known anatomical and physiological data. The portions of these chapters which are novel or peculiar to Mr. Spencer, are almost wholly speculative, and in great measure, so far as we can see, devoid of scientific or practical value. As a mere connected exposition, its warp and woof is too exclusively conjectural. But any further remarks on these subjects, and on our author's treatment of the themes of Psychology proper, must be deferred until our next issue.

[TO BE CONTINUED.]

II.—THE FUNCTIONS OF THE BRAIN.

THE FUNCTIONS OF THE BRAIN. By David Ferrier, M. D. With Numerous Illustrations. p. 323. New-York: G. P. Putnam's Sons, 1876. Chicago: W. B. Keen, Cooke & Co.

For good reasons, the central nervous system, more especially its intra-cranial portion, is attracting at present, a larger share of attention from anatomists, physiologists and pathologists than any other part of the organism. A greater amount of unexplored territory lies within the confines of the spinal cord and brain, under whatever aspect they are considered, than is to be found, it is probable, in any other part of the body. It is, hence, at this time, one of the most tempting domains open to investigation, and the one most likely to yield rewards both scientific and practical, in the immediate future. And this little work of Dr. Ferrier's is one of the best fruits of its study. It is, in a sense, an epoch-making book. It is not only valuable on account of the novel facts it contains, but because of its *suggestiveness*. It is, in large part, made up of physiological facts discovered by the author himself, with sensible and often acute reasonings on them.

We propose to make this notice the occasion for a rather extended review of the present condition of the physiology and pathology of the central nervous system, more particularly of the brain; and hence, while attention is given chiefly to the present work, we shall not hesitate to refer to researches not mentioned in its pages. Most of the facts given in the work, as well as in other recent publications, we have had occasion to notice and discuss in the pages of the JOURNAL, but this will not prevent us from giving a connected statement of those believed to be the most valuable, nor from attempting to estimate their scientific and practical bearings. In the endeavor to carry out this design, it will not be practicable for us to enter on a

history, even of recent progress in regard to the anatomy and physiology of the central nervous system. To do this satisfactorily, would exceed, the limits of the present notice. But with this declaration, we must pass at once to the subject in hand.

The work contains thirteen chapters. It may be of service to some of our readers, to give their titles. They are, respectively: I. *A Sketch of the structure of the Brain and Spinal Cord;* II. *Reflex Functions of the spinal cord;* III. *Functions of the medulla oblongata;* IV. *Functions of the mesencephalon and cerebellum;* V. *Functions of the optic lobes, or corpora quadrigemina;* VI. *Functions of the Cerebellum;* VII. *Functions of the cerebrum;* VIII. *Phenomena of electrical irritation of the cerebral hemispheres;* IX. *The Hemispheres considered physiologically;* X. *Functions of the basal ganglia;* XI. *The Hemispheres considered psychologically;* XII. *Diagrammatic summary;* and finally, XIII. *Cerebral and cranial topography.*

The preliminary "Sketch of the structure of the brain and spinal cord," is given very properly "as a guide to the details of experimental investigation." In discussing the "exact localization of the sensory and motor tracts of the spinal cord," Dr. Ferrier seems inclined to adopt the results arrived at by Woroschiloff, as regards the motor conducting tracts, that is, in assigning this function chiefly to the lateral columns. This we believe to be substantially the correct view, and for reasons which we would be glad to give *in extenso*, but we must defer their statement until another occasion. "The anterior columns are regarded more as commissural connexions between the motor nerves and adjacent segments, and not at least the direct paths of motor impulses proceeding from the brain." (P. 4.) We do not doubt the substantial correctness of this opinion; but the statement seems to us to omit reference to one of the most important probable offices of certain of the fibres of the anterior columns. We have been led, in our own studies, to look upon them as part of the spinal apparatus of co-ordination. Our reasons for this view, it is part of our purpose to give at some length, at another time, in a review of Stilling's work on the spinal cord. ("*Neue Untersuchungen Ueber den Bau des Rueckenmarks*," etc.)

