

On the Pathology of Mania. By JOSEPH WIGLESWORTH,
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*Read at the Section of Psychology of the British Medical Association,
Annual Meeting, held at Liverpool, August, 1883.*

In investigating the complicated phenomena of mental action, normal and abnormal, it is not sufficient that we confine our attention to the nervous system in its latest stage of development, but we must direct our thoughts to the manner in which it has been built up; in other words, if we wish to understand how the nervous system acts, we must see how it has been developed.

Briefly, then, we consider that there is no essential difference between the simplest reflex action and the highest manifestations of intelligence. The nervous arc consisting of afferent and efferent fibres and intervening corpuscle, shows us the unit out of which the nervous system is built up; and it is by the combination of two or more such reflex arcs, fibres from which meet in a common centre, that the simplest form of nervous system is produced, and by the combination and re-combination of an infinite number of such simplest nervous systems, the highest nervous systems are elaborated. The union of a number of nerve fibres from a number of nerve cells in one centre permits of the action of such nerve cells being controlled and co-ordinated by that centre; and by the union of a number of such centres of co-ordination in one higher centre it is possible for the numerous plexuses of cells and fibres individually combined in such lower centres of co-ordination to be all co-ordinated together in such higher centre; and the process of evolution implies a perpetual superposition of higher upon lower centres of co-ordination, so that what were at one stage of development, the highest centres, become at a more advanced stage subject to the control of still higher centres, and are therefore themselves relegated to an inferior position, so that when we reach the last term of evolution, at present expressed, we have an infinity of lower centres of co-ordination, controlled and co-ordinated by one or a few higher centres. These highest co-ordinating centres are of course the latest developed; but the more recently a nerve centre has been evolved the less stable is it, and the more likely is it to give way in an adverse environment.

We arrive, then, at the important conclusion that *the highest*

centres in the human brain are the latest evolved, and therefore the most liable to decay.

I wish to lay particular stress on this proposition, because in my opinion a full appreciation of it will assist us largely in our endeavours to comprehend the intricacies of mental pathology.

In every investigation into the phenomena of Mind it is necessary to keep clearly in view the distinction between Feeling and Intellect; for, as Herbert Spencer insists, the former is the material out of which the latter is formed. Feelings constitute the inferior tracts of consciousness, out of which in the superior tracts of consciousness Intellect is evolved by structural combination.* Intellect comprehends only the relational element of Mind. The highest centres in the human brain, therefore, will consist of the latest evolved relational elements.

The proposition here advocated is that Mania is a disease involving disorder of the relational elements of Mind, and of a greater or less number of these according to the intensity of the disease; in other words, what we clinically know as Mania, has for its material substratum, an affection, functional, or organic, of the higher co-ordinating plexuses of the brain.

Let us take an ordinary case of Mania, in which an individual after a period more or less short of mental under-action—so-called “Stage of Melancholia”—passes into a condition of mental over-action, the most prominent characteristics of which are excitement and incoherence. These manifestations are readily explicable on the theory here advocated. As we saw the lesion is confined to the higher co-ordinating plexuses of the brain, and we will suppose it to be of an irritative character. In the first place, then, these centres will be over-active, and will inhibit the lower centres in connection with them; but an individual who has the greater number of his nerve cells inhibited will be to that extent inactive—he will present more or less of mental torpor, and will probably be described as Melancholic; but an irritative action proceeding in the delicate protoplasmic substance of which a nerve cell is composed will probably quickly render it functionless; so here the over-activity of the higher centres quickly passes into under-activity, and the lower centres before inhibited now escape altogether from the control of the higher, and being neither controlled nor co-ordinated act over-vehemently and incoherently, and such

* “The Principles of Psychology,” by Herbert Spencer, Vol. i., p. 192.

over-action and incoherence will continue until such time as the higher centres recover their controlling and co-ordinating power.

