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MENTAL SYMPTOMS ASSOCIATED WITH HEAD INJURY THE PSYCHIATRIC ASPECT*

BY

EDWARD MAPOTHER, M.D., F.R.C.P.

Professor of Psychiatry, University of London; Medical Superintendent, Maudsley Hospital

My contribution towards discussion of the problem in question is limited to two of its aspects—namely, incidence and prognosis. No general conclusion on these points could be reached except by working forward—that is, by systematic and unselected consideration of after-history in a large number of cases. The necessary facts could best be collected by one or more general hospitals that are called on to deal with many such accidents. A standard mode of examination, probably including such investigations as a radiograph of the skull and cerebrospinal fluid analysis, would have to be adhered to regardless of the needs of the particular case. It would be necessary that a full history of recent and remote experiences and mental tendencies should be obtained shortly after onset, and that subsequent regular notes should record at the time any changes that occurred. In the absence of such data it is clearly impossible to reach general conclusions as to incidence by working backwards from cases that eventually are seen by the neurologist or psychiatrist, since these are only the cases in which serious sequels have followed, and the psychiatrist sees in proportion more of the serious mental sequels, while the neurologist sees more of the slight. Moreover, in the case of the psychiatrist there is for various reasons a tendency for him to see after accident a higher proportion of those who before it already had some mental symptoms than of those who had been perfectly normal.

Bearing in mind all these sources of error, and realizing that it is at present impossible to estimate total incidence, it yet seems worth while to consider the relation to head injury of the very numerous varieties of mental abnormality that may follow, their respective frequencies and time relations, the connexion of these with one another, and finally the course which different varieties are prone to take. Before going further certain distinctions and definitions are necessary.

1. The relation of a mental abnormality to head injury may be physiogenic or psychogenic. The minimum evidence of physiogenic causation is the presence of retrograde amnesia.

2. Whatever the type of causation, one can consider cases either in broad outline or in detail. (a) One can concentrate upon syndromes—that is, upon the effect of the injury on structures subserving functions which are innate and common to us all, and so upon structures which may probably be known fairly soon; or (b) one can study the effect upon connexions of a kind that are acquired and peculiar to the patient, and so disturbance of functions, in a way that for a very long time will only be expressible in psychological terms, and these of an individual kind.

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I propose here to deal mainly with effects that are physiogenic and expressible approximately in terms of syndromes.

The psychiatrist is principally concerned with those mental sequels that follow "recovery of consciousness." In my opinion the only practicable criterion of "recovery of consciousness" is awareness of external environment and accessibility. It is true that this often makes it as impossible to ascertain the duration of unconsciousness as whether the skull was fractured. But the obtaining of a statement uniformly from all patients is dearly bought by a convention which makes that statement mean something quite different in various cases. Such is the inevitable result of identifying the duration of unconsciousness with the period which the patient subsequently cannot remember; this period may correspond to one or more of about eight different varieties of amnesia that follow head injury.

For present purposes I wish to classify as psychotic all mental abnormalities after recovery of consciousness into the character of which the patient at the time lacks insight and which if sufficiently prolonged would have justified certification. The term neurotic implies the contrary in respect of each of the two points. I shall deal largely though not exclusively with psychotic sequels.

Returning to the problem of the relations of various forms of mental disorder to head injury and their prognosis, I propose to attack this in two ways: (1) by discussion of published evidence of various authorities; (2) by consideration of hitherto unpublished data which I have collected from a number of sources.

1. Published Evidence

There are no national statistics in England and Wales that indicate the influence of head injury in causing mental disorder. The number of motor casualties has steadily risen until it has reached nearly 6,000 deaths and over 200,000 injured per annum. It may be that in these days of universal third-party insurance the tendency to reckon oneself a casualty has increased; but it would probably be safe to assume that incidence of serious head injury with survival must be rising about as fast as deaths from motor accidents. The statistics of the Board of Control concerning admissions to mental hospitals reveal no trace of this. They show admissions attributed to injury as stationary in absolute number and as forming a declining proportion of the total number. This result is due to the fact that they not only fail to discriminate as to severity of injury but also fail to distinguish between injury to the head and to the rest of the body.

It might have been thought that insurance companies would possess collective statistics about incidence and prognosis of mental disorders after such accidents. The companies, if possible, tend to settle claims within the first year after accident. One would, however, expect *a priori* that a settlement would be related to such collective statistics. They exist in the case of epilepsy but not of mental disorder. This is no doubt due in part to the difficulty of defining mental disorder, but since this disregard applies in respect of persistent psychosis one must ascribe it partly to the prevailing underestimation of this as a sequel.

