A PLEA FOR THE MINUTE STUDY OF MANIA.¹

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ANY ONE accustomed to the literature of general medicine, and turning to that of psychological medicine for the first time, must, I think, be struck by the comparative paucity of reports of cases in the latter, or at least of reports of cases intended to illustrate diagnosis, or the grouping of symptoms in mental diseases. True, in our special journals, and also in non-special journals, cases of insanity may, from time to time, be found described; but these are almost invariably published, because they illustrate the success or futility of some kind of treatment, or the morbid anatomy of some coarse lesion in the nerve-centres, and not because they are typical of any variety of psychical derangement. The records of cases indeed which are issued from lunatic asylums, whatever be the motive of their publication, are singularly deficient in information bearing on the modifications of the higher cerebral functions, and many of us would be puzzled at this moment, were we asked by any zealous student, to refer him to a series of clinical delineations which would convey to him a just conception of the nature and procession of the impairments of the senses and intellect, or perversions of the emotions and will, which correspond with the commonest forms of insanity. Perhaps the best and most vivid sketches we possess are those contained in a few of our text-books, and in the writings of some of the older authors on our subject, but even these have not always been taken from nature. Some of them commend themselves to us by their literary rather than their scientific

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merits, sacrificing, as they occasionally do, the angularity of a fact to the rounding of a period, and darkening knowledge by mere rhetorical flashes.

If we inquire the reason of this paucity of clinical reports of cases of insanity, we shall, I believe, find that it is to be attributed to several causes. In the first place, asylum medical officers have been called on hitherto to give so large a proportion of their time and energy to administrative, sanitary and routine duties, that they have had little left to expend on minute and tedious observations at the bedside or in the wards. Without clinical clerks, or with a very inadequate number, they have had to keep their own medical records, and have therefore confined these within narrow limits, and made them of an eminently practical character. Thus it has come about that the case-books of most asylums have been kept for official rather than scientific purposes, and do not afford the information that is necessary for the preparation of clinical reports. In the second place, the medical men who enter asylum practice are ordinarily unprepared by previous training to sift and classify the special phenomena that then fall under their notice, even if they had the leisure and disposition to do so. Unacquainted with the physiology of mind, they are bewildered by its morbid manifestations, and lack that knowledge of terms and those habits of thought that are essential to an accurate analysis of psychical derangements. In the third place, the observation of aberrations of mind is exceedingly difficult and laborious, even to those who are qualified for the task, and hence few have had the intrepidity to undertake it. And in the fourth place, the attempts as yet made in this direction have not proved of much real value, while their speculative interest has not served to secure perseverance in them. No practical benefit or guidance has seemed to accrue from anything beyond a vague and general survey of the mental condition in insanity, and so we have learnt to be content with comprehensive phrases, such as excitement, depression and incoherence, and have had little encouragement to draw up inventories of symptoms, which we invariably failed to connect with pathological changes.

And yet notwithstanding this deficiency of clinical records

of insanity and disregard of its psychical aspects, most of those engaged in lunacy practice have had to give considerable attention, in certain cases, to those mental symptoms in which alone, for legal and social purposes, insanity consists. In mania they may have attempted no analysis of the overwhelming disorder of mind, but in partial insanity they have been compelled to search out its weak points, and to ascertain in what respects it has departed from its healthy state. To do this they have had to practise what I shall venture to call *ideo-diagnosis*. They have had to stimulate by their ideas the mind which they desired to examine. Just as in testing the electric reactions of muscles and nerves we apply the electrodes at various points of the cutaneous surface, and note the results, so in testing the state of the mind we apply our ideas, as it were, at various points of its surface; we travel over it more or less systematically, gauging its *ideo-sensibility* and irritability as we go, and determining as best we may, whether and to what extent they are increased, perverted, or abolished. But what we travel over in this way, when practising *ideo-diagnosis*, is but a scheme of mind which we have constructed for ourselves. Doubtless our skill as specialists and expertness in detecting insanity, when it is latent or concealed, will depend in great measure on the thoroughness of that scheme and the ingenuity with which we pursue the researches to which it guides us; but even the most thorough scheme hitherto devised is artificial after all, and however it may help to establish the existence of insanity, will not aid us in that medical diagnosis which we should strive to attain to. For our scheme of mind does not harmonise with any scheme of brain, and our exploration is not conducted in accordance with our knowledge of cerebral topography; and hence if we come upon what is apparently a tolerably isolated patch of diseased mind, we are utterly incompetent to indicate the whereabouts of its pathological substratum. But it seems to me that standing as we do in the light of modern researches into the functions of the brain, we cannot be content any longer with this old style of *ideo-diagnosis*, but must work in all cases of insanity towards a localisation of the lesion, and a recognition of its nature. We must aim at an anatomical and

