism. These results are applied to similar events in the psycho-physiology of man. The application of this principle to the problem of cortical localization appears as a natural development at this point. This takes us back to one of the starting-points of Goldstein's biology: he gives a clear account of his views on cerebral localization, already well known from numerous previous papers. The differentiation between the "central" and "peripheral" part of the cortex is treated in full. Only in the latter can the relation between the focus and the specific disturbance be established. Lesions in the central parts are always followed by a general disturbance which is demonstrable in every other function of the organism. "Localization of a function means, not merely excitation of a certain focus, but a dynamic event which affects the whole nervous system, even the whole organism, and has a definite Gestalt in every performance. The focus gives this Gestalt of excitation a peculiarity which is expressed in the figure-formation. The focus has by virtue of its special structure its own characteristic influence on the activity of the whole."

Finally, the specificity of the senses, as far as they are connected with special peripheral apparatus, is discussed from the new viewpoint. Even these sensory events are formations of the whole organism, and the interaction between different senses is demonstrated by striking examples. That there are specific functions and structures is not denied; but specificity only arises out of the activity of the whole.

The fact of antagonistic innervation seems especially difficult to bring into accordance with Goldstein's views. He thinks that, in so far as it occurs at all, it is artificially and experimentally produced. The activities of the voluntary muscles and the vegetative nervous system which have been interpreted on the assumption of antagonistic innervation are explicable as "whole" effects. Concepts like "inhibition" or "regulation" are losing their value as explanations. Alternative forms of reaction and phasic changes "belong, however, to the normal activities of life". But Goldstein considers them as signs of slight "catastrophe reactions" which are unavoidable in adaptation to the environment.

Surprisingly enough, this chapter is concluded by a broad discussion on the "phenomenon of anxiety". The central position of anxiety in Goldstein's theory is closely connected with the importance he lays on the "catastrophic reaction". Anxiety is the subjective and, by virtue of its somatic manifestations, the objective expression of the collapse of the personal world and ego. While the sick man tries to find ways of avoiding the "catastrophe reaction",

the normal man has to face the threat of catastrophe courageously ; in doing so he realizes his essential nature by creative activities.

This is followed by a short discussion of the psycho-somatic problem, and an extensive criticism of psychoanalysis and its relations to biology. The conceptions of psychic and somatic are —as Goldstein thinks—only modes of view which, however justified, are only material if one regards the reaction of the organism as a whole. The general biological laws hold for both. In the discussion of psychoanalysis the separation of conscious and subconscious and the overwhelming influence of one part (sexual theories) on the whole are sharply criticized. Goldstein refers in this connection to the types of isolated part-reactions which he finds in children's behaviour. This isolation only disappears during development as centralization increases. The great difference between Goldstein and Freud seems to the reviewer to lie in Goldstein's positive valuation of consciousness. He emphasizes the importance of consciousness in the finest and most differentiated reactions. He estimates highly " the special qualities which the human being has obtained by the possibility of being conscious ". By this reasoning he not only takes up a position contrary to Freud, but also separates himself from all biological romanticists, like Klages, who attempts to discredit the conscious mind (*Geist*) by putting vital forces in the foreground.

Eventually Goldstein tries to elucidate and to characterize the " essential nature " of the organism. This is—as we have heard—the guiding factor in the reactions of the whole, and is at the same time realized in these reactions.

In order to approach this central conception Goldstein uses observations on " preferred " behaviour (*ausgezeichnetes Verhalten*) which he published some years ago. The organism does not carry out all those activities which would be possible were one merely to consider its isolated parts. It has a tendency to prefer definite modes of behaviour, either in perception or movement or attitude. Subjectively the " non-preferred " behaviour is accompanied by feelings of " not right ", " disagreeable ", " unsatisfactory ", " difficult ", etc. The organism wants to return to a different, quite definite behaviour. Goldstein considers this in numerous examples of sensory and motor behaviour, especially in connection with vestibular functions. This leads up to the assumption of certain constants which determine the essential nature of the individual. In a time constant (this is more or less equivalent to a " personal tempo ") he sees one of the distinguishing characteristics of personality. Besides individual constants he distinguishes similar constants for the species.

To avoid extending this survey to an inordinate length it seems better not to discuss the later, merely philosophical chapters of the book in full. The first of them deals with the epistemological foundation of the theory (" The Nature of the Biological Cognition ') ; two others deal with special applications and general conclusions (on " normality ", " health and disease ", " heredity and breeding ", " life and mind ", " the hierarchical structure of living beings ", " on man and animal "). The latter chapters express the author's convictions on a variety of subjects, and are of great personal charm. The final chapters, " On *Gestalt* Psychology and the Doctrine of Physical *Gestalt* ", and " Cognition and Action ", contain limitations and safeguards of the theory without adding anything really new.

Yet this survey of titles may give some impression of what a comprehensive work of thought has been inspired here by medical experience. The book is

full of stimulating ideas and every biologist who finds time to think about the fundamental basis and aims of his work will have to come to terms with it.

W. MAYER-GROSS.

Die Seelenstörungen der Blutdruckkranken: Beiträge zur psychiatrischen Alterspathologie und zu einer "Psychiatrie auf pathophysiologischer Grundlage". By E. KRAPF. Wien, 1936. Pp. 120.

The distinction between arterial hypertension and arteriosclerosis, which has been generally recognized in general medicine, is scarcely mentioned in the psychiatric literature. The author of the present monograph has rightly noticed the importance of this subject, and tries to apply this advance to psychiatry.

His investigations are based on extensive material. He worked through not only the admission of arteriosclerotic, presenile and senile psychoses to the Munich Psychiatric Clinic, but also a great number of other cases of psychoses commencing after the forty-fifth year. Finally he made use of those cases diagnosed post-mortem as having been definitely hypertonic during life.

A short review of the actual German conception of hypertension disease is followed by a detailed descriptive clinical section. The psychic disorders of patients suffering from high blood-pressure are classified in four main groups:

(1) Short attacks of unconsciousness or deep clouding of consciousness.

(2) Short lasting exogenous psychoses with deep clouding of consciousness.

(3) Homonymous disturbances (depressions with or without additional features and of very varying duration).

(4) Permanent change of personality sometimes forming the background for episodic disturbances.

A particular section deals with the differential diagnosis of psychic disorders in hypertonics and in climacterics, presenile, seniles and arteriosclerotics. One can, in fact, hardly speak of the differential diagnosis, as the author tries to show the hypertonic features in all these diseases. In particular, Kraepelin's presenile psychosis is to a large extent very similar clinically to the cases investigated by Krapf.

Evidently the author's interest is concentrated on what happens in the brain, especially in its circulatory system, during these hypertonic mental disorders. This cannot be observed by biopsy in man, nor can post-mortem examination give a direct explanation of this occurrence. Therefore the author tenders "circumstantial evidence" of the existence and the pathogenetic importance of functional circulatory disturbances. These, however, can only explain that there are cerebral phenomana, but not why the particular clinical picture appears. In order to explain this, one has to venture some hypotheses. Three such are discussed by the author:

(1) One can assume a specific predisposition or "*Anlage*".

One can regard as responsible either—

(2) The intensity of the damage or—

(3) Its special localization.

As mentioned above, this clinical study is based on extensive clinical material and is illustrated by numerous elaborate records. Beyond this the author uses his clinical experiences to discuss some general problems of psychiatry. With regard to constitution he assumes a very general "episodic"