In the absence of satisfactory civilian statistics one might turn for help to the records of military casualties. It is obvious that fractures of the skull in war are accompanied by laceration of the brain and by infection far more often than those in civil life. But apart from such factual differences, there are discrepancies between military and civil findings which cannot be reconciled. This would seem to depend upon the fact that the conclusions as to military cases have been based on an acquaintance with cases that was not close enough or not long enough, upon failure to define terms, and upon other statistical fallacies which will presently be considered.

Official figures concerning casualties of war, both those derived from British and those from foreign sources, agree in dismissing as insignificant the influence of head injury in causation of either neuroses or psychoses. In my view this tendency is greatly overdone.

It is, of course, a truism that of the total of those who were recognized as suffering from a persistent neurosis or psychosis which became manifest during military service, and who have been pensioned or treated by the Ministry for these disabilities, a vast majority owed their disability to a combination in varying degree of neuropathic predisposition and emotional stress. It is further true that of the total number of cases of neurosis and psychosis of war, those which are in any degree the result of serious head injury form a very small proportion indeed. But it may be not merely a logical error to suppose that this last statement can be inverted; it may be one apt to result in grave injustice in both military and civil cases. It may be wrong, in a patient with a history of head injury and with a syndrome indistinguishable from one of those that occur functionally, to dismiss as negligible the chance that the main factor of this syndrome is the physical effect of the head injury.

I propose to deal separately with the problems of neuroses and of psychoses of war and briefly with the former, because there are no civilian figures regarding incidence of neuroses, either with or without head injury. There can therefore be no quantitative evidence from civilian sources as to the probable fallacy involved in disregarding minor mental sequels of gunshot wounds of the head.

My personal experience and that of the Maudsley Hospital would indicate that it is extremely difficult to discriminate sharply the minor organic element in many such cases from accompanying neurosis. But our experience would suggest that, so far as such discrimination is possible, even in healthy young adults persistence of organic mental disability which unfits for employment is very common.

It seems incredible that patients the subject of head injury due to war do not suffer in many cases from residual mental symptoms like those of the "traumatic psychasthenia" that persists in imperfectly recovered civil cases. That such cases do not appear among those drawing pensions for war neuroses may be due to the fact

that while suffering from the usual syndrome they receive their pension for "G.S.W. head." That they do not figure among those treated at Ministry of Pensions clinics and hospitals is due to the same fact: they do not have to attend. More often than in the case of patients with neuroses of emotional origin they are men of an independent type who try to bear the ill they have and get on with it.

Turning to the problem of post-traumatic psychoses there is more to be said. While special factors may operate to some extent in war cases, on the whole there is a very close similarity in the reasons which have led to the underestimation of the influence of head injury in causing psychoses, whether in peace or in war; this gives the problem a continuing importance.

The total incidence of insanity in cases of "G.S.W. head" according to British official records is the same as that for the general male population, which varies from 0.34 to 0.35 per cent. I am informed that experts attached to the German and French equivalents of the Ministry of Pensions stated that they had no evidence other than the cases of actual dementia and mental deterioration after damage to the brain to suggest that psychoses followed "G.S.W. head." Their experience showed that psychoses in general and schizophrenia in particular were as frequent among the civilian population as among men wounded in the head. It is notable that the same experts rejected the belief that trauma might have any influence in accelerating the course of neurosyphilis—a belief held by most clinicians whose experience is detailed rather than statistical.

It is like putting science in blinkers to disregard, in considering such statistics, the possible preconceptions of those who collect them and who draw the deductions. I am afraid that as a clinician I am left obstinately convinced that some undue scepticism on the part of officials tired of importunacy must here be allowed for. The figures indicate that, apart from gross damage to brain, head injury of war has no influence whatever in determining psychoses. Surely this is too good to be true. When a clinician has seen the immediacy with which, in civil cases, psychoses evolve from the early syndrome following concussion without gross damage and either clear up or persist, can he accept such conclusions? Usually he will have seen even a few war cases having such immediate relations. But whether he has done so or not, will he be prepared to believe in such a mysterious difference between psychotic sequelae in war and in peace?

On the contrary, the clinician will be set looking for possible sources of statistical fallacy, and I think here he will easily find half a dozen or more.

(i) Statistics are of negligible value unless confined to cases in which "G.S.W. head" is grave enough to have some real effect on the brain. In so far as statistics of serious cases are diluted with others of mere scalp wounds, naturally incidence of physiogenic mental disorders will approximate to normality.

