prominent, if the epigastrium be constantly tender on pressure, if the skin be hot and dry and the pulse quickened, the remedy will not succeed.

The usual precaution of giving arsenic soon after a meal should be practised, and it is always proper to begin tentatively. If the drug do not disagree, the dose should be gradually increased. When large doses are reached, a few drops of tincture of opium may be desirable to prevent purging. The constitutional effect of arsenic must, of course, be attended to, as warnings to diminish or to omit its use.

This is not a therapeutic age. Such, indeed, is the prevalent scepticism about the action of remedies, that the term cure is by many objected to as unphilosophical. As a firm believer in the efficacy of medicine, I protest against this. We are, happily, in possession of some agents, and, should, therefore, be hopeful not only of obtaining new ones, but of extending the application of the old, by which disease can be stopped in full career. Arsenic, when rightly employed, has this power in cases differing so widely as ague, certain headaches, and diseases of the skin. The present communication professes to add another triumph to the list. But, in order to establish a new treatment, help and co-operation are needed. Now, it seems to me that one of the great advantages of such a powerful Association as ours is that the truth of a clinical observation by any one of its members can be quickly tested by others. It will be a source of pleasure to me if, in due time, the results of any trials of arsenic in diseases of the stomach as recommended in this paper, are either communicated through the medium of our excellent JOURNAL or to myself personally.

CASE OF "LE PETIT MAL":

WITH SOME OBSERVATIONS ON THE RESPONSIBILITY OF EPILEPTICS,

By J. THOMPSON DICKSON, B.A. CANTAB., ETC.

THE vast importance of responsibility is more than an inducement for studying carefully the varying phases of the mind, particularly in connection with disease; and there certainly is no doubt that *le petit mal* plays a very important—perhaps the most important—part in the development of those nerve-changes which precede, and are essentially associated with phenomena such as we see exhibited in temporary exacerbation, occasional over-excitation, and exaltation; in a word, transient insanity and transitory conditions of mental inaction and depression.

The exaltation of ideas, and the violent and destructive forms of mania attendant upon *le haut mal*, admit of no question. The subject has been ably illustrated and commented upon by M. Jules Falaret; and his Memoirs, "*De l'état Mental des Epileptiques*," in *Archives Générales de Médecine*, 1860 and 1861, are deserving of the most careful study, although his general proposition of the irresponsibility of epileptics, is only true within certain limitations; but the intimate association of transient insanity with that very slight expression of epilepsy, to which the term *petit mal* is given, has been but little considered till recently. Much attention has, however, been lately drawn to it; especially by the great and illustrious Trousseau, whose loss the medical profession throughout Europe is lamenting at the present time. This association is highly important, and it is as marked as it is important; while every additional case is of value, augmenting, as it does, the accumulated evidence we have of the imperfection of our legal definition of responsibility—a definition vague and untenable, and leaving hopelessly in gross darkness that inextricable question upon which too often the criminality and the life of a poor and innocent accused are made to hang, whilst the slander still adheres, though unjustly, to the medical profession that they are incapable of defining responsibility more comprehensively than the lawyers; and certain trials in our criminal courts seem to appear a mockery of justice.

There are not, perhaps, on record many more striking cases of *le petit mal*, followed by transient disturbances of the mental faculties, than those given by Trousseau in his *Clinical Lectures*; they present extraordinary perversion of mind, indicated by extraordinary actions and following slight epileptic seizures—sometimes as slight as a passing momentary vertigo in persons of otherwise sound and vigorous intellect. Such strange and antagonistic phenomena at first beset our inquiries with the greatest possible difficulties, especially as the seizure may, from its slowness, pass unobserved; but, at length, directing our attention to the very intimate relation between mind and matter, these very extraordinary antagonisms furnish us with the strongest evidence we can wish for in our consideration; and, I think, lead us, at all events, one step nearer a clear understanding of mental phenomena, both in health and disease.

Responsible actions are under the control of the will; but this ever versatile and capricious will of man would be but little amenable to re-

sponsibility were it not one of the dependents of reason; but reason is a faculty which is in abeyance in the absence of thought, and in the absence of healthy, or normal, thought, the inferences of reason will be as imperfect, or erroneous, as inferences deduced from false premises; whilst healthy, or normal, thought is dependent upon the perfect tone and harmonious operation of the cerebral cells.

