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and that this dryness conferred upon them the greater power of resisting heat which characterized seeds. Nay, further—2. Although no seeds could be shown to be able to resist the influence of boiling water, Spallanzani assumed that these unknown seed-like germs might be able to do so. Thus alone was he able to continue in the panspermatist faith—on the strength of these assumptions only, could he refuse assent to the probability of a germless origin of living matter, more or less after the fashion suggested by Needham and others. It will, therefore, be interesting for us now to consider how far the progress of science tends to confirm or reverse Spallanzani's assumptions.



MENTAL PHYSIOLOGY.

BY DR. J. C. BUCKNILL.

AN important work on the above subject, by a man so eminent and so various in science as Dr. Carpenter, cannot fail to attract the attention and to be worthy of the study of all those whose work in life is to prevent or restore mind from its morbid conditions, and who fully appreciate the necessity of building the edifice of Mental Pathology upon the sure foundations of Physiological Science.

The history of the work before us is told us by the author in his preface. It has grown out of the interesting and suggestive chapters on Psychology, which formed part of the fourth and fifth editions of his "Principles of Human Physiology." It is, however, more than a physiological treatise. It is an attempt to reconcile the facts of science with the reasonings of philosophy, to bridge over the abyss which yawns between materialism and immaterialism, to find some standpoint for free-will, morals, and responsibility, within touching distance of the brain-cells. Quoting from Charles Buxton's "Notes on Thought," the author says :

"Irresistible, undeniable facts demonstrate that man is not a den wherein two enemies are chained together ; but *one being*—that *soul and body are one*—one and indivisible. We had better face this great fact. 'Tis no good to blink it. Our knowledge of physiology has come to a point where the old idea of man's constitution must be thrown aside. To struggle against the overwhelming force of Science, under the notion of shielding Religion, is mere folly."—(*Preface*, p. xiii.)

It is not always certain, when language like the above is used, whether the writer intends to affirm that the body is the soul or the soul is the body, for there is confusion in using two words for one thing, and especially two words which through all the ages of thought have been held to express such opposite meanings. In a work on physiology, however, it is the body and its functions which have to be

discussed, and we should have been glad to have found that the body, and the body alone, was the subject of this most learned treatise. Such, however, is very far from being the fact, for, although Dr. Carpenter enters into no ontological discussions, and rarely mentions the soul under its old name, it is present in most pages of his book under the designation of Free-Will. Free-will it is which is the foundation of morals, which renders man responsible for his actions, which gives him the power of forming his own character, which rules and dominates, or at least ought to rule and dominate, all the emotional and intellectual functions of the brain which science shows to be the result of animal chemistry. The autocratic power of the will is the key-note of the whole book, or the red thread which runs through all its pages, as that royal mark does through the ropes and cables of Chatham. Memory is a function of the brain, and so also is judgment, and desire in all its hues, but the will is free, if you will only let it be so; free from the embarrassment of corporeal imperfection, and capable of directing and ruling the senses, the passions, and the reason to all the ends and purposes which good theologians portray as the right aspirations of the soul.

Dr. Carpenter states that—

“According to the view which it has been *the special purpose of this treatise to develop*, the relation of the will to mental is essentially the same as that which it has to bodily action. The measure of its exertion will be the sense of effort which we experience in *intentionally* exciting, directing, or restraining any particular form of mental activity” (p. 138).

The will, therefore, can direct the mind as it can direct the muscles. It can order the attention, and

“Can detach its subjects, which have at the time the *greatest* attractiveness for it, and can forcibly direct it to others from which their attraction would otherwise divert it” (p. 38).

If this be true, the Will exists and is free. But is it true? Can any human being intentionally choose the lesser desire, all things being considered, and all forces outside the so-called will being estimated? This great, greatest perhaps of all questions, is answered by Mr. Mill, and all the determinists, in the negative. Dr. Carpenter takes the opposite view, and founds his mental physiology upon his opinion. He thinks the will is self-determining, and capable of choosing to be influenced by the smaller attraction, and this constitutes its freedom. But if the will exists, and is free, what is it? Certainly not merely the “determinate effort to carry out a purpose previously conceived,” as the author in the first instance defines it; for this bare determinate effort is the very idea of it propounded by the most logical necessitarian determinists. It is far more than this.

