resignation; but the paper was found scrawled all over with "Je suis fou." During the last year of his life the patient, who had always been a great card player, spent nearly all his time in dealing real or imaginary cards. Once he lay upon the floor for fourteen hours at a stretch playing with imaginary cards. Convulsions became more and more frequent, mental deterioration and paralysis increased, and after three months' confinement to bed death ensued, the patient persisting to the last that he was Sultan of Turkey. This case was preceded by much sexual excess, but not by syphilis.

On Post-Epileptic States: A Contribution to the Comparative Study of Insanities. By J. Hughlings Jackson, M.D., F.R.C.P., LL.D., F.R.S., Physician to the London Hospital and to the National Hospital for the Epileptic and Paralyzed.

(*Continued from p.* 365.)

Section VIII. Need of Wide Clinical Knowledge.—If anyone thinks that the study of Diseases of the Nervous System as they are Dissolutions will take his attention from their clinical or practical consideration he is mistaken. I urge two methods of study, one scientific and one clinical. Without a considerable clinical knowledge of cases no one is fitted to begin the scientific, comparative, study of nervous diseases. For the scientific study of insanities a very wide clinical knowledge is necessary. It would never do to confine attention to cases described in text-books by Alienist Physicians, to what I may call "orthodox" cases of insanity. Not being an Alienist Physician I say this, and what follows in the present Section, under correction by the Members of this Society, who of necessity know very much more of "Diseases of the Mind" than I do. I should not presume to address Alienist Physicians on their special subject had I not the hope that from a long study of simpler diseases of the Nervous System, I might contribute something of at least indirect value for the elucidation of the most complex problems they have to deal with. In a later section I shall urge a study of cases of abnormal mental affections, many of which are not, in a clinical regard, cases of insanity at all, and, so far as I know, are not dwelt upon in books on Insanity.

Further, we must, in such an inquiry as this, study diseases of the Nervous System which are in no reasonable sense cases of Insanity regarded from any standpoint. It is a legitimate hypothesis that the same fundamental principles apply to all nervous diseases whatsoever, from such as paralysis of an external rectus up to insanity. I have illustrated this, Section IV. The Alienist Physician, above all other physicians, should have a large general knowledge of the simpler nervous diseases before he tries to explain the most difficult of all diseases whatsoever. On the principle of studying simple things as a basis for the elucidation of the more complex we should deal with foot-clonus after an epileptic fit as well as with elaborate and universal movements, as in epileptic mania, after one; both symptoms exemplify the same principle, "loss of control." Before anyone studies epileptic paroxysms, surely he ought to study epileptiform paroxysms, which are vastly simpler. If we do not know well what is found after these comparatively simple seizures we ought to be diffident in concluding as to the nature of post-epileptic states. Finding unmistakable paralysis after the simple fits, we are justified in stating the hypothesis that there is paralysis after epileptic fits; we can then seek evidence of very different kinds towards proving and disproving the existence of that paralysis. Towards this end we should study cases of aphasia; especially should we study temporary aphasia after certain epileptiform seizures; all the more because this aphasia is often associated with paralysis of the face or arm, or both. That the physical condition correlative with loss of words is loss of nervous arrangements, representing complex, etc., movements of the tongue, palate, lips, etc., is, I think, as certain as that the paralysis of the arm and leg that so often goes with the aphasia is loss of movements of those limbs.

In the preceding remarks is the excuse, if any be needed, for going so much further afield than is the custom when dealing with one subject. But the "one" subject, post-epileptic states, refuses methodical consideration apart from other nervous diseases. Every nervous disease, being a flaw in one great evolutionary system, demands consideration as wide as we can make it with precision.

That certain general principles, implicitly stated in the formula of evolution, apply to all diseases of the Nervous System is an hypothesis verified only in some cases. It is

quite certain that both hemiplegia and aphasia display reduction from the complex, special, etc., towards the simple, general, etc.; and that the principle exemplified in these two cases applies to some simple cases of Insanity is equally certain. It is quite fair to apply the hypothesis in all cases of nervous disease; this remark will sound strangely, of course, to those who erroneously suppose that an hypothesis, a supposition, is a conclusion, which it is not.

