

importance. In it mind, spirit and matter meet to form the triune man in the image of the Triune God. There is no difference in the members of the human family, Hottentot, Mongolian or European, as to their minds, the difference is only in the structure of their brains. After death and the resurrection all the redeemed of Adam's race will be equal.

Often on the thoroughfares of crowded cities, in the parlors of the devotees of fashion, in the offices of money dealers and in the haunts of the busy fortune hunters, I have tried to imagine the appearance of the brain structures of the different types of the *homo genus* and compare one with another. Shape of head, contour of face and form of features furnish a slight index to the hidden form and individual structure of the brain. The behavior of the individual is the best criterion of the sanity or insanity of his mind organ. The conduct of every individual must be compared with that of the highest type of man and his brain can be graded thereby with accurate precision.

Faces may deceive, pomp of wealth or foible of fashion may conceal, but truth will out and show by character the inwardness of the brain. The brainiest men are those whose habits of life are nearest perfection. The world is full of deformed brains.

A NOTE ON THE PATHOMENTAL EFFECTS OF DEGENERATIVE HABIT.

Read in the Section on Neurology and Medical Jurisprudence at the Forty-Seventh Annual Meeting of the American Medical Association at Atlanta, Ga., May 5-8, 1896.

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In his play, "Two Gentlemen of Verona," Shakespeare makes Valentine say—

"How use doth breed a habit in a man."

In this remark we have an expression of psychological truth, that three centuries of later observation has not been able to gainsay. The disciples of heredity have availed themselves of the apparent effects of habit impression in formulating their creed, employing them as evidence of a double meaning, especially if they were of a degenerate nature. "Evidence here," they would say, "of congenital predisposition, to think and act in lines that enfeeble mind and pervert body." The pessimistic speculations of a Schopenhauer or a Nordau may echo the opinions of medieval prophets of a fate-bound destiny, and find a hearing in a certain class, but the cheerful sunlit view of a better future for him who seeks it earnestly is finding a larger recognition among the sober and thoughtful year by year. In the field of anthropology there does not appear that tenacious insistence upon the preëminent influence of heredity that characterized the discussions of ten years ago. Manouvrier, Brouardel, Magnon, and others of authority refuse to admit the existence of any distinctive type of nervous organism for the vice-bound and criminal, and contend that it is not so much the inheritance of a disposition toward conduct of an irregular vicious nature as it is the social relation into which one is born or in which he lives, *le milieu*, what should receive consideration, when we commence to trace the etiology of moral perversion and crime. In the Paris Congress of 1889 M. Manouvrier argued with great force upon the principle that the commission of acts in violation of law did not demonstrate a morbid type of constitution but rather a certain caste of temperament and unfortunate surroundings.

Dr. Henry Maudsley, once a pronounced apostle of heredity of the severe class, said lately in answer to the question. "Is a man hopelessly chained down by the weight of his inheritance?" "By no means, for there is something else besides inheritance that makes fate, and that is education. It is a physiologic law that the brain throughout infancy, childhood and youth grows to the circumstances with which it is placed, and therefore the actual development of a brain may be as much influenced by the kind of nutriment supplied to it as long as it grows."

The verdict of psychology is substantially in keeping with that of physiology. Sully, for example, in "Handbook of Psychology," writes: "In the present state of knowledge heredity only helps to account for comparatively few among the host of peculiarities that go to make up the natural phases of individual character. . . . External influences cause variations. No two are subject to the same influences. The school, the circle of friends, the business, etc., differentiate minds. The body takes on a form of growth because of the special line of habit in eating, exercising, etc., of the individual. So the mind grows on what it is fed in the daily life. Lines of mental growth will be to some extent predetermined by innate capabilities and tendencies, but these only partly limit the process; they do not fix its precise character. The particular ideas and connections of ideas that form the intellectual habits fix the peculiar coloring of the feelings and the special lines of conduct will all be determined by the character of the surroundings." A particular trend of thought now becoming popular in educational circles is derived from a philosopher of a century ago, Herbart, and which accentuates in stronger terms than those of Sully the effect of education. According to Herbartian pedagogies children have at first no real moral character but acquire it through the union or association of arts of will that have a moral quality. It is the business of training to bring all classes of will action under the dominion of moral maxims in order that "a symmetrical passion for good" may be created. Thus it is clear that in the Herbartian doctrine it is the tone and quality of the general habits that determine the character, and these habits are not fortuitous, or predetermined by birth.