“We have now, however, to consider a much more obscure question, namely, the *nature of the self-determining agency* to which we give the name of Will.

Is it, as some think, the mere resultant of the general (spontaneous or automatic) activity of the mind, and dependent like it upon physical antecedents? Or, is it a power which, being completely independent of these conditions, is capable of acting *against* the preponderance of motives?—as if, when one scale of a beam is declining downward, a hand placed upon the beam from which the other scale is suspended were to cause that lighter scale to go down. Now, that the will *is something essentially different* from the general resultant of the automatic activity of the mind, appears to the writer to be proved, not merely by the evidence of our own consciousness of the possession of a *self-determining power*, but by observation of the striking contrasts which are continually presented in abnormal states of the mind between the automatic activity and the power of volitional control (i. e., in toxic delirium), while the weakening of that power, usually in concurrence with an exaltation of some emotional tendency, is the special characteristic of insanity.”

Dr. Carpenter proceeds to show how the will can override reason and judgment, in questions either of intellectual or moral truth, by keeping some considerations out of view and by fixing the attention upon others; so that in this manner the will determines the balance of evidence which commands belief, as it does the balance of evidence which determines conduct. It is, perhaps, superfluous to observe that this self-determining power which rules the senses, guides the opinions, directs the judgment, and controls the conduct of men, which is something essentially different from the general activities of the mind, and is completely independent of physical antecedents, cannot be a physiological, and therefore must be a spiritual power. And this notion agrees with what we have read in other places than Dr. Carpenter's book on Mental Physiology, and where it has caused us less surprise. Granted—we have seen it stated—that perception, memory, emotion, judgment, and all other activities which you more or less successfully demonstrate to be functions of the brain are so in fact, still there is the will. In what ganglion or convolution will you locate that? What influence has the chemistry of the little cells upon that prime motive power? What can change of structure effect there?

It is autocratic, self-dependent, and, excepting in itself and by itself, unchangeable. It is at least a spiritual force with which body has naught to do. It is the heavenly part of man. It is the soul.

The theological bearings of the question will be somewhat out of place in these pages, but it is worth while to remark that the absolute freedom of the will does not fit in with some systems of theology which are tenaciously held by large numbers of Christians.

Let those who think that there can be no morality and no religion, no foundation for human responsibility, and no basis for a moral code, without freedom of the will, read the great work of that grand old Puritan divine, Jonathan Edwards, entitled “A Careful and Strict Enquiry into the Modern Prevailing Notions of that Freedom of the Will which is supposed to be essential to Moral Agency, Virtue and

Vice, Reward and Punishment, Praise and Blame." Romans, ix. 16, "It is not of him that willeth." Edwards, who has been well compared for his philosophic acumen to our own Berkeley, maintains that—

"The decision of most of the points in controversy between Calvinists and Arminians depends upon the determination of this *grand article* concerning the freedom of the will requisite to moral agency."

He argues that God's moral government over mankind is not inconsistent with a determining disposal of all events of every kind throughout the universe.

"Indeed" (he says) "such a universal determining Providence infers some kind of *necessity* of all events—such a necessity as implies an infallible previous fixedness of the futurity of the event; but no other necessity of moral events, or volitions of intelligent agents, is needful in order to this than *moral necessity, which does as much to ascertain the futurity of an event as any other necessity*. As to freedom of will lying in the power of the will to determine itself, there *neither is any such thing*, nor any need of it, in order to virtue, rewards, commands, counsels," etc.

The theology of the most numerous, and, perhaps, the most earnest, sect of Protestant Christians is shown to be utterly adverse to the doctrine of free-will, and it would be equally untrue and uncharitable to deny that the lives of millions of persons guided by these opinions have proved from the Reformation to this hour that the opinion that neither will, thought, nor conduct is free, is consistent with a strict morality.