Dr. Ferrier would seem (p. 4) to attribute to Schiff and Vulpian, the discovery that the gray matter is capable of conveying sensory impressions; but the credit of this discovery belongs to Brown-Sequard, rather than to the authors named. The opinion of Schiff, that tactile impressions are conveyed upwards in the posterior columns, does not seem to us well founded, for both anatomical and physiological reasons. They are to be regarded as probably subservient to the co-ordination of muscular motion, *through the medium of the muscular sense.* These columns, it seems, are partly composed of longitudinal commissural fibres, connecting the different spinal ganglia, represented in the gray

matter of the spinal cord, and corresponding to the different pairs of spinal nerves. There is but little more of probability in the view of Woroschiloff. quoted by Dr. Ferrier, that the lateral columns contain the fibres of the sensory tracts. This, if true at all, must be so to a very limited degree. We regard the chief tract for the conduction of sensory impressions upwards, the length of the cord, toward the brain, to be *the gray matter*, and not so much the fibres of either of the columns.

In the endeavor to trace upward, through the medulla, the motor and sensory tracts of the cord, Dr. Ferrier says "the motor paths undergo decussation at the anterior aspect of the lower extremity of the medulla oblongata, at a point termed the *decussation of the pyramids*. At this point, therefore, the path of motor or efferent impulses, from the hemisphere, crosses to the opposite side of the cord." This decussation, Dr. Ferrier recognizes, as others have done, as complete in man, but probably incomplete in certain of the lower animals, as has been shown by Philipeaux and Vulpian, among others.

There is frequent reference, in this first part of Dr. Ferrier's work, to anatomical researches of Meynert, but those of Luys are scarcely mentioned. Notwithstanding the fact that so much of the work of M. Luys is schematic, and notwithstanding the undue preponderance of hypothesis in his writings, we regard them as highly suggestive and valuable, though not the most reliable and satisfactory. As an instance of this neglect of the results of the labors of Luys, we would refer to Dr. Ferrier's remarks on the probable cerebral destination of the superior crus of the cerebellum. The view of Meynert is cited, that its fibres may contribute to the corona radiata; but at this point, a hint is given by Luys, which we consider of some value. He calls attention to the fact that there is a rather remarkable agreement histologically, even in the matter of tint, between certain cell groups in the cerebellum and the "red nucleus" in the corpus striatum. This fact of agreement in histological details may throw some light on the cerebral termination of the superior crus of the cerebellum. The conjecture warranted by this fact, if it be such, does not, so far as we can see, conflict with any known anatomical and physiological data.

In speaking of the reflex functions of the nervous system, and especially in the simplest forms of the nervous system, as in the ascidians, we notice, *en passant*, that Dr. Ferrier adopts the views of Kovalewsky, Darwin, and others, that the ascidians are to be regarded as "the ancestral type of the vertebrates." Dr. Ferrier adopts the views of Schiff, and that of one of his pupils, Herzen, as to a certain mode of arresting reflex action. If a single sensory nerve should be irritated, it may be followed by reflex action. If so, the action that would naturally result may be arrested, according to these authors, by irritating a sensory nerve in some other part of the body. The tendency to reflex action in one part is neutralized, in some way, by the tendency

simultaneously developed by irritation elsewhere in the nervous system. Now, though this is a valuable fact, yet it does not, in our opinion, have the force of a law, in nervous physiology, as Dr. Ferrier would seem to imply, in his mode of stating it.

Dr. Ferrier reviews at some length, the facts relating to the reflex adaptive action of the spinal cord, and which were so prominently brought into notice by Pflueger, some time ago. (*Die Sensorischen Functionen der Rueckenmarks der Wirbelthiere.* Berlin, 1853.) The latter held that the various complicated actions a headless frog can perform are to be looked upon as evidence that the spinal cord is possessed of mind; and hence, is endowed with consciousness, will, etc. But the author sides with Goltz and others who ascribe such actions to *reflex adaptive action* of the cord, and as it seems to us, correctly; but this question is not without its difficulties.

In the remarks on the medulla oblongata, there are no points worthy of special mention. Dr. Ferrier, however, does not share in the rather strange opinion of Vulpian, that the medulla oblongata is the seat of the emotions. Dr. Ferrier, moreover, in his remarks on the seat of a vaso-motor center in the medulla, would seem to imply that it is the sole vaso-motor center in the cerebro spinal axis. He says "the vaso-motor nerves pass (from this center) by the spinal cord, to the blood vessels, etc." But this statement disregards the fact which we have long taught, that a line of such centers extends down the whole length of the cord to its lower end. The chief vaso-motor center located in the medulla, dominates the line of centers mentioned; just as the brain, in some of its parts, dominates the gray motor centers in the cord, which are related to the voluntary muscles by the motor nerves. By means of this view, we can explain the observations of Vulpian, quoted by our author, which go to show that even after it has been severed from the medulla, and has been in this way, cut off from the influence of the supreme vaso-motor center, lesions of the cord modify the circulation of the blood, in certain parts of the body, in the same direction, too, as that of lesions of the medulla.