Dr. Hughlings Jackson, in a paper to which I have pleasure in expressing my acknowledgments, has well laid this down with respect to Epileptic Mania.* "On removal," says he, "of the influence of some of the highest nervous arrangements the next lower nervous arrangements, no longer controlled, spring into activity, and it is from *their* activity that the maniacal movements result. On the physical side there is loss of function of some of the highest nervous arrangements, and increased activity of the next lower. Correspondingly on the psychical side there is loss of consciousness and mania."

This explanation given of post-epileptic Mania by exhaustion appears to me to be fully applicable to the cases of what may be styled Idiopathic Mania, so frequent in asylums.

It is clear on the theory here advocated that the nervous plexuses, which by their activity produce the manifestations which we style maniacal, are really the healthy parts of the brain; and equally clear is it that they make up the major part of that organ, the actual lesion being confined to a comparatively small portion.

In styling these lower centres as healthy, it is true that they must be looked upon as hyperæmic; for to say that a nervous plexus is acting with abnormal vigour, and to say that it receives an abnormally large supply of blood, are different sides of the same question. But what I wish to insist upon is that this hyperæmia is a purely secondary thing—that it is the result of a demand on the part of the nervous plexuses for an increased supply. And this leads me to consider the current theory of Mania, viz., that it is due to hyperæmia of the brain; for whether the hypothesis of higher and lower centres be invoked or no, the theory in possession seems to be that a vaso-motor paralysis has led to a general hyperæmic condition of the cerebral cortex, and it is from this hyperæmia that the mania is supposed to result. The hypothesis of a vaso-motor paralysis, due to a primary lesion of the sympathetic, is so convenient a way of disposing of complicated questions in pathology that one can hardly wonder at the tendency to avail one's self freely of it; nevertheless, I think it necessary to protest against the disposition to put everything down to lesion of

* "On Temporary Paralysis after Epileptiform and Epileptic Brain Seizures; a Contribution to the Study of Dissolution of the Nervous System," Vol. iii., p. 443.

the sympathetic. This system, doubtless, has its diseases, as every part of the body has; but when the contention is between a primary lesion of the sympathetic and a primary lesion of the cerebrum, it is desirable to call to mind the relative stability of the two nervous systems, for the sympathetic system is not only uniform for the race, but has maintained a more or less constant character through a long series of inferior organisms; whereas the cerebrum in its higher developments is of quite recent origin, and is therefore infinitely more unstable than the former.

Let me emphasise the position here taken up, viz., that Mania is a primary disease of the highest co-ordinating plexuses of the cerebral cortex, and that from the temporary or permanent abolition of the function of these centres the lower centres—comprising the greater portion of the cerebral cortex—are thrown into activity, and that the tendency to overaction in these lower centres causes, by a reflex stimulus through the vaso-motor system, an extra supply of blood to be sent to the parts in question, just as we see when a gland is called into activity, which increased supply of blood will last just as long as the demand for it continues.

A pathological theory to be acceptable should explain not only the ordinary type of a disease, but also the lightest and most severe forms under which it occurs; and the theory here advocated seems peculiarly applicable to all varieties of mania; for in the most trivial forms we should suppose that the very highest co-ordinating plexuses were alone involved, whilst in the severest cases we have only to consider that the lesion has spread in depth so as to involve a much larger number of co-ordinating plexuses, to obtain a ready explanation of the phenomena manifested; indeed, in the very mild forms, the impression distinctly conveyed to the mind of the clinical observer is that the individual is to a great extent conscious of his slight vagaries, but has lost to some extent control over himself; but this is only another way of saying that his highest nervous plexuses do not properly inhibit his lower. Again, in the severest forms, great incoherence goes along with great excitement; but the greater the number of the higher plexuses in abeyance the worse co-ordinated will be those that remain, that is to say the more incoherent will be their action, and they will act with all the greater activity.

