toward the right and left, forming equally large portions, thus presenting a central and two equally large lateral masses, and still all in one. The right mass was soft and the left hard. The tumor, as a whole, is an example of the cystic, fibro-cystic, fibrous, and edematous myoma; certainly unique in my experience.

An operative peculiarity is worthy of mention, and the excuse for its adoption was the collapsed condition of the patient, which made increased haste to complete the operation necessary, as she had already been under anesthesia three-quarters of an hour. The degeneration had almost obliterated the cervix, thus making abdominal fixation impracticable. Time was too precious to attempt the ideal method—total extirpation. The Staffordshire knot was therefore applied to the short supravaginal portion of the cervix. This may not have been in accord with good surgical principles and may have been unnecessary, as there was not the slightest hemorrhage from the stump. The value of a few minutes' time under such circumstances can hardly be overestimated. This defect in the technique gave me no little uneasiness afterwards.

The shock was terrible. Whisky was given hypodermatically every few minutes during the latter part of operation, and when put to bed she was given $\frac{1}{5}$ grain of strychnia and $\frac{1}{2}$ grain of morphia. She rallied well, however; the pulse varied from 116 to 130, and the temperature from 99 to 102 until the beginning of the fourth day, when she had a violent chill, the temperature rising to 105 immediately afterward and the pulse to 150. The abdominal incision was separated to the peritoneum, which having entirely united the abdomen was not reopened. Fluctuation could be distinctly felt in the cul-de-sac. The os was sufficiently patulous to admit a good-sized rubber drain tube which was passed through it into the pelvic cavity. A free discharge of pus followed and in four hours the temperature had fallen to 101 and the pulse to 130. From this time on, recovery was uninterrupted, and she left the Hospital in five weeks after the operation in excellent condition.

This desperate case points out the propriety of at least explorative operation in such cases, and the possibilities of abdominal surgery, though it is doubtful if even an exploration would have been made in this case had not the patient's sufferings been so great from the accumulated fluid.

Case 17.—Came under observation Sept. 27, 1893. She was markedly septic and had had two profuse uterine hemorrhages within the last two months. The lower part of the abdomen was slightly enlarged, produced by the enlarged, tender and movable uterus. The patient had never been pregnant. The menses had been irregular for the last seven months, with dysmenorrhea, and a purulent offensive leucorrhea had been constantly present. Irregular chills had annoyed her for the last few weeks. Pulse 90, temperature 100. The first sign of ill health was about a year ago, when she discovered a "lump" in her abdomen on the right side and very low down. The striking symptoms were chills followed by fever; extreme pallor and emaciation; pain, tenderness, hemorrhage and an offensive purulent leucorrhea.

Hysterectomy was performed Oct. 3, 1893. The cervix made a good pedicle, and was therefore secured in the lower angle of the incision. The anterior and right lateral wall of the tumor was a suppurating mass, and its estimated weight was four pounds. The highest temperature reached was 103 on the second day. Recovery uneventful.

Case 19.—Came under observation Oct. 31, 1893. Dark complexion, very anemic, considerably emaciated, never pregnant. More or less fever for last two months; normal temperature at this time; the abdomen was about as large as it would have been had she been five months pregnant. The uterus was situated low down in the pelvis, fixed and three and one-half inches deep. The cervix was slightly hypertrophied. The menses reappeared regularly, have been profuse the last three months, amounting to severe hemorrhage, succeeded by an offensive purulent leucorrhea. There was constant pain and tenderness in the lower part of the abdomen on the right side. The abdominal enlargement was symmetrical. The clinical history, confirmed by the physical signs, would seem to indicate that a suppurating myoma was probably the pathologic condition. On opening the abdomen, the large, red and fluctuating tumor was exposed. A trochar was thrust into it, and more than two quarts of pus drawn off. The sac consisting mainly of the right tube and degenerated ovary were enucleated from their bed within the pelvis and ligated off. The left ovary was as large as a hen's egg, and undergoing cystic degeneration. The pus tumor enveloped the fundus and body of the uterus in such a way as to completely fix that organ. The pelvic cavity also contained a parovarian cyst as large as a hen's egg. The symmetrically enlarged and hard abdomen, the fixed uterus and the hemorrhage were the misleading symptoms. Not the slightest fluctuation could be detected before opening the abdomen. Death occurred on the fifth day from septic peritonitis, the infection, no doubt, occurring during the operation, though the irrigation was thorough and though not more than half a drachm of pus escaped within the pelvic cavity.

