

simple data. By his second principle he necessarily repudiates association in the Lockian sense. Although he keeps the names of the old laws of association, contiguity and similarity, he states explicitly that "quasi-mechanical reproductive adherence has its source in the noetic coherence". In principle, reproduction by association and the eduction of correlates are akin. The distinction is that in reproduction the relata have already been related in past experience, the organisation is old, whereas in eduction of correlates the educed correlate is new. It is this aspect of his third principle in creating new knowledge that Prof. Spearman wishes to stress, and it is just this stress that differentiates his principle from that of relative suggestion advocated by Thomas Brown in his "Philosophy of the Human Mind", 1820. Whether such a distinction of 'old' and 'new' is one that can be drawn in any absolute sense is a question that need not be raised in this connexion.

Locke left us with unreconciled methods and principles, and in connecting these with differing schools in contemporary psychology, I may seem to be emphasising divergencies of doctrine. Indeed, I may seem to be giving support to the gibe that to-day there is no psychology, only a collection of psychologies. By many this is thought to be a sure sign of decadence. At first sight there is much in the present situation which may give rise to a sense of disappointment to those of us who belong to the older generation. The present century opened full of hope—psychology was emerging as a new science. It was being recognised as some-

thing distinct both from philosophy and from physiology. It was rapidly developing a technique of its own. All was 'set fair' for the growth of the 'new' psychology. It is true there were schools in a very limited sense. There was Leipzig, Göttingen, Paris, Harvard, Cornell, etc., but the lines of cleavage represented, say, at the Paris Congress of 1900, were but deep furrows in a common experimental field. To-day the schools appear to be separated by unbridged gulfs. Yet it is little more than fifty years since Wundt opened his laboratory in Leipzig, and fifty years is a brief interval in historical retrospect.

Is the present division of theory really a bad sign? Does it indicate the 'petering out' of the spirit which animated the workers from 1879 to 1900, or is it a sign of vigour? I believe there are good grounds for believing the latter alternative. Prof. Woodworth, in his book "Contemporary Schools of Psychology", declares, "all the schools are emphasising something that demands emphasis and serve a useful function in the progress of psychology". The methods and principles which find a place in Locke's Essay may demand for their reconciliation, not resolution but increase of knowledge, to enable us to mark out their respective spheres.

If Prof. Woodworth is right, we need reject no 'psychology' as false, but rather consider how far its particular teaching serves to explain certain aspects of complex human phenomena. This thesis can be illustrated by applying it to the data of experiments on recall.

Obituary

MR. E. EDSER

MANY students of physics, as well as numerous friends in the world of applied science, will regret to learn that Mr. Edwin Edser died on Aug. 17, at sixty-six years of age, after a long period of acute suffering bravely borne. He was one of the most unassuming of men, yet everyone who knew him appreciated the breadth and depth of his knowledge of all branches of physics, and his clear understanding of fundamental principles used either in theory or in practice.

Mr. Edser was a student at the Royal College of Science, South Kensington, and obtained his associateship in physics in 1892, being top of the list. After a year of research he was appointed demonstrator in physics at the College, under Sir Arthur Rücker, and in 1895 became lecturer in physics and head of the mathematical department of the South-Western Polytechnic, Chelsea. Later, he was lecturer in physics at Woolwich Polytechnic, and from 1903 until 1914 was head of the Department of Physics at Goldsmiths' College, University of London.

While at the Royal College of Science, Mr. Edser carried out some notable pieces of research and was associated with Sir Arthur Rücker in an important paper on the objective reality of combination tones, read before the Physical Society in March 1895. The question of the objective exist-

ence of summation tones as distinguished from supposed beat tones, which had previously been the subject of much controversy, was proved conclusively by the experiments and results described in this paper.

Mr. Edser was an ingenious experimenter, and so long ago as Aug. 17, 1893, he contributed an article to NATURE upon a simple arrangement of apparatus devised by him to illustrate Michelson's method of obtaining interference bands. The use of this apparatus in connexion with experiments on change of phase of light after reflection at a silver surface was described by him in an article in NATURE of Sept. 23, 1897. Mr. Edser was probably one of the earliest experimenters in Great Britain to make use of the principle of Michelson's interferometer, and he applied it to investigate the effect of movement in liquids upon the velocity of light. He also used the instrument in an investigation with Mr. S. G. Starling on the effect of the electric discharge upon the velocity of light. In a paper read before the Royal Society in 1898, Mr. Edser developed Maxwell's electromagnetic theory of light so as to include dispersion, metallic reflection, and allied phenomena.