a pathological diagnosis, and these are only to be reached by a careful study of symptoms and of their mode of onset and associated conditions. We are perhaps far off any success in localising and characterising mental diseases, but the endeavour to do so should at least be made, and that it may be made, trustworthy, clinical records are a first requisite; and therefore it is that I put in a plea for the minute study of mania, which will, I think, yield to minute study results of great importance.

I take it as an established fact that there is localisation of function in the brain. I cannot here enter upon the proof of that proposition, nor is it necessary that I should do so, for I dare say we are all familiar with that proof and are agreed that it is complete and conclusive. We may adopt the view that the mental operations are dependent upon separate arrears of brain-substance, or we may hold that they are connected with distinct cell and fibre mechanisms existing in a more or less diffused and interblended manner, but in either case we arrive at what is practically localisation of function in the brain; for those who hold the latter view are obliged to admit that certain portions of the hemispheres are always and principally concerned in the carrying on of intellectual and volitional operations; that the fibres and cells concerned in the conduction and elaboration of sense impressions exist in maximum quantity in different parts of the surface of the cerebrum, and that certain definite portions of the brain are in some way related to the production of movements.

I take it also as an established fact that insanity is a disease of the brain which does not always involve the whole of that organ, but which, in a large majority of cases, is localised in certain regions of it. This hypothesis is necessary to the explanation of the innumerable varieties of insanity which occur, and is borne out by pathological observations as far as they go, and by analogy drawn from the affections of other organs. It seems certain that there are system diseases and focal diseases, neural and adneural changes in the brain, just as there are in the spinal cord, and that these are severally signalised, in the brain as in the cord, by distinct sets of symptoms.

But if there is localisation of function in the brain, and if

insanity, which consists in morbid modifications of brain function, is dependent upon local lesions, we ought to be able to determine with more or less precision the position of the brain-lesions, or of its functional derangements in certain cases of insanity. The inquiry must be an eminently difficult one, for reasons which need scarcely be enumerated, but still it must be undertaken if real progress is to be achieved in psychological medicine. By the diligent study of symptoms, of the modifications of motor and sensory conduction, of reflex action, of co-ordination and nutrition, various diseases of the spinal cord have been traced to their origin, so that we can now say with confidence, in many cases, that a lesion exists in a certain white or grey tract at a certain level. Is it not to be hoped that by an even more assiduous study of symptoms in connection with morbid anatomy, we shall yet be able, in cases of insanity, to define the particular territories of the brain that are involved in the morbid process? I think this is not only to be hoped but to be anticipated, and therefore it is again that I plead for a minute study of mania, which will probably conduce in no small degree to our knowledge of localisation in disease.

But it may be objected that mania is of all mental diseases that which is least likely to afford us help in an investigation of the cerebral condition corresponding with insanity. It invades, it may be said, all mental processes, is eminently complex, and probably depends upon a disorder diffused over the whole encephalon. These objections, however, admit of satisfactory answers, and it may, I think, be shown that next to general paralysis, mania of all forms of insanity presents the most favourable opportunities for the exploration of cerebral function in disease. We are not entitled to speak dogmatically as to the nature or distribution of the pathological changes upon which mania depends, but such evidence as we possess points to the conclusion that these often partake of the character of an erythema, and are not spread over the whole of the brain, but are limited to certain regions of it. Mania is of course a comprehensive term, and includes a number and variety of mental states, from mere transitory excitement up to the wildest fury, or the most chronic madness.