The hypothesis here advocated of the pathology of mania may be further elucidated by a consideration of the parallel states of Dreaming and Delirium. If a dream instead of being buried in the depths of subjective consciousness were acted

upon the world's stage it would be called an attack of Mania. I do not mean that it would be like Mania in every particular, but it would at least resemble it sufficiently to be nominated as a species of the genus. Now we have in sleep an anæmic condition of the brain, which, though possibly not the cause of sleep, is nevertheless its constant accompaniment; we may suppose the anæmia to be pretty uniform throughout the cerebral cortex, but this being so, clearly the highest and most delicate nervous plexuses, will be most plunged in torpor, and will thus lose their control over the lower, which, themselves subject to the general paresis, will exhibit activity in a modified form. It is clear, indeed, that the rest of a nerve cell is altogether relative, for whilst the function of the highest plexuses is probably for a time altogether in abeyance during sleep, the nerve cells which preside over the respiratory movements for instance are ever vigilant. It is probable, indeed, that the lower centres in the cerebral cortex are always acting more or less in ordinary sleep; but it is only when the higher centres are sufficiently active to take some kind of cognizance of the activity of these lower centres that we become aware of a dream.

Take again the case of Delirium, which presents many resemblances to Mania. What is the cause of Delirium? We say that it is due to the circulation of impure blood through the cerebral cortex, which produces degradation of the protoplasmic substance of the nerve cells, and it is doubtless true that such a state of things would produce abnormal mental action; but why does this take the form of delirium? We have a ready explanation on the principles here advocated, for the circulation of impure blood being uniform throughout the cortex, the highest and most delicate nervous plexuses would suffer first and most—would be involved in a disproportionate degree to the lower, which for a time at least would be permitted a period of over-activity and incoherence.

In both these cases we have an agent acting on the whole cerebrum at once, and it is owing to the disproportionate extent to which the unstable higher centres are affected, as compared with the relatively stable lower ones, that the phenomena in question are considered to be produced; whereas in Mania the argument is, that the higher centres are affected idiopathically, so to speak, and the activity of the lower centres is manifested without modification.

The question may be further illustrated by a consideration of the effects of anæsthetics.

How are we to account for the stage of excitement through

which an individual passes, during the administration of chloroform for instance? That is, how can the same agent produce at one moment over-activity and at another under-activity of nervous action? We may readily account for it on the principles here advocated; it might be said, indeed, that an individual in the course of Chloroform Narcosis passes through a very transitory attack of mania; for the action of the anæsthetic must be exercised first and mainly on the unstable higher co-ordinating centres, through the depression of which the lower centres are thrown into exalted action, and are permitted a brief period of activity before they too are overtaken by the paralysing influence of the drug, and pass into temporary quiescence. The difference in action between different anæsthetics may be explained by the different degrees of rapidity with which they make their action felt.

It is not out of place to refer for a moment to the action of nervine sedatives in the treatment of maniacal excitement. I think it will be the opinion of all present, that these drugs are not of much service in an attack of ordinary mania. I do not mean that they are never of use, but that their employment has not been attended with the results that might on *a priori* grounds have been anticipated. But on the view here advocated of the state of a maniacal patient's brain—that it is in a negative and positive condition—negative as regards the higher centres, positive as regards the lower—we find an explanation of the difficulty, for a sedative drug will doubtless exert its action pretty uniformly over the cerebrum, and whilst it will depress the positive lower centres, it will doubly depress the negative higher ones, and thus tend to perpetuate the vicious cycle.

The terms "highest centres" and "highest co-ordinating centres" have been frequently made use of in the course of the foregoing remarks, but though these must necessarily be situated in the cerebral cortex, no attempt has yet been made to localise them more definitely; the centres themselves being in some sense hypothetical, their exact situation must necessarily be more so, nevertheless data are not wanting to indicate the path on which we should travel. The nervous system sensori-motor in its first beginnings, is sensori-motor in its latest endings, and the gradual superposition of Intellect upon Feeling is rendered possible by the gradual co-ordination of the sensori-motor elements. Herbert Spencer has pointed out that Feelings correspond to the molecular changes going on in nerve corpuscles, and Relations between feelings (*i.e.*, the In-

