THE EDUCATION BILL.

THE important conference between representatives of the local education authorities and Mr. Fisher, President of the Board of Education, held in London on November 20, is indicative of the keen interest taken by responsible men in the Education Bill so far as its vital clauses are concerned. Mr. Fisher was not called from his high office as Vice-Chancellor of the University of Sheffield simply that he might promote a measure embodying certain changes in methods of educational procedure and administration, or to increase the bureaucratic powers of the Central Authority with some possible advance in the essential features of education, but in response to a growing and insistent demand, largely induced by the lessons of the fierce conflict in which we are engaged, which has thrown a lurid light upon the defects of our educational system, that Parliament should initiate a liberal measure of educational reform so complete and all-embracing that no child of the nation shall be allowed to escape from its fostering care, however insistent may be the demands of industry.

Mr. Fisher has enthusiastically responded to this demand, and by his speeches in and out of the House has aroused a deep and almost universal desire that his educational reforms, by no means rising to the height of his aspirations or fulfilling the ardent hopes of some educationists, should be given a chance of legislation. Unfortunately, the measure is weighted with certain provisions which, in the opinion of many persons jealous of the claims of local government, are likely to impede the initiative and sap the public spirit and independence of the local authorities. From the tenor of the interview mentioned above it is fairly clear that Mr. Fisher is prepared to go a long way to meet the criticisms offered so far as certain of the administrative clauses are concerned, and there is hope therefore that an agreed measure may result which will dispose of the excuse that the Government cannot find the necessary time for its discussion.

Many measures of reconstruction, to take effect after the war, are afoot, but most of them are likely to be futile of result in the absence of an educational measure of the character Mr. Fisher has placed before the nation. It is accordingly with warm approval that we note that an important body like the British Science Guild has on this ground approached the Prime Minister with a demand that facilities shall be given to enable the Bill, after due consideration and such amendments as may be found necessary, to become law in the course of the present session of Parliament. In all, 331 resolutions, of which 156 are from Labour organisations, have been received by the Government urging that the Bill should be pressed forward with all possible speed. The prospects of the Bill becoming an Act have, indeed, improved greatly during the past few days. On November 23 Mr. Fisher, in a speech at Brighton, declared that the Government intends to pass the Bill, and the Parliamentary correspondent of the *Times* says it is understood that the Government is prepared to consider favourably the giving of facilities for the Bill this session, provided that a guarantee is given that the debates in the House of Commons are limited to a specific number of Parliamentary days.

A large deputation, representative of all parties in the House of Commons, waited upon the Prime Minister on Monday to urge the importance of passing the Bill into law without delay. Mr. Lloyd George was unable to give any definite pledge, but he suggested that if the present session were prolonged it might be possible to take the Bill towards the end of the session, and if not, it would be given priority next session. It is possible, therefore, that the second reading will be taken before Christmas, and, in any case, the Bill is to be given precedence next session if it does not come on before.

MARINE BIOLOGY.

FOURTEEN papers, forming vol. xi. (1917, pp. 360), are issued from the Department of Marine Biology of the Carnegie Institution of Washington. Three papers record observations on the scyphomedusa, *Cassiopea xamachana*, which is common in shallow water near the laboratory at Tortugas, Florida. This medusa, which thrives well in aquaria, is accustomed in nature to a considerable range in salinity and in temperature, and, having commensal algal cells, is in some measure independent of the oxygen supply of the surrounding water. On removing, by means of two circular cuts, the peripheral region, including the sense-organs, and the central stomach, an annular piece of tissue is obtained which is paralysed (owing to removal of the sense-organs), but is capable of stimulation by an induction shock until a contraction wave going in one direction is entrapped in it. Such a wave may maintain itself for days with little change of rate provided the temperature, CO_2, salinity, and H-ion concentration of the sea-water remain constant. Such rings of tissue provide extremely favourable material for the study of variations in the rate of nerve-conduction in natural sea-water and in artificial sea-water solutions. Dr. A. G. Mayer concludes, after many experiments on these rings, that nerve-conduction is due to a chemical action involving the cations sodium, calcium, and potassium (magnesium is non-essential), the sodium and calcium combining with some proteid. The high temperature-coefficient of ionisation of this ion-proteid may account for the high temperature-coefficient of the rate of nerve-conduction.