My acknowledgments are especially due Drs. Collamore and Van Pelt who have so kindly assisted me in most of these operations, also Drs. Reed, Chapman, Tracy, Hollister, Donnelly, Bodman, Gardner, Cherry and Craver. To the gentlemen who have so kindly referred cases to Robinwood Hospital for treatment, I extend my sincere thanks. Without their friendly support much less would have been accomplished.

MIND A PRODUCT OF BRAIN ENERGY.

BY CHARLES J. LEWIS, M.D.
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"What distinguishes the practice of the medical profession, in treating the diseases and repairing the injuries of the *genus homo*, from that of the veterinarian? . . . . It is the *worth* of man, he being a rational being, the other being an animal destitute of reason. . . . . I would further define the mind as the superintending, the guiding power of corporeal manifestations; it directs all the movements of the body, over which it has complete control; it is to the body what the engineer is to the steam engine, the body being but a mere machine suited to develop the operations of the mind, and preserved and kept in order by the organic functions."

The above question, with its answer in two parts,

is from an article by Dr. John M. Farrington, in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION of March 31, 1894.

Herein, the Doctor utters words to the effect that members of the *genus homo* are intellectually superior to members of the *genus equus*. This is freely admitted to be a statement of facts in the case as to their differences in intelligence *now*. But is he sure, as he says in the body of this long article, that the difference is due to man's brain possessing an inherent power to employ the senses to form ideas, in a manner more advantageous than would the same organs, other means being equal, in the horse? We have evidence that the horse "remembers, combines and reasons."

Let us go back into pre-historic times. In those dull, dim days man and horse, we will assume, were inhabitants of the same fauna. We will also assume though, that man had slightly the larger brain, but that his organism in none of its parts was better adapted for making a record of his experiences—such as naming things, recording sentiments and the like, than was the organism of the horse. Although a larger brain is granted to man, if he could not make a better use of it for perfecting devices for recording his solved problems—wrought-out facts—than was possible for the horse, it is at once apparent that both man and horse would travel down the ages shoulder to shoulder at the same rate of speed, in the acquirement of knowledge.

Man, with a hand armed with thumb and fingers, can make a *record* of his ideas which can be more easily deciphered and appropriated as personal experiences, than could be any *new experiences* by those who succeed him. New experiences require many verifications before admittance into the realm of facts. The horse not having such a limb-instrument as the hand, was and still is incapable of making a record which will be interpretable after the death of the individual experiencing. Thus each oncoming generation of the horse species makes the same round after round of experiences, without an appreciable advancement, simply because their ancestors left no intelligently recorded heritage, either in the description of their enforced slavedom under man or of a stock of useful knowledge. The trust the horse hands down to its succeeding generations we herein show to be exceeding small, thin and easily rusted-out of tradition's memory. Not any smaller, thinner nor more easily rusted-out heritage, however, than would be the trust of a *handless, toeless, and a recordless humanity*. This points to another rendering of the following by the Doctor: "That there is a union of the mind with the body, and he who ignores the mind of man in treating his diseases may well be classed with the veterinarian."

The second part of the answer, "that the mind is to the body, what the engineer is to the steam engine," we are hardly prepared to hear as coming from a member of the medical profession of to-day. However, since I am not hitherto responsible for the medical training of any member of my chosen profession, I cheerfully grant the widest scope of opinion. If a living human being is identical with a dead steam engine which can not modify its output of force, then a comparison between the two is permissible. If not, then not. A steam engine is constructed in such a manner that when a part is worn out, it can be replaced by a new one. But can a hopelessly cirrhosed liver, or an opaque cornea, or a single ganglion-cell in that part of the cerebral cortex known as the granular formation of Meynert, after having lost their function be restored to usefulness again? To this there can be but one answer. The difference, then, between a machine and an organism, lies in the fact that the latter can modify or wholly inhibit an action stimulated by a sensation. But when the steam in the steam-chest of an engine receives an impression from the engineer, it has but one thing to do, namely, to move the piston which turns the drive wheel. It has no choice; it can not assume the position—I may or I may not move the piston. From this we learn that there is nothing gained by comparing things that are clearly dissimilar in their make-up and uses.