The following case lately came under my notice. It is, in the highest degree, important as a medico-legal question; whilst, as a psychological study, the case is unique and pregnant with interest.

Amelia M., aged 18 years, was admitted into Guy's Hospital, June 5th, 1867, under the care of Mr. Poland, with a cut throat. The incision was not large, and she made a good recovery; but the wound was self-inflicted. She is a slightly-made girl, has a fair delicate skin, dark hair and eyes; the lower lip is long and slightly projecting, and her general expression is intelligent, though the lower lip gives the unmistakable impression of epilepsy. Her mother stated that while she was pregnant with this girl she was several times frightened by an epileptic—an apprentice of her husband, who was a tailor. Her family history, on the father's side, was good, and there was no evidence of epilepsy or insanity; and on the mother's side it was equally good. A nurse girl was employed to take charge of this child while an infant; and it appears that on one occasion she let her fall, when the back of her head was struck violently. The mother remarked that from two up to about nine years of age, the child was stout and well nourished, but that she often fell and frequently struck her head. On one occasion she was playing with some other children in Clerkenwell, when she fell on a door-step, and cut the back of her head open. Once, when about two years old, she was very ill; the symptoms were evidently cephalic, but the mother cannot give any satisfactory information on this point. From nine up to the age of puberty she was more or less delicate, and complained from time to time of giddiness and strange sensations in her head. She is of an amiable and happy disposition, and her mother says she is nice tempered, and a great favourite with all who know her. In ordinary health she is lively, and at times excitable. About the beginning of May, 1866, when nearly seventeen, she commenced to menstruate; but about six weeks previously she was, for the first time, attacked with a seizure which was supposed by her mother to be a faint. She has had several such seizures since. A very slight aura, which she very indefinitely terms "a strange sensation," always gives warning of the invasion. Usually she sits down, becomes deadly pale, and almost instantly loses all consciousness. She has some amount of tonic spasm, mostly confined to the hands and jaws; but the whole of the left side is partially affected, and a slight amount of left hemiplegia always remains for a day or two after the fit. Clonic spasm is not well expressed; a slight flush comes over the face, after which she remains in a profound stupor for an hour or an hour and a-half. On one occasion, the coma continued for two hours and a-quarter. As this coma passes away, the eyelids open, and the eyes appear rolling, bright, and wild. She will then speak, answer questions, and walk; afterwards she invariably sleeps for a considerable time. She has never been noticed to micturate during a fit. She never screams at the onset, neither has the attack ever been so sudden that she could not sit down in time to save herself from falling. She had never before exhibited any inclination to violence on recovery; and her memory of the events which follow a fit is so defective, that she cannot describe what her feelings have been, and although, after apparent recovery, she will speak, answer questions, and walk with the semblance of rational demeanour, she is forgetful, and I should, perhaps, say absolutely ignorant, of everything that has occurred from the time of an aura to the time of waking from the after-sleep. These fits have occurred about the menstrual period; but that function has always been irregular, sometimes recurring in three, sometimes in six, weeks; always deficient in quantity and colour. After a fit, and the phenomena immediately attending it, have passed away, she usually complains of strange feelings in her head; and for a day or two is more or less low-spirited and melancholy. Two or three times she has had a nocturnal seizure. She is always aware when a fit has occurred from the feeling of stiffness on the left side, and the general languor and depression she experiences. A week before cutting her throat she had a seizure, and remained in the stupor for two hours and a-quarter; for several days after this she felt very greatly depressed, and says she became low-spirited because she was not allowed to go to her business; but the idea of self-destruction had never struck her—in fact, it was farthest from her thoughts. She appeared quite to comprehend the enormity of such a deed; but, apart from all moral consideration of the matter, which could hardly be expected in one so young, her whole desire is to live—not to die. She has not the slightest recollection of the circumstance; she knows nothing of going up-stairs—of taking one of her father's razors—of lying down on her mother's bed—of cutting her throat—or of hiding the razor under the sheet,—all of which she appears to have done; and she

was found on the bed in a state of unconsciousness. It was a matter of no great surprise to her to wake from a profound stupor, with the languor and strange sensation of a nervous system recovering from the shock of epilepsy; but it was a matter of the most intense surprise and horror to her to wake and find, in addition to this languor, that her throat was bandaged; and that, while she had been in a state of absolute oblivion, she had been right into, and was hardly then delivered from, the jaws of death.