And with these numerous and varied mental states diverse conditions of the brain are doubtless associated ; from a slightly heightened activity of the nervous arrangements in one or a few convolutions, with a trifling excess of the hyperæmia that accompanies ordinary functional activity, to widespread and intense capillary engorgement, or to the exudation of inflammatory products into the tissues. Fortunately we see but little of the morbid anatomy of mania, but when death does take place from exhaustion, or from some intercurrent disease during a maniacal paroxysm, the pathological appearances which we are most accustomed to find are engorgement of the vessels, hypertrophy of the brain itself, so that it expands, as it were, slightly on the opening of the skull, and vinous staining, due to capillary congestion of the grey and white matter—appearances, indeed, quite analogous to those which are seen in the skin when death has occurred during an erythematous inflammation of it. Now it is this vinous staining of the brain-substance that affords, I believe, a clue—an imperfect one, but still a clue—to the localisation of the cerebral disorder in mania, and that gives ground for the statement that even in fully developed and acute mania the whole brain is not involved. Whoever has carefully scrutinised this vinous staining will, I think, assent to the statement that it is not generally diffused, and that its most striking characteristic is, that in the medullary substance it occurs in scattered blotches. A very attentive examination of it in a number of cases has convinced me that in the cineritious substance, too, it is very unequally distributed, both in the layers of which the cineritious substance is composed and over its superficies. Although less patchy in the grey matter than in the white, this vinous staining is in the latter often confined to certain districts of the hemispheres or groups of convolution, and even occasionally to parts of particular convolutions. I have seen it strictly symmetrical in its distribution in the two hemispheres, and I have seen it much more marked in one than in the other, though never altogether confined to one. I have seen it pretty uniformly diffused over a large area of the brain, and I have seen it in distinctly isolated spots with tracts of normal brain-substance between. It is not suggested that

this vinous staining is the primary and essential change in mania, or that any connection between the symptoms of mania and the distribution of it has ever been traced out, or even between the severity of mania and its extent, and I refer to it not to argue that such a connection may be made out at present, but to indicate that the pathological conditions which subtend mania do not implicate the whole of the cortical substance of the hemispheres, a truth which I might also establish by showing that when the whole of the cortical substance is involved in inflammatory action, as is sometimes demonstrably the case in meningitis or encephalitis, a series of symptoms very different from those of mania is exhibited.

In order, however, to trace mania to its pathological seat in the cerebrum, and to render its symptoms instructive in connection with the localisation of morbid conditions, it is not requisite that we should be able to recognise its distinctive post-mortem appearances, if any such exist. To know clearly the function of a part, and to perceive in a diseased state a perversion of that function, is a sufficient justification for referring the disease to the part to which the perverted function belongs. And to know clearly the different functions of the different parts of a compound organ, and to perceive in a diseased state a perversion of certain of these functions while others remain intact, is sufficient to warrant the conclusion that the diseased state is partial in its distribution and involves only certain parts of the organ, leaving other parts exempt from attack. And so in mania, I maintain we may be justified in concluding without any assistance from post-mortem revelations, that the diseased state is limited to certain areas of the brain. During its progress certain functions of the highest nerve-centres are manifestly perverted, and these functions experiment is teaching us to regard as dependent on certain brain territories. A careful observation therefore of these perverted functions, especially when we can differentiate them clearly, will enable us to determine what brain territories are implicated by the lesions or functional derangements on which mania depends.

Now in mania the functional derangements which are presented to our observation are very numerous and of a highly

complex character. Disorders of all the mental functions, of volition, the intellect, the emotions, the propensities are displayed in a confused, inextricable, and ever-shifting mass, and these do not at present offer themselves to ready and immediate analysis. But besides these there are, I think, other functional derangements of the supreme nerve-centres, derangements of motility and sensibility which have not attracted special notice, but which will perhaps reward careful study, and afford insight into the pathology of the disease. I desire to call particular attention to the motor and sensory symptoms in mania, and to express my conviction that through a consideration of these we may attain to a greatly increased knowledge of its anatomical substrata.

The existence of motor and sensory symptoms in mania is obvious enough. Restlessness is almost indispensable to our idea of it, and every description of it that exists abounds with references to great muscular activity, contortions, gesticulations, violence, and wild cries. But these disorders of movement in mania have not been subjected to minute analysis. They have been regarded only as expressions of psychical exaltations, and as such have not been thought worthy of detailed examination. And no doubt many of the movements of maniacs are but unrestrained manifestations of ideal and emotional states, or reflexes of inordinate strength. But besides these movements there are others which, by their peculiarity and purposeless persistency, are marked out as being of a different character. And these it is which will probably, I think, be shown to depend upon excitation of the motor centres of the brain by a morbid process, and which will thus sometimes supply indications as to the parts of the brain involved in that process, and as to its lines of propagation and retrocession.