All human thought points to the fact that non-living matter yields a different expression from matter which is alive. From this we have accustomed ourselves to declare that there is a difference in the make-up and uses of the two kinds of matter, whether this is so in their ultimate constituent parts or not. To strengthen this diverging view, we need but consult modern biology. H. J. Campbell (1892), makes the statement that the embryonic cells of a fertilized ovum coalesce into three layers; the epiblast (external layer), hypoblast (internal layer), and mesoblast (middle layer). These membranes continuing to develop from food sources, finally enlarge so as to form all the complicated structure of an adult.

Without enumerating them, we will assume that the tissues having their origin in the mesoblast and hypoblast will be coördinate in development with those from the epiblast.

The embryonic membrane—the epiblast—is the outer of the three layers. It is also called ectoderm, and neuro-epithelial layer. This layer is of special interest to the physiologic psychologist, in that from it is developed the nervous and some other tissues of the body. And there is another point of interest connected with this tissue, in the relation which it holds to the others, as one of its names indicates—namely, neuro-epithelium. By this we see that the outside of the body—the epidermis—is formed from this layer, making thereby for the outside of the body a membrane which has its rise in common with the nervous tissue. Hereby the body has sensory tissue overlying its entire outside, fitting it for sensing environing motions from any possible direction.

There is something remarkable in the statement that the epidermis which covers the body is of the epiblast. Not in the fact of this fact; but in the failure of psychologists hitherto, to fully comprehend the advantages accruing to the animal organism therefrom. In the oncoming of animal life, sensibility made its first appearance in the skin as a special sense. Now by adding to this a clothing—*epithelium*—derived from a tissue in common with the nervous system, every spot of the outside of the body becomes a living sentinel to give information of impingement by environing objects. When these would portend harm, the organism could choose between contending with them and fleeing to a place of safety; or, if pleasurable, it could remain in quiet and enjoy them.

The bodies of all living beings are cellular, and divided into two chief classes—the protozoa and metazoa. An amœba is a single-celled animal, and of the protozoa, while man is of many cells—metazoa.

After we have observed and named every cell and every cell colony in the human embryo, and having become conversant with the action of these protoplasmic bodies in the adult, whether singly as in the protozoa, or in a colony as in the human eye, then, and not until then, will we be able to divest ourselves of the training we have had in mythological lore. A part of this lore is the very prevalent notion that mind, at least in part, has some mysterious origin other than products of vibratory or molecular motions proceeding from the five end-organs into the brain. I do not deprecate the efforts that men have made in the past, but shall simply aim at bringing into view the methods of the past, and contrast them with those of the present.

As to voice: Voice is a sound symbol produced by the organs of speech, interpretable by the center for hearing. The noises made by mammals lower than man by their vocal organs are not regarded by man as speech, on the ground of not being comprehended by him as uttered symbols of ideas. The vocal organs in man and all mammals are essentially the same, while the expression of speech is dependent upon the process of ideation and perception.

The making of these *uttered* symbols of ideas, comprehendable by the visual center of the cerebral cortex, has been effected by a system of graphic characters called letters. Presumably, man's first record of an idea was through depicting the object it represented by some such crude procedure as marking its form with a rod in the sands of the seashore. The stimulus to this might have been the beholding of one's image in the still water near by. But what could be the stimulus which ultimated in representing a sound by a symbol, such for instance as a letter of the alphabet? The *comprehension* of this momentous act marked the initial point of advancement which secured for man an advantage in the race for the acquisition of power over all others of the animal kingdom. Possibly the stimulus might have been a struggle between two individuals of different clans who, though having different languages, nevertheless attempted to understand each other's speech. One being resourceful, attempted to make known to the other his ideas by marking in sand or dust, or some impressionable surface which chanced to be at hand, a picture of some object which might be familiar to both.