Next in order, Dr. Ferrier proceeds "to the consideration of those parts of the encephalon which lie between the cerebral hemispheres and the medulla oblongata, comprising the *pons varolii, corpora quadrigemina, and cerebellum.*" The functions of these parts of the central nervous system "may be determined by a study and analysis of those forms of activity which are manifested by animals, when all the centers situated in advance of the corpora quadrigemina, or optic lobes, have been removed." And such is the subject and the method of this chapter.

Dr. Ferrier gives an account of the phenomena exhibited by different species of animals after the removal of the hemispheres to the extent above described. His descriptions refer to the frog, carp, pigeon, rabbit, guinea-pig, and do not materially differ from those of other physiologists since the time of Flourens.

The lower down the animal is in the scale of existence, the more completely does it retain its functions when mutilated in the manner just supposed. The higher animals operated on, such as cats, dogs and monkeys, seldom survive the shock of the operation, and if they do, never recover to the extent that seems possible among the lower animals. Simply for the sake of rendering the subsequent discussion comprehensible, we will quote our author's account of the phenomena, shown by the rabbit after removal of the hemispheres.

"When the hemispheres have been removed from a rabbit or guinea-pig, the animal, at first utterly prostrate, after a varying interval, begins to show signs of the retention of a capacity for the performance of actions of a considerable degree of complexity. It is observable, in the first place, that the muscular power of the limbs has become enfeebled, to a very considerable extent. The muscular weakness is proportionately much more marked in the fore, than in the hind limbs. The animal can maintain its equilibrium on its legs, though of a rather unsteady character; and the fore paws have a tendency to sprawl, or to be planted in irregular positions. If the equilibrium is disturbed, the animal is capable of regaining it. If the hind foot is pinched, the animal will bound forward, in the usual manner, until it strikes its head against some obstacle, or until the excitation has exhausted itself. No one, so far as I am aware, has observed that power to avoid obstacles in the path, manifested by frogs and fishes similarly treated. The rabbit, therefore, continues its flight, once begun, in a headlong and blind manner. The pupils, however still contract when a strong light is thrown into the eye, and the eyelids wink if the conjunctiva is directly menaced. A loud sound will cause the ear to twitch, and provoke a sudden start. Colocynth, or some equally unpleasant rapid stimulus, will cause movements of the tongue and muscles of mastication, in all respects resembling those characteristic of disgust, with efforts to get rid of the nauseous taste. Ammonia held before the nostrils will cause a sudden retraction of the head, or induce the animal to rub its nostrils with its paws. Not merely does the animal respond by certain movements, to a pinch or prick of its toes, or tail, but if the pinch is a little more severe, it will respond with repeated and prolonged cries, of that plaintive character with which all sportsmen are familiar, who have gone hare or rabbit shooting. Vulpian specially calls attention to the plaintive character of these cries, as distinguished from the brief cry which may be elicited when all the parts above the medulla have been destroyed. My own experiments entirely confirm the description which Vulpian has given to them. If the animal be left to itself, undisturbed by any form of external stimulus, it remains fixed and immovable on the same spot, and unless artificially fed, dies of starvation, like the frog, fish and bird, in the midst of plenty. If artificially fed, however, the animal may live an indefinite period.

"With the exception of the greater degree of muscular paralysis, and the diminished power of accommodation of movements, in accordance with sensory impressions in general, and with visual impressions in particular, the phenomena manifested by rodents deprived of their cerebral hemispheres differ little from those already described in frogs, fishes and birds. The power of maintaining the equilibrium is retained; co-ordinated locomotive actions and emotional manifestations are capable of being excited by impressions on sensory nerves, essentially, if not altogether, to the same extent in all.

"In cats, dogs, and higher animals, the prostration is so great, and there is such interference with motor power, that the independent activity of the lower centers, so far as relates to the maintenance of equilibrium and co-ordinated progression, practically ceases to exist; though the fact of emotional response to sensory impressions points to the conclusion that we have to deal, not with the complete absence, but only with the suspension of the other forms of functional activity. This conclusion is capable of substantiation by other facts, to be adduced when we come to consider, in a more detailed manner, the functions of the hemispheres." (p. 39–40.)