Since, according to the doctrine of Evolution, the highest centres (Section V.) represent all parts of the body, a case of Insanity being a disease of these centres, is physically the evolutionary sum of something out of disease of every part of the body; speaking very crudely, it is the representative of diseases of all parts of the body. Hence we should study the simple diseases of the spinal cord, medulla oblongata, and pons Varolii (which are, so to say, "detailed nervous diseases," being of small regions of the body), as a preparation for the study of insanities, exceedingly complex diseases of the highest centres (which are diseases of centres representing all parts of the body in wholes). Moreover, just as in the study of Insanity, we do not limit attention to cases described in text-books on that disease, so we should not limit attention to cases of disease of the cord, medulla, and pons described in ordinary neurological text-books.

Section IX. Limitation of the Inquiry into Mental Disorders of Epileptics.—It is frequently said that temporary elaborate abnormal actions sometimes occur periodically in epileptics, whilst they are "unconscious," unpreceded by an epileptic fit of even a slight degree. Dr. Clouston, in his very valuable work, "Mental Diseases," says that mental symptoms essentially periodic and paroxysmal most often occur after the fits. But he mentions five other ways in which "Epileptic Insanity" occurs in relation with them. Dr. Savage, in a most important article, entitled "Some of the Relationships between Epilepsy and Insanity," *Brain*, January, 1887, when speaking of what is called masked Epilepsy, expresses the opinion that in most of these cases a fit of some sort, great or small, does occur before the strange acts. Again, to give a quotation from that article, "I have met with but few cases of true masked epilepsy, and in none have I been convinced that no fit had occurred." In his work, "Insanity and Allied Neuroses," p. 384, Dr. Savage writes, "It is common to meet with cases in which,

immediately before or after the fit, an outburst of uncontrollable fury of the most destructive kind takes place." But he speaks, too, of such outbursts as most commonly occurring after the fits, and on sudden return to consciousness.

I believe I may assume that the majority of Alienist Physicians admit that *suddenly* occurring *temporary* abnormal elaborate actions during unconsciousness in Epileptics (and it is with such cases only that I deal) are in most instances preceded by a fit, although not, as my hypothesis is, in all instances. I do not undertake to show the converse—that there are actions after every epileptic fit. In the process of slow re-evolution, during return to complete consciousness after slight fits, there are really often actions which are little heeded as post-epileptic states; the patient may take out his watch, look at his papers, ask what day it is, what o'clock it is, etc. (re-orientation).

I may here express my surprise that I have not succeeded in making evident that my belief is that elaborate actions during unconsciousness in Epileptics occur *after* paroxysms. The title of an Article I published, "Medical Times and Gazette," July 19th, 1873, is "Remarks on the Double Condition of Loss of Consciousness and Mental Automatism *following* certain Epileptic Seizures." I now give a quotation from that article, ". . . Dr. Hughlings Jackson does not believe, as he used to do (see this Journal ['Medical Times and Gazette'] December 14th, 1867, p. 642), that the Mental Automatism of Epileptics—epileptic mania, for example—is the result of the discharge [epileptic] of any part of the brain, that is to say, *not the direct result*. The duplex condition is found, he considers, when the discharge is *over*. The mental Automatism is one of the indirect results of the [epileptic] discharge. It is true that in some cases of sudden mania [in Epileptics] a prior seizure is not witnessed. Hence, some say that mania occasionally 'replaces' a fit. (This is the very opposite of the view now being stated.)" (Italics in original. The words in square brackets alone are new.) The title of another paper ("On Temporary Mental Disorders *after* Epileptic Paroxysms," West Riding Asylum Reports, Vol. v., 1875), shows that I have continued to hold the doctrine that suddenly occurring elaborate abnormal states in epileptics occur *after* their fits. I argued to the same effect (Croonian Lectures, "British Medical Journal," April 5th, 1884).

Section X. Degrees of Post-Epileptic States.—There are

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three degrees. (1) What may roughly be called "Confusion of thought;" there is here a mental condition of two opposite elements, (*a*) slight defect of consciousness, and (*b*) persistence of the rest of consciousness.* (2) (*a*) So-called "loss" of consciousness with (*b*) actions. (3) (*a*) coma with (*b*) persistence, seemingly, of "vital" operations only.

That the three degrees do occur after epileptic fits of different severities is certain; therefore, each of them ought to be considered in this inquiry. Yet I think the custom is to deal only with the second degree, as if the first and third required no explanation as post-epileptic states. But surely coma after an epileptic fit ought to be considered in the same inquiry as that in which unconsciousness with mania after such a fit is considered. Is it not unmethodical to cut off the first and third degrees and to deal only with the second degree of one series of states found after epileptic paroxysms?