We have, perhaps, written more than enough for these pages on "the special purpose" of Dr. Carpenter's work, namely, the development of the theory that, although the mental functions generally are automatic, the will is free. The theory, so far as we can ascertain, is not sustained by any facts fit to sustain an argument of such weight. The assumed fact that we are conscious of freedom and power to act in accordance with our moral judgment is revealed in face of the contradiction which it constantly receives, for the sense of restraint said to be felt by one is at least equivalent to the sense of liberty said to be felt by another. It is even more appreciable. A bird may think itself free to fly where it lists, yet, when dropped from a balloon, it falls like a stone. Any captive may think himself free until he get to the bounds, and the freest of us all is still a captive—

"And drags at each remove a lengthening chain."

THE TRAVELLER.

"The tendency of the human free-will is to fly upward," writes our author. "It is by the *assimilation* rather than by the *subjugation* of the human will to the Divine that man is really lifted toward God; and in proportion as this assimilation has been effected does it manifest itself in the life and conduct, so that even the lowliest actions be-

come holy ministrations in a temple consecrated by the felt presence of the Divinity" (p. 428). This, however, is not physiology.

Outside the narrow circle where Dr. Carpenter treads the barren heath of metaphysics, tethered to his theory of free-will, lies the wide and beautiful world of Nature which no one knows better than himself. Naturalist, physiologist, philosopher, philanthropist, there are few men who touch Nature, and human nature, at so many points; and there are very few who can illustrate their knowledge from such rich stores of reading and research.

We are not surprised, therefore, to observe an important journal speaking of Dr. Carpenter's new book as being "as amusing as a novel." Not that novels always are amusing, or that amusement is a proper aim for a scientific work, yet the wealth of illustrative anecdotes scattered through these pages seems to justify the intended compliment of the *Lancet* reviewer. The thought, however, most impressed upon ourselves by Dr. Carpenter's wide acquaintance with men and books, and the use he has made of it in his abundant illustrations of mental phenomena, is that these phenomena are in their very nature so transitory and fluent that they afford most unsatisfactory data for scientific conclusions. Physical facts can be repeated and verified. Even facts of rare occurrence and beyond the control of man do repeat themselves, and can be waited for. The astronomer, or at least astronomers, can wait for the next transit of Venus, or the next appearance of a comet; but who can be expected to wait for the man capable of "repeating correctly a long act of Parliament, or any similar document, after having once read it?" (p. 457); or of that distinguished Scotch lawyer who performed a feat of legal ratiocination while he was asleep, which had baffled the utmost exertion of his waking powers (p. 593). These cases are quoted by the author on the respectable authority of Abercrombie, who recorded them forty years ago, and the time for their repetition has perhaps not yet come full circle round.

Without the opportunity of a verification, men are apt to accept marvelous statements as to mental facts with a degree of indulgent faith which they would never extend to any physical feats or phenomena. No one would accept the statement that a man had run a mile in two minutes, but that a man had performed a prodigious feat of cerebral exertion far surpassing, in comparison with the average powers of man, the excess of power which this would indicate, will gain ready credence, and find record in repetition without end. We should rather have expected that Dr. Carpenter, dealing with the faculties of mind from the scientific point of view, would have had more vividly before him than appears this peculiarity of the evidence on his subject, and that he would have preferred to choose the commoner and more verifiable facts than the curiosities of mental literature; that he would have directed his research rather to the ocean-currents of

mind than to the record of occasional floods, transient eddies, and doubtful whirlpools. His method in this respect, we think, is somewhat defective, and method in such a matter, is of the very essence of the investigation.

