On the other hand, it contains much information which is of value to the student and which the beginner might fail to find out for himself. The discussions of individuality, alternation of generations, and sexuality are especially good.

The book is well printed and its fifty-three illustrations are well chosen and clear.

J. S. Kingsley.

Professor Mosso's Lectures at the Clark University Decennial.

Two lectures were delivered by Professor Angelo Mosso at Clark University during its Decennial Celebration, in the summer of 1899, which seem to deserve wider publication than they will obtain through the volume issued and distributed by the university in commemoration of that event. This volume has been already reviewed in Science, without, however, special reference to the contents of these addresses.

The former of the lectures, of which notes are here presented, is called 'Psychic Processes and Muscular Exercise.' It would be difficult to exaggerate the importance of the ideas presented, although the campaign against present public opinion which a practical realization of some of its consequences would demand might well discourage a Pestalozzi. The logical conclusion has, however, been arrived at both by the psychologist and by the medical man, as well as by the physiologist, who is both.

One of the most important of the rising beliefs of American medical men regarding common school education is corroborated in this address by the eminent Italian. In it he sought to show "how intimately related are mental processes and movements. If we desired to make a pedagogical application," he says, "we might say that physical education and gymnastics serve not only for the development of the muscles, but for that of the brain as well."

Children should begin reading and writing only after they are nine years old, and it is becoming evident that as much time should be devoted to muscular exercise as to intellectual exercise. No absolute local separation of movement and sensibility is demonstrable. Muscular fatigue exhibits phenomena identical with intellectual fatigue. Internal reflex phenomena seem largely to condition attention which, therefore, is not wholly within the will's control. Nerve cells have only a small power of resistance and show, on the average, every ten seconds a tendency to rest. It is probable that only part of the brain is active at a time—the various parts relieve each other. The structure of all nerve cells seems to be the same—it is only their relations which are different. The more mobile any animal's extremities the more intelligent, other things being equal, he is: the most mobile parts are those which are the most sensitive.

The other address, called by Professor Mosso 'The Mechanism of the Emotions,' adds not a little to our knowledge of the somatic aspect of emotion, dealing especially with the sensitivity of the bladder—one of the most sensitive of the viscera.

The seat of the emotions of joy and of sorrow seems to Professor Mosso to lie undoubtedly in the so-called sympathetic nervous system. In 1881 he noticed (with Dr. Pellacari) the contraction of the bladder during weak sensations. Besides those of the bladder, he has studied the movements of the stomach and intestines, including the rectum.

The bladder's movements are both active and passive, but the former are of chiefer interest and alone are considered here. The experiments were conducted both on dogs and on women. The instrument employed was his own plethysmograph, a very valuable hydraulic arrangement too well known to need description here. This was connected with the bladder by means of a 'female catheter.' The human subjects studied were young women in the hospitals, who, of course, volunteered their services. He recorded in the cases of both the women and the dogs the thoracic and abdominal respiration and the movements of the bladder independently. He considers that the bladder exhibits 'the most delicate reflex movements which occur in the organism.' The bladder contracted not only to very slight emotional stimuli, but also to changes in the organism instigated by problems in mental arithmetic.

In explanation, it is postulated that the blood pressure increases and the blood vessels and smooth muscular fibers contract in order to prevent the blood from collecting in the abdominal cavity, the brain requiring additional blood pressure for its additional activity—regulated by the sympathetic nervous system.

Mosso is right in denying in this lecture teleology to the reflex phenomena of strong emotions, but he is wrong in statements as to Darwin's theory, for this the latter never claimed for strong affective states. It is the excitement, and not the mode, of the emotion (pleasant or unpleasant) which, in case of the bladder, determines the loss of organic equilibrium. This is a conclusion easy to accept when we consider that one of the functions of the visceral blood vessels is to be a reservoir for blood necessarily expelled from other bodily parts.

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SCIENTIFIC JOURNALS AND ARTICLES.

The Journal of Comparative Neurology, May, 1900. The first article, 'Observations on Sensory Nerve Fibers in Visceral Nerves, and on their Modes of terminating,' by Dr. G. Carl Huber, details observations made upon the innervation of the hollow viscera by means of methylene blue intra-vitam. This is followed by a short note by the same author on 'Sensory Nerve Terminations in the Tendons of the Extrinsic Eye-muscles of the Cat,' the organs being somewhat different from the ordinary neuro-tendinous spindles found in the other skeletal muscles. Dr. Huber and Mrs. Lydia M. DeWitt follow with a paper of 50 pages and six plates entitled 'A Contribution on the Nerve Terminations in Neuro-tendinous End-organs,' describing the structure of these sense organs as studied by the methylene-blue method in amphibians, reptiles, birds and mammals. In all cases the tendons are supplied with a special nerve end-organ consisting of several tendon fasciculi, embryonic in nature, which in birds and mammals are generally surrounded by a connective tissue capsule, while they are usually not so surrounded in reptilia, and never in amphibia. They are generally, but not always, innervated by a single non-medullated nerve fiber, which, after repeated branching, ends in one or many tufts of non-medullated fibers, the details of whose structure vary with the different animals studied. Dr. H. H. Goddard describes and figures a new brain microtome recently made at Clark University for cutting entire human brains. F. J. Cole, of University College, Liverpool, gives a prospectus of 'A Proposed Neurological Bibliography of the Ichthyopsida.' 'The Number and Size of the Nerve Fibers Innervating the Skin and Muscles of the Thigh in the Frog,' by Elizabeth Hopkins Dunn, M.D., demonstrates that the fibers innervating the thigh are more numerous and of greater average caliber than those innervating the rest of the leg. Hence in the frog the fibers of greater diameter run the shorter course. About 8 per cent. of the fibers which innervate the thigh divide, one division running on into the lower leg. Dr. H. Heath Bawden gives 'A Digest and a Criticism of the Data upon which is based the Theory of the Amœboid Movements of the Neurone,' accompanied by a bibliography of 115 titles. The usual book notices complete the number.

THE July number (Vol. I., No. 3) of the *Transactions of the American Mathematical Society* contains the following articles: 'Wave propagation over non-uniform conductors,' by M. I. Pupin, of New York, N. Y.; 'Ueber Systeme von Differentialgleichungen denen vierfach periodische Functionen Genüge leisten,' by M. Krause, of Dresden, Germany; 'On linear criteria for the determination of the radius of convergence of a power series,' by E. B. Van Vleck, of Middletown, Conn.; 'On the existence of the Green's function for the most general simply connected plane region,' by W. F. Osgood, of Cambridge, Mass.; ''D' lines on quadrics,' by A. Pell, of Vermillion, So. Dak.; 'Sundry metric theorems concerning n lines in a plane,' by F. H. Loud, of Haverford, Pa.; 'An application of group theory to hydrodynamics,' by E. J. Wilczynski, of Berkeley, Cal.; 'Determination of an abstract simple group of order $2^7.3^6$. 5. 7 holoedrically isomorphic with a certain orthogonal group and with a certain hyperabelian group,' by L. E. Dickson, of Austin, Tex.