Dr. L. R. Cary has carried out experiments to test the influence of the sense-organs of the medusa on metabolism and regeneration. The oral arms and stomach having been cut away, a strip of subumbrellar ectoderm, in which alone the nervous elements are contained, was removed along a diameter, and thus nervous connection between the halves of the disc prevented. Comparison of such insulated halves, in one of which the sense-organs were present, while in the other they had been removed, showed that the half-disc with sense-organs always regenerated more rapidly, especially in the early stages. The experiments indicate that the rate of regeneration is simply an expression of the general metabolic activity of an animal, and as such is subject to the influence of the nerve-centres Dr. S. Hatai gives an account of the composition of normal and starved medusæ.

Prof. E. N. Harvey describes experiments on, and discusses, the chemistry of light-production in animals. He has studied in detail a Japanese marine ostracod Crustacean, *Cypridina hilgendorfi*, in which light-giving material is formed in a gland opening near the mouth and, on agitation of the animal, is readily extruded as minute yellow globules which dissolve in water to a colourless solution. Oxygen is necessary for light-production, in which two substances—"photogenin" and "photophelein"—are shown to be concerned. Photogenin, present in the luminous gland cells, is colloidal, and probably a proteid. Photophelein, which is found in high concentration throughout the body of Cypridina, is crystalloidal and of unknown composition. One part of the gland in 1,700,000,000 of water will give visible light on the addition of photophelein. A similar photogenin-photophelein reaction was found in Japanese fireflies (Luciola). Mrs. Harvey records observations on Noctiluca, the luminescence of which is traceable to granules (photogenin) in the protoplasm, but photophelein could not be demonstrated.

Dr. A. J. Goldfarb has investigated the variability of the eggs of sea-urchins; Dr. H. L. Clark records the habits and reactions of a Comatulid (Tropiometra); Dr. A. L. Treadwell describes several new species of Poly-

chæta; Dr. H. E. Jordan gives an account of the structure of the striped muscle of Limulus, and also traces the embryonic history of the germ-cells of the loggerhead turtle from the emigration of the primordial germ-cells from the yolk-sac endoderm to their arrival in their final positions.

RESEARCH PAPERS FROM THE UNIVERSITY OF SYDNEY.

THE University of Sydney has recently issued (for private circulation) several volumes of reprints of papers by members of its staff and by its research students during the period 1909–16. It is clear that the University is doing its duty in contributing to scientific progress, and in training its best students in the methods of research. Thus in vol. A we have a list of upwards of sixty papers (twenty of which are included in this volume) ranging over the subjects of mathematics, physics, chemistry, agriculture, and engineering; and although, of course, they are of unequal value in the eyes of an expert, they are all concerned with genuine scientific problems, the solution of which means something more than a mere class exercise. One paper is of an exceptional kind, as dealing with a chapter of mathematical history. This is Prof. H. S. Carslaw's Napier commemorative lecture, which gives a clear and interesting account of what Napier's logarithms were (even yet this is often wrongly stated), and of the way in which they were calculated. The other papers are technical, and we must content ourselves with noting those in the complete list which obviously deal with specially Australian matters. These are: (1) Two papers on superannuation and pension funds; ; (2) one on the teaching of mathematics in Australia; (3) one on Australian coalfields and collieries; (4) one on the Hargreaves goldfield, N.S.W. None of these, however, appear in this volume, probably because the stock has been exhausted.

