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PHYSICAL LIFE AFTER DEATH.

Man is a physiological trinity. His life is threefold. At the base, and embracing the phenomena of circulation and nutrition, is the organic life, as Bichat terms it—the life which the animal shares with the plant. Resting on this is the animal life, as exhibited in the phenomena of the sensory nervous system; and intimately connected with the latter, as its highest development, is the mental life, characteristic of man. These three are one, but not inseparable. They are not born together, nor do they always die together.

Death is not a simple phenomenon, nor one of instantaneous occurrence. When man dies normally, as of old age, he dies like a tree, in detail, beginning at the top. The series of slow and partial deaths which, with the old man spared by disease, result in the last end of all is eloquently described by Papillon.

"All the senses in succession are sealed. Sight becomes dim and unsteady, and at last loses the picture of things. Hearing grows gradually insensible to sounds; touch is blunted into dullness; odors produce but a weak impression; only taste lingers a little while. At the same time that the organs of sensation waste and lose their excitability, the functions of the brain fade out little by little. Imagination becomes unfixed, memory nearly fails, judgment wavers. Motions become slow and difficult on account of stiffness in the muscles; the voice breaks; all the functions of outward life lose their spring. Each of the bonds attaching the old man to existence parts by slow degrees. Yet the internal life persists. Nutrition still takes place, but very soon the forces desert the most essential organs. Digestion languishes the secretions dry up, capillary circulation is clogged, in their turn that of the large vessels is checked, and at last the heart's contractions cease. This is the instant of death. The heart is the last thing to die."

This orderly sequence and painless closing of life is, however, comparatively rare. Sometimes the mind dies long before the animal life is seriously affected, as when death is preceded by years of imbecility. Sometimes death seizes first upon the extremities and creeps upward, the mental powers remaining intact to the last. Again the mind may flicker with unwonted brilliancy after the animal life has seemed to go out. In all cases, however, the organic life is the last to yield.

A tree does not die instantaneously when felled, though death begins at that moment; similarly life persists in the animal body after the thread of animal life is severed. And as slips from a felled tree may be grafted upon a living trunk, and thus escape the death of the parent stem, so may portions of a dead animal be transplanted to the living, and so have their life perpetuated.

If death were immediate throughout the entire organism, such a transference of members without any interruption of their physiological activity would be utterly impossible.

Thus the vital knot of Flourens, the point in the spinal marrow which that physiologist made the seat and center of vitality, is effectually disposed of. It is true that any disturbance of that portion of the nerve is more fatal than a like disturbance of any other part of the organism; but that is not because it differs in kind from other portions of the nervous system. Life is not more concentrated there than elsewhere; that is simply the initial point of the nerves which animate the lungs; and the breath ceases, and death quickly ensues, when their office is interfered with.

Unlike the remarkable small dog of the nursery rhyme, animals, even the highest of living creatures, do not die "all over" at once. Our bodies are composed of many more or less independent parts, each living its own life, while contributing to the life of the whole, and each dying by itself. The human tissues may not retain their individual vitality so long as those of the lower orders of life, still they are very slow of dying. The hair and the nails continue to grow, and even the complicated processes of absorption and digestion go on for hours after the life of the organism has apparently ceased.

The throbbing of a frog's heart after its complete separation from the rest of the body is often described as a characteristic illustration of the persistent vitality of reptilian structures. But the human heart will do the same. In the case of decapitated criminals, it has been observed that the uncovered heart, even when the stomach, the liver, and the intestines have been removed, will continue the pulsations for an hour or more after the guillotine has done its fatal work. One day when Robin was operating on the body of a criminal an hour after his execution, an example of reflex action was observed as remarkable as any of the seemingly intelligent movements recorded of the limbs of decapitated frogs.

"The right arm," says Robin, "being placed obliquely extended at the side of the trunk, with the hand about ten inches away from the hip, I scratched the skin of the chest, at about the height of the nipple, with the point of a scalpel, over a space of nearly four inches, without making any pressure on the muscles lying beneath. We immediately saw the great pectoral muscle, then the biceps, then the anterior brachial, successively and quickly contract. The result was a movement of approach of the whole arm toward the trunk, with rotation inward and a half flexion of the forearm upon the arm, a true defensive movement which threw the hand forward toward the chest as far as the pit of the stomach."

Such spontaneous exhibitions of life by the dead are trifles, however, as Papillon observes, compared with those which may be excited by means of certain stimulants, particularly electricity. In evidence he cites the experiments of Aldini on two criminals beheaded at Bologna, and those of Ure, in Glasgow, on the body of a criminal that had remained an hour hanging on the gallows: the details of which are too horrible for repetition.

Less horrible, but not less remarkable and instructive, was an experiment made by Brown-Séguard on the head of a decapitated dog. Having beheaded the animal, taking pains to make the section below the point at which the vertebral arteries enter their bony sheath, the operator fitted to the arteries little pipes, connected by tubes with a reservoir of freshly oxygenated blood. At this stage the head failed to respond to the action of electricity; but when a current of blood was forced into the arteries, irregular motions of the eyes and the facial muscles began, succeeded by regular harmonious contractions, as if prompted by the animal's will. The injection of blood into the cerebral arteries was kept up for a quarter of an hour, during which the mimicry of life was continued. On stopping the injection, the motions ceased, and the spasms of a second death ensued.

The question was raised whether such a temporary renewal of life could be brought about by the same means in a human subject. Brown-Séguard was confident that it could be done, even with the head of one decapitated by the guillotine, provided certain precautions were taken to prevent the filling of the arteries with air. But when it was proposed to him to try the experiment on a condemned criminal, he declined, not wishing, he said, to witness the agony of such a human fragment temporarily recalled to sensibility and life.

