

were a report on erratic blocks, and a paper by Prof. E. Hull on the glacial rocks of Ambleside.

Very few papers dealt with palaeontological subjects. Mr. M. Odling described a problematical fossil from the Chipping Norton limestone, and Dr. M. C. Stopes read a paper on structural petrifications from the Mesozoic and their bearing on fossil plant impressions.

Sir T. H. Holland read a suggestive paper on the cause of gravity variations in northern India; Mr. T. Sheppard gave a well-illustrated account of the Humber during the Human period; Dr. Tempest Anderson showed a magnificent series of photographs in illustration of his paper on Matavannu, a new volcano in Savaii (German Samoa); and Dr. A. Irving read papers on the pre-oceanic stage of planetary development and on a buried Tertiary valley through the Mercian chalk range, and its later rubble drift. Prof. A. McWilliam described the metallurgical industries in relation to the rocks of the (Sheffield) district. Finally, reports were presented by Prof. J. Milne on seismology, and by Prof. W. W. Watts on geological photographs.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The Gedge prize has been awarded to G. R. Mines, of Sidney Sussex College, for his essay entitled "Researches on the Physiological Action of Inorganic Salts chiefly in Relation to the Cardiac and Skeletal Muscles of the Frog."

R. H. Compton, Gonville and Caius College, has been elected to the Frank Smart (university) studentship.

The State Medicine Syndicate has appointed J. E. Purvis, of St. John's and Corpus Christi Colleges, to be secretary to the syndicate in the place of Dr. Anningson, who has resigned the office after twenty-five years' service.

The council of the Institution of Civil Engineers is prepared to consider applications for a nomination to the Palmer scholarship. The nominee must be the son of a civil engineer, must be desirous of studying and graduating at the University of Cambridge, and must be in such circumstances as to need the scholarship, which is of the annual value of 40*l.* Copies of the regulations may be had from the secretary of the institution, Great George Street, Westminster, S.W.

THE first course, dealing with neurology, of the Page May memorial lectures in physiology, will be delivered by Prof. C. S. Sherrington, F.R.S., at University College (University of London) on the following Mondays and Tuesdays, at 4.30 p.m.:—October 24 and 25, November 7 and 8, November 28 and 29. The lectures are open to the public without fee.

It is announced in *Science* that at Yale University the salaries of professors and assistant professors have been increased by 9800*l.* from the alumni fund. The salaries of full professors are to be 800*l.* to 900*l.* and 1000*l.*, based mainly on length of service, but modified somewhat by university responsibility and personal distinction. In the case of assistant professors the maximum salary is increased to 600*l.*

THE Aeronautical Society offers the following course of lectures at the Northampton Polytechnic Institute, Clerkenwell:—November 2: the study of dynamic flight, J. H. Ledebor; November 16: the mechanics of the aeroplane, Algernon E. Berriman; November 30: theory and design of propellers, T. W. K. Clarke; January 11, 1911: aeroplane surfaces and controls, with some remarks on chassis, Herbert F. Lloyd; January 18: the motive power in aeroplanes, Captain A. D. Carden, R.E.; January 25: lines of aeronautical research, Bertram G. Cooper. The lectures will be given on Wednesdays at 8 p.m., and applications for tickets are to be addressed to the secretary of the Aeronautical Society, 53 Victoria Street, Westminster, S.W.

A CIRCULAR letter has been issued from the Education Offices of the London County Council inviting from the

NO. 2138, VOL. 84]

optical trade an expression of opinion on the advisability of endowing a central opto-technical institute at a cost of probably 30,000*l.* for the building alone. As a successful issue to this project is dependent mainly on the expression of a large volume of trade opinion in its favour, Mr. J. Aitchison arranged for a meeting of opticians to be held on Monday last, October 17, at Anderton's Hotel, Fleet Street, E.C., at which it was resolved to support the suggested establishment of an opto-technical institute in Clerkenwell "to further the work which has been hitherto carried on at the Northampton Institute, and has proved of great value to the optical industry." In his letter convening the meeting Mr. Aitchison remarked:—"Whatever difference may still exist between different parties in the trade, all are agreed to cooperate in whatever seems to be possible for the advancement of our industrial status, by forwarding the course of technical education and concentrating public attention on the importance of the movement."