As to the effect of habits, however acquired, it is undeniable that they produce in time conditions of mind and body that in themselves reflect a healthful or injurious nature. Are the habits of a vicious kind? Persisted in they accomplish alterations in the substance and relations of the cerebro-spinal organism that are abnormal and degenerate. Thus the soil of mind becomes more appropriate for the generation of evil fruit than for good. The benign elements become feeble and uninfluential or so perverted that their response to suggestions of a vicious sort contributes to moral disorder.

The studies of the cerebralist have shown that the form and constitution of the brain bear a particular relation to mind capacity and character. We know that certain endowments of structure render one more susceptible to the adoption of manners and habits of a coarse and perverting nature. Benedict, Lombroso, Maudsley, Spitzka, H. Mann, Allen, Buttolph, etc., have discussed the characteristics of structure that may dispose a man in certain relations of suggestion to respond to impulses of an unlawful kind. Dr. Maudsley remarks, "All broad-headed people are very

selfish; that is, all who have the head broad in proportion to its length. . . . An undue preponderance of the breadth of the head throughout the region in which they (the phrenologists) place the propensities, indicates with certainty an animal self-love which can scarcely be trusted at all times to adopt only fair means for its gratification." The London professor, arguing from the relation of the anterior brain lobes to intellect further remarks, "The bad features of a badly formed head would include a narrowness and lowness of the forehead, a flatness of the upper part of the head, a bulging of the sides toward the base and a great development of the lower and posterior part; with these grievous characters might be associated, as wideness of the zygomatic arch, as in the carnivorous animal, and massive jaws." Such a development of brain intimates the possession by nature of strong animal instincts, and a comparatively weak endowment of those sentiments that inspire kindness, sympathy and deference. Upon such a stock it were easy to graft habits of a vicious sort through exposure to surroundings that are degraded and brutal.

Thought habit then has its coördinate factors in the cerebral substance, where molecular changes are produced with facility and effect correspondent to the duration of the habit. Repetition operates not only to render these molecular changes more rapid and easy, but is productive of growth of nerve substance of a special sort, an evolution correlative to the habit acquired. The motor areas of a trained artisan are more extensively furnished with appropriate cells than those of an office clerk. The use of hand and arm stimulate action and consequent cell proliferation in the anterior and posterior ascending convolutions. The artist develops those centers of form and color that are of daily employment in his profession and they become noticeably marked in his cranial physiognomy. Professor Gates of Chicago experiments on the color sense of dogs and proves that the enforced exercise of that sense for a period had a result in decided increase of brain tissue in the color area.

Conversely, disease of mind faculty is attended with declension and disease of the cell elements of the coördinate center and decline in strength. Any habit, therefore, that inhibits or suppresses the activity of an important intellectual or moral faculty disturbs the mental balance and impairs the integrity of judgment in no trifling degree. This impairment if not compensated will go on until pronounced insanity results. Interference with the normal function of any physiologic organ continued or frequently repeated causes deterioration of that organ and of its cerebral center of nervous supply. This deterioration implies either functional decline or positive disease of the reciprocal parts. Habits that contribute to the maintenance of health oppose tendencies to disease, of whatever nature the disease may be. The late Sir James Cox, in his enumeration of the six leading causes of physical deterioration that may eventuate in insanity, places "dissipation of various forms" first, because habits of dissipation affect the nervous system more directly and certainly than other causes. The specially conspicuous of these habits are: Alcoholism, the use of tobacco and opiates. The disturbances of function wrought by the practice of taking alcoholic beverages daily belong to our common stock of knowledge and represent generally or analogously what of nerve injury is done by toxic narcotics as a class. They depress the vital tone of every organ of the body. Of alcohol