So much as to an outline of the facts observed after removal of the hemispheres; but, says Dr. Ferrier very truly, "When we turn from the consideration of the facts themselves to the theory of their explanation, we enter on a *questio vexata* of physiology and pathology." The position of Dr. Ferrier himself, in relation to the question in issue, is that the complicated actions certain animals may perform after removal of the cerebral hemispheres, is not to be attributed to the presence and action of mind, but to nerve reflex adaptive action. One of the chief reasons for this belief, lies in the fact, as it seems to be, "that in the absence of the cerebral hemispheres, the lower centers, of themselves, are incapable of *originating* active manifestations of any kind. An animal with brain intact exhibits a varied spontaneity of action, not, at least immediately, conditioned by present impressions on its organs of sense. When the hemispheres are removed, all the actions of the animal become the immediate and necessary response to the form and intensity of the stimulus communicated to its afferent nerves. Without such excitation from without, the animal remains motionless and inert. It is true, that some of the phenomena which have been described, would seem to be opposed to this view, but they are so in appearance only, and not in reality." (P. 40.)

Dr. Ferrier enters at length into the question, as to the presence of consciousness, as indicated by the plaintive cry of the rabbit, when it is injured after removal of the hemispheres, or the avoidance of obstacles by the frog, under similar conditions, etc. He is inclined to adopt the views of Goltz and of Lotze of Goettingen, that such actions are simply the result of an excitable mechanism, adapted, either hereditarily or by education,

to perform them. Longet, Carpenter, and others, have regarded the mesencephalon as the seat of sensation (*sensorium commune*), and the actions which take place through it, as their central seat, are called *sensori-motor*, as is well known. One of the chief proofs of this position is drawn from a consideration of invertebrates. They perform actions, evidently conscious, it is said, but, "have no true cerebral hemispheres, but only a series of ganglia, homologons with the mesencephalic ganglia of vertebrates."

But Dr. Ferrier denies the parallelism of the cases, and hence, the validity of the conclusion founded on it. He says quite truthfully, that the assumed parallelism is "materially weakened by the fact that invertebrate animals are capable of actions of an *entirely different kind* from those of vertebrates deprived of their cerebral hemispheres." But if the cases *are* parallel, it is manifest that with essentially the same nervous apparatus, they ought to perform the same actions. A higher vertebrate, deprived of its cerebral hemispheres, will not move, as a rule, unless excited by some external impression, and will perish in the midst of plenty. But the lower vertebrates "manifest a varied spontaneiety of action, under, as far as we can see, the same external conditions; they *seek* their food, are capable of education, and *learn to adapt* their actions, so as to seek what is pleasant, and avoid that which is painful, faculties which are entirely abolished by removal of the cerebral hemispheres in vertebrates." "From this," says he, "I would argue that the ganglia of the invertebrates are not completely homologons with the mesencephalic ganglia of vertebrates; for if they were so, we should expect that not merely sensation, but also the other psychical faculties should be manifested by vertebrates deprived of their cerebral hemispheres, even though to a less degree. But it is not a difference in degree only which is obsrved, but a manifest difference in kind. It is probable, therefore, that in the ganglia of the invertebrates there are nerve cells which perform, in however lowly a manner, the functions of the cerebral hemispheres in vertebrates."

From such considerations, Dr. Ferrier turns for proof of the correctness of his position, to the phenomena witnessed in the case of man, in such forms of disease as do not abolish consciousness, but do abolish sensibility in one half of the body. Under such circumstances, *though sensibility is utterly lost*, reflex actions take place as truly as ever. In such a case, the actions take place without consciousness. In man, and the highest vertebrates, we doubt not, these arguments represent the truth; but in the lowest vertebrates, we are inclined to admit that the mesencephalic ganglia may, as in the case of the invertebrates, perform offices which belong to the hemispheres in higher vertebrates.

But in the discussion of this question, we are met by practical difficulties. If we insist, with Dr. Ferrier, and many others