tellectual Element of Mind) to molecular changes in the fibres which connect these nerve corpuscles.* But in the course of evolution, the relational elements are co-ordinated in a series of centres, and centres of co-ordination imply nerve-vesicles; therefore there should be in the cerebral cortex a series of co-ordinating centres corresponding to the connecting system of the brain. Does such a system exist? If so, it should not be met with in other nervous tissues, but should be peculiar to the cerebral cortex, this being the sole seat of the Intellect, as distinguished from a more or less confused sentiency. In the grey matter of the spinal cord we have the sensori-motor mechanism in a comparatively simple form, for it is now clearly established that the nerve cells of the posterior cornua subserve sensory, and those of the anterior cornua, motor functions. Have we any analagous elements in the cerebral cortex? I think it may be said that we have. Putting aside the first layer of the cortex as non-ganglionic, modern anatomical and physiological research renders it highly probable that the second and third layers of the cortex have a sensory, and the fourth layer a motor function, so that the nerve-cells of these three layers would constitute the sensori-motor mechanism of the cerebral cortex. But we have here an additional layer—the fifth layer—that of spindle cells, in which the characters sought for appear to be realised; for in addition to being unrepresented elsewhere, and therefore peculiar to the cerebral cortex, it belongs, as Meynert long ago pointed out on purely anatomical grounds, to the connecting system of the brain. The presumption therefore here hazarded is, that the spindle-celled layer subserves the relational, that is, the intellectual element of mind; and since Mania was concluded to be an affection of the latest evolved relational elements, we are now brought to the further conclusion that it is an affection of the latest-developed nerve-plexuses of the spindle-celled layer.

Since in all probability in the frontal lobes the whole brain is re-represented, it is legitimate to consider that it is in the frontal region that the latest developed plexuses are to be sought, though they would not necessarily be confined to this district.

I wish to point out, however, that the conclusions formerly reached as to the *nature* of the lesion in Mania, have no necessary connection with the hypothesis here suggested as to its *seat*, which latter may or may not be illusory, without affecting the validity of the former.

* "The Principles of Psychology." Vol. i., p. 190.

Towards the commencement of this paper, I defined Mania as an affection *functional or organic* of the highest co-ordinating plexuses of the brain, and this leads me to the final consideration as to whether or no there is a material lesion underlying the phenomena which we know as Mania—a lesion of nerve-cells that is capable of demonstration by the microscope. Some varieties of Mania indeed are of such a transitory character as to forbid us to suppose that there can be more than a functional derangement at work; many cases, however, appear to run such a definite clinical course, are moreover of such lasting duration, and end in such utter mental wreck, as to compel one to think that there is a definite material affection of nerve-cells at the bottom of the disease; but though unable at present to demonstrate its presence, if there be such a lesion, sooner or later it will surely come to light; for dark as is the pathology of Insanity at the present, we may confidently anticipate the time when the daystar of human knowledge will arise, even over this benighted region, and the shadows flee away.

Visceral and other Syphilitic Lesions in Insane Patients without Cerebral Syphilitic Lesions. By WM. JULIUS MICKLE, M.D., Grove Hall Asylum, London.

Read in the Section of Psychology at the Annual Meeting of the British Medical Association held at Liverpool, August, 1883.

It has been stated by some that it is syphilis originally mild and benign in its manifestations, that is most apt to cause cerebral syphilis; one saying that the subjects most liable to cerebral syphilis are those in whom the secondary symptoms have been slight or transitory; another asserting that often one can find no history of preceding cutaneous or other affection of either the secondary or tertiary order; another, that any syphilis may be followed by specific cerebral affections, the original mildness of a syphilis being no guarantee against future cerebral affections of syphilitic origin, and that the great majority of the cerebral affections are furnished in examples of syphilis which is of medium severity, or (less often) is benign. This last observer, in 47 cases of cerebral syphilis, found three after severe or grave syphilis; 30 after syphilis of medium severity, and 14 after syphilis benign in its manifestations. As stated by myself