One noteworthy whirlpool of deception and credulity, namely, spiritualism, Dr. Carpenter has investigated here and elsewhere with great care—not, perhaps, so much in reference to the wild turmoil itself, as to the manner in which innocent chips and straws are whirled round on its surface, or engulfed in its depths. He has shown how much and how far persons of a certain constitution may, by automatic action of muscle, nerve, and brain, be the dupes of their own imperfect organization, and the puppets of stronger and more vulgar minds. We could have wished that the peculiarities of extra-automatic people could have been investigated by themselves, and in a strictly scientific manner, and without according the undeserved honor of inquiry to those who travesty the wholesome laws of Nature, convert a fit into a heavenly trance, an hysterical girl into a prophetess, an automatic movement into a communication with the spirits of the dead. We scarcely think that the one grain of truth was worth sifting from all those bushels of chaff and rubbish. Perhaps no one who was not thought to be open to conviction in these matters would have been permitted to look behind the foot-lights, and if Carpenter had spoken sharply and bluntly, as Faraday did of the table-turners, his opportunities for investigation might have been greatly curtailed. As it is, Dr. Carpenter has done rare service in this cause now and aforetime.

Dr. Carpenter states that the number of persons capable of being biologized is "from one in twelve to one in twenty; so that, in a company of fifty or sixty persons, there are pretty sure to be two or three who will prove good biological subjects." We apprehend that a very wide margin must be left for the effects of deception and credulity even in the simple process of biologizing. We never saw a lunatic biologized, and we have seen a hundred experimented upon by professors of the art. In as many school-girls probably a large proportion would be found susceptible, especially if they had been ill supplied with good food and fresh air, and had imbibed an undue amount of sensational poetry and fiction. One lady Dr. Carpenter has himself biologized into so deep a sleep that she could not be awakened by any ordinary means, even by being roughly shaken. "Her slumber appeared likely to be of undefined duration; but it was instantly terminated by the operator's voice calling the lady by her name in a gentle tone." What assurance, however, can the doctor have that this young lady was not playing a trick upon him, or simply indulging a caprice? It is always wise to try the simplest explanation first, and in women the capricious is certainly more common than the biological temperament, even if the author's statistics of the latter be correct.

The warning against these experiments, which are too much the pastime of the idle, the hysterical, and the foolish, is of weighty import :

“The undue repetition of such experiments, however, and especially their repetition on the same individuals, is to be strongly deprecated ; for the state of mind thus induced is essentially a morbid one, and the reiterated suspension of that volitional power over the direction of the thoughts, which is the highest attribute of the human mind, can scarcely do otherwise than tend to its permanent impairment” (p. 565).

The question of “Unconscious Cerebration” or “Latent Mental Modification,” which is peculiarly Dr. Carpenter’s own, is too important and unsettled to be fully discussed within the brief limits of a review. Dr. Carpenter thinks that his views had been anticipated by Sir William Hamilton, but the passage he quotes from that philosopher scarcely appears to us to detract from the author’s priority of thought. Sir W. Hamilton’s “mental activities and passivities of which we are unconscious, but which manifest their existence by effects of which we are conscious,” are plainly indicated by the sentence which follows as referring to the unknown and the incognizable. We are conscious of the knowable, unconscious of the unknowable.

“There are many things which we neither know nor can know in themselves, but which manifest their existence indirectly through the medium of their effects. This is the case with the mental modifications in question. They are not in themselves revealed to consciousness, but as certain feats of consciousness ; suppose them to exist, and to exert an influence on the mental processes, we are thus constrained to admit as modifications of mind what are not phenomena of consciousness” (p. 518).

Hamilton proceeds to explain that we can only be conscious of a determinate state or mental condition which supposes a transition from some other state : “But as the modification must be present before we have a consciousness of it, we can have no consciousness of its rise or awakening, for this is also the rise or awakening of consciousness.”

If all this means any thing, it must mean that we are only conscious of mental states which exist at the time, and that we are unconscious of preceding mental states, or of the transition from preceding to existing states. How Dr. Carpenter can hatch unconscious cerebration out of that egg we cannot imagine.

Neither can we see how John S. Mill can be thought “explicitly to accept the doctrine of unconscious cerebration,” seeing that he “considers unconscious mental modification as a contradiction in terms ; attributing the phenomena to unrecognized changes in the substance of the brain which he regards as the constant physical attendants of mental modifications.”