(ii) The ratio expressing incidence of insanity or of schizophrenia in the male population is not one of astronomical constancy. It has a wide range of variation with age, time, and place. This might allow of some extra incidence among men with "G.S.W. head" without such increase being obvious. (The extra incidence among civilians with serious head injury is far beyond the range of normal variation.)

(iii) It is likely that among those liable to "G.S.W. head" (mostly front-line soldiers) the tendency to such psychoses as idiopathic schizophrenia is below average. If so, incidence up to average would indicate not indifference of "G.S.W. head" but, on the contrary, its influence in off-setting natural immunity.

(iv) Many patients who would be in a mental hospital if suffering from identical symptoms of non-traumatic origin are neither certified nor in any institution if the psychosis be due to head injury of either military or civil causation. Both in peace and in war cases compensation is generally available that makes it possible to keep the patients uncertified at home. This is shown by the high proportion of very chronic, helpless, or troublesome patients among those actually sent.

With regard to the special question of whether a post-traumatic schizophrenia exists, and the incidence of this, two points should be noted:

(A) Refusal to recognize existence of this is often due to an outworn conception of schizophrenia as being not a mere syndrome but a "disease" of constant and specific aetiology. Under the influence of this conception we get argument in a circle. The name "schizophrenia" is withheld from traumatic cases to which it would be applied if a history of injury were absent. Naturally we shall find little schizophrenia as a sequel of head injury if to those cases that might be thus named we apply the so-called diagnosis "insanity with gross brain lesion."

(B) Even if as a general principle the occurrence of schizophrenia with causal relation to head injury is recognized it is easy in the individual cases unduly to minimize the responsibility of trauma by overemphasizing trifling indications that may be seen as precursors of schizophrenia but are also common in those who never develop it. A case for dismissing most actual instances as idiopathic rather than traumatic can be bolstered up by use of such evidence.

The whole situation becomes analogous to that of epilepsy once it is grasped that, like epilepsy, schizophrenia is the name of a syndrome and that the idiopathic variety is merely the commonest among many. We see that after head injury schizophrenia may, like epilepsy, appear early, and may then be transient or may persist. It may occur later with an interval of normality. While responsibility of trauma for fits is recognized although these first occur after an interval of years, I should not for the present suggest such recognition in the case of schizophrenia appearing after an interval of more than a few months. Thus the evidence of connexion is much stronger in cases of "traumatic schizophrenia" hereafter cited than is usually required for diagnosis of "traumatic epilepsy."

2. Evidence from Hitherto Unpublished Data

Personally I have always found it difficult to reconcile statements made by pensions officials of various countries concerning absence of causal relation between head injury and mental disorder with one's clinical experience showing the immediacy of sequence. Thus it has seemed worth while, in respect of civilian cases, to try and frame some statistics that are based upon either personal knowledge of the patients or at least upon a detailed study of the clinical records made by psychiatrists in charge of the cases. One difficulty which arises is that the impression which any psychiatrist would get regarding the incidence, nature, and outlook of traumatic mental disorder would vary enormously according to the conditions under which he practised. I have therefore thought it might be useful to collate: (i) All instances, among a series of 5,000 psychiatric cases seen consecutively in private practice, in which serious head injury and definite mental disorder coexisted and in which there appeared to be a clear causal relation between them. (ii) All similar instances from each variety of L.C.C. institution at which may be treated any sequels of head injury that come under a psychiatrist at all.

The collation of the statistics from various types of L.C.C. institution has involved preliminary examination of

over 30,000 case records. I have to express thanks to the medical superintendents of twelve institutions for granting access to these records and at the same time to the medical staff and social workers for all the trouble they have taken in searching for relevant cases. It is hoped that others may be able from special standpoints to make a more adequate analysis of the cases so extracted.

CASES SEEN IN PRIVATE PRACTICE

There were 123 cases in which mental disorder was said to be present and was attributed to an alleged head injury among 5,000 consecutive patients seen privately. However, forty-three of these 123 patients were seen for medico-legal purposes and only eighty for purely medical reasons. This situation contributed to the fact that of the 123 the relation was truly causal in ninety-two but not so in thirty-one. Disregarding the latter, the proportion of cases in which mental disorder and head injury were causally related among all those seen privately works out at 18 per 1,000.

The group of thirty-one cases were excluded from the eventual comparison with other groups derived from various municipal institutions (which had been similarly weeded). In all such groups there might be a tendency towards inclusion of too many cases as illustrating correlation of mental disorder with head injury. One needs constantly to check this tendency, which results from several causes. First, the distortion of history to which relatives are prone. The temptation in "idiopathic" cases to find some event that can be held responsible is almost irresistible. Attribution to injury is to most relatives more agreeable than admitting mental disorder to be constitutional and perhaps hereditary. In medico-legal cases, of course, there is an added incentive for distortion—a hope of pension, or of damages for injury sustained during employment or in a road accident.