An interesting record of the activities in research of the anatomists and biologists of the University is contained in vol. i., series B. Unfortunately the volume is by no means complete, for of the fifty-seven papers which have actually been published during the period covered (1909–16) only twenty-eight are represented. This, however, is five more than we are led to expect from the table of contents, which is to that extent inaccurate. These papers represent the original research of a dozen different authors, and naturally range over a wide field, from pathological anatomy to zoogeography. The most distinctively Australian contributions are those dealing with the fauna of the great island-continent. The botanical side of biological science is but slightly represented, though we may expect to see a great advance in this direction now that a separate department of botany has been established in the University. A good many of the papers were originally published in English journals, and are already well known to workers in this country. Of the remainder, the Proceedings of the Linnean Society of New South Wales furnish a very large proportion. We may direct special attention to Mr. E. F. Hallmann's "Revision of the Monaxonid Sponges described as new in Lendenfeld's Catalogue of Sponges in the Australian Museum." Such a revision was greatly needed, for the catalogue in question is a singularly unsatisfactory piece of work. Mr. R. J. Tillyard's papers on dragonflies constitute a conspicuous feature of the volume and a very notable contribution to the study of this group of insects, which is dealt with from the different points of view of systematic zoology, geographical distribution, and physiology. We note that Messrs. Hallmann and Tillyard are, or were, both Linnean Mackay fellows in zoology. These fellowships have done much to promote the study of zoology in a country where an immense amount of work still remains to be done before our knowledge of the fauna can be placed upon a really satisfactory footing. The issue of this volume coincides with the retirement of Prof. Haswell from the chair of zoology, which he has so long held. He himself contributes four memoirs to the collection, and we hope that his valuable researches in Australian zoology will long be continued.

Series B, vol. ii., is concerned with geology, pathology, and physiology, the first-named science occupying by far the greatest portion. The papers include a series by W. N. Benson on the "Great Serpentine Belt of New South Wales," where the perennial subject of the connection between radiolarian cherts and pillow-lavas comes up for discussion in the case of rocks of Middle Devonian age. The association of frequent casts of Lepidodendron with radiolaria has raised interesting physiographic questions. The alluvial deposits of Copeton, N.S.W., containing tinstone and diamonds, have been worked since 1873, and Mr. L. A. Cotton has recorded (1914) a diamond in a quartz-dolerite of the district. He regards the basic magma as the true matrix, and does not suggest a derivation from underlying rocks. Prof. Edgeworth David has stimulated so much of the geological work in the University of Sydney that his address to the Australasian Association in 1913 seems very fittingly included in this volume. It deals with the influence of an Antarctic continent, varying in dimensions in geological time, on the climate of Australia, and attributes the cold Permo-Carboniferous conditions to the immense extension of land in the south of the southern hemisphere. Among the physiological papers is one of importance to chemists, by Mr. H. Wardlaw, on "The Accuracy of Neumann's Method for the Estimation of Phosphorus." Though this author's work has been largely concerned with milk, of human or other origin, he has found time for a specially Australian study on the variations of temperature in Echidna.

THE SURVEY OF INDIA.

THE Indian Survey Report for 1915–16 contains nothing of special interest either in the department of exploration or in that of science, but it is a good record of solid work carried out under the direction of Sir Sidney Burrard, curtailed in certain branches by the exigencies of war service, but on the whole a most satisfactory report. The progress made in the topographical mapping of the huge area of India in the ten years preceding 1916 shows that between one-fourth and one-fifth of that area has been completed on various scales and by various methods up to date, but one is left in doubt as to the comparative values of the revision necessary in the mapping of an older date than 1905. The whole of India (or very nearly the whole) must have been mapped by then, on scales which are much the same as those now adopted for various classes of land area. Surely very little revision is necessary in those barren areas (within the frontier) that were mapped on the smaller scales. On the other hand, much of the 1 in. per mile mapping must have required actual re-survey. The area remaining to be mapped amounts to 1·382767 square miles (or thereabouts?), so the Survey of India has still a career before it.

It is worthy of note that thirty-six "Imperial" officers have been withdrawn for active service, and that of that number no fewer than seven have already laid down their lives for their country. A survey party has been attached to the forces in Mesopotamia, and the result of its work will be of special interest, but otherwise no trans-frontier geo-