In a letter to NATURE of May 2, 1912, concerning peculiar shadows cast by leaves during the partial solar eclipse of April 17, 1912, Mr. Edser made the

interesting observation that where a leaf was isolated from the bulk of the foliage, its shadow took the form of a crescent, thus actually being a negative image of the visible portion of the sun during its partial eclipse. In his inimitable way, he immediately devised a laboratory experiment to illustrate the phenomenon, and thus showed that when light from an extended source throws the shadow of a small object on a screen, under such conditions that the umbra of the shadow is not formed, then the shadow is the negative inverted image of the source of light.

Mr. Edser's textbooks on heat, light, and general physics are very widely known. He took special pains to make all his explanations as clear as possible, and many of the experiments described in his books were original and required only the simplest apparatus. When his textbooks were written, few science students of the standard for which they were intended were familiar with advanced mathematical methods, so the calculus was not used in them, and therefore some of the proofs now appear cumbersome from a more modern point of view. He was, however, very successful in presenting difficult parts of his subjects without making large demands upon the mathematical knowledge of students, though he was himself a good mathematician.

Since 1915 Mr. Edser's work was mainly concerned with the physical problems involved in flotation processes of mineral separation. One of his colleagues of Minerals Separation, Ltd., writes as follows:—"Much of his work in the investigation of the complex phenomena of flotation was published in the 'Reports on Colloid Chemistry'

of the British Association, his more important contributions being 'The Concentration of Minerals by Flotation' (Fourth Report, Coll. Chem., Brit. Assoc. Rept., 1922) and 'Molecular Attraction and the Properties of Liquids' (*ibid.*). From the latter the following conclusions he arrived at may be quoted: 'Of the energy which represents the surface tension of a liquid 94% is located in the surface layer one molecule diameter in thickness, while the remainder is located at a greater distance from the surface'. And in respect of the Law of Molecular Attraction: 'Two molecules attract each other with a force that varies inversely as a power of the distance separating them, and this power must be higher than the fifth. In all liquids the result of analysing the experimental data is to indicate that the molecules attract each other inversely as the *eighth* power of the distance separating them, but mercury is not in good agreement with this law.' Some could have wished a wider audience for these papers than their present (virtual) burial place affords."

In several respects, Mr. Edser represented the best type of product of the physical laboratories of the Royal College of Science and the stimulating influence of Sir Arthur Rücker and Prof. C. V. Boys. He was not only fertile in ideas, but also skilful in all laboratory arts, and able therefore to devise and construct simple and effective apparatus to test or demonstrate them. Withal he was a delightful companion, an artist of considerable merit, and of catholic literary taste; and his memory will long be cherished with affection by a wide circle of friends.

News and Views

Report of Council of the British Association

THE report of the Council of the British Association, adopted by the General Committee at the York meeting, included several matters of particular interest. The period of the presidency, for example, now coincides with the calendar year instead of extending from one meeting to the next. The nomination of the new president is made known, however, on the first day of the annual meeting, and the General Committee accepted the recommendation of the Council that Sir Frederick Gowland Hopkins, president of the Royal Society, should be the president of the Association next year, when the meeting will be held at Leicester on Sept. 6-13. A notable change of policy with regard to allocations of grants to research committees was brought before the General Committee. For many years these grants have been made on a year-to-year consideration of available balances and have amounted to about £1000 annually. The general treasurer, Sir Josiah Stamp, in a memorandum upon the financial position and outlook of the Association, pointed out the weakness of this system and suggested that, for a time at least, not more than £400 should be expended annually from general funds on grants for research, and that an annual sum of £500 should be placed to a contingency fund. This recommendation was approved by the Council, which

is of opinion that the true function of the Association, in making grants to research committees, is the initiation of particular pieces of research rather than their quasi-permanent endowment. In addition to the grants made from general funds at the annual meetings, the Council can deal at any time with applications for grants from the Caird Fund. Prof. J. L. Myres retires from the office of general secretary of the Association, which he has held since 1919, and the Council records its deep sense of gratitude for his devoted services. The two general secretaries are now Prof. P. G. H. Boswell and Prof. F. J. M. Stratton. The new members of Council are Sir Henry Dale, Dr. Allan Ferguson, Prof. R. B. Forrester, Dr. H. S. Harrison, Sir John Russell, and Prof. F. E. Weiss.

Social Consequences of Scientific Discovery

THE concern for the social consequences of the application of scientific discoveries which has been voiced by Dr. L. P. Jacks in a series of recent articles was reflected in several of the addresses and discussions at the recent British Association meetings. Dr. Jacks suggests that, instead of lending itself to the creation of endless desires, science might regard its task of giving man control over the forces of Nature as sufficiently advanced for the time being and turn its attention to the equally important task of assisting man to control himself. Recognition of this necessity was as explicit