Section XI. Three depths of Dissolution: Shallows of Evolution Corresponding.—It is convenient here, although somewhat out of order, to remark in mere outline on the physical conditions of the Three Degrees as they are three different depths of Dissolution of the Highest Centres with correspondingly three different shallows of Evolution remaining.† I shall, for convenience sake, speak of the Highest Centres as if they were made up of "layers," which of course they are not: I say particularly that I am not thinking of layers of cells of the cerebral cortex; I am speaking quite artificially, and, so to say, diagrammatically. I shall assume that there are four layers.‡

(1) In the first degree there is loss of function (effected by the prior epileptic discharge) of the first, highest layer (first depth of Dissolution). To this answers the negative affec-

* In former papers (see this Journal, April, 1887, Section XVIII.), I have spoken of what is known as the Intellectual Aura (I call it "dreamy state") as being the positive element in some cases of the first degree of post-epileptic states. In this paper a more inclusive expression is used. I now feel uncertain as to the exact symptomatological nature of the "dreamy state."

† I never use the expressions Evolution and Dissolution of the Mind. It would be convenient perhaps to use them sometimes if one could be sure that they would be taken to imply mere parallelism with Evolution and Dissolution of the highest cerebral centres of the Nervous System.

‡ I speak at present of Dissolution after epileptic fits as being uniform, as if, that is, all the divisions of the highest centres were evenly lowered in function. Yet, I believe that the Dissolution in these cases preponderates in one lateral half of the brain; that there is local Dissolution of the highest centres. I shall rectify the statement made in the text later on.

tion of consciousness. The lower level of evolution (we should say sub-level) is the second layer during activities of which the consciousness remaining arises.

(2) In the second degree, the first and second layers are functionless (second depth of Dissolution). To this answers the "loss" of consciousness. The level of Evolution, being the third layer, is shallower, and during its activities (or, as some would say from them) the actions * arise.

(3) In the third degree the Dissolution is still deeper. It is of the first, second, and third layers, and, correspondingly, there is still greater negative affection of consciousness, coma. The lower level of Evolution is the fourth layer, and possibly no consciousness attends its activities. Of course, it may be held that in this degree all four layers of the highest centres are quite out of function, a view I do not take.

In all cases, whether in health or in Disease, the activities of the Highest layer are determined from below. The Lower Level of Evolution in the second degree, although we spoke of it as being the third layer, is the whole of the Nervous System except the highest two layers of the highest centres. If there be any psychical states in this degree they attend activities of the third layer, which is the highest there is then.

It is not held that in any of the three degrees the Dissolution is confined to the Highest Centres, although the illustration by the artifice of layers literally taken declares that it is. But the illustrations are purely artificial. And even supposing that the highest centres were in layers the Dissolution would not really be abruptly limited to this or those layers, as I have, for convenience, stated it to be. Unquestionably, plainly after severe fits, the lowest of all centres undergo some Dissolution. Loss of the knee-jerks after some epileptic fits (Westphal, Gowers, Beevor) shows that some spinal centres have lost function. The Dissolution in deep post-epileptic coma is highly compound; it may be rudely symbolized (using the initial letters of highest, middle, and lowest centres with indices, but with no pretence of exact quantification) as $h^3 + m^2 + 1$. This is only a way of saying over again that there is (Section V.) loss of some of three

* I use the term action in a psychical sense; actions are psychical states corresponding to certain movements of the limbs, etc., in the same way as the psychical states words (also actions) correspond to certain complex, etc., movements of the tongue, palate, lips, etc.

orders of movements, most complex, less complex, and most simple. We are at present neglecting the important fact that post-epileptic Dissolution is in this way Compound.*

Section XII. The Comparative Study of Insanities.—The Comparative Study of Insanities is by regarding all "Mental Diseases," of which post-epileptic states are some, as Dissolutions beginning in the highest (cerebral) centres of a great sensori-motor mechanism. Such a study is of three kinds.

(1) We may consider different kinds of insanity in comparison and contrast with one another; that is, as they are physically owing to Dissolutions beginning, or preponderating, in different divisions of the highest centres (Local Dissolutions of these centres). For example, we might compare and contrast cases of melancholia with cases of general paralysis; hypothetically in the former there is Dissolution beginning in the posterior, in the latter beginning in the anterior lobes of the cerebrum.

(2) We may compare and contrast different degrees of the same kind of insanity; that is, as each is a different depth of Dissolution of the same division of the highest centres, the three degrees of the post-epileptic condition, for example.