Even at the very height of acute mania, when the symptoms are infinitely complex and varied, certain markedly predominant movements may frequently be seen, which it is impossible to connect with any feeling or intention. Thus some maniacs will run about uninterruptedly night and day in a purposeless manner, and if held down in bed, will continue to move their feet and legs, as if still engaged in running. Others, again,

will remain in bed and rarely move their lower limbs, but will toss their arms about incessantly, or busy their hands unceasingly in smoothing or fraying the bedclothes. May we not suppose that, in the former class of cases, there is irritation of the postero-parietal lobule of the brain, in which Ferrier has localised the crural movements, and that in the latter class the irritation is concentrated in the ascending frontal and parietal gyri, in which the brachial and manual movements are localised. Some maniacs talk vociferously, and jargonise. May we not infer that in them there is an irritative lesion of the oro-lingual region in the third frontal convolution? Others are resolutely silent, but shake their heads from side to side without intermission. May we not suppose that in them the cortex of the superior temporo-sphenoidal gyrus is hyperæmic or inflamed?

It is not, however, in acute and fully developed mania, but in the milder attacks of the disease and in its initial stage, that useful observations of its motor symptoms may, in my judgment, be carried on. Mania may burst out at once without warning, or after a *stadium melancholicum*, in sudden completeness, but much oftener it begins in trivial deviations from customary habits of thought, feeling, and action, and attains its height by a crescendo movement. And, in the latter case, with the earliest mental wanderings come the muscular disturbances, which I regard as significant. These muscular disturbances, which may indeed precede the mental symptoms, or at least secure recognition earlier than they, are exceedingly varied in character; but I would mention, as amongst the commonest of them, fixed elevation of the eyebrows, producing a staring expressing of the countenance; habitual quivering of the upper lip, such as is seen in a child that is about to cry; twitchings of the zygomatici, rolling movements of the eyeballs, sudden clenching of the hands, and tremors of certain groups of muscles. I saw recently a case of mania in a youth in whom the malady was inaugurated by general restlessness, and a peculiar movement of the left hand. For two days before any mental disorder was apparent he brushed back his hair with his left hand every few seconds, in a rapid and abrupt manner. The movement was not habitual to him, and he

could only control it by a strong effort of will, and for a short period. Whenever his attention was withdrawn from the effort of control, the movement immediately commenced again with increased energy. In a case of recurrent mania in a lady, which I have had under observation with Dr. Ferrier, the return of the attacks of excitement is invariably announced by loud grinding of the teeth.

Now in such cases, and under such circumstances, it seems to me that the motor symptom perhaps betrays to us that region of the brain which is the starting-point of the vital irritation. Where there is grinding of the teeth at the outset of each paroxysm of recurrent mania, we might presume that the irritation, which afterwards spread over a wide zone of the cerebrum, had its centre and point of origin in or near the lower frontal gyrus. Where there is the sudden elevation and backward movement of the left hand, as in brushing the hair as a precursor of acute mania, we might believe that the upper part of the ascending frontal convolution of the left hemisphere is primarily at fault. And so where there are clenchings of the hands, twitchings of the cheeks, quiverings of the lips, rolling of the eyeballs, or elevations of the eyebrows, as preliminaries of mania, we might surmise that the ascending parietal, the ascending frontal, the superior middle frontal, or the angular gyri, were respectively the points of departure of the morbid process, or of one morbid process out of a series.

Next in importance to the observation of the earliest motor symptoms in mania, comes the observation of the order of succession of the motor symptoms as the disease advances, for this order of succession, if it could be ascertained, would disclose to us the line of march of the disease over a certain district of the cerebrum. Opportunities of making such observations in a trustworthy manner probably occur but rarely, but one such happened to me two years ago, and it was indeed this case, which I watched with Dr. Bucknill and Mr. Musgrave, that first impressed me with the extreme interest of motor symptoms of the kind which I am alluding to. A lady, aged 36, who had been depressed for a few days, suddenly became excited, restless, and talkative. For the

first few days of the excitement it was remarked that her eyes were very widely opened, and her pupils dilated. On the third day it was noticed that there were frequent sharp catching movements of the right hand, and these continued at intervals, sometimes at the rate of thirty per minute, until the fourth day, when it was remarked, the patient being then in bed, that there were constant flexion and extension movements of the right foot, or the ankle. On the fifth day, and for many days afterwards, the movements of the foot having ceased, there were incessant rhythmic waving movements of the right hand and arm. The left arm lay at rest, but the fingers of the left hand were constantly twisted, the middle finger being turned over the dorsal aspect of the ring-finger. Here it appeared warrantable to suppose that one arm of the morbid process had stretched along, during a period of three days, from the posterior end of the upper frontal convolution through the upper extremities of the ascending frontal and parietal gyri to the postero-parietal lobule on the left side, and had also run down the ascending frontal convolution, while on the right side the ascending parietal convolution was the only part of the motor area implicated.

