

ease and similar appearances produced by poisons, yet it may be very difficult, if not impossible, to make the distinction without knowing the history of the case. I should consider any of these lesions, much more a combination of them, sufficient to demand an analysis, unless poisoning could be eliminated in some other way. As neurotic poisons may leave their odor, so irritants may cause very characteristic signs of their presence (not true pathological lesions), any of which should call for an analysis. Such are the white patches of arsenious acid sometimes found firmly attached to the mucous coat of the stomach, the peculiar slate-colored deposit said to have been seen in the stomach after poisoning by corrosive sublimate, and the remains of poisons themselves sometimes discovered by close inspection. Here, too, may be noted the preservative effect of arsenic.

This attempt to consider the nature and weight of the evidence furnished separately by the history, symptoms, and autopsy, may at least have suggested the importance in every medico-legal case of gaining evidence from every possible source. The history, or the autopsy, taken separately, is often entirely inconclusive, while the two together may be decisive.

Poisoning has been suspected in cases of death from various natural causes; for instance, peritonitis, intussusception, strangulated hernia, and more rarely rupture of the stomach or duodenum, rupture of the bile ducts, and rupture of the uterus. By combining the history and the autopsy in such cases it is often possible to declare that death could not have been caused by poison. The evidence from the autopsy can always be obtained unless decomposition prevents, while an exact and reliable history may easily be wanting. To be deprived of either class of evidence can only be considered a misfortune. Yet if all the obtainable evidence is duly weighed, if our reasoning is founded on facts and not on theory, we may expect to decide the question under consideration to the advantage both of the public and of ourselves in the vast majority of cases.

I trust that the somewhat desultory and unscientific character of this paper may be attributed partly to the nature of its subject, which hardly seems to admit a more precise and definite answer.

NORMAL CEREBRATION FOLLOWING THREE YEARS OF DISEASED MENTAL ACTION; THE MYSTERY OF ITS PATHOLOGY.

BY C. P. BANCROFT, M. D., BOSTON.

AMONG the insane the physician occasionally sees a chronic case, in which he had supposed every ray of intelligence obliterated, suddenly brighten up after years of thoroughly diseased mental action, and speak rationally and intelligently. Such cases are as rare as they are interesting, and it is about them that I wish to speak, illustrating the subject by a typical case that occurred in the New Hampshire Asylum. There is but little on this interesting matter in the text-books of insanity. The subject itself, however, is well worthy of investigation, for the study of such cases may throw some important light on the pathology of one of the most obscure diseases, and may also add something to our knowledge of normal mental action.

The tendency of the latest investigation is to prove that mental action is developed through the activity of the nervous system; that chemical and cellular change in that system always precedes the evolution of thought. This leads us to the conclusion that insanity is a physical disease as much as pneumonia or pleurisy. Disordered mental action is dependent on disordered nerve tissue. I think nearly all alienists of the present time subscribe, in the main, to this view of the physical basis of mind. But any specialist who has lived among the insane recognizes the difficulty of establishing a perfect analogy between cases of mental and ordinary physical disease. Indeed, we seem to know as little about the pathology of insanity as we do about its morbid anatomy; and probably the same mystery that surrounds mind in general will always to a greater or less degree obscure it when diseased.

That the analogy between mental and ordinary physical disease is not complete is very evident. A man who has had paraplegia for three years does not suddenly take up his bed and walk, and yet a man's mind may be so diseased that not a single normal thought may be evolved for years, and, owing to the disordered state of his intellectual system, the man may have sunk into a condition worse than that in brute life, and yet, suddenly, after years of such diseased action, that same man may give utterance to sound thought, and may call into perfect play some of the higher attributes of mind, such as memory, realization of time, consciousness of his own condition, etc. It is as if a man with advanced locomotor ataxia should suddenly, perhaps for a few minutes only, arise and walk naturally. There is evidently something in the pathology of insanity that we have not grasped. We can understand tolerably well the ninety and nine cases that have chronic mental disease, and die, either in their thoroughly demented or maniacal condition, without uttering an intelligent idea. We can, to a certain extent, understand how there may be cases of recurrent mania, in which the patient runs through a more or less acute excitement, recovers, and breaks down again. Every hospital has its circulatory cases, and physicians are able to predict with great certainty in some cases the date of a fresh attack. But it is not to these that I allude. I refer to the cases in which the attributes of mind seem to have been destroyed, to cases in which, of the three factors of mind, namely, feeling, volition, and thought, feeling and volition, at least, seem to have been obliterated. In short, we find it extremely difficult to understand how it is that a man with chronic mania or dementia, in whose mind there does not seem to remain a single rational idea, how such a man may suddenly come back to himself, as it were, and speak intelligently.