we know that its high diffusible quality enables it to penetrate the animal tissues in every direction, and by impairing the nutritive properties of the blood to interfere with those metabolic changes that are essential to the maintenance of the integrity and vigor of every organ, muscle, nerve, gland, mucosa, lymphatic, etc., all suffer deterioration from frequent contact with it. We know well its ravages on stomach, kidney, heart and liver, and its inhibitive effects upon the cerebral and spinal centers are matters of every day observation. It may be that Hyrtl more than merely accentuated his impressions from laboratory examination when he said that he could easily detect the brain of a drunkard in the dark because of its comparative hardness, but we certainly should expect a similar effect upon the nerve mass whether it were placed in alcohol to soak, or the latter instilled by daily installments. The impairment of the functional energy is so reflected in the character and conduct of the habitué that we are irresistibly led to the conclusion that the disturbances of the nervous centers are those with which the higher psychical faculties of mind are directly concerned. These no longer exert their normal control in the intellectual and moral expression, and weakness of will and instability of judgment advance *pari passu* with the alcoholic invasion.

It is not claimed that alcohol has a specific effect upon certain brain parts, and attacks them on opportunity, but that by perversion of the nutritive supply it as an early effect lowers the functional tone of the brain, and these may introduce a train of evil consequences to motor and psychic action. The senses, which at first may be exalted through inhibition of vaso-motor control, become later obtunded; the intellectual perception relatively declines, and with this power to reflect and to appreciate nice distinctions is lost. The sentiments of courtesy, refinement and kindness, esteem of virtuous character, independence and manly resolve become less and less exhibited, until quite replaced by indifference to the commonest usages and requirements of propriety and duty. The character assumes more and more a pathologic form. We have the exhibition finally of a mental lesion as insanity, whose physical concomitants of perverted function offer material for an easy diagnosis. The alcoholic invasion especially affects the higher organic centers of the brain, those that correlate moral apperception, because of their more delicate adjustment to the economy of nutrition and sympathetic impression. Then, too, their comparative remoteness from the arterial centers may be another reason for their disturbance. Grief, disappointment, chagrin, poverty, may be alleged as cause for a large proportion of society's inebriates, but the fact remains that eight-tenths of the intemperate drinking that abounds is begun in the home or the friendly circle by indulgence of the appetite in ways imprudent or vicious. As Dr. Bushnell once said: The scale and order of simplicity once broken, then ensue a distempered or distemperate life that runs more certainly to that which is intemperate.

The cocain, opium and other drug habits of our day may run a shorter course than that of the alcoholic, but their perverting effects are not more certain or disastrous. A similarly associated impairment of the physical and mental organisms is the outcome, a similar change of function, from capacity to incapacity, from strength to impotence, from probity to dishonesty, from nobility to vileness, from humanity to

bestiality. These are pathomental artefacts of an uncontrolled self-indulgence. Now that we have the *dictum* of the French pathologists at command to supplement our own observations, we know that the habit of smoking operates to produce changes in the blood and the tissues through cardiac irritation and gastric derangement, changes that in time necessarily lower the general vital tone, and affect unhappily the economy of mind. The pessimism and dyspepsia of Carlyle were correlative. What of his inveterate pipe smoking and his almost equally inveterate indulgence in stomach-trying diet? How the fine cells of that powerful brain must have suffered from the scanty nutritive supply that a vitiated blood stream brought to them! We can easily imagine that the blood of the author of that story of the French Revolution so luridly picturesque in its narration of horror must have bristled in the microscope with its billions of crenated corpuscles. The eccentric vision of the historian and the distempered conduct of the man as husband and acquaintance furnish a homily for the moralist, and a fertile study for the neurologist.