No doubt there are many brain-changes of which we are not conscious, but mental change, without consciousness, is, according to this

very high authority, a contradiction in terms. But all the facts adduced by Dr. Carpenter to prove unconscious cerebration are distinctly mental changes such as, according to Mill, it is a contradiction in terms to designate as unconscious.

These mental changes may be classed almost entirely under two heads: 1. Recollection without effort; and, 2. Apparent increase in the results of thought without further thought.

It may be taken as one of the commonest mental experiences of most men, that a fact, and especially a name, which they endeavor to remember, which escapes from the determinate effort of recollection, often suddenly jumps, as it were, into the recollection without effort, after they have been thinking of other matters. Dr. Carpenter explains this by the theory that the part of the brain engaged in storing up and reproducing past impressions is not the same part of the brain which is engaged in the consciousness of those impressions, or in the consciousness of their reproduction; and that after the seat of consciousness has given up its futile labor, the seat of memory unconsciously continues its activity, and when it has unconsciously brought its work to a successful issue it communicates the result to the seat of consciousness; then, and not before, the fact is consciously remembered. Upon this we must remark that the conscious effort to command the memory, without guide or clew, is generally and singularly unsuccessful in result. The only way to succeed in remembering some forgotten thing is to seek some clew, some thread of ideal association which may lead us to it. The direct bald effort fails, for the simple reason that the attention is fixed upon the effort, and not upon the idea sought. Withdraw the effort, and the attention fixes upon the idea. The memory of the thing was in the brain, must have been there all the time, or it could never again have been remembered. Memory is a latent power, and always unconscious. Recollection is the mental activity which opens the cells of memory to the consciousness and recollection, therefore must always be conscious. That any portion of brain-work is done unconsciously in the act of recollection, is a theory to which we cannot subscribe without far stronger evidence than any which we have yet seen adduced.

The second class of facts adduced to prove that mental work can be performed by the brain without consciousness, are almost as common among men who are in the habit of employing their minds in intricate and difficult subjects. A man thinks on some matter which needs to be considered from various points of mental view, which appears to have bearings on many other subjects which seem to need elucidation from many quarters; he turns all the mental material over and over again until the whole business seems a jumble, and, in confusion and weariness of thought, he puts it aside. He sleeps upon it, and the next day that which overnight was a daub of confused colors, is seen as a bright and clear mental picture. The instances

adduced by Dr. Carpenter of this mental phenomenon are varied and exceedingly interesting, but we suppose that no reader of these pages will have any difficulty in referring such experience to himself. But, affirming the facts, will he also agree with the explanation that this power, of seeing old thoughts in a new light, is due to work which the brain has been doing in the mean time, while he was unconscious of its activities? The brain has been doing work, no doubt. It has been replenishing its forces by rest and nutrition. But has it been performing acts of memory and ratiocination? Has it been sifting away the chaff of irrelevant material, and retaining the grain of reason, and the possessor of the brain all the while unconscious of these mental activities? If so, Dr. Carpenter's theory of unconscious cerebration is a new, original, and most important light on the nature of mental activities. But if the power of looking at things anew, of considering arguments afresh, giving irrelevances the chance of being forgotten, and essentials the opportunity of being duly weighed, if this results in the better and clearer understanding of the subject of thought from the simple fact that the mere effort of thought is made under great advantage over the old, then the theory would seem to be unnecessary and superfluous. We think of fishing to-morrow, and pull out fly-books and materials, and are entangled in a medley of feathers, silks, and lines. In the morning we put up our rod, and, with a cast of flies suited to the weather, we seek the stream. Was the mind all night, being unconscious, arranging that which bothered us so in the evening? So with the materials of ratiocination; we begin by collecting from all sides that which may be needful, and the mind becomes perplexed and confused, until the time for decisive thought or action comes, and then we take those things only which are needful.