Now, nobody saw the fit; yet, with the evidence before us, no one can doubt that she had been the victim of the epileptic phenomena; the only objection that can be raised is the negative one, viz., the rule of her seizures was monthly, and she had experienced one a week previously. This objection fortunately is answered by the fact that she had another seizure on the fourth night after her admission into the hospital; so that the recurrence of her fits by no means follows any rule, while we have the positive assurance that she herself felt afterwards all the strange depression that her fits usually produced. There was neither affectation, nor attempt to dissemble, on the part of the child in her simple story; and the mother's affection, which appeared very marked, was so great as to preclude all idea of untruthfulness in hers. It might have been satisfactory, as regards diagnosis, had she voided some urine involuntarily, or had some petechiæ been noticed on the face and neck. She did not, perhaps on account of the cut in her throat diverting her attention from familiar sensations, remark either the depression or the stiffness to the same extent as she had done the week previously; but she noticed them and remarked them, notwithstanding the fact that the effect of the seizure of the week before had hardly passed entirely away; but, even supposing that her own observations were wanting, the loss of consciousness is in itself sufficient evidence of a fit, particularly in any one known to be the subject of *le petit mal*, or other form of epilepsy.

There cannot be a doubt that thought is one of the operations of life; and life, or vital force, is one of the manifestations, or modes of motion, and correlative with light, heat, electricity, and the other forces. We cannot doubt that thought depends upon the motion of the cerebral cells, much in the same manner that the cells of other tissues depend upon motion for the due performance of their function. In all the processes of life a certain amount of motion is involved; and in the operations of the brain-cells, whether in the direction and control of the locomotor apparatus, the more intimate control of what we term vital organs, or the more inscrutable operations of the production of thought, motion is either expended or used up. In the more chemical operation of nutrition of cells, some motion in the mode of vital force is expended; though in this elementary process compensation is made for all the losses the cells have sustained in their varying operations. To make clear my meaning, I will employ a very simple illustration. We are enabled to deal with the motion of zinc and sulphuric acid; if we place them together, their motion is immediately manifested as chemical force; if we add another metal, as a piece of platinised silver, we are enabled to deal with a portion of the same motion in another way, we can have it expressed as electricity; this, again, we can have manifested as light, heat, or magnetism, or applied as mechanical motion. This process will continue so long as any portion of the zinc and acid remains; and so long as we continue to supply more of these materials we can develop the mechanical, or any of the other, modes of motion for an indefinite period. Now this is exactly what occurs in the brain; new material is constantly added to the cerebral cells in the process of nutrition, and herein a store of motion, to be again manifested in the changes the cells undergo in their vital operations. The quantity, or amount, of motion that may be made manifest with a given amount of zinc and acid, is a matter of calculation; and I do not conceive that it is out of the limit of possibility to determine the amount of motion expended in the production of a particular thought. Now, in a perfectly healthy brain one or more cells are set in motion by a communication from without; or, we may say, an external force, communicating through one of the senses, with a cerebral cell, excites or sets it in motion; the result of this is the stamping, as it were, of the impress of this external on the brain-cell; but the motion does not stop here; the inertia thus overcome, the excitation is communicated to neighbouring cells which already bear other impressions, formerly relieved in the same manner; thus certain memories are induced which, to use the ordinary expression, correct the new impression, and thus a simple idea is formed. A simple idea, thus conceived, remains a permanent impress on the cerebral cell, becoming a part of what we designate the mind, and always ready for use, and appears as memory whenever the cell is again excited, or set in motion. The equilibrium of the cells may be restored immediately after the idea is formed; more generally, however, the motion is communicated to other cells, which also bear the impress of simple ideas, which are thus brought into remembrance. In this manner we get the phenomenon of relative suggestion; and, by weighing idea with idea, we produce the phenomenon which we call