(3) We may consider insanities (as they are diseases of the highest centres) in comparison and contrast with diseases of lower centres, with aphasia and hemiplegia, for example.

The comparisons and contrasts we mean are (1) of the *physical* conditions of different insanities with one another; (2) of degrees of the *physical* conditions in the same kind of insanity, and (3) of the *physical* conditions in insanities with

* There is nothing more important regarding Evolution and Dissolution than that they are processes, respectively, of increase and decrease in Compound Order. I have long been possessed by this notion. I gave an example of it (*Med. Times and Gaz.*, Dec. 19, 1868) when stating details of the sequence of spasm in a case of epileptiform fits. It may be that in the sensory sphere Compound Order is analogous to Weber's Law. But speaking of the sensory sphere I would put it as follows, without any attempt at exact quantification: A certain degree of stimulus at the sensory periphery produces no effect (I mean that no sensation ultimately arises), as the stimulus does not overcome the resistance of elements of any lowest sensory centre. A stimulus somewhat stronger produces a very great effect; for being, the supposition is, just sufficiently stronger to overcome the resistance of elements of some lowest sensory centre, there is liberation of a large quantity of energy by those elements, and ultimately a great effect is produced on the highest sensory centres. An increase of the strength of a nervous discharge produces a compound effect. This applies to normal and abnormal discharges of sensory and of motor elements. The principle is exceedingly important with regard to differences in the physical processes during faint and vivid states of object consciousness, ideation and perception for example.

those which are lesions of lower centres. I do not mean, of course, that we may not profitably compare and contrast mental symptoms of one kind of insanity with those of another kind; for example, the mental symptoms of melancholia with those of general paralysis. With such comparisons and contrasts I do not here occupy myself. I deal with mental symptoms as signs only of what is not going on or of what is going on wrongly in the Nervous System.

Section XIII. On the Significance of Positive Mental Symptoms.—We must be careful not to compare and contrast the wrong things, as we may easily err in doing if we confound the Physical with the Psychical. Further, we shall get wrong if we think of "mental symptoms" without analyzing them into negative and positive (often super-positive). Whilst it is absurd to compare and contrast negative mental symptoms with negative physical symptoms, it is, if possible, more absurd still to compare and contrast a *mélange* of negative and positive mental symptoms with any physical symptoms. Dissolution alone is owing to disease in the sense of pathological process. It is a negative functional state caused by a pathological process; the negative symptoms of a patient's insanity alone answer to it. Positive Mental symptoms in all cases of insanity answer to activities of healthy nervous arrangements on the level of evolution remaining. These two statements on the symptomatology of insanities are so important in the comparative study of these diseases that I will illustrate them at length, although in doing so I shall have to repeat particularly still more of what was said generally in Section IV.

Repeating statements of the preceding paragraph otherwise, the assertion is that the physical condition for positive mental symptoms* is never caused by *pathological* processes; on the contrary, these symptoms occur during activities of parts which are healthy and which are normal too, except often for *physiological* over-activity; they attend activities of all which is left intact in a nervous system maimed by Dissolution, activities of that which Dissolution has spared. We ought to avoid such expressions as that disease "causes Mental symptoms," or that it "disorders the functions of the brain." These expressions hide the fact that we have to deal with a symptomatology made up of two diametrical opposites.

What to medical men are positive mental *symptoms* are,

* I exclude "crude sensations" such as occur at the onset of epileptic fits.

or are parts of, Mentation which is perfectly normal in the patient, as certainly normal in him as the mentation of the sane is normal in them. The mentation of the sane attends activities of the proper Highest layer of Evolution, the mentation of the insane of *their* highest layer. Thus in the first degree of post-epileptic states the patient's *then* highest layer is the second layer of his normal highest centres, and his mentation is correlative with activities of that layer. What we call the insane man's extravagant conduct displays his Will; what we call his illusions are his Perceptions (Memory); what we call his delusions are his beliefs (his Reasoning); and what we call his caprice is evidence of his Emotional change.

The insane man is a different person from his sane self, and we should take him up for investigation as that new person. For although we speak, as is the custom, of defect of consciousness as if it were a something, it is a nothing; it is so much consciousness eliminated, got rid of. The correlative functionlessness of nervous arrangements, Dissolution, is a physical nothing; it is so much of the highest centres eliminated, temporarily or permanently, as the case may be. The insane man, the new person, has, in this way, a lower consciousness and a shallower nervous system than the former person, his sane self. But this shallowed nervous system, with the parts of the body it represents, is all there then is of him physically, and thus no wonder that correlatively *he* (all the "he" there is) believes in what *we* call his delusions. Indeed, if, as I assert, the delusions are the patient's beliefs, it is tautological to say he "believes in his delusions," that being equivalent to saying "he believes in his beliefs."