It is not to be expected that cases of mania, with motor symptoms admitting of such a simple interpretation as has here been offered, will be frequently encountered. In most cases the motor symptoms are intricately complex, and are associated with voluntary emotional and reflex movements, in a way that defies all attempts at separation, and in few cases does the morbid process pursue a course determined purely by tissue continuity. It is probable that the irritative condition of the cortex is spread and propagated, in many instances, in accordance with the functional alliances of different parts, or with their vascular supply, and then of course it would be in vain to look for a succession of symptoms corresponding with the arrangement of centres in any region of the brain. Still it may be occasionally possible to obtain glimpses of the lines of invasion and retreat of irritative lesions through the motor areas of the brain through the order of succession of the motor symptoms, and that order of succession is therefore deserving of careful study.

But there are sensory as well as motor regions in the brain, and sensory as well as motor symptoms in mania, and a judicious investigation of these sensory symptoms will, in all likelihood, help us still further to understand the nature and distribution of the pathological conditions which underlie the maniacal state. Hallucinations of sight, hearing, taste, smell, and cutaneous sensibility, and impairments of sensory perception in connection with any of these, are difficult to identify and isolate. At the inception of a malady, however, certain retinal or Schneiderian or cutaneous projections may now and again be singled out, and then become the key to some of its secret recesses, opening up to our inspection, as it were, certain pathways of pathological inroad. As they are, however, purely psychical states, as opposed to physical symptoms, and as the statements of a maniac are rarely reliable, their existence is much more difficult to establish satisfactorily than is that of morbid motor phenomena. And even when they have been proved to exist, their interpretation is beset with difficulties. Bastian has pointed out, as I think with great justice, that the perceptive centres for visual and also for acoustic impressions, have probably a widespread seat in the cerebral hemispheres, while those pertaining to the gustatory and olfactory senses have presumably a more limited distribution. And yet, when we have in any case of mania distinct evidence of an optical illusion, or coloured vision, at the commencement of the attack, or persistently through the whole of it, I should be disposed to diagnose an irritative lesion, including incontinent discharge in the angular gyrus. And where, again, we have auditory hallucinations I should be disposed to diagnose a similar state of things in the superior temporo-sphenoidal convolution; then if in any case we found hallucinations of taste, or marked imperfection of that sense, with muscular movements of the lips, tongue, and jaws with those movements, in fact which are usually consequent on the excitation of the gustatory sensation, we might with propriety hazard the opinion that the middle temporo-sphenoidal convolution was the seat of morbid irritation. Where, again, we found hallucinations of smell, or of tactile sensibility, and these are by no means

uncommon in the early stages of mania, we should naturally refer these to lesions of the subiculum, and of the uncinate gyrus and hippocampus major.

And here it may occur to us that in our attempt to elucidate and connect the symptomatology and pathology of mania, we have overlooked the facts that there are extensive regions of the brain, the præfrontal lobes, which have yielded to experiment only negative results as regards both sensation and motion, and that there are grounds for believing that the centres for the highest mental functions are located in these lobes, and that in a large proportion of cases of insanity the essential morbid changes have their starting-point and home in them. But we are not left altogether without indications of the existence and progress of disease in it. I dare say we are all familiar with cases of mania which begin in a singular hebetude, or in a suspension sometimes sudden of voluntary and varied activity. The patient's muscular powers and sensation are unimpaired, he comprehends all that is said to him, and does not labour under any delusions or hallucinations, but he stands fixed and motionless, or performs any actions to which he may be urged in a stiff and machine-like way. His muscles are perhaps slightly rigid, and his whole aspect suggests that he is under a severe duress which checks all manifestations of spontaneity. He is, I should say, over-inhibited. But a little later a singular change has taken place in his condition. He is no longer statuesque, but restless. Hebetude has given place to animation, still without delusions or hallucinations; he is fitful and inconsiderate, being swayed inordinately by every passing impression that is made on him. He is incapable of concentrating attention upon any subject or of remaining at rest. He is now, I should say, under-inhibited. The highest controlling centres, which were in the first instance stimulated, have now become paralysed. In the first state they arrested the activity of the centres that are subordinate to them, and now their control has been withdrawn from these centres, which respond therefore in an excessive and extravagant manner to all appeals made to them. But the highest controlling centres are located in the frontal lobes, and the conclusion therefore is