before him, that the actions performed by the higher vertebrates, which have been deprived of their hemispheres, are simply reflex and adaptive, and do not imply consciousness, the question arises, where can we rationally stop with this way of construing nervous action? If the complicated actions which can be performed by a brainless frog, are not to be regarded as an evidence of the presence and action of mind, what actions are an evidence of it? Why not explain all actions the same way? Is not all brain action reflex and adaptive? The discussion of this question will fall more naturally into a later part of this notice, when examining Dr. Ferrier's views as to the nature of brain action; and hence, until that time, we will dismiss it. But, on the contrary, if we affirm that the actions of the brainless frog are to be looked upon as evidence of the presence and action of mind, when shall we arrest this mode of interpreting nervous phenomena? Why not admit that the actions performed by the spinal cord, or even by the sympathetic ganglia, or ganglion cells, are an evidence of the action of mind? The fact of the case is, that the difficulties in the way of drawing a distinction between the action of the mesencephalon and spinal cord are so great, that some have been led to affirm that wherever there is gray nerve tissue there is mind. While we are by no means of the opinion that we are obliged to carry either reflex action everywhere throughout the nervous system, if anywhere, or to admit all gray nerve tissue as indicating the presence of mind, if any nerve tissue does, we will not, at this place, enter on a statement of our views; but we promise to attempt to discuss this subject at an early day.

We do not doubt but that all gray nervous tissue may be, and probably is, the seat of reflex action, we do doubt whether all mental action is reflex; but we promise to take an early opportunity to discuss this subject in a manner commensurate with its importance.

Some of these difficulties involved in the terms consciousness, sensation, etc., Dr. Ferrier thinks may be dissipated by means of certain distinctions. He says, "If we avoid the term sensation altogether, and arbitrarily use the term *æsthesis* to signify a mere physical impression on the centers of special sense, and the term *noesis* to signify a conscious impression, we may avoid some of the difficulties caused by the ambiguities involved in the common terms. The reaction of the mesencephalic and cerebellar centers might be termed *æsthetiko-kinetic*, and be thus distinguished from the *kentro-kinetic*, or excito-motor actions of the spinal cord, on the one hand, and the *noetiko-kinetic* action of the cerebral hemispheres on the other." (P. 46.)

To these terms, or the ideas they express, we can see no valid objection; but as regards the first term, we would not limit it to mere "physical impressions on the centers of special sense." We would make it include all sensory or excitor nervous impressions whatever.

The chapter on the "maintenance of equilibrium" is a valuable and suggestive one. Says Dr. Ferrier: "The maintenance of the equilibrium is an example of æsthetiko-kinesis, and involves the conjoint operation of three separate factors: 1. A system of afferent nerves; 2. A co-ordinating center; 3. Efferent tracts in connection with the muscular apparatus concerned in the action."

As regards the "afferent apparatus," or system of afferent nerves, it is said to be "of a compound nature, but mainly consists of three great systems, which, in conjunction, form that *synæsthesis* on which the due maintenance of equilibrium and co-ordination depend. The equilibrium is disturbed by lesions of one, or more, or all of these. These three systems are: 1. Organs of reception and transmission of tactile impressions; 2. Organs for the reception and transmission of visual impressions; 3. The semicircular canals of the internal ear, and their afferent nerves." (P. 47.)

By these three routes, or sources, are the peripheral impressions received, which excite the central co-ordinating nervous apparatus. As regards the first route, or that of the tactile impressions, it is seen to be disordered in spinal locomotor ataxia, the affection being largely confined to a particular portion of the posterior columns of the spinal cord. In this disease, the power of co-ordination is in a measure lost, and is especially manifest if the individual closes the eyes, so as to become deprived of visual impressions, as a means for co-ordination. Tactile sensibility is lost at the same time as a means of co-ordination. As Dr. Ferrier says: "The fact of chief importance with which we have to deal, is that the loss of the faculty of equilibration and co-ordinated progression proceeds *pari passu*, with the diminution of sensibility to certain forms of cutaneous impressions. These are especially impressions of contact, and it would seem that the contact of the soles of the feet with the ground is, in great measure, the exciting cause of the co-ordinated combination of muscular actions concerned in the maintenance of the upright posture and steady progression."

Dr. Ferrier seems inclined to reject the view that the disorder of the "muscular sense," so-called, has a share in spinal ataxies; for, after a moderately full discussion of this subject, he says, that "it would appear that it is not any and every form of tactile impression that is the efficient excitant of the co-ordinating centers of equilibrium and locomotion, but a special form of *cutaneous* impression generated by contact." (P. 53.) If it is really the view of our author, that the muscular sense must be excluded, as a factor, from the spinal ataxies, we could hardly agree with him; but we cannot, in this place, enter on the discussion of so large a question.