The successful treatment of the chronic habitué involves as a primary object the readjustment of the factors of his thought life, so that his motives for right and orderly living shall be renewed and his will inspired with energy and persistence. But we shall fail to restore coherence and harmony in his psychic relations if we do not in the outset attend to the rebuilding of his body, awakening to fresh activity the organic functions, so that the nervous correlates of mind—cell and fiber—shall be supplied with the elements essential to their reinvestment, and this reinvestment should go on in advance of psychic reformation in order that the intelligence of the man shall be conscious of a growing strength. The older the habit the more difficult its management, yet it is the age of the habitué that has more to do with the determination of curability. Who, however, will say that the degenerative changes in a given case have gone so far that no improvement is possible? Those whose experience warrants an expression of judgment are inclined to take encouraging views of the effect of considerate treatment. The President of this section, after years of critical observation, has said: "The tendency in nature being toward the maintenance of the perfect type, we may look for an endowment of new normal tissue where all the conditions are favorable, and under such circumstances a cure, or what is popularly called reformation, takes place."

Each case must be studied by itself; the type of constitution being understood, the stage of degeneration may be approximated, and a forecast of the probable outcome of systematic treatment be ventured.

DISCUSSION ON PAPERS OF DRS. DRAKE AND DRAYTON.

Dr. CHARLES H. HUGHES—The first paper seems to take a rather peculiar position. The term mental disease, as applied to insanity, and as a synonym for insanity, has been understood by alienists and psychiatrists in all countries to be a conventional term. Science has assumed that mind is the aggregate of the personality and individuality of the person, as discerned through the several functions of the brain and cerebro-spinal axis. It has never entered into the metaphysical question as to what is mind. Nor has it attempted to fathom the nature of the cell. Psychologic science has relegated the question of the nature and essence of mind to the unknowable. The Cartesian philosophers maintained that the mind resided in the whole and in every part of the organism; that

it represented the individuality of the person and was the psychic portraiture of his personality. Science has to do with material things; its instrumentalities of research are material, and the organs which it examines with the microscope, the test tube or the crucible are material. Science says that the brain is the organ of mind, adopting that term and accepting it from the psychologists. The somatic psychologists study the physiology of the brain in regard to the manifestations of what philosophy has called mind. Now, we have never attempted to maintain that the material entity of the psychologists could become diseased, because if it become diseased it might also die, and we know the dilemma in which we might be placed. Science has judiciously evaded this question, and left it to the domain of pure psychology. No sound psychiatrist, no correct alienist, who is careful of what he says, will go upon the witness stand or the rostrum and maintain that the mind can become diseased.

We do not think that the brain centers preside exclusively over the material metabolism of the organism. While science has reached the point at which it believes that conditions in the gray cortex have much to do with the normal metabolism of the organism, it has not reached the point at which it can say that they all reside there, for we know that acephalous beings have the power of physiologic metabolism in their ganglionic processes; that hearts are formed, livers developed, kidneys evolved, etc., without the intervention of the higher psychic centers of the cerebrum. While, in the main, the object of the paper would meet with the concurrence of most men who have made this a life-long study, still I think it has somewhat trespassed beyond the domain of science.

Dr. BURR—It seems unnecessary for us to go into matters in connection with the soul, the spirit.

The subject of autointoxication I consider of great importance to those who are treating insane conditions. I find myself confronted with difficulties in the way of medicating those cases ordinarily. They have symptoms which I would like to meet by medicine directed to the condition, but the objection of the patient is very difficult to counteract.

As I have always understood the term hypochondriasis, it signifies a willful lack of interest in one's self, and I am satisfied that in the majority of cases of hypochondriasis there is at the bottom a pathologic condition, and often this condition of autointoxication, owing to trouble with the kidneys, the intestine, malassimilation and faulty metabolism.