thought; and, by various complications and orderly multiplications of the same elementary process, we obtain all the wonderful attributes of mind, from simple apprehension up to reason. The object of this paper, however, is not to discuss life as a mode of motion; but I have premised the above to illustrate the remarks that are to follow. The limits of this paper, and the value of space necessarily preclude my entering into the arguments here; but I trust I have made the idea sufficiently plain for the purpose. We may look upon all diseased conditions as imperfection, or diminution, of life in the cells; and the exquisitely delicate central cells, if changed in their normal constituents in the slightest degree, whether atrophic, amyloid, or fatty, or whether disturbed by shock of any kind, must be looked upon as imperfectly alive, or as having lost some of their vitality, and unable to sustain that motion required to develop their normal function. It is now apparent that, if motion be not communicated from cell to cell, no memory of former impressions is brought before the mind; no correction of a new or present impression can take place; no simple idea can be perfectly formed, still less can thought be produced. An external may produce an impression on one or more cells, and the impress may be very strong; but, if uncorrected by former experiences, even though an idea may be formed, it will be imperfect or erroneous. An idea, or, perhaps, even an impression so formed, may be an incentive to action; but the action will be vague, unreasonable, and objectless, and probably altogether averse to reason and judgment. This is the essential condition of all the varying expressions of insanity. The great complexity of mental phenomena operating in the many forms of madness, are only questions of degrees of vitality, and of a number of imperfect cells operating, in the same ratio as the simple idea and the highly complex thoughts are merely questions of the number of healthy cells in motion in the healthy brain.

The principal conditions impairing the life of the cerebral cells are—
1. Imperfect nutrition, giving rise to loss of tone to changes such as amyloid, and fatty degeneration, atrophy, etc.; any or all of these may be present and be manifested as insanity in its ordinary forms, that is, admitting only of imperfect or uncorrected impressions and perversion of ideas.
2. Shock, whether from direct external violence, electric influence, or from causes operating internal to the body, as the sudden anæmia of the cerebral lobes, or the subsequent congestion of the base of the brain. Perhaps these internal origins of shock, which are the exciting phenomena of epilepsy, are among the most profound of causes operating in the temporary or permanent impairment of vitality of the cerebral cells. In the ordinary insane epileptic the conditions arising from malnutrition are usually present, but, at the time of their seizures, they have in addition a further diminution of the cell-vitality, by reason of the shock, and hence may be explained the greater intensity of the mania of epileptics. If now we look at epileptics not insane during the periods of freedom, it is not surprising that they should suffer from some temporary impairment in the power of arranging their ideas after a seizure. In the more violent manifestations as *le haut mal*, when the phenomena are more perfectly expressed, a longer time appears to be occupied in the process of recovery; the equilibrium and tone of the cells are restored with that of the other tissues during the passive stage that follows the great expenditure of nerve-force through the muscular spasm; but, in such cases as *le petit mal* and *epileptic vertigo*, when the musculo-motor system is scarcely, if at all, affected, the profound disturbance of the brain-cells is the more manifest, consciousness seems to be restored very quickly, but it is only a very partial restoration, and the profound alteration or diminished vitality of some or all of the cells still persists. I say some or all, for it is to be borne in mind that epilepsy is always more severe on one side than the other. The actual change in the cells, as Trousseau remarks, is inscrutable, and may not be more than the alteration which takes place in the particles of glass and metal when a Leyden jar is charged; but, though so inscrutable as to evade our actual observation, it is nevertheless equally profound in its intimate operation. The effect of shock to the cells is probably very much allied to the disturbance of electrical equilibrium, the alteration in the life or motion of the cells may be regarded as the parallel of the change in the particles of glass and metal in the charged jar, the gradual recovery as the gradual restoration of the equilibrium. After recovery, the brain-cells resume healthy action, and again take on their normal function, thought, but during recovery their action is imperfect, and thought thereby is perverted. The imperfection of the impression, too, is strikingly shown in the fact that as a rule the person after recovery has not retained any impression of what has passed, and has not the slightest recollection or memory of the occurrences of the time that elapsed while passing through the epileptic phenomena. Thus it is, that a person cannot rightly be held responsible for actions performed during the stage of recovery from a shock of *le petit mal*.