Dr. Ferrier refers to, but does not discuss the question, as to whether "the different forms of tactile impressions are conveyed by different nerves," as Dr. Brown-Sequard has supposed, or

whether the same nerve fibres convey all kinds of sensory impressions, the different forms of the same being "conditioned by the nature of the stimulus applied to the peripherical terminations" of one and the same nerve fibres, as has been held by many, as well as by M. Vulpian, who is cited by our author. As to the opinion of Brown-Sequard, we have no hesitation in rejecting it; and the latter view, only represents the truth in part. It is true that the same nerve fibre may convey different kinds of impressions, but one of the most important features in the whole case is not mentioned. It is that when the impressions are conveyed to the center, that they are diffused through it, by means of the fine net work of fibres, with which nerve cells and the axis cylinders of nerve fibres are connected, and in this way the impression reaches those groups of cells in the cord fitted to re-act to them. Other groups of neighboring cells are not affected by a certain impression, because they are fitted to re-act to other kinds of impressions. The real point for the analysis of sense impressions is at the nervous centers, as in the receiving apparatus of the Gray telephone, for the sake of example. We do not offer these views as if they were novel, but as having greater importance than any one seems to have admitted, so far as we are aware.

Though visual impressions are believed by Dr. Ferrier to perform ordinarily a subordinate part in the co-ordination of muscular movements, yet, in locomotor ataxia, when the capacity for the maintenance of equilibrium by means of tactile impressions is impaired or lost, visual impressions become absolutely necessary, as may be easily proved. In locomotor ataxia, the patient is obliged to make conscious efforts to maintain an equilibrium. "But conscious efforts," as Dr. Ferrier says, "except under the guiding influence of present visual impressions, are utterly unable, of themselves, to compensate for the loss of tactile impressions. In this we see the necessity of immediate in contradistinction to mediate or cerebral registrations of visual impressions, for the due excitation of the co-ordinating centers, a fact which shows the mainly esthetiko-kinetic nature of the phenomena." (P. 55.) We would be glad to remark further on this subject, especially in view of its relations to sea-sickness, but our space will not permit. We shall return to it at another time in the future.

Next in order comes a consideration of labyrinthine impressions, in their relations to the maintenance of equilibrium. But this subject has been rather fully discussed, in former numbers of the JOURNAL, in referring to the researches of Mach, Breuer, Crum Brown, and others. Practically, this subject has much importance, on account of its relation to Menière's disease. After describing the results of experiment on the semicircular canals, in producing vertiginous movements, Dr. Ferrier says in regard to the origin of the impressions producing them, that they "are consequent on interference with, or perversion of cer-

tain impressions which act on some central organ of co-ordination, is shown by the fact that section of the auditory nerve within the skull, causes marked disturbances of equilibrium," as shown by Brown-Sequard. The author adopts Dr. Crum Brown's description of the labyrinthine mechanism of co-ordination, consisting chiefly of the semicircular canals, the nerves distributed to the membranous ampullæ of which, take cognizance of changes in pressure, etc., occurring within them, and transmitting the impressions to the cerebellum, or at any rate, to the co-ordinating centers. But we must postpone further remarks until the next number of the JOURNAL, in which we will endeavor, not only to give a full summary of the experiments and views of Dr. Ferrier, but also a critical judgment as to their value.

III.—DISEASES OF THE NERVOUS SYSTEM.

HANDBUCH DES KRANKHEITEN DES NERVENSYSTEMS, XI. ERSTE HAELFTE: von Prof. H. Nothnagel, in Jena; Prof. F. Oberneier, in Bonn; Prof. O. Heubner, in Leipzig; Prof. G. Huguenin, in Zurich, and Prof. E. Hitzig, in Zurich. Mit 5 Holzschnitten. Leipzig, 1876. 819 pages. (*Hand-book of Diseases of the Nervous System.*)

In former numbers of the JOURNAL, we have taken occasion to notice the two parts composing the twelfth volume of Ziemssens' Hand-book, and which treat of the more general and peripheral disorders of the nervous system. The present volume which precedes them in the series, forming as it does the first portion of the eleventh volume, but which appears later in order of time, is devoted especially to affections that directly involve the brain and its membranes, the disorders of its circulation and nutrition, its inflammation and those of its membranes, with also the results of cerebral syphilis and tumors. The different articles or memoirs are by some of the most distinguished authorities on their respective subjects, as will be readily seen by reference to their names at the head of this article. Like those in the volumes previously noticed, they are, in the present state of our knowledge, almost exhaustive monographs of the disorders of which they treat, and by no means mere text-book handlings of their subjects. There are, it is true, many points that, in our opinion, are insufficiently discussed, and some that are, perhaps, omitted almost altogether; but these omissions or de