Among the thirty-one excluded cases were many presenting difficult and interesting problems of aetiology. Some details will illustrate the similar sort of weeding that had to be done in respect also of the groups from L.C.C. institutions.

31 Cases in which Mental Disorder was Said to be Present and was Attributed to Alleged Head Injury, but which were Excluded as not having True Causal Relation

(a) Organic disease with mental incapacity existing before accident (whether unchanged or aggravated by it):

Epilepsy, 2; general paralysis, 1; post-encephalitic Parkinsonism, 1; arteriosclerosis, 3; meningovascular neurosyphilis, 1.

(b) Mental disorder without well-defined physical disease existing before accident (whether unchanged or aggravated by it):

(i) Injury unconnected: amentia, 1; schizophrenia and paraphrenia, 4.

(ii) Injury suicidal and due to prior psychosis, 3.

(iii) Injury due to alcoholism, 3.

(c) Mental disorder developed after injury but independently of it (as shown by long interval):

Idiopathic schizophrenia, 4; idiopathic epilepsy, 1.

(d) Malingering, 7.

CASES TREATED AT VARIOUS L.C.C. INSTITUTIONS

1. During the five years 1932 to 1936 inclusive there were 12,000 admissions to the seven London County mental hospitals receiving the certifiably insane from London south of the Thames and thus serving a population of some two millions. Of these 12,000, mental disorder was causally related to head injury in thirty-three—that is, approximately in 3 per 1,000 admissions. This group contained a large proportion of very late cases and those of bad prognosis and often difficult to nurse—for

example, those complicated by epilepsy or arteriosclerosis. If cases were admitted early it was commonly on account of some antisocial propensity such as epileptoid mental paroxysms or persistent demoralization. This bears out the view that the number of those certified as suffering from insanity due to head injury gives no real estimate even of the psychotic results due to this cause.

2. During the same period 4,000 patients were admitted to two of the London observation wards which I visited weekly. Of this total sixteen were suffering from mental disorder clearly attributable to head injury—approximately 4 per 1,000 admissions. The majority fell into two subgroups: to one the same remarks apply as to mental hospital cases. The other subgroup was made up of quite early cases too troublesome to nurse in ordinary wards on account of "cerebral irritation" or similar restless excitement, from which they were suffering when first seen.

3. Among 7,000 consecutive registrations at the psychiatric out-patient clinics of North London which are

and to deal as out-patients with those having relatively minor consequences (either psychogenic or physiogenic).

Since the number in this series is too small, and since admission was selective and was based on three independent reasons, no general conclusions can be drawn as to the incidence or the prognosis of traumatic mental disorder as a whole or of particular forms of this. But the series possesses considerable value as a set of examples because it has proved possible to trace all patients of the series and without exception to ascertain their present condition—in many cases years after treatment. The series at least suggests in a preliminary way the future which may be anticipated for a number of syndromes and the influence upon prognosis of a number of complicating factors additional to the head injury.

Detailed study of clinical records of all the cases figuring in Tables I and II reveals occurrence after head injury and, within at most six months, of a large number of psychotic sequels of both the psychogenic and physiogenic types.

TABLE I.—A Study of Cases of Head Injury with which were associated Mental Syndromes Definitely Attributable to Injury

	Total Seen Privately, 92. Total In-Patients at Maudsley, 51						Northern Clinics, 44		Observa- tion Wards, 19	Mental Hospitals, 38	Total All Sources
	Private Practice only, 77		Seen Privately, afterwards at Maudsley, 15		Maudsley Hospital, 36						
	Psychoses 23	Neuroses 54	Psychoses 13	Neuroses 2	Psychoses 24	Neuroses 12	Psychoses 13	Neuroses 31	Psychoses 19	Neuroses 38	
Total of each group											229
Instances of :											
(1) Known fracture	4	9	5	1	9	3	—	—	5	8	44
(2) Evidence of compression by haemorrhage		5	1		2				1	3	12
(3) Epilepsy	1	8	1		4		1		2	8	25
(4) Specialized mental syn- dromes :											
(a) Cortical anaesthesia and cortical paresis :											
Agnosia		8	3	1	3		1		1	3	20
Apraxia											
Sensory aphasia ..											
Motor											
(b) Korsakoff's syn- drome	3		3						4	1	11
(c) Demoralization ..	6				2				5	6	19
(d) Epileptoid mental paroxysm	2		2				3		3	5	15
(5) Generalized syndromes :											
Schizophrenic and para- phrenic dementia ..	11		5		9		5		7	12	49

an offshoot of the out-patient department of the Maudsley Hospital there were forty-six having a definitely causal relation between symptoms and head injury—a proportion of nearly 7 per 1,000. This figure is intermediate between that for the mental hospitals and observation wards on the one hand and private practice on the other. The reason, of course, is obvious.