Dr. Carpenter's theory of unconscious cerebration is in accordance with what we may call his regional physiology of the brain. He places the higher psychological functions in the convolutions of the cerebrum, but the cerebral ganglia or the sensorium is the seat of our consciousness of these functions, as it is that of external sensations, but of that class of "*truly* subjective sensations" which comes to the sensorium, "the result of changes in that cortical layer of the cerebrum which we have reason to regard as the seat of the higher psychological operations." When the psychological operations of the cerebrum have been reflected downward upon the sensorium, they become subjective sensations, and give rise to the formation of an *idea*.

"It is the *sensorium*, not the cerebrum, with which the will is in most direct relation; and in order that this doctrine (which lies at the basis of the whole inquiry as to the relation of the will to motives, and the mode in which it determines our character and actions) may be rightly apprehended, it is necessary here to consider the following physiological question: Whether cerebral changes are in themselves attended with consciousness, or whether we only become conscious of cerebral changes as states of ideation, emotion, etc., through the in-

strumentality of the sensorium—that is, of that aggregate of sense-ganglia, through the instrumentality of which we become conscious of external sense-impressions, and thus feel sensations?" (p. 109).

"In this point of view the sensorium is the one centre of consciousness for visual impressions on the eye (and by analogy on the other organs of sense), and for ideational or emotional modifications on the cerebrum—that is, in one case for sensations, when we become conscious of sense impressions; and, in the other, for ideas and emotions, when our consciousness has been affected by cerebral changes. According to this view, we no more think or feel with our cerebrum than we see with our eyes; but the *ego* becomes conscious through the same instrumentality of the retinal changes, which are translated (as it were) by the sensorium into visual sensations, and of the cerebral changes, which it translates into ideas and emotions" (p. 111).

It would be impossible to put in clearer language this new doctrine, the psychical and the physiological counterparts of which are thus made to fit so accurately and consistently. The first question, however, which ought to have been entertained is the basement of physiological fact upon which all this imposing edifice has been erected. We are not aware of any, over and above the experiments of Flourens, who showed that birds performed consensual movements, apparently indicating the retention of consciousness, after the cerebrum had been removed down to the optic thalami and the corpora striata. But in complement to these interesting experiments, we have the fact that frogs perform consensual movements which may be taken to *indicate* the retention of consciousness after the spinal cord itself has been divided. The movements of Flourens's pigeons no more prove the retention of consciousness than those of a decapitated frog, which "when acetic acid be applied over the upper and inner part of the thigh, the foot of the same side will wipe it away; but if that foot be cut off, after some ineffectual efforts, and a short period of inaction, the same movement will be made by the foot of the opposite side" (p. 68).

If, under the light of these facts, it be difficult to maintain that the seat of consciousness is not diffused through the central parts of the cerebrum *and* of the spinal cord, the pathological fact that in the human being the optic thalamus or the corpus striatum may be fundamentally changed in consistence and structure by disease, without loss of consciousness, is a barrier against the acceptance of Dr. Carpenter's theory, which, as yet, we are unable to make our way over, under, or through; and, at present, our conclusion is, that unconscious cerebration is an hypothesis all in the air, and unsupported by any foundation of physiological fact.

Whether the activities of the cerebral convolutions are unattended with consciousness until they have been reflected upon the sensorium, is a question which perhaps physiological experiment, or even more likely pathological research, will answer before long. In the mean while we are exceedingly incredulous, and retain our faith in the old

opinion that consciousness resides in the cerebral convolutions, and that we are conscious of all mental changes which take place therein.

