

are quite absent, in the dark. (Dr. Russ's words are: "I did four tests which seemed to give a positive effect.")

3. That if a strong beam of light be allowed to fall on the suspended system of the instruments the gaze has no longer any effect.

There are no grounds on which a definite conclusion can be based, but I think the inference is that the effect is an optical one.

Measurements should therefore be made to see what electromagnetic rays are responsible for the effects. (1) Are they stopped by a thick slab of lead glass? If they are, they are probably X-rays. (2) Are they stopped by æsculin or by β naphthol disulphonic acid? If they are, they are probably ultra-violet rays. (3) Are they stopped by strong methyl-violet? If so, visual rays may be responsible. (4) Are they stopped by a saturated solution of ferrous sulphate in water? If so, then they may be infra-red rays.

In the next place tests should be applied to see if the rays obey the ordinary laws of (a) reflection, (b) refraction, (c) polarisation, (d) inverse squares. In fact, everything should be done to correlate Dr. Russ's observations with known physical laws, before metaphysical explanations are even thought of. Since writing the above I have seen a letter in the *Lancet* of August 6 in which Dr. J. D. Suttie points out that another conclusion can be drawn from Dr. Russ's experiments. For example, in the experiment in which he found that the side of the solenoid looked at rotated away from him, what Dr. Russ was really doing was to place the fixation point of his fovea co-ordinate with the side looked at. But Dr. Suttie observes

that all other parts of the solenoid would be equally co-ordinate with some other part of the retina, and that if all parts of the retina were equally active there is no reason why any movement should take place, since the forces on the two sides would balance. Therefore he argues that the effects obtained by Dr. Russ drive us to the conclusion that the fovea is very superior to the rest of the retina in the degree of its activity [If it were very inferior, the same explanation would equally hold good.—H. H.], and holds further that the force ("if there be such") "is refracted by the optical media of the eye in a manner similar to light."

Dr. Suttie then goes on to suggest that "the deviation [refraction by optical media?] of the force would supply a valuable clue as to its nature, and that obvious controls would be to test persons whose retinas are inactive through disease, or who suffer from opacity of the eye media (e.g. cataracts)." With these points of Dr. Suttie's letter I entirely concur.

In his reply to Dr. Suttie's letter Dr. Russ (*Lancet*, August 13) writes: "His [Dr. Suttie's] reference to cataracts as controls is surely a feeble suggestion." To me, at all events, it seems clear that Dr. Russ has entirely missed the point of Dr. Suttie's suggestion, viz. that tests on an eye with a cataract would decide whether the effects found by Dr. Russ are due to forces originating from eye structures lying in front of or behind the crystalline lens. Surely not a "feeble" suggestion at all, but a very valuable one! It seems to me that it is not in regard to this suggestion alone that Dr. Russ has misunderstood Dr. Suttie.

Obituary.

PROF. G. T. LADD.

DR. GEORGE TRUMBULL LADD, who died at New Haven, Connecticut, on August 8, was born at Painesville, Lake County, Ohio, in 1842. In 1879 he became professor of philosophy at Bowdoin College, and two years afterwards, in 1881, was appointed to the chair of philosophy at Yale. Later he was elected Clark professor of metaphysics and moral philosophy at the same university, a position which he occupied until 1905, when, on his retirement, he received the title of emeritus professor. As a lecturer Prof. Ladd was well known in other countries besides America. Three times—in 1892, 1899, and 1907—he gave courses of lectures in Japan, and in 1899 and 1900 he visited India, lecturing in philosophy at the University of Bombay, and in the philosophy of religion at Calcutta and elsewhere. He was in England in 1911, and was present at the first of M. Bergson's lectures on the nature of the soul at University College, London, in the October of that year. His writings are numerous, and many of them voluminous. Certain of his books have

been widely used in the universities of the United States and of this country.

So far back as 1887 Prof. Ladd published his "Elements of Physiological Psychology," which was based, to a large extent, upon the second edition of Wundt's "Grundzüge," but had distinct merits of its own as an independent compendium and discussion of the psychophysical material then available. A revised edition appeared in 1911. A more important and original work of his is that which saw the light in 1894, "Psychology, Descriptive and Explanatory"—as was said of it at the time: "Literally a weighty production, it turns the scale at three pounds avoirdupois."