4. A final group of patients to be considered comprises fifty-one with the same causal relation who were treated as in-patients at the Maudsley Hospital during the years 1923 to 1936 among a total of 7,000 (this group of fifty-one included fifteen derived from my own series of ninety-two). The patients of this group have been specially studied by Dr. Tennent.

Of these Maudsley in-patients thirteen might have been classified as neurotic and thirty-eight as psychotic. The first qualification for admission was either good prognosis or scientific interest, but there is naturally a tendency to treat in the wards patients with relatively severe sequels

TABLE II.—Cases of Psychosis Following Head Injury within Six Months

	Affective Group (21 Cases)		Schizophrenic Paranoid Group (49 Cases)	
	Number With Definite Prior Evidence	Number Without Definite Prior Evidence	Number With Definite Prior Evidence	Number Without Definite Prior Evidence
Cases having onset without interval after injury ..	13	0	9	24
Cases having onset with interval after injury ..	1	1	0	12
Cases having recurrent attacks after injury	4	2	2	2

Psychogenic Sequels of Head Injury

It will be convenient here to deal briefly with the occurrence of affective syndromes (including anxiety states) after head injury. Hysteria may be dealt with

at the same time, since to this applies most of what is to be said.

In determining any of these syndromes the physical effect of the injury is of minimal importance—as witness the fact that they often occur in cases with no retrograde amnesia at all. The important factors are: (i) the purely emotional shock experienced at the time of the accident or subsequent distress caused by any impairment of the patient's bodily condition or external circumstances; (ii) the constitution at the time of accident—that is, the resultant of inborn tendencies and the evolution of these which has been determined by age, physiological epochs, and any prior experience (mental or physical).

Minor degrees of affective disturbance (and minor paranoid reactions) may follow head injury in virtue mainly of the first group of factors or, at least, of these coupled with minor constitutional abnormalities. Affective and paranoid developments of psychotic severity after trauma occur almost exclusively in those with evidence of major neuropathic tendency (previous attack, persistent abnormality of some degree, or strong family history). This is indicated by Table II in respect of major affective cases.

Hysteria.—This term is used here in a strictly limited sense—the representation or exaggeration of some incapacity (whether physical or mental) motivated by desire to obtain pleasure or reduce displeasure with incomplete knowledge of the motive or intention for representation or exaggeration. If knowledge is complete then the condition is malingering; if such insight is totally and permanently lacking then we are dealing with a psychotic condition which should hardly be called hysteria. The transition from one to other category may be entirely continuous in different cases or in the same one.

Hysteria as a factor of any degree whatever in post-traumatic mental syndrome is far less frequent than used to be thought, and as the whole mental picture it is still less common. It was present in thirteen out of my series of ninety-two cases, but in four at least of these it was combined with either physiogenic disability or with affective disturbance that was not motivated. Even that gives an unduly high idea of its prevalence owing to the large proportion of medico-legal cases in my series.

It is a gross mistake to look only to financial motives for hysteria even in compensation cases, as shown by one case in a mental hospital where the whole mental syndrome was hysteria following head injury. Even when money is the main motive, those of us most conscious of our own rectitude need not be entirely scornful. The patient with any physiogenic disability often regards the capitalization of it at the highest figure as being a duty to his family and his sole chance of doing anything for them and is usually prompted by his wife.

Mental Syndromes having Physiogenic Relation to Head Injury

Physiogenic syndromes appear to fall into two classes:

(A) Disorder of specialized mental functions, probably associated with damage to particular neuron patterns and so perhaps with lesions of focal distribution.—This class includes cortical impairments of perception and of voluntary movement; agnosias and apraxias of various types; sensory and motor aphasia. Also in my opinion Korsakoff's syndrome; demoralization; epileptoid mental paroxysms.

(B) More generalized types of mental disturbance, probably associated with diffuse impairment at one of a series of cortical levels.

I should incline to suggest that the universal sequence of stages during recovery in a very severe case is as follows: (1) Coma. (2) Confusional states with: (a) stupor; (b) active delirium. (3) Schizoid states with: (a) schizoid stupor; (b) schizoid activities. (4) Psychasthenic states with: (a) depersonalization and derealization; (b) obsessional thought, feeling, and action.