Upon comprehending that sounds which were cognizable by the center of hearing could be represented by names recognizable by the center of vision, nothing could be more obvious than that out of man's natural curiosity a few individuals in each generation would become devoted to the work of correcting, improving and enlarging the processes of making an intelligent record of speech. To this end, man soon discovered that his hands were very important factors.

The monkeys—quadrumana—though *four*-handed, have not as yet, awakened to their potentialities in the direction of using their fore-limbs for making a record of ideas which were understandable by succeeding generations. Owing to this, their ideas are few and necessarily of the simplest character. After one of the Simian tribes has obtained only a faintly comprehended notion that he could represent a speech-symbol in such a manner as to have it typify, as though made for the eye, presently others would become associated with him in its development, and the process thus inaugurated would be a substantial beginning of an era of progress. Why it is that some individual of the quadrumana has not taken this initial step of advancement, as well as man, I leave for the future to answer.

For obvious reasons much of the acumen of our forefathers was expended in the direction of establishing language; that is, in forming or agreeing upon words or names for the various objects which cast reflection upon their sense-organs. The five senses are also called end-organs.

Owing to the undeveloped state of the art of making a record of names of things observed in earlier times, success in this direction did not come before printing was invented. This made it possible for the dissemination among the people of all names agreed upon. This stimulated the scholars everywhere to a more constant and systematized effort to collate all fact-words known, and this in turn brought into existence a class of experienced workers in collating fact-words into groups or special departments of science. Among these I might mention mathematics, logic and more recently, the physiology of the brain. Many words, among them sun, moon, stars, day, night, water, man, animal, became permanent through tradition. But for all newly coined words tradition was a very tedious method of giving them permanency. Among objects or supposed objects having names given them in early times, I might mention alchemy, necromancy, witchcraft, soul, spirit, God, mind. This class of words are aptly said to belong to a class of objects which is supposititious when viewed in their commonly supposed meaning. And rightly, too, for it is undetermined, even in our time, whether any reflected motion passes from them to form by impingement an image upon any one of our five end-organs. This fully accounts for the vague and varied opinions held concerning their import.

As stated above, since we now have a quick means —the press—of disseminating the names of things, there has arisen among us a widespread desire to memorize them, *i. e.*, to increase our knowledge. Students find that they are aided very materially in obtaining more knowledge of things but partially understood, by asking questions and by comparing the new answers with the old.

A, B and C, are persons conversing. A asks B what mind is. B replies that "the hand does not feel, the tongue does not taste, nor the eye see, but the mind through the medium of the organs and the brain feels, tastes and sees." Turning to C, he asks the same question, and C answering, says: "Mind is the sum total of one's comprehended impressions." In B's answer we have an affirmation that mind is an entity—has an independent existence of its own, and that the end-organs and brain are only incidental and very unimportant appurtenances. While C declares that mind has arisen in its totality from sense-impressions that have gone to the cerebral cortex and by it cerebrated into ideas which are comprehended. To comprehend a thing is to differentiate it from all other things. Can B be sure that he has differentiated mind from sense-organ and brain? Unless he is certain that he has so differentiated, obviously he is affirming without knowledge.

C demands a hearing for his statement on the ground of the preposterousness of having mind in a being that was devoid from birth of even a faintest trace of either of the five senses, thus making it im-

possible for it to experience a single sensation. That is, that it could neither smell, taste, hear, see nor feel. Manifestly, a being of this simple description would be less complex than the sensitive plant. Yea! it would be a *no-sense* being. Having no organs to sense wave-motions reflected from objects, what the premise for affirming that such an organism can give forth expressions that are indisputably sequences of ideation?

These statements permit the declaration, that we have ground for an enduring hope in the progressive character of humanitarianism, as expressed by those who maintain that the raw material out of which ideas are made are the *motion-things* we call sense-impressions. And further, that this unitary font of human intellection, has already been placed upon a permanent basis. Nevertheless, the student-teacher should ever evince a hearty zeal in teaching his pupils, among other things, that the senses of taste and touch are stimulated only by objects in actual contact, while the senses of smell, of sight and hearing are exercised only by reflections from objects that are always out of impact; *i.e.*, at a distance. Herein Ziehen is right in saying that it is from sense-impressions that the brain can build up ideas, to which I will add, that it is from these ideas being regarded as a whole, we have what we are pleased to call mind.