Dr. SANGER BROWN—The great trouble in neurology has been that we have been wanting in sufficient distinct and clear data with which to work, and I think the conception of the neuron as it has been promulgated by students in various countries in the last year or two—due mainly to the great improvements that have been made in the process of staining, and studying the primary unity of the nerves—has gone a great way toward giving the remarks which we have before made, and which have been hypotheses, an actual definite meaning.

I simply wish to refer to the published results of Dr. Berkeley's recent investigations in Johns Hopkins University, which were set forth some months ago in *The Brain*. This only covers one department of this subject, but it is a very important one and one which I think ought to be emphasized, because it shows that it is possible we may look forward to a time when the various poisons, the auto-infections, etc., can be definitely reducible to a distinct anatomic basis; indeed, that it may be possible, perhaps, to reduce insanity to this anatomic basis.

Heretofore we had been forced to say that there were gross changes in alcoholism in the brain. There might be sclerosis in alcoholism or there might not; I do not think it is possible to demonstrate that. If two brains were laid down before us, one of the worst drunkard in the world, and one of a man who had never tasted a drop, I do not think it would be possible to differentiate between them. Dr. Berkeley took a large number

of rabbits and fed them with all the alcohol they would stand for seven or eight months, until many of them died of convulsions. He found no process of hardening on examining their brains but he did find changes in the body of the neuron—not changes in the axis cylinder. This was not the result of the staining process, because he made numerous control experiments. I think this indicates the direction in which we should look, because when we are studying neurology we are only studying the function of the neurons, and everything indicates that they may be regarded as so many units, and we can study the symptoms exhibited from that standpoint.

Dr. J. T. SEARCY—I refer in my paper to changes by toxins in the neuron, a change in the shape and size of the body, this becoming shrunken, and the processes of the neuron being altered at their extremities.

The changes in the axis cylinders of peripheral nerves are also noted in some conditions like the neuritis of alcohol and peripheral neuritis. The whole subject is still in the beginning of its growth.

Dr. DRAKE—One of the strictures on my paper seems to be as to my claim that the functional activity of the centers of metabolism was dependent upon the tissues in the brain. This I wish to explain, as I include in the brain everything in the cranial cavity. The ganglionic centers I consider to be centers which receive their energy from these higher centers. If they receive no reinforcement of energy, then the metabolism ceases, but so long as they are connected by nerve fibers with the higher centers then the process continues. Cut the connection and the process continues for awhile, but as soon as the energy which is already contained in those lower centers is exhausted the metabolism ceases. The heart can pulsate out of the body for awhile by virtue of the energy which is contained in its own ganglion centers. As soon as that energy is expended, it ceases to beat.

Dr. KLEINSCHMIDT, of Washington, D. C.—Hodges has shown very clearly the great influence exerted upon the central nerve cells by excitation of its axis cylinder process, the changes being shown in altered conditions of form, etc. Again, it has been shown, over and over again, by Weigert especially, that normal excitation, if repeated through the cells of the nerve centers, have their influence upon the morphology and undoubtedly also upon the chemistry and molecular structure of the central nerve cells. So that, considering the central nerve cell as the center of energy, we may readily suppose that influence such as cited by the gentleman from New York will have a very decided impression upon the central nerve cell. He held that by a proper mode of educating the brain that had been reduced by disease or intoxication or bad habits, we were able to reproduce by proliferation new central nerve cells. I do not believe that that process has as yet been clearly demonstrated. I do not believe that the central nerve cell, and especially the higher differentiated nerve cell of the cerebral cortex, under any conditions can increase and multiply by proliferation. But there is another way in which we may educate that central mechanism. Taking the studies of the neuron we find that the nerve cell itself adds to its connections and the capacity of the nerve cell is entirely to be measured by the number of connections it can make with other nerve cells, bringing it into nearer connection with the center of the system in which it may be. In this case proper education may lead to a new combination, to increase in the protoplasm processes by which new combinations are brought about, and in that way we gain a greater result. We can not suppose that all nerve cells are equally affected; and all the nerve cells in a single cortex are probably not occupied at one time. Now, if we can increase the metabolism in a nerve cell to such an extent that these processes shall form into wider connections, we therefore improve that nerve cell. I do not think that a cerebral cell once formed can proliferate.