With these few ideas in mind, I wish to outline as briefly as possible the clinical history of Hiram Gore, and to discuss the peculiar features of his mental condition. Gore was a native of New Hampshire, married, forty-two years of age, shoemaker. He was admitted on the 24th of May, 1877. Had been insane once before. The attack had been of one week's duration before admission. About ten days before, he had had some difficulty with a neighbor, and attempted to shoot him, for which he was arrested, and committed to the jail in Portsmouth. After his arrest he had been growing more excited, and for two days previous had been completely maniacal, violent in language and conduct, destroying everything he could lay his hands upon.

The report of May 30th reads: Since admission has been thoroughly maniacal, talking a greater part of the day, but resting a portion of the night; talks in a rattling, disjointed way, with no sense or connection. Has torn his shirts, and will not keep a thread on him; has also destroyed more or less of the bed-clothes, and pulled out the straw from his bed, and scattered it upon the floor. Is thin in flesh, but eats well.

June 1st. Continues much excited, and remains in his room; will keep no clothing on, and consequently is permitted to walk his room without any; seems to bear his excitement well, has a flourishing appetite, with regular bowels, and holds his flesh.

June 6th. An attempt was made to dress him, and allow him to stay in the hall, but as he immediately tore his clothing, canvas mittens were used; these seemed to quiet him a little in his actions, although he did not for an instant cease his constant, incoherent talking.

June 20th. Has been in the hall for several days only wearing mittens occasionally.

June 26th. Became more violently excited; is full of insane pranks. Attendant entered his room, and at first could not find him, but a little search disclosed him inside the straw bed; he had crawled inside the mattress, buttoning it after him. From this time on Gore grew worse. He became the most persistently maniacal person I ever saw. Sedatives were tried in vain. Both day and night he kept up one prolonged and continuous state of activity; for a few moments only would he catch a little sleep. Immediately on waking he would commence his incoherent speech. Still he ate heartily of whatever was given him. In his habits he became perfectly bestial. He seemed in appearance and actions devoid of every ray of intelligence. This state of things continued until the summer of 1880. He then began to show signs of exhaustion. Notwithstanding that he was so weak he still kept up his incoherent talking. Began to have abscesses form over his body. Became excessively emaciated. In August a diarrhoea appeared which could not be checked. He gradually failed in strength, although he still continued as wildly incoherent as ever until the morning of 13th of October, 1880. On this morning the attendant entered his room, and in his usual way said to Gore, "Good morning, Hiram," when, to his astonishment, Gore looked at him with an intelligent expression, and said: "I want to die. I feel ready to die. I have suffered for three long years, and I want to go where I can rest." These were literally the first intelligent words the patient had uttered for three years. He repeated these words or something similar during the next few hours, but he seemed to be gradually sinking. Occasionally he rallied, and then his face would lighten up, and a countenance that during his whole residence in the asylum had been a blank wore an intelligent look. There seemed by his actions to be something on his mind that he wished to say, but he appeared too weak to say all that he wished. He did speak, among other things, of his wife, and of trouble he had had with her and his daughter, giving the name and age of the latter. When the attendant went out of his room the patient would call him back and say there was something he wished to tell him, but he did not seem able to express himself. He gradually failed, and died about nine P. M. of exhaustion. Until he became too weak to recognize anything he still appeared intelli-

gent, and seemed to make an effort to make himself understood.

I wish now to briefly analyze the condition of Gore's mind, attempting to ascertain the character of its diseased action, and also to ascertain what faculties were left unimpaired, and what were apparently destroyed.