THE first part of "Statistics of Public Education in England and Wales" for 1908-9 is now available (Cd. 5355). It deals entirely with educational statistics. New tables have been added this year giving particulars as to the occupations of the fathers of pupils and as to the previous education of pupils in secondary schools. The tables dealing with technical education remain much the same as in previous years. Before giving particulars as to the number of technical institutions in England, it must be pointed out that the Board of Education defines a technical institution as one giving an organised course of instruction in day classes, including advanced instruction in science, or in science and art, and provided with a staff and equipment adequate for the purpose. Provision must be made in such institutions for at least a two years' systematic course in science, or in science and art, either alone or in conjunction with subjects of general, commercial, manual, or technological instruction. Except in special cases no student may be admitted to the course unless he has passed through at least a three years' course of instruction in a "recognised" secondary school, or is more than sixteen years of age and qualified by his general education to profit by a course of advanced instruction. In 1908-9 forty such institutions were recognised by the Board of Education, and they provided 121 courses. The number of teachers in the institutions was 787, and the number of students who attended at any time during the year was 3314. Of the teachers 766 were men, and of the students 3091 were boys and men. As regards the age of the students, it may be said that 1046 were under eighteen years of age. The number of efficient secondary schools on the Board's grant list was 804 in 1908-9. These schools provide a progressive course of instruction in the subjects necessary to a good general education upon lines suitable for pupils of an age-range at least as wide as from twelve to sixteen or seventeen. Among other things, an adequate proportion of the pupils must remain at least four years in the school. In these 804 efficient schools there were 4338 men- and 4098 women-teachers teaching 73,270 boys and 62,401 girls.

### SOCIETIES AND ACADEMIES.

#### MANCHESTER.

Literary and Philosophical Society, October 4.—Mr. Francis Jones, president, in the chair.—T. Thorp: A method for preventing the tarnishing of silver-on-glass parabolic mirrors. The mirror was carefully levelled on a turntable, and its axis of rotation made coincident with that of the turntable. The whole was then rotated uniformly at the calculated speed required to cause a liquid to assume the same parabolic form as that of the mirror. A 1 per cent. solution of "Schering's" celloidine in amyl acetate (after a lengthy period of settling) was flooded on to the surface of the mirror to a depth of about one-third of a millimetre. This was allowed to dry very slowly, when the resultant film was found to have a perfectly even surface of a thickness of about 1/300th of a millimetre. On testing the mirror no perceptible loss

of definition was observed, and in actual use the performance was satisfactory. It is absolutely essential for the success of the method that the mirror be quite enclosed, and exposed only to an atmosphere of amyl acetate so as not to be allowed to dry, for about one hour after the solution has been flooded on, as, without this precaution, a perfectly uniform film cannot be obtained.—Dr. Henry **Wilde**: The origin of cometary bodies and Saturn's rings. The first part of this paper is a further exposition of the author's theory of the origin of comets and cometary bodies from the interior of the planets of the solar system, with new illustrations drawn from experimental mechanics. Dr. Wilde considers that the recently discovered satellites of Jupiter and Saturn, which have retrograde motions, are planetary ejectamenta, and from their comparative minuteness are hardly entitled to rank as satellites. The theory advanced by Olbers, the illustrious discoverer of Pallas and Vesta, that the planetoids are fragments of an exploded planet, finds confirmation in the great irregularities of their orbits and the direct and retrograde motions of cometary bodies. The author next discussed the origin of Saturn's rings, which has for a long time engaged the attention of natural philosophers. Kant assumed that Saturn at an early period of its history had the characteristics of a comet, and that its tails contracted upon the planet and formed a ring. Laplace supposed the rings to be the original nebular substance uncondensed into the form of a satellite. The author ventures to affirm that the rings are the ejectamenta of Saturn when its diminishing energies were insufficient to eject a comet with its train of meteorites, or a cometary satellite. Dr. Wilde adduced evidence to show that the interior rings were formed some time subsequently to the outermost one, which is separated from the others by an annular space of 2585 miles. The author has drawn up a table of distances of the rings from Saturn and the times of their revolutions, calculated from his measurements of the photographs recently taken at the Lick Observatory.