A. SPECIALIZED PHYSIOGENIC SYNDROMES FOLLOWING HEAD INJURY

As stated these may include (i) cortical impairments of perception and voluntary movements; agnosias and apraxias; sensory and motor aphasia; (ii) Korsakoff's psychosis; demoralization and epileptoid mental paroxysms. I do not intend here to say more about the items of subgroup (i), but something about those of subgroup (ii).

Korsakoff's Syndrome.—This has been regarded by Symonds as one of the universal stages in the process of recovery from any mental impairment by head injury which goes as far as loss of consciousness. I should be loath to agree on theoretical grounds; if at any stage in the universal process of recovery mental disturbance were limited to that extremely specialized incapacity to which this distinctive name can most usefully be restricted, then the fact would seem destructive of an illuminating generalization which Symonds himself has expounded. Clinical fact, of course, and not theoretical preconceptions must decide. But I have not found fact as suggested.

Demoralization of every kind is another occasional sequel which is apt to become apparent after an interval. By demoralization is meant habitual disregard coupled with consciousness of the anti-social character of one's acts in pursuit of pleasure or avoidance of displeasure. There were nineteen cases among all the psychotic cases which I investigated—including six among my own. It is most common by far among children, and among adults I think it was commoner in soldiers, and for the same reasons that produced a wave of criminality as an aftermath of war. It is not confined to those who have been morally below par before the accident. Though usually a psychogenic element is traceable in determination of the condition it cannot be wholly explained thus. It may be an almost isolated anomaly or may be associated with widespread deterioration of various kinds and degrees.

Epileptoid Mental Paroxysms.—What are popularly called "brain storms" usually include violence. They may be associated with persistent demoralization or with a schizophrenic state, or with liability to motor convulsions. But they may also occur in post-traumatic patients who for most of the time are decent citizens. They were relatively common among those who had a head wound in war, and are specially liable to be precipitated by a small amount of drink.

B. GENERALIZED MENTAL DISTURBANCES

Certain principles emphasized by Dr. Symonds concerning these appear in essence to be not only true but to exemplify conceptions of great importance; these conceptions have a much wider significance in psychiatry than their particular application to post-traumatic mental syndromes. The objective facts are as follows.

In respect of these syndromes a constant sequence can be recognized. According to the severity of general disturbance to the brain, impairment proceeds as far as one of a definite series of syndromes of which the most extreme is coma. In the course of recovery these syndromes can be recognized as a series of stages, and recovery necessarily proceeds in regular order from one to another of them.

While that order is constant the total duration of recovery may vary from one hour or less to weeks or months. Not only so, but the duration of halt at particular stages of the sequence is variable. Secondary dissolution may reverse the order of recovery.

Such principles will appeal to any psychiatrist whose general outlook is influenced by the thought of Hughlings Jackson. These principles represent the generalized organic syndromes of traumatic mental disorder as a sequence, the connexion between which is inherent in the normal structure of the central nervous system.

Economy of hypothesis renders such a view preferable to another which seeks cause for separate syndromes in distinct pathological processes. The onus is upon those who hold the second view to demonstrate the alleged specific changes, and it seems very doubtful that this can be done.

On the one hand an early stage in recovery of post-traumatic mental disorder ("cerebral irritation") and on the other hand the final stage (what I like to call traumatic psychasthenia) have by separate observers been ascribed to cerebral oedema. If in either case manometer readings of the cerebrospinal fluid or ventriculograms were decisive, or if the results of hypertonic treatment were conclusive, then we should have to accept these findings regardless of theory; no such proof exists so far as I know.

Traumatic Schizophrenia and Paraphrenia.—As a universal stage in the process of recovery there seems to occur a generalized disturbance which corresponds to the essence of the schizophrenic and paraphrenic syndromes (as these are seen in their most common form—the idiopathic or endogenous). Again something has to be allowed for age, rate of progress, duration, and the addition to the clinical picture in traumatic cases of disabilities due to grosser and even localized damage. My findings seem to show that the occurrence of schizophrenia or paraphrenia as a stabilization of a universally occurring schizoid stage is common, that relapse into such a psychosis in a few months is frequent, and in either case the attack may be transient or the change lasting.

With regard to evidence of prior neuropathic tendency, frequency is much less with schizophrenic and paraphrenic sequels than with affective disorders.

(a) In a proportion of the cases there is evidence of prior schizoid or paranoid disposition (previous attack, persistent abnormality of some degree, or strong family history). Even here it is to be noted that the evolution of a psychosis which incapacitates the patients usually occurs after the accident without interval. (b) In a somewhat larger proportion the psychosis of the same type develops a few months after the accident in a patient who has no pre-traumatic history indicating such liability; this is comparable to what commonly occurs with traumatic epilepsy. (c) In a proportion larger than the two former combined a psychosis of the same type develops with neither interval nor evidence of pre-traumatic tendency.