It is somewhat remarkable that, notwithstanding the large part which consciousness, or want of consciousness, plays in Dr. Carpenter's system, he has nowhere attempted to show wherein it consists or of what it is composed. Certainly it is in great part composed of the perception of sensations coming from without, and, so far, may well be located in the *sensorium commune*. The *cœnæsthesis* also, the common feeling of the organism, enters largely into its composition, and may have its place of recognition in the same cerebral centre. But evidence has yet to be sought that the consciousness of ideas, whether they be intellectual or emotional, has its seat elsewhere than in that part of the brain where these ideas are formed, namely, in the cortical layer of the cerebral convolutions. Dr. Carpenter appears to adopt the metaphysical opinion that consciousness is the perception of the *ego*, and as such is one, simple and indivisible, but the physiological view of consciousness will be that it is highly complex, and compounded variously at every varying moment of perception, ideas, and emotions, some of which obtrude more or less upon the attention, some of which are more or less faint and unrecognized, but which nevertheless exist, and can be found, if the attention be directed to them. The consciousness always is, and must be, highly complex. Even when an intense sensation seems to convert the whole body into one great pain, one sense of torture, there is that sense and the idea of it, and the emotion it causes, and some appreciation of the surroundings faintly recognized; even in *melancholia attonita*, when some one frightful delusion has taken possession of the mind to such an extent that the patient seems to have sunk into the abyss of dementia, he still hears and sees, and has some apprehension of his surroundings, so that even in this case his consciousness is the compound result of very different sensibilities. Some of these are forgotten by the memory, some are lost, but none are forgotten by the mind. As a feather falls not to the earth without drawing the earth to itself, so in psychics, the most feeble and transient sensation, unnoticed and not forgotten, because never really placed in the memory, is still a factor of the mind through all its subsequent existence, and in the history of all mind forever.

A due appreciation of the elements of consciousness, from this point of view, will perhaps lead Dr. Carpenter to admit that unrecognized and unremembered parts of consciousness have still existed among its components, and that, as no motion of matter can exist for a moment without leaving results in modifications of physical universe, so these unrecognized and unremembered parts of consciousness must serve in the chain of mental paternity or genealogy of all succeeding mental states.

The chapter on insanity is excellent, barring the intrusion of the

volitional theory. We are glad to observe, too, how fully he has adopted our own views of the *emotional* nature of insanity, and of the genesis of intellectual delusions or perverted emotions. These opinions, first advocated by us in the twelfth volume of the *Medico-Chirurgical Review*, in 1853, appear since that time to have been generally adopted by mental physicians, and it is now gratifying to obtain the concurrence of a great physiologist and philosopher.

The modes of disturbed emotion which tend to the production of insanity are not, according to our observations, the various forms of angry passion which are commonly called quick or bad temper, and the author has probably accepted, in too serious a sense, the remark made to him by Dr. Conolly on this point.

“The writer well remembers, when going with Dr. Conolly through one of the wards on the female side of the lunatic asylum at Hanwell, Dr. Conolly remarked to him, ‘It is my belief that *two-thirds* of the women here have come to require restraint through the habitual indulgence of an originally bad temper’” (p. 663).

Conversational remarks of this kind are often made with little intention of their being taken accurately in support of scientific theories. Probably the doctor had just then been vexed with some extraordinary display of female temper, but we think that if questioned he would have admitted that insane women as a class have scarcely worse tempers than other women, and that angry feelings do not constitute the modes of emotion which more frequently lead to the evolution of insanity. Grief and pride, and that compound of hope and fear we call anxiety, these are the modes of emotion which are the frequent groundwork of mental disease.

In conclusion, we can strongly recommend this interesting and erudite work to our readers. If we think the automatism of the mental functions which physiologists are compelled to recognize is opposed adversely to the methods of strict science, by the much-debated and certainly unestablished doctrine of free-will, it must not be forgotten that the author, in his belief in the freedom of the will, has on his side the support of widely-spread opinion, and that it is somewhat unfortunate that his conscientious labors to prove and establish the physiological importance of free-will have fallen in this instance for review into the hands of one who, with Jonathan Edwards, believes that there is no such thing. The scope of the work is far larger than the comments which our space permits us to make would lead our readers to expect. It is replete with information, and remarkable for clearness of statement and of thought. Disagreeing, as we do, with its main purpose, we cannot avoid the expectation and the hope that it will provoke rivalry, and yet it richly deserves, and will no doubt occupy, a place in medical literature, the vacancy of which has been much felt, as a text-book on Mental Physiology.—*Journal of Mental Science.*

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