#### NEW SOUTH WALES.

**Linnean Society**, August 31.—Mr. C. Hedley, president, in the chair.—Dr. H. G. **Chapman**: A contribution to the study of the precipitins. The paper records the results of an examination, by gravimetric methods, of the relations of the interacting substances in precipitin interactions. It was found that the amount of precipitate yielded by each antiserum was a fixed quantity for each cubic centimetre of antiserum, provided that sufficient homologous protein was present to precipitate completely the precipitin in the antiserum. In total interactions the weight of precipitate was proportional to the amount of antiserum. In partial interactions the weight of precipitate increased with ascending weights of homologous protein. Since the precipitates are derived mainly from the antiserum, it has been possible to determine the weight of the anti-substance in the antiserum. Consequent on the results of the gravimetric study of the interaction, a method has been devised to separate the proteins of closely allied species. Suggestions are made as to the composition of a precipitin-antiserum, as regards the components, giving rise to general avian and specific interactions. The preliminary results of the application of the test to the differentiation of vegetable proteins are recorded. They show that a group-specificity holds for proteins of vegetable origin. The derivation of precipitate from antiserum has not been sufficiently considered in relation to deviation of complement.—Dr. A. J. **Turner**: Revision of Australian Lepidoptera, part v. Part v. deals with the subfamily Geometrinæ of the family Geometridæ, comprising 40 genera and 124 species. The number of known species has been greatly added to, especially from the northern part of Australia, since the publication of Mr. Meyrick's "Revision of Australian Lepidoptera, No. ii., Geometridæ," in the society's Proceedings for 1887 (p. 835).—A. F. **Basset Hull**: Description of a fossil Chiton (Mollusca) from north-west Tasmania. The description is based on an example of a median valve, which shows the species to have been allied to, but distinguishable from, *Lorica affinis*, Ashby and Torr, and the living *L. volvox*, Reeve. The specimen was collected by Mr.

W. S. Dun from the base of the Turritella sandstone at the foot of a bluff between Wynyard and Table Cape. The beds are referred to the Jan Jukian by Hall and Pritchard; that is to say, they are near the base of the Tertiary, as developed in southern Australia. Victorian geologists correlate them with the marine series at Spring Creek. The Eocene age attributed to these beds must be regarded as purely relative.

### DIARY OF SOCIETIES.

FRIDAY, OCTOBER 21.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—The Standardisation of Locomotives in India, 1910: Cyril Hitchcock.

WEDNESDAY, OCTOBER 26.

BRITISH ASTRONOMICAL ASSOCIATION, at 5.—Annual Meeting.

FRIDAY, OCTOBER 28.

PHYSICAL SOCIETY, at 5.—Demonstration of a New Method for producing High-tension Discharges: Prof. Ernest Wilson and W. H. Wilson.—The Behaviour of Steel under combined Static Stress and Shock: F. Rogers.

### CONTENTS.

PAGE

Recent Progress in Psychical Research. By Sir Oliver Lodge, F.R.S. . . . . .	489
Fossil Club-mosses and Ferns. By D. H. S. . . . .	490
The Collected Works of Huygens. By J. L. E. D. . . . .	491
A Primer on Coal Mining . . . . .	492
Our Book Shelf . . . . .	493
Letters to the Editor:—	
Early Burial Customs in Egypt.—Prof. W. M. Flinders Petrie, F.R.S. . . . .	494
Lord Morton's Quagga Hybrid and Origin of Dun Horses.—Prof. James Wilson; Prof. J. C. Ewart, F.R.S. . . . .	494
Tests for Colour-blindness.—Dr. F. W. Edridge-Green; The Reviewer . . . . .	495
Water Vapour on Mars.—Prof. Frank W. Very . . . . .	495
A Caution.—E. A. S. . . . .	496
Dr. John Peile: A Correction.—The Writer of the Article . . . . .	496
The Centenary of Berlin University . . . . .	496
Town-planning. By A. E. Crawley . . . . .	498
The Melanesians of British New Guinea. ( <i>Illustrated</i> .) By S. H. Ray . . . . .	499
The Centenary of Filippo Cavolini . . . . .	500
John Willis Clark. By Dr. Sidney F. Harmer, F.R.S. . . . .	501
Prof. Maurice Lévy . . . . .	502
Notes . . . . .	502
Our Astronomical Column:—	
A Bright Projection on Saturn . . . . .	507
Spectrum and Radial Velocity of $\phi$ Persei . . . . .	507
Metcalf's Comet, 1910 <sup>b</sup> . . . . .	507
Comets and Electrons . . . . .	507
Measures of Double Stars . . . . .	507
Recent Results in Solar Physics . . . . .	507
The Ninth International Conference on Tuberculosis . . . . .	507
The International Scientific Congress at Buenos Aires. By Prof. C. D. Perrine . . . . .	509
Recent Investigations on the Cultivation of Rubber . . . . .	510
The Mineral Resources of the United States. By J. W. G. . . . .	511
Airship Flights . . . . .	512
Mathematics and Physics at the British Association . . . . .	513
Chemistry at the British Association . . . . .	517
Geology at the British Association . . . . .	520
University and Educational Intelligence . . . . .	521
Societies and Academies . . . . .	521
Diary of Societies . . . . .	522