

Other important work carried on under this Division during the year has included the sending successfully of beneficial species to foreign Governments suffering from outbreaks of the white or fluted scale, the preparation of an account of the work accomplished during the past two years against the San José scale, an investigation of the injurious grasshoppers of the Western States, work upon remedies to be used against the house fly, suggested by the growing belief in the importance of this insect as a carrier of disease; work upon the geographic distribution of injurious insects of the United States, and experimental work in agriculture.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The Board of Electors will meet on February 11 for the purpose of electing a successor to the late Professor of Pathology, Dr. Kanthack. Candidates are to send their names to the Vice-Chancellor on or before February 4.

The Clerk Maxwell Studentship in Experimental Physics has been awarded to Mr. J. S. E. Townsend, of Trinity College.

At a meeting in Birmingham, last week, of the Court of Governors of Mason University College, Mr. Chamberlain, in his capacity of president of the College, occupied the chair. In the course of his remarks, Mr. Chamberlain mentioned that the endowment fund of the proposed University of Birmingham had made very considerable progress, and that further assistance was to be expected from the leading managers and directors of the great limited liability firms, who were inclined to take a proper view of their responsibilities and obligations in a question upon which the future of the city so largely depended. Referring in more detail to the University scheme, Mr. Chamberlain emphasised the importance of establishing a faculty of commerce in connection with the curriculum. "Whilst," he remarked, "we shall always hope that in the University the highest culture will receive its due attention, still I think it important, to justify our separate existence, that we should have distinctive features in our curriculum, and nowhere shall we find that better than in such a faculty of commerce." Mr. Chamberlain's ambition is that in the future the business men of Birmingham and the district who enjoy a fair social position will not consider themselves properly equipped for their career without having obtained a degree in the University faculty of commerce.

THE annual meeting of the Geographical Association was held on Wednesday, January 11. As already stated (p. 238), the Association was founded in 1893, and its aim is to raise geography as a school subject from its present low level in secondary schools by spreading the knowledge of all such methods of geographical teaching as bring into play the pupil's intelligence and reasoning powers, instead of merely loading the memory with names and isolated facts. A memorial to boards of public examiners on the subject of reforms in examinations in geography has already, in many cases, led to a marked improvement in the character of the questions set. Amongst other means adopted by the Association for the furtherance of its aim, are lectures and meetings for discussion; the adoption of the *Journal of School Geography* as a medium for the publication of information of service to teachers of geography; and the circulation of lantern slides (maps, diagrams, and views of scenery). The question of a syllabus has been before the Association for some time, but the Committee are unwilling to lend their authority to any definite scheme of work, preferring rather to encourage individual teachers to explain in detail their own ideas of method, the outcome of their own practical experience. Mr. Douglas W. Freshfield, the president of the Association, delivered a short address at the annual meeting, and in the course of his remarks he referred to points dealt with in the report, and commended the decision of the Committee in not insisting upon any particular form of syllabus.

A CONFERENCE on science teaching in connection with the Technical Education Board of the London County Council was held, under the direction of Dr. Kimmins, at the South-West London Polytechnic, on January 12 and 13. The following papers occupied the morning of January 12:—"The Teaching of Optics," by Mr. Sanderson, headmaster of Oundle School; "The Method of Teaching Science," by Mr. Frank Weedon,

of Alleyn's School, Dulwich. Dr. Garnett presided. In the afternoon Miss Edna Walter, of the Central Foundation School for Girls, and Mr. Burkhardt, of Owen's School, Islington, read papers on "The Teaching of Chemistry." Prof. Armstrong occupied the chair. At the third meeting Mr. S. H. Wells, Principal of the Battersea Polytechnic, and Mr. S. Whalley, of Simon Langton School, Canterbury, read papers on "The Teaching of Elementary Mechanics in Schools." Prof. Hudson Beare presided. At the fourth meeting, papers on "The Teaching of Heat," by Mr. Arthur Adamson, of the Central Higher Grade School, Manchester; and on "Magnetism and Static Electricity," by Dr. T. Buchanan, of Gordon College, Aberdeen, took up the attention of the meeting. Prof. Ewing presided. It is much to be hoped that this very successful experiment will be repeated next year. The attendance at each meeting was large, and included, in addition to many science teachers from all parts of the country, several of the inspectors of the Science and Art Department, and such well-known men of science as Dr. Gladstone and Captain Abney. Enthusiastic discussions followed each paper, and the number of practical hints which were to be gleaned at each meeting well repaid attendance. The collection of apparatus, specially designed for use in schools, which Dr. Kimmins had got together and had arranged in the physical, chemical and mechanical laboratories, should do a great deal in the direction of acquainting science masters with what other teachers are doing. Many of the exhibits were original, and highly ingenious.