Prof. James Ward's Encyclopædia article had appeared nine years before, yet Prof. Ladd's volume, in certain respects, broke new ground, to which, however, Prof. Ward's article had obviously prepared the way. In particular, the divisions of the book involved the complete abandonment of the old and vicious doctrine of "faculties," and in it the conception was consistently adopted that the formation and development of a so-called faculty were themselves

precisely the things which scientific psychology had to explain. Doubtless the author was inclined to lay too much stress on the view that the different "faculties" all resulted from the combination of the same elementary processes, and that each differed from the others by emphasising, so to speak, one principal kind of these processes, whereas the more fruitful procedure has been that of seeking to exhibit such "faculties" rather as differentiations of one common process. Nevertheless, his treatment of the growth and development of mental life, and especially of the higher forms of cognition, is illuminating and suggestive. In regard to feeling, he argues, but scarcely in a convincing way, against the view that pleasure and pain stand out as the only distinguishable qualitative differences characterising the primary experience we designate feeling.

In 1895 Prof. Ladd published a work entitled "Philosophy of Mind: An Essay in the Metaphysics of Psychology," in which were handled the problems which psychological science passes on to philosophy for a more thorough examination—problems started, for the most part, by that mode of human experience which is described as the consciousness of self. He maintained that a mind is a real being which is known as a self-active subject of states and as standing in manifold relations to other beings. The theory of psychophysical parallelism is vigorously criticised by him, and the theory of interaction defended.

In the volume of *Mind* for 1892 Prof. Ladd gave an interesting account of some researches of his concerning the influence of the *Eigenlicht* of the retina upon visual dreams—a subject that deserves more attention than it has hitherto received. He was one of the first to introduce the study of experimental psychology into America, and the Yale psychological laboratory was founded by him.

As a philosophical thinker Prof. Ladd was greatly influenced by Lotze, whose "Dictate" he translated into English. Perhaps his most distinctively metaphysical work is that entitled "A Theory of Reality," published in 1899. It presents a continuation of the line of thought he had pursued in an earlier book called "Philosophy of Knowledge," published in 1897, in which he had found that the categories of the understanding are forms of reality as well as of truth; that the knower has, in individual self-knowledge, an intuitive insight into reality; and that other real existents are known by analogy of the self. In the metaphysical treatise he tries to show that the universe consists of real beings of various grades, each grade being distinguished by the amount of self-hood possessed by its members. What we name "things" are, in truth, imperfect and inferior selves. Neither "things" nor self-conscious lives are mere manifestations of an absolute mind, for all have self-activity and relative independence, yet they exist together as a unitary system which is related to the absolute mind as object to subject. The activities of finite entities are, in fact, twofold;

they are at once acts of the finite entity and acts of the absolute being which is their ground. In this last contention, it is true, he cuts rather than unties the Gordian knot; the conclusion is one which human thought throughout the ages has been striving to reach, but has never succeeded in rendering logically tenable.

Two other books of extensive scope followed—the "Philosophy of Conduct" in 1902 and the "Philosophy of Religion" (two volumes) in 1905. The latter is an exhaustive treatment of the subject from both the historical and the speculative points of view, and has scarcely received the consideration that is its due. Prof. Ladd's literary activity was maintained to the end. In the last few years there emanated from his pen a series of popular manuals bearing the titles "What can I know?", "What ought I to do?", "What should I believe?", "What may I hope?", and "The Secret of Personality," all of them thoughtful and replete with the wisdom of experience.

G. DAWES HICKS.

THE death is announced, in *Science* of August 12, of MR. LOUIS ALBERT FISCHER, physicist and chief of the Division of Weights and Measures of the United States Bureau of Standards. Mr. Fischer died on July 25 last at the early age of fifty-seven years, only a few weeks after his distinguished colleague, Dr. E. B. Rosa. Early in life he joined the old Weights and Measures Office of the U.S. Coast and Geodetic Survey, and during his eleven years' service with the survey he carried out numerous tests for the standardisation of weights and measures, particularly of the length standards. This work led to the formation in 1901 of the National Bureau of Standards, in which Mr. Fischer took an important part. He was immediately appointed chief of the Division of Weights and Measures, and continued to hold the post until his death. During this time he conducted numerous investigations of scientific and technical value, which covered such subjects as the standardisation of chemical glassware, screw-threads and gauges, the thermal properties of various metals and alloys, the densities of water-alcohol solutions, the testing of watches and clinical thermometers, model laws for State weights and measures services, etc.

In 1905 Mr. Fischer organised the annual Conference of Weights and Measures of the United States, and afterwards acted as secretary to the organisation, which consists of national, State, and other officials interested in the promotion of uniform legislation regarding weights and measures. Mr. Fischer was regarded as the leading spirit of the last decade in America in all matters concerning weights and measures, yet in spite of the immense amount of administrative and technical work he accomplished, he also contrived to find time to carry out researches which have earned for him a reputation as one of America's leading metrologists.