As just said, the insane man is a different person from his former sane self. In a case of post-epileptic unconsciousness with mania, the second person, as we shall call him, differs from the first, the normal, person by a minus and by a plus. Physically there is less of him by lack of the highest two layers of his highest centres, and there is too much of what is left of him in the sense that there is greatly increased activity of the layer reduced down to.

By taking a simpler case, I can show how we are misled if we do not distinguish the two persons when we use the same pronoun for each of them. I take the normal Dissolution of sleep, the first depth of

it. No one denies that the "positive mental symptoms" in this case of "normal insanity" are correlative with activities of perfectly healthy nervous arrangements.* "I am awake now, but in my sleep *I* was dreaming. I wonder that in my dream *I* could have believed that the Emperor of China was a steam engine." The I's and the *I*'s, the same for the grammarian, symbolize two different persons for the student of mental diseases. *I*, we may call him B, is I, we may call him A, *minus* the use of the higher nervous arrangements of the highest centres (Dissolution), and *plus* increased activity of the next lower, Evolution remaining. The dreamer does not wonder because his mentation is correlative with all there then is of him. For A to wonder that B did not wonder implies a confused notion that he (A) was present with, and was being tricked by the temporarily existing B. But when B existed there was no such person as A. It is rather the other way. B is present with A on re-evolution; or, to speak more carefully, B's dream, his mentation, remains quasi-parasitical in A for a short time, as much as and so long as A remembers it, or, more simply, *has it* after awaking, after ceasing to be B.

Whilst popularly it is permissible to say that the sane man "lives in the real world," and that the insane man, say the dreamer, "lives in a world of his own," the statements are, when regarded scientifically, very misleading. Everybody, sane or insane, "lives in a world of his own;" everybody's real world, what seems real to him, is made up of "projections" of his own images. The only thing outside which we can suppose to be "common at all" is that which makes each have images peculiar to himself. I will now illustrate this.

A cabman is standing dressed by his bed in one of my wards. On my coming up to him he asks me to get into his cab, and to tell him where he shall drive me. I ask, "Where is your cab?" With a sneer and a manner which amounts to saying, "What a fool you must be," he exclaims, pointing to his bed, "Why, there!" This patient saw a cab, and that image strongly "projected," his objective state, at a time when I saw a bed, when I had that image strongly projected, my objective state. It is of no

* The images in dreams and in insanity are as certainly objective as the images of the sane man's ordinary, waking, perception are.

avail for trustworthy witnesses to assert that the patient *could not have seen* a cab, because there was no cab present, and, therefore, that the patient "only fancied," etc., that he saw one. Something, not himself, "got out of" himself the image cab, "out of" the bystanders the image bed.* It might be said that this doctrine confuses reality and unreality. But what reality and whose reality? The image cab was the patient's reality; the image bed was the healthy bystanders' reality.

(*To be continued.*)

Description of the New Hospital at the Montrose Royal Lunatic Asylum. By JAMES C. HOWDEN, M.D. (*With Plate.*)

It being necessary to extend the accommodation of the Montrose Royal Lunatic Asylum, it was deemed advisable to erect a hospital entirely detached from the main building, in which all the bodily sick and other inmates who required special medical care would be brought together, and placed in circumstances more favourable to treatment than they could be in a ward of the asylum proper.

This project recommended itself the more that the sick room accommodation has always been a weak point in the institution, a portion of an ordinary ward only having been set aside for the purpose.

A classification of the present population showed that between one in five or six might with advantage be treated in the proposed hospital.

Fifty beds for each sex was therefore fixed on as the extent of the accommodation required, and the principle adopted in the plan is to provide purely hospital conditions suited to the insane in a building which, though worked in connection with the main establishment, would be independent of it as regards its appliances and nursing staff.

The site of the new building is at the north-west corner of the grounds. It is sheltered from the north and east,

* I do not say "image *of* a cab" and "image *of* a bed." I am not endorsing a crude popular psychological hypothesis that "real" outer objects, in themselves coloured, shaped, etc., photograph their colour, shape, etc., on us. What I call the image is a state of the mind (each person's), a "ghost," standing as a symbol of something not us, of the nature of which something we know nothing.