At a meeting of Convocation of the University of London, held on Monday, it was resolved:—"That, in the opinion of this house, the new regulations for the matriculation examination tend to discourage the study of modern languages in schools, by making them entirely optional and alternative to science." The following resolution was referred to the standing committee:—"That the examination in general elementary science should be restricted to the first part of the subject, and comprised in one paper; the second part to be made optional with the other sciences, and a third language to form a separate and obligatory section taking its place."

At the annual general meeting of the Headmasters' Association, on Friday last, the following resolutions were adopted: (1) "That this Association cordially welcomes the Board of Education Bill as a first step towards the organisation of secondary education in England, and is of opinion that the consultative committee proposed therein ought to be permanent and to contain representatives of the Universities and of bodies of teachers." (2) "That this Association records with satisfaction the statement made by the Lord President in introducing the Board of Education Bill—viz. that the proposed Education Office would probably be so organised as to consist of three departments, dealing with primary, secondary, and technical education respectively."

THE Association of Technical Institutions held its annual conference in London on Thursday last. Lord Spencer was elected president for the ensuing year, and delivered an address, on which he dwelt on the extreme importance of improved technical education in the interests of our commerce and industry, and indicated some of the more pressing reforms that were needed. The following resolution was afterwards carried:—"That the Association desires to place on record its appreciation of the Board of Education Bill, 1898, as a first instalment of legislation on the lines recommended by the recent Royal Commission, and its hope that the Government may see its way to proceed further in the same direction."

THE Association of Directors and Organising Secretaries for technical and secondary education held its annual meeting on Friday last, Mr. H. Macan presiding. The chief subject discussed was the Government Secondary Education Bill, and the constitution of the proposed local authority to be responsible for technical and secondary education. It has already been agreed among the bodies interested that on the new local education authorities the County Council should have half the representation, and the School Boards a third, the remainder being made up of co-opted members. At Friday's meeting, some hostility was shown towards the proposal to give School Boards so large a representation as a third, or even any at all, the opinion being expressed that the present powers possessed by County Councils are sufficient to secure the representation of all educational interests in the areas of administrative counties. Among the resolutions agreed to was one expressing the view

that, in the opinion of this Association, it was both undesirable and impracticable to draw any line of separation between secondary and technical education in any legislation concerning central or local authorities, and another to the effect that in no case should a permanent consultative committee be attached to the Board of Education.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 15, 1898.—“The Action of Magnetised Electrodes upon Electrical Discharge Phenomena in Rarefied Gases.” Preliminary Note. By C. E. S. Phillips. Communicated by Sir William Crookes, F.R.S.

The experiments described in this paper were undertaken in order to study, more especially, the action of magnetised electrodes upon the phosphorescent afterglow which is often seen to illuminate the inner surface of the glass walls of vacuum tubes when an electrical discharge has passed within them.

The apparatus employed consisted of a glass bulb, nearly spherical in shape and about 2½ inches in diameter, open at both ends, for the purpose of inserting and sealing into position, two soft iron electrodes, so placed that their pointed ends were within 1/16 inch of one another.

Each electrode had a screw-thread of suitable pitch cut upon it in order that two brass cups, when screwed into position and sealed with cement to the glass, might serve to keep the electrodes central, to reduce the possibility of their rushing together under the influence of strong magnetic forces, and to seal airtight the two ends of the bulb.

Suitable arrangements having been made for strongly magnetising the electrodes by means of a powerful external electro-magnet, the bulb was then connected to a Sprengel air-pump and slowly exhausted. During this process the usual luminous phenomena were observed whenever a discharge was passed through the bulb; while on magnetising the electrodes the results obtained were, in some cases, very remarkable.

A rarefaction having been obtained such that a three-inch spark from a ten-inch Apps induction coil could scarcely start the glow, it was observed that, after a strong stimulation of the bulb had taken place and then been stopped (the electrodes meanwhile remaining unmagnetised), on exciting the magnet a luminous ring suddenly appeared within the bulb, between the pointed ends of the electrodes, and in a plane at right angles to the direction of the magnetic lines of force. It shone brightly for a moment, when the magnet circuit was “made,” and it was more sharply defined at high exhaustions—becoming, in fact, hazy and indefinite if the pressure within the bulb were slightly increased. Even with the connecting wires between the coil and the bulb completely removed after stimulation, the ring formed as well as ever when the magnet was turned on. At the moment the ring appeared within the bulb the glass walls became electrically charged so strongly that, in some cases, a spark could be seen to pass between the glass and either of the exposed ends of the electrodes at the moment the magnet was excited. It was further noticed that the ring was in rapid rotation and also very sensitive to variations in the electrical charges, upon the bulb.

Under certain conditions a second ring formed concentrically with the first. Experiments were also made with external magnetic electrodes, and irregular green splashes and puffs of white cloudy light appeared in the interior of the exhausted vessel when the electrodes were magnetised.