In the face of such evidence it is unscientific to dismiss such sequels as due merely to coincidence or to the antecedent of a tendency that anyhow would have become overt later. There is no reason to regard the causation as psychogenic. In fact, the conclusion cannot be escaped that a considerable number of psychoses of schizophrenic and paraphrenic type occur as direct and physiogenic sequels of head injury.

Traumatic Psychasthenia.—I believe persistence of ultimate incapacity for employment by mental disabilities which are not gross and obvious to be more common than Dr. Symonds does. The physical character of the con-

dition is indicated by the almost constant incidence of headache and dizziness, especially on stooping or moving the head. Allowing for differences attributable to age of onset, to rate of progress, and to duration, the content of this terminal stage corresponds pretty closely to that covered by the inclusive term "psychasthenia" according to its usage by Janet. I feel that this term, which has been allowed to become obsolete, would serve a useful function as a comprehensive category covering negative and positive symptoms due to derangements at the highest mental level. It seems to have the same sort of right to recognition as the accepted term schizophrenia—namely, a right based on specially frequent coexistence of certain symptoms and minor syndromes in different cases, and upon the fact that these same symptoms and minor syndromes are apt to occur successively in a single case.

Prognosis of Mental Disorder Associated with Head Injury

This prognosis depends primarily on how far the association is (a) accidental; (b) psychogenic; (c) physiogenic.

(a) No discussion is possible here of cases in which head injury is not one factor of the mental disturbance. It is of course never the single cause: there are no single causes in psychiatry.

(b) *Psychogenic Disturbances.*—(i) Major attacks of affective disturbance and major paranoid states run their characteristic course. If purely affective they are not influenced in any specific way by being related to trauma.

(ii) Minor affective reactions, including anxiety states, being less related to constitutional bias and more to the emotional shock of trauma and the damage wrought to the patient's health and circumstances, tend to last as long as this damage and to improve in so far as it can be reduced. The prognosis of hysteria depends on the importance of the constitutional factor and the motivation. When related to compensation it will usually clear unless so protracted that a taste for idle invalidism has become ingrained.

(c) *Physiogenic Results.*—(i) The occurrence of fracture of skull or of compression by haemorrhage in early stages has no importance other than any which it may derive from likelihood of being associated with grave damage to the brain. There seems to be no evidence as to total frequency of known presence of fracture in two groups respectively—namely, those in which after consciousness fully returns some mental derangement persists and those in whom none does. But it seems that known presence of fracture is proportionally as common among those cases in which mental disorder never exceeds a "neurosis" as among those in which it amounts to a "psychosis."

(ii) Certain of the specialized forms of organic mental disturbance clear up in the great majority of cases so far as they themselves are concerned. This applies to cortical anaesthesia and paresis, to agnosia and apraxia, and to sensory and motor aphasia. But they are present in cases where serious damage to the brain has occurred, and there is greater likelihood of persistent traumatic psychasthenia following.

(iii) The same principles apply in the case of Korsakoff's psychosis—namely, almost invariable disappearance of the syndrome itself, but frequent persistence of traumatic psychasthenia in the same patient.

(iv) The occurrence of traumatic epilepsy is of specially bad prognosis: development of progressive dementia is common with this.

(v) The outlook in cases with epileptoid mental paroxysms or with persistent demoralization is almost uniformly bad.

(vi) In many cases with an acute schizoid or paranoid syndrome that develops during the acute phase of the illness this clears up.

(vii) Disappearance of the same syndromes is less frequent if they follow after any interval, however short, of apparent normality.

(viii) Residual symptoms having at least the severity of those termed traumatic psychasthenia are very common. The condition is of good prognosis up to about two years, but any change which persists longer than this is apt to be permanent. In assessing the degree and importance of residual defect standardized tests are of little value. Symptoms that are reported by a reliable and unbiased witness as occurring but which cannot be detected at interview must be accepted. Many of the minor changes of this condition—such as lack of initiative, retardation, loss of memory for engagements, indecision—which need not transpire at interview, may destroy the usefulness of anybody doing responsible work.

(ix) While the syndrome traumatic psychasthenia may remain stationary, it may, on the other hand, be the starting-point of a progressive deterioration into dementia.

(x) Permanent change is more likely (a) at the extremes of life; (b) when organic disease exists—for example, arteriosclerosis; (c) when there is a constitutional psychopathic tendency. It must be recognized, however, that even in young adults, and even in absence of any of the grosser psychotic sequels, traumatic psychasthenia may persist.