Dr. CHARLES H. HUGHES—I only know of one man who ever maintained that the cerebral cortex cells could be reproduced, and that was John P. Gray, of Utica. The peripheral nervous system can reproduce the central nervous system. I do not think in regard to the question of degeneration, that toxicity is the sole cause of mental aberration in those cases in which insanity appears. I think that we are not yet prepared by any of the later researches to explode the doctrine that insanity is the product of more than one generation; that a morbid aptitude of the cell, or the neuron as we shall have to say now, and we shall have to speak of neurons, neurils, and epi-neurils, in order to be in accord with the progress of modern histologic research—is one of the factors. I do not think that insanity, as a rule, is primarily developed by any form of acute toxicity. It is excited by it, but it resides originally in the morbid aptitude of the psychic center or cell envelope.

I do not believe, however, in the degeneration of the race, that the psychic sense of the average human being is less capable of sustaining pressure; on the contrary, I believe that they are standing more than the same centers in our ancestors and that the tendency of nature is to preserve the type:

"So careful of the type she seems;
So careless of the single germ."

Individuals fall by the wayside, unable to carry the burdens laid upon them, and failing to learn wisdom early in life.

It is the pathologic condition of the center of the cell soil that gives rise to the morbid manifestation. Given a certain influence that acts upon the psychic centers of one individual and his cerebrum sustains it without morbid result. One individual takes alcohol in his blood, and displays no delirium; another takes opium, and displays no delirium; while the third becomes crazy drunk or markedly insane under the influence of either. It is the pathologic condition of the cell that displays the aptitude of degeneracy of habit, and it is the morbid tendency which is the exciting cause.

SARCOMA OF THE CHOROID, A SERIES OF CASES.

Delivered before the Section on Ophthalmology at the Forty-seventh Annual Meeting of the American Medical Association, at Atlanta, Ga., May 5-8, 1896.

BY GEORGE F. FISKE, M.D.

CHICAGO.

Case 1.—M. E. B., architect, age 50, presented himself April 3, 1888, complaining of a cloud in the right eye which followed a severe attack of "catarrhal fever" three weeks before.

O. D. 36 in. Sph., 42 in. Cyl., 90 deg. 5-5 Sz.

O. D. 48 in. Sph., 18 in. Cyl., 90 deg. 5-6 Sz.

In the left eye there were several choroidal plaques in the upper outer periphery, and floating opacities in the vitreous. In the right eye separation of the retina on middle nasal side, extending within 2 mm. of the papilla. Nothing to distinguish it from ordinary separation of the retina. No suspicion of tumor.

Patient gave a history of very close application and was in a highly nervous state. Consultation was had with two other specialists, with no thought of sarcoma. Patient stopped work for two weeks, protected the eyes from light, wore a bandage and remained in bed quite constantly, with no change. He then resumed his work to a certain extent, contrary to advice, and did not return to the writer until June 18, when vision was reduced to perception of light, anterior chamber shallow, tension plus, pain and cyclitis. Diagnosis of sarcoma was made and immediate eversion of the orbit advised. Patient preferred to go to Europe, where eye was enucleated in Berlin, the middle of July and proved to be a melano-sarcoma, patient dying within six months, result of metastases in the liver; no recurrence at seat of operation.

Case 2.—Mr. G. A., plumber, aged 40, consulted me Oct. 9, 1890, having noticed for five weeks that sight in the right eye was imperfect.

O. D. 0.75 D. Cyl. 90 deg. 5-8 Sz.

O. S. 0.75 D. Cyl. 90 deg. 5-5 Sz.

Examination of the right eye with the ophthalmoscope revealed a small separation of the retina on nasal side, showing the retina pushed forward by a small body, apparently 1 mm.