Geological Society, January 4.—W. Whitaker, F.R.S., President, in the chair.—Capt. A. W. Stiffe exhibited a fossil *Cardium* (?) from the beach at the foot of the cliffs of Ormara (Makran Coast).—“Geology of the Ashbourne and Buxton Branch of the London and North-Western Railway: Ashbourne to Crake Low,” by H. H. Arnold-Bemrose. The southern part of the new railway from Ashbourne, through Tissington and Crake Low to Buxton, exhibits several sections in Trias, Boulder Clay, Mountain Limestone, and Yoredale Beds. Interstratified with the latter is a thick bed of volcanic ash, with thinner intercalations of tuff. Within a mile of Tissington ash is exhibited four times in the cuttings, and according to the view of the author it is the same bed repeated by basins and domes, one of the latter of which is faulted. While the rocks succeeding the ash in some places are limestones, cherts, and shales of

Yoredale type, in one section they resemble more closely the upper beds of the Mountain Limestone. The limestones are often dolomitised.—“The Oceanic Deposits of Trinidad,” by Prof. J. B. Harrison and A. J. Jukes-Browne. The object of this communication was to present some observations on the succession and geological relations of the beds which have long been known in Trinidad as the Naparima Marls. In his historical introduction Mr. Jukes-Browne deals with the writings of Mr. Guppy and Prof. Harrison, and shows that three definite issues are thus raised: (1) Are the Nariva Beds above or below the Naparima Marls? (2) Do the *Globigerina*-marls occur in the Naparima district, and, if so, are they connected with the Radiolarian marls, or are they part of a separate formation? (3) What is the relation between the San Fernando Beds and the other groups? Mr. Guppy and Prof. Harrison agree in answering the first part of the second question in the affirmative, and in stating that the two marls are closely connected together. It appears that the *Globigerina*-marls occupy the place of the basal chalks of Barbados, but are much thicker, while the radiolarian rocks are thinner, and the interbedded volcanic ashes so frequent in Barbados are wanting in Trinidad. Chemical and microscopic analysis of the *Globigerina* and radiolarian beds are given, and, compared with similar analyses of the Barbadian deposits, they show that more quartz and argillaceous matter occur in Trinidad. The following correlation is proposed:—

BARBADOS.		TRINIDAD.		
Coral Rocks.	}	Moruga Series.	}	Pleistocene and
Bissex Beds.		Naparima Marls.		Miocene.
Oceanic Beds.				Miocene.
	}	San Fernando Beds.	}	Oligocene and
Scotland Beds.		Nariva Series.		Eocene.

The Oligocene and Eocene Beds are of shallow-water origin, and seem to be unconformably covered by the Naparima Marls.

PARIS.

Academy of Sciences, January 9.—M. van Tieghem in the chair.—On the hysteresimeter constructed by MM. Blondel and Carpentier, by M. Marcel Deprez. The author describes an instrument for the measurement of hysteresis, constructed by him about four years ago for the *Conservatoire National des Arts et Métiers*, the principle of which is identical with that of the hysteresimeter recently invented by MM. Blondel and Carpentier, the only differences being that the author's instrument was of dimensions suitable for measuring the hysteresis of iron rings of the size actually used in dynamos, and contained an electro-magnet instead of a permanent magnet.—The cryoscopy of urine, by M. Ch. Bouchard. From the observed depression of the freezing point of urine, suitably diluted if necessary, the depression due to sodium chloride present is subtracted, and the mean molecular weight of the rest of the solid matter determined in the usual manner. In a man in a normal state of health the value of this mean molecular weight is about 62, rarely falling below 60, or rising above 68. In disease the value of this constant is usually raised, varying from 68 to 112.—Histology of the skin. Definition and nomenclature of the epidermal layers in man and mammals, by M. L. Ranvier. Seven distinct layers are described as existing in the epidermis of man and mammals, each layer being characterised by perfectly clear physical characters and chemical reactions. The names given to these strata are: *Germinativum*, *filamentosum*, *granulosum*, *intermedium*, *lucidum*, *corneum*, and *disjunctum*.—Observations of the total eclipse of the moon of December 27-28, made at the Observatory of Bordeaux, made by MM. G. Rayet, E. Doublet, and F. Courty, by M. G. Rayet.—Report on a memoir of M. Partiot on the choice of a velocity formula.—Generalisation of the analytical prolongation of a function, by M. Eugène Fabry.—On the singular points of a function defined by a Taylor's series, by M. Servant.—On the correspondence between right lines and spheres, by M. E. O. Lovett.—On the bending of a cylinder with circular base, by M. Ribière.—On the experiment of Lord Kelvin and Joule, by M. A. Leduc.—On the variations of resistance of an electrolytic conductor in a magnetic field, by M. H. Bagard. The author has succeeded in showing that the resistance of a solution of copper sulphate, suddenly placed in a magnetic field of about 5000 C.G.S. units, undergoes an increase of about one per cent. its original value.—On the absolute value of the magnetic elements on January 1, 1899, by M. Th. Moureaux.—On the preparation and properties of calcium arsenide, by M. P. Lebeau. This