Enough has been given to show that life and death are not such simple affairs as is popularly supposed; and that in another sense than the poet meant, it is not all of life to live, nor all of death to die.

We will close with a suggestion to sensational novelists: Having "snarled up" the hero of the tale in a maze of circumstantial evidence, it would make a very stunning denouement to save him at last, by means of a post mortem confession of the crime by a murderer executed for another crime, the confession to be extorted through the combined agency of galvanism and the transfusion of fresh blood!

Or the clever concoctor of scientific hoaxes for the World might surpass himself by giving a detailed account of such an operation on some obscure victim of rural justice, wherein the resurrected man might make confession of the Nathan murder and reveal the whereabouts of Charlie Ross.

THE KEELY MOTOR DECEPTION.

The Chicago Railway Review avers that the SCIENTIFIC AMERICAN and other papers have proceeded to kill, dissect, analyze, and condemn Keely's pretended motor, when they confessedly know nothing about its operation or construction. But the Review is evidently in error here, for the Keelyites have given many details, not only of the mode of operating the motor and producing the "cold vapor," but also of the manner in which the treasury of the Keely Motor Company was supplied with cash. It is from this information, furnished in pages full at a time by the

parties themselves, in their anxiety to get their scheme before the public, that the adverse conclusions complained of by the Review have been reached.

The concurrent testimony of the leading members of the Keely Company, as voluntarily published by themselves, is that Keely produces his alleged power by blowing with his mouth, for 30 seconds, into a 3½ gallon kettle, then lets in a little water, then turns a cock, and behold! he has produced a "cold vapor," having an energy of from two to ten thousand pounds per square inch. The inner arrangement of the apparatus, with its pipes, chambers, nozzles, valves, and connections, is described, and great pains is taken to reiterate that no heat, electricity, chemicals, or other substances save air and water are employed, and nothing is done except to operate the faucet. Now you see it, and now you don't, according to the way the cock is turned. Such in brief is the Keely motor. Mr. Collier, the Philadelphia lawyer and financial agent of Keely, testifies that he made three visits to New York, and obtained in all the sum of one hundred thousand dollars from capitalists here. This money, he says, he obtained by exhibiting to the parties the averment of Keely substantially to the above purport, Charles H. Haswell, who had witnessed Keely's performances and personally tested and reported upon the apparatus, being among those present. After a portion of the money was paid, the victims were, by agreement, allowed to witness the motor for themselves, and the balance was then obtained from them. A curious fact in connection with this business is that Mr. Haswell now earnestly denies that he assisted the deception or endorsed the integrity of Keely's operations.

More than a year ago we published portions of Mr. Haswell's report given in endorsement of Keely, on the strength of which, Mr. Collier tells us, he obtained the first ten thousand dollars from the New Yorkers. Mr. Haswell has never until now complained of our comments then made. Under date of June 26, 1875, Mr. Haswell writes another report in behalf of the Keely motor, published by us on page 37, current volume. In this report he confirms, at some length, all that he had previously written, specifies the tests he personally made, and again commits himself in support of the scheme. But in the next breath, he writes us complaining that we have done him injustice, and especially requests us to print the subjoined note for his vindication, which we do with pleasure, leaving him to reconcile, as best he can, the denials which he now makes with the various reports in behalf of Keely which he has placed before the public.

To the Editor of the Scientific American:

Your notice of my query to you of the 17th inst. involves a repetition of it.

Thus: Am I to understand that my mere report of certain results, which I saw developed by a vapor in Mr. Keely's house, are held by you to be an endorsement of the integrity of the operation Mr. Keely claims for the generation of it? I being wholly ignorant of the construction of the instrument of generation, or the manner of operating it?

Further, I never was employed, as asserted by you, to test the motor, neither have I done it, or do I know of any one who has.

The gentleman to whom my query was confided appears to have overlooked the fact that observation and analysis are very different matters. I am, respectfully,

CHAS. H. HASWELL.

New York, June 28, 1875.

We have received from all parts of the country many original contributions relating to the Keely motor, pro and con, also many new plans for motors quite as wonderful, if not exceeding in merit, the Keely device. Our limited space will only permit the publication of a few of them. Among the essays received is one in which the writer bases his advocacy of the Keely nonsense upon the fallacious but popular idea that water, like nitroglycerin, contains a vast amount of force, ready to be liberated by the mere pull of a trigger. We are unable to publish the entire article, but we make the leading thought of its contents the basis for a few remarks in an article upon some of the practical differences between the two substances mentioned.

ENGLISH PATENT LAW DISCUSSION.

We gave a brief abstract not long ago of the Patent Law Reform Bill introduced in the House of Lords by Lord Cairns. The bill was full of objectionable clauses, its main purport being to bring about the abolition of patent grants in England. The aristocracy of Great Britain have reached the conclusion, substantially, that inventors and their patents are a nuisance, do more harm than good, and ought, as far as possible, to be legislated out of existence. So the bill passed the House of Lords, and was sent to the House of Commons, where it now is.

It is almost unnecessary to say that the adverse sentiments of the Lords, expressed during the discussion of the bill and confirmed by its passage, created the greatest dissatisfaction among working men, engineers, manufacturers, and all who have at heart the advancement of knowledge, Science, and useful industry. Meetings were immediately called in remonstrance against the further movement of the bill, and large numbers of petitions to that end from societies and influential personages have already been sent in to Parliament. The prospect now is that the bill cannot pass the Commons, and will therefore fail to become a law.

For several years past there has been going on in England a discussion of reforms thought to be necessary in the patent law, the prevailing idea being that some radical alteration was necessary, although no agreement could be reached as to what precise change was essential. The present endeavor of the Lords to abolish patents has quickened the discussion, and induced a more practical examination of the present law than ever before. The result appears to be that the existing English law, when compared with that of