First in regard to the character of its diseased action. His cerebration was almost wholly subjective. Sensations imparted from his environment had little or no effect in exciting ideas or perceptions. He did not even have delusions excited by persons or objects about him. He would look at you vacantly or about the room all the while talking most incoherently. Scattered, detached words, names of individuals he had once known, followed each other in quick succession; but not a single idea was expressed. Those words evidently related to parts of old ideas and associations that had been previously stored up in his mind when he was well; now they came tumbling out incoherently without representing any idea. What I wish especially to emphasize is that his mind merely acted on what it had received in the past; the present was as nothing to him. In the second place it would seem as though something within the cerebral centres was keeping up a constant irritation, causing old ideas, old impressions, to be continually aroused and brought to consciousness; but they were so rapidly excited and brought in view, and succeeded one another so quickly, though without sequence or logical connection, that language was not capable of uttering them intelligently. One part of an idea was no sooner expressed in language than another idea was called up and the expression of the new idea crowded out the expression of the old. So much for the character of the mental action in this case. Now let us see what attributes of normal mind were still possessed by this diseased mind. We shall find present (1) consciousness, (2) perception of time, (3) memory. We shall find in abeyance volition.

(1.) Consciousness was not destroyed. It was through consciousness that he evidently made an attempt to express the rapid flow of ideas and perceptions that took place in his brain. And when at last after three years of almost continual incoherence his brain, apparently exhausted, refused to send forth ideas, then through this same consciousness we find that the man really was exhausted, and that he welcomed death as a speedy relief.

(2.) The patient possessed a knowledge of time. The knowledge of time possessed by the human mind is, when analyzed, found to be a very complex idea. The lower animals are doubtless unable to measure time that has passed. We hear of remarkable instances of tow horses on the street railway that seem to know exactly when the day's work is over, and when the last trip is made direct their steps toward the stable. But this conception of time in that case is undoubtedly due to the fact of a certain amount of muscular exhaustion and a certain amount of hunger which, by recurring day after day, has led them to feel that at about such a time when they experience such and such sensations, that is the time for leaving off work. But the human conception of time — of a year for instance, — is a far more complex act. First there is a day, then a night; then seven of these days and nights make a week. Four of these weeks make a month. Three of these months make a season. Twelve of these months or four of these seasons make

a year. All this is a very complex idea, and to be able to comprehend it one's mind must recognize the change of day into night, and night into day; and the change of summer into autumn, and autumn into winter, and so on. So that our patient's mind was in a more or less receptive state after all. And though he seemed to indicate a condition of mind lower than that in brute life, he still possessed mental attributes higher than any possessed by lower animals.

(3.) Memory. Memory was not by any means impaired wholly. We have already alluded to the fact that detached ideas, evidently relating to the man's past life, followed one another in rapid succession for three years. When now this incoherence suddenly ceased, and ideas were not pressed forward in this rapid, confused manner, the man looked up intelligently and remembered the past, remembered that he had been three years in a state of disease, and even recalled the circumstance of domestic trouble. And here is where the pathology of such cases confronts us. If there is actual disease of the nervous structure of the brain, just as there is actual disease of the cord in locomotor ataxia, or of the kidney in Bright's disease, why should the diseased organ suddenly act normally in the one case and not in the other? Why should the brain after years of diseased action suddenly evolve normal intelligent thought? The cord never regains its normal functions in locomotor ataxia; nor the kidney its function in chronic Bright's disease. Evidently the analogy is not as perfect as it seemed to be. We suppose the brain to be structurally diseased, and yet suddenly the normal action of mind asserts itself and ideas are rationally expressed. We almost feel driven to the assertion that in such cases as these insanity is not a structural disease, but rather that the mental disturbance is of a functional character.