The hope of the race is now, as heretofore, in the student who is ever on the alert and questions the position of state, of church and of philosophy, as to their individual worth; if either makes for an enlarged personal freedom it shall be fostered; but if either shall be found to retard personal advancement, it, through neglect shall be permitted to enter upon the period of senile atrophy.

The earth—man's home—is for the enlightened. Only they who are loyal to this spirit are destined to survive. They alone have in them the functional activities of organic life. A human being who pits his organic life against his spiritual, is an anomaly, and one or the other of these opposing forces will sooner or later yield to its unfitness.

The argus-eyed student is always conservative and patient, but ere long physiology's shrill voice will call upon the differentiators of things—builders of facts—to join their forces, and all the obstacles to human betterment growing out of the mythological aspect of mind, however formidable, will go down before the advance of an enlightened people.

Yes, mind *is* a product of brain energy.

Out of the myriad observations made by myself and others of sensations after having been modified by cerebral tissues, I have synthetized their ultimates into one sentence, namely,

Mind is the sum-total of one's comprehended impressions.

IMMEDIATE CAPSULOTOMY FOLLOWING THE REMOVAL OF CATARACT.

Read before the Medical Society of the State of Pennsylvania, May 17, 1894.

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All ophthalmic surgeons endeavor to obtain perfect vision after the removal of a cataract. On account of its prevalence, the loss of one of the most valued of the senses, and the restoration to vision by a bloodless and painless operation have concurred to render this operation an object of the highest attention to surgeons; and the progress of improvement in the operation has been commensurate with the advances made in surgery elsewhere in the economy. Unfortunately, with all our skill and knowledge, success does not always follow the removal of an opaque lens. The many contingencies incident to the healing of the wound, the distortion of the cornea, the subsequent change in the media caused by iritis, or a thickening of the posterior capsule—one or all of these factors play a very important rôle in the subsequent restoration to vision.

The opaque lens, with its capsule, obstructs the vision, causing blindness of the patient. To remove this obstruction requires considerable dexterity; to restore vision, absolute cleanliness and most careful after treatment. The most disheartening factor in a cataract operation is that sooner or later the posterior capsule thickens, and again dimness of vision follows; the lessening of the sight is not so great as it was before the removal of the lens, but still the patient is debarred the comfort of reading, writing, or attending to business matters in which it is necessary to have perfect vision. It is to prevent this latter change that I advocate the splitting or parting of the posterior capsule at the time of the primal operation.

Having had the opportunity of following many operators, good, bad and indifferent, and noting the after results, I frequently saw excellent vision follow bungling manipulation. The surgeons did not possess that delicate sense of touch so essential in making the corneal incision, snipping the iris, lacerating the anterior capsule, and delivering the lens. They lost courage, or their hand became so tremulous after they had ruptured the capsule that the operation would have been a failure had they not taken a lens scoop in hand, entered the eye, and fished out the cataract and its capsule, with always more or less loss of vitreous. With very great care in the after-treatment many of these patients would recover, and in the majority of cases which did recover no capsule interfered with their visual acuity. It was witnessing such operations that led me to think that a parallel process carried out, however, on more delicate operative lines, at the time of the primary operation, would still lessen the dangers that such harsh measures would be sure to excite.

The ancient method of removing cataracts from the direct line of vision was by *couching;* that is, passing a delicate needle through the sclerotic coat on the temporal side of the eye-ball, posterior to the ciliary bodies; pressing it forward and into the crystalline lens. Then, by a backward sweep of the point of the needle, lens and capsule were torn from their position, and deposited down and out in the vitreous chamber. Celsus, the celebrated Roman physician, who lived at or about the commencement of the Christian era, describes, and is generally esteemed the father of this operation. It was not very satisfactory in its results, according to the data obtainable from the earlier writers. Fabricius, who flourished in 1600, speaks with great despondency of this operation; later on, Hiester, 1711 says: "Though the operation is easy to be performed, the success is so very precarious that among a great number of persons, couched by the most distinguished oculists, very few met with the desired