MENTAL SYMPTOMS ASSOCIATED WITH HEAD INJURY

THE NEUROLOGICAL ASPECT*

BY

J. P. MARTIN, M.D., F.R.C.P.

Physician to Out-Patients, National Hospital for Nervous Diseases, Queen Square; Neurologist to the British Postgraduate Medical School

In considering the mental disturbances which frequently result from injuries to the head we recognize at once two groups or chains of possible causal circumstances. The first consists of material elements and comprises the organic injuries of the brain and the subsequent reactive changes in the cerebral tissues. The second consists of abstract elements and comprises the emotional disturbances connected either immediately with the accident itself or with the patient's adaptation to his normal life afterwards, and if the question of compensation arises it adds to this group further elements of anxiety and possibly greed. Both the material and the abstract factors react by their different means on a mental constitution and a mental content which are in large measure peculiar for each individual. The thread of the material effects and the patient's mental constitution are the warp and the woof of the weave of mental symptoms, and the emotional effects are printed on; but we who find it difficult enough to make out the pattern may often be in doubt as to what is imprint and what is woven in the texture.

The range of our subject includes cases of many different kinds, and I have grouped them below chiefly according to their physical nature, but I shall have time only for brief discussion of two or three of these groups.

Classification in Groups

The subject as I see it contains the following groups. In many cases the initial mental symptom is unconsciousness, using the word in its popular sense—that is to say, the abolition of all signs of mental activity.

1. Cases of "simple concussion" in which the unconsciousness is usually of brief duration and there is no indication that

the brain has been organically injured.—I have never seen any "mental" symptoms persisting in such cases, with the exception of one quite atypical instance which will be referred to in group 7.

2. More severe cases in which unconsciousness is usually more prolonged and there is conclusive or strong presumptive evidence of organic injury of the brain.—In such cases recovery is occasionally characterized by profound mental disorder lasting many weeks or months, and it is with such instances that we are most concerned to-day.

2a. Rare cases of this kind in which, recovery having reached a certain stage, relapse occurs and the patient sinks into a state of dementia—cases of "late dementia."—I have seen three such cases, and the descriptions of them are fairly common in the literature.

3. Cases in which there has been actual loss or known gross local damage of cerebral tissue which may in itself be responsible for mental changes.—I have in mind cases with open wounds through which cerebral tissue has been extruded, cases of gun-shot wounds and perforating injuries, and cases of depressed fracture in which the damage is local.

4. Cases of intracranial haemorrhage, particularly (a) traumatic subarachnoid haemorrhage, and (b) subdural haematoma.—Here the physical factors appear relatively simple, while on the psychological side the cases differ obviously from those of the earlier groups in that the sequence of mental changes is from normality down to coma instead of from coma upwards.

5. Cases in which fits occur and are accompanied by intellectual deterioration.—The fits are likely to begin long after the injury, and the factors responsible for the mental symptoms are evidently different from those operating in the preceding groups.

6. Cases of so-called "traumatic neurasthenia."—The physical evidences of injury, if there were any, have disappeared (or have been allowed for), but mental symptoms of a nature that we know well have become apparent. This is a difficult and complex group, which we must try to unravel.

7. Cases in which the mental symptoms, persisting after the accident, are those of one of the well-known types of psychosis and probably depend essentially on the patients' antecedent mental constitution.—Cases of manic-depressive psychosis, schizophrenia, and paranoia have all been described following head injuries. I have myself had one case in which a dementia with schizophrenic features followed, in a boy of 16, an injury which caused unconsciousness for about half an hour and no outward signs of organic damage to the brain. It is difficult to know for how much the physical factors count in such instances.

Stages towards Intellectual Recovery

In group 2 the physical concomitants usually leave little doubt that the brain has been organically damaged. There are probably signs of fracture of the skull and possibly cranial nerve disturbances, reflex changes, signs of local weakness of limbs, or blood in the cerebrospinal fluid. The initial stupor may last a number of hours or several days, and the return of mental activities is gradual. In the vast majority of cases the patient passes as "normal" mentally within a few days, and if I describe cases in which recovery takes weeks or months it is because of their great intrinsic interest and because of the light they throw on other cases. The course of events is somewhat as follows.

THE IRRITABLE AND NOISY PHASE

The patient ceases to be entirely passive when moved or touched, and makes grimaces or movements—and soon utters words—expressive of resentment. Within a very short time he may become abusive when attended to or even when spoken to. This phase varies in duration from a few hours to many weeks. It is sometimes accompanied by periods of restlessness and noisiness, and I have had

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