So much for the faculties of mind that were preserved in our case. Of powers that were in abeyance we have to record volition. To all outward appearances this man no more exercised will power than a vegetable. As regards his thoughts will did not appear to control them in the least. The result of this was that for three years he did not have a single connected thought. As regards his actions will appeared to exercise no influence whatever. The result of this was that he would remain for hours in constrained and uncomfortable positions, that he tore and dashed about his room much as a wild bird would do, utterly regardless of self. But most remarkable of all is the fact that in his innermost consciousness the man suffered. He not only was simply exhausted and worn out, as is a piece of machinery after excessive use, but he was cognizant of the fact. He suffered, as he tells us, for three long years: and though he knew it still he could not control the terrible disease that overpowered him. Will power was lost. In these conditions of disease it would almost seem as though the patient lived a double life; his *ego* which seems to lie back of all, and is observant of all, and yet cannot control the mental state; and then his diseased mental self which rushes wildly on refusing to be controlled by either will or feeling.

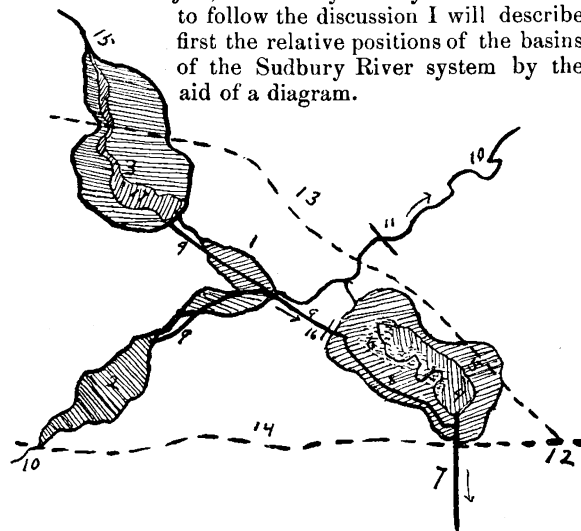
The study of such cases would seem to point to one thing, namely: that though the centres of cerebration may be so affected that normal thought is an impossibility, nevertheless that higher, more immaterial mental state, that condition of mind which we call the *ego*, the conscious self, exists undiseased in some of the

most hopeless forms of insanity. And though for years it may seem to have disappeared, and to have lost influence over the centres of thought, nevertheless it does exist and, as in our present case, may assert itself in the midst of the greatest mental and physical dissolution.

THE WATER SUPPLY OF BOSTON.¹

BY HENRY J. BARNES, M. D.

THE public supply of water for the city of Boston has so far improved that we can once more drink without disgust, although it is still highly discolored, and there is a disagreeable smell, particularly in that drawn from the hot-water faucets. The change took place during the cold weather in the early part of December, and it is reasonable to ascribe this to the weather quite as much as to the fact of Farm Pond being shut off. For just before the new channel was finished around the margin I could not detect the bad taste so familiar in Boston in the water of this pond. Besides we did not get the good water from Basin No. 2, as promised by the Water Board, for an accident to the main, laid in the bed of Basin No. 1, necessitated the mingling of the water of the two basins before it could be used through the new channel, and the analysis of the water of No. 1, made by Mr. Remsen, November 5th, prompted him to classify it in point of impurity with Farm Pond, Bradlee Basin, Pegan Meadows, and Basin No. 3. His subsequent discovery of spongilla in Farm Pond seems to have so occupied public attention that the filthy conditions of the other basins where no sponge has as yet been found have been lost sight of. To emphasize the importance of these other basins as factors in polluting the water I invite your attention to this subject, and that you may be better able to follow the discussion I will describe first the relative positions of the basins of the Sudbury River system by the aid of a diagram.



SUDBURY RIVER SUPPLY.

1, Basin No. 1. 2, Basin No. 2. 3, Basin No. 3. 4, Farm Pond drawn down. 5, Farm Pond. 6, Distribution of spongilla. 7, New conduit to Chestnut Hill. 8, New channel. 9, Mains connecting Nos. 2 and 3 with Farm Pond. 10, Sudbury River. 11, Temporary dam. 12, South Framingham. 13, North division Old Colony Railroad. 14, Boston and Albany Railroad. 15, Stony Brook. 16, Upper gate house. 17, No. 3 drawn down in the summer of 1881.

¹ Read before the Suffolk District Medical Society, December 31, 1881.