During the stage of recovery, motions will be excited in the cells by both external and internal impressions; i.e., by external objects, and by

memories or relative suggestions. This impression will only be perfect in so far as the cell shall have regained its vitality, and the less the vitality of the whole brain, the less perfect will be the excitation of those cells which bear the impressions necessary for the correction of one newly formed; still less will it be possible for sequential ideas to follow one another so as to induce healthy thought; in a word, reason will be in abeyance. An impression or an idea may be present, and in the absence of others may be so vivid and powerful that it becomes involuntarily the incentive for action, and the poor unfortunate victim of this influence rushes forward in blind unreason to the commission of an insane act, an act perhaps of no legal importance, or, as is equally probable, to one of the gravest offences against moral rectitude and legal responsibility. A long slumbering idea of murder or suicide, theft or violence, may be awakened in the mind just returning to consciousness after an epileptic shock; an idea that long ago may have had a passing presence, but which was instantly corrected by a nicely educated sensibility, by experience, by a delicate and well developed emotion, and by sound reason; an idea necessary in the mind, not willingly, but by reason of our communication with the world, and our interchange of ideas with our fellow men. Such, doubtless, was what happened in the case of the poor girl whose misfortune we have been considering; surely responsibility is an attribute that cannot belong to her at the time of her seizures. Can we doubt that the idea was suddenly awakened in her mind, and, as she had not a sufficiency of brain-matter in motion to allow her to reason, she was hurled on to the commission of the saddest of crimes which stain the pages of the history of humanity?

A NEW FORM OF AMBULANCE FOR COUNTRY AND VILLAGE HOSPITALS.*

By HORACE SWETE, Esq., Weston-super-Mare,
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[AFTER mentioning various forms of ambulances that had been proposed, and especially one that had been figured in the *Illustrated London News*, which, though excellent for town work, was too cumbrous and expensive to admit of its general use in country districts, Mr. Swete stated that, for some time, he had turned his attention to the production of an ambu-

lance that should at once be cheap, and easy for the sufferer, and that could be used in the conveyance of infectious cases without fear of communicating any disease. The ambulance he had designed was now in use; and he had placed it in the hall for the inspection of the members present. It was constructed of varnished wood and iron, the curtains and bed being made of vulcanised India-rubber, so that the whole could be washed without injury.]

Ambulances have been for some time part of our military equipment, and are generally constructed on the model of a gun-carriage, palanquin, or police-stretcher. In the summer of 1864, feeling that village hospitals were now spreading rapidly over the country, and that their utility would be much enhanced by having a cheap and easy means of carriage for the sick poor, I designed an ambulance, which I now bring before your notice.

I have endeavoured to get out of the gun-carriage groove in which many of our ambulance inventors have run, and to construct one in which I have had constantly before me its practical adaptation to country use. I, therefore, started with the idea that twenty guineas would be the outside price that would enable the carriage to be within the reach of our workhouses, country, and especially village hospitals; and that the objects to be attained were—Freedom from conveyance of infection; ease to the sufferer, and as few changes as possible; lightness of construction; ability to examine a wound or watch a patient in transit; and that the whole should not exceed the price of twenty guineas, giving a fair profit to the maker.

This ambulance is constructed thus. The body is like a skeleton hearse, without bottom or sides, the panels at the side being filled with glass-shutters or curtains of vulcanised India-rubber cloth, capable of being drawn back opposite a wound, etc.

The back of the carriage opens as a door. In the bottom are three rollers, on which runs a wooden tray, having placed in it, a mattress covered with vulcanised cloth (or, in infectious cases, straw, which may at once be burnt). This tray has two strong iron handles at each end, and one at each side; so that it can be conveniently carried up a narrow staircase. The vehicle is hung by four elliptic springs on four wheels, and is capable of being turned in its own length. It has a driving-box; and shafts for a pony or donkey, which can be obtained in nearly every village, are strapped on the roof, with a handle to draw it by hand. On each side is a rail, so that any friend or attendant, whilst watching the

patient and walking with the hand resting on the rail, will give considerable assistance in propelling the carriage. A lamp is fitted outside and inside the carriage. No ornamental work exists. The wood is ash, with deal panels; the wheels are ash, with turned spokes. There is neither paint nor putty used; the whole being varnished inside and out, and the iron work bronzed. A spanner is attached to the driving-box, ready for use to change the handle for the shafts. The name of

the hospital or union to which the ambulance is attached, is painted on an ornamental ribbon or scroll on the door.

Its dimensions are 7 feet 6 inches by 3 feet 9 inches; the height 4 feet 9 inches. The tray in which the mattress is placed is 6 feet by 2 feet. The total weight is under 3 cwt. The appearance is not inelegant; and the carriage would not look *outré* in the entrance hall of an hospital or union-house.

The mode of use is as follows. The carriage being brought near the place of accident, or where the sufferer lies, the tray is taken out

* Read before the Bath and Bristol Branch.