that in cases of mania beginning in the manner just described, the disturbance of the cerebral cortex starts from that region. No doubt lesions in this large region of the brain will be followed by very varied assemblages of symptoms according to their position and extent, and the cases to which I have adverted illustrate only one mode of invasion of disease in this region. We shall most of us recognise, I fancy, in Ferrier's account of the effects of destruction of the antero-frontal lobes in monkeys an accurate portrayal of the first stage of mania in another and numerous class of cases. "I could perceive," he says, "a very decided alteration in the animal's character and behaviour, though it is difficult to state in precise terms the nature of the change. The animals operated on were selected on account of their intelligent character. After the operation, though they might seem to one who had not compared their present with their past, fairly up to the average of monkey intelligence, they had undergone a considerable psychical alteration. Instead of as before being actively interested in their surroundings and curiously prying into all that came within the field of their observation, they remained apathetic or dull, or dozed off to sleep, responding only to the sensations or impressions of the moment, or varying their listlessness with restless, purposeless wanderings to and fro."

My object in this paper has been merely to point out what appears to me to be a new and promising method of investigating mania, by a close observation of its symptoms in the light of recent researches into cerebral localisation. I could not within the limits assigned to it do more than indicate in a few instances the kind of symptoms that should be specially observed and the manner in which they may be translated into intimations of cerebral disease, and I have not therefore been able to make use even of the scanty stock of facts bearing on the subject which I have as yet been able to collect. If I am correct in believing that mania is immediately dependent on irritative lesions of the cerebral cortex which invariably involve the highest centres, but which very irregularly and unequally invade the sensory and motor regions of the hemispheres, then an abundance of facts will not

long be wanting to verify and illustrate the proposition and to explain away difficulties like that which presents itself when we remember that irritative lesions of those very centres which in mania we suppose when irritated to cause movements of the kind adverted to, in other conditions result in convulsions and chorea. It may be that the coincident involvement of the higher controlling centres in mania, and their exemption from participation in the irritative state in convulsions and chorea, accounts for the difference in the phenomena observed in these disorders, in all of which we assume the same motor centres to be morbidly irritated, or it may be that differences in the kind and degree of the irritative condition affords the key to the solution of the problem; but on such points we can only vaguely speculate at present, and until much careful investigation has been carried out.

But it may be demanded what advantage is to be secured by even the most detailed study of the movements, hallucinations, and thought-currents in mania? Supposing that all these had been traced to their starting-points in the brain—an altogether extravagant supposition—and that we were able to put our finger on the gyri in which the disorder originated in each case, what nearer should we be to its curative treatment, what reward should we reap for our patience and pains? It is not for me here to answer at any length such old-fashioned and short-sighted interrogatories, or to defend the acquisition of knowledge for its own sake even when that acquisition calls for protracted toil. All knowledge brings its own exceeding great reward, but not to those who pursue it in a purely mercenary spirit. But more than this; knowledge never fails to bring with it gifts that were not contemplated when it was sought. For a time it may seem to stand, solitary and useless, serving only as a monument of the ill-directed industry of him who quarried it and set it up; but in due season, as the building of the temple of science proceeds, the place is found which it and it alone can fill, and it becomes an integral and essential part of the goodly structure. If then an intimate knowledge of the phenomena of mania promised no immediate or practical return, it might still be pursued in confidence that

some unforeseen recompense would be bestowed on it. But even now some valuable fruits that may be gathered from that knowledge may be discerned. In the progress of pharmacology it has been established that certain drugs act specifically on certain centres in the spinal cord, medulla oblongata, and basal ganglia; and it is not too much to anticipate, when certain functional areas and centres have been satisfactorily differentiated in the brain, we shall soon be put in possession of means of modifying their activity and of arresting some of the disordered states into which they are liable to pass. Our experience of cannabis Indica, hyoscyamus, stramonium, belladonna, strychnia, chloral and other drugs, points to a preference and priority of action in each over definite cerebral tracts and regions, and a further experimental employment of these drugs, and of other therapeutic agents which will certainly be put into our hands, in the light of an enlarged acquaintance with cerebral localisation in health and disease, cannot fail to conduct us to conclusions of the utmost practical utility. Groping in the dusk as we do at present, we occasionally find our way in cerebral disease to the application of an appropriate and potent remedy. Walking in brilliant illumination, as we may perchance do hereafter, we should achieve such triumphs of our art, not occasionally, but habitually.