sensitive. These striking differences in the sensitiveness of two caterpillars to the colour of their environment are highly suggestive, and we may hope that these interesting results will be followed by further investigation on the same lines. The paper is illustrated by some beautiful coloured plates of the effects of lichen and variously coloured bark upon the colour patterns of the caterpillars.

Of the other papers in the volume, attention may be directed to Mr. Guy Marshall's interesting essay on conscious protective resemblance, and to Dr. Dixey's account of the Lepidoptera of the White Nile with some excellent cases of seasonal dimorphism in which the cryptic colour is pronounced in the dry season form.

Mr. Annandale gives a remarkable account of the mantis of the Malay Peninsula that resembles the blossom of a Melastoma, and Prof. Poulton records the capture of a swarm of *Hypolimnas misippus* on a ship 500 miles from the nearest land.

It is quite impossible to do justice in a short notice to the many interesting features of this volume, but enough has been said to show that the activity of the workers in connection with the Hope Department of the Oxford Museum continues, and that the results obtained are of striking value, not only to the specialist in entomology, but to the great body of naturalists in general who have at heart the important problems of the theory of evolution.

S. J. H.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—An exhibition of 50*l.* a year, tenable for two years, is offered by the governing body of Emmanuel College to an advanced student, commencing residence at the college in October, 1904. Applications should be sent to the Master of Emmanuel not later than October 1.

MR. CARNEGIE has given 10,000*l.* to Kenyon College to endow a professorship of economics.

PROF. T. G. BONNEY, F.R.S., will deliver during May, at University College, two lectures in advanced geology on the subject, lessons from geological mistakes:—(1) about rocks; (2) about ice action.

CARDIFF University College has received an additional donation of 550*l.* from the Drapers' Company towards its building fund. The company has already contributed 10,000*l.* for this purpose.

DR. F. H. NEWMAN has been appointed educational adviser to the Durham County Council, and Mr. Hugh Ramage, of St. John's College, Cambridge, has succeeded him in the office of director of higher education for the City of Norwich.

AN interesting feature of the appeal issued on behalf of the fund for providing new and adequate buildings for the University College of North Wales is the liberal response which has been made by old students of the college, the amount already subscribed or promised from this source being no less than 1313*l.*

THE second volume of the report, for the year 1902, of the U.S. Commissioner of Education has reached us from Washington. This part of the report is devoted largely to statistics, from which it is easy to arrive at the exact state of each grade of education in the United States. We notice under the information given respecting universities, colleges and technological schools that the total amount of benefactions reported during 1902 by the several institutions for higher education amounted to 3,408,000*l.*, of which upwards of 2,500,000*l.* was received by thirty-one universities and colleges of university standing benefiting to the extent of 20,000*l.* or more.

AT a special meeting of the general council of the University of Glasgow held yesterday Lord Kelvin was unanimously elected to the Chancellorship. Tuesday, April 19, will be observed as commemoration day at the university. In the morning an oration will be delivered by Sir William Ramsay, K.C.B., on "Professor Joseph Black, M.D., of the University of Glasgow (1756 to 1766)," the enunciator of the doctrine of latent heat; and honorary degrees will be conferred. In the afternoon the medallion of the late Prof. John Young, M.D., will be unveiled in the Hunterian Museum. At a university banquet to be held in the evening Sir William Ramsay will be entertained as the guest of the evening.

A CORRESPONDENT of the *Times* states that the Secretary of State for India has sanctioned the decision of the Government of India to establish an agricultural research station, with an experimental farm and an agricultural college, at Pusa, in the Darbhangah district of Bengal, and to devote to the purpose the donation of 30,000*l.* entrusted to the Viceroy by Mr. Henry Phipps for some object of public utility, preferably for scientific research. The farm is to serve as a model for similar institutions under provincial Governments, some of the existing institutions being in need of improvement. Lines of experiment are to be initiated and tested before being recommended for trial under local conditions on the provincial farms; seed of improved varieties will be grown for distribution in the different provinces; results reported from other farms will be tested; scientific research work will be carried on; and practical training will be given to students at the college, which is to be known as the Imperial Agricultural College. The students' course will be one of five years, and it will be open to young men from all parts of India. Mr. Bernard Coventry, manager of the Dalsingh Serai estate, has been appointed principal, and enters upon his new duties forthwith, but the college will not be ready to receive students until August or September of next year.

THE third annual general report of the Department of Agriculture and Technical Instruction for Ireland serves admirably to show the great improvement in scientific education in Ireland since the transfer of the administration of the Science and Art Vote from South Kensington to Dublin in 1901. Many instances of this improvement could be given from this report for 1902–3, but one will suffice to show the extent of the activity of the new Irish department. With the aid of direct grants from the department out of the Science and Art Vote, and of indirect grants out of the department's endowment through technical instruction committees, 184 secondary school laboratories, involving an expenditure of, approximately, 35,000*l.*, have been fitted and equipped within two years. When it is remembered that in April, 1901, there were but six science laboratories in secondary schools in Ireland, and that there are now 190 laboratories, with provision for 3500 students working simultaneously, the rapidity with which the department's programme has been adopted will be understood. Laboratories are now recognised in Ireland as an essential part of secondary school provision just as much as desks, blackboards and maps.

AN important Minute on Indian education has been issued and a summary of it was published in the *Times* of Monday. The Minute deals with education of all grades, and with the educational needs of girls and women as well as of boys and men. Referring to university work, the State document points out that it has been realised in India that universities which are merely examining boards tend to accentuate the defects of the Indian intellect—the disproportionate development of the memory, the incapacity to observe and appreciate facts, and the taste for metaphysical distinctions. It is proposed, as a result of the recent commission, to reconstitute the unwieldy senates of the universities, to define and regulate the position and powers of the syndicates, and to extend by law to graduates the privilege of electing members of the senate. The universities will be empowered to provide teaching, while collegiate teaching will be tested not merely by examination, but by systematic inspection, and a higher educational standard will be enforced from affiliated colleges. Such colleges must have a properly constituted managing body, an adequate teaching staff, suitable buildings and equipment, students' residences, sufficient funds, and a proper scale of fees. Government is prepared to afford liberal financial aid to enable the universities and affiliated colleges to adapt themselves to these new conditions, trusting also that such aid may stimulate private beneficence. As regards Indian technical education, the Minute states it has hitherto been

mainly directed to the higher instruction needed to train men for engineering and other employments in Government service or in mines, mills, &c. Valuable work has been done in colleges of engineering and science, and their development is of great importance. But, with a view to the development of Indian industries by native capital for the supply of Indian markets, special technical training must be afforded, resting on the basis of a simple and practical general education acquired in the ordinary schools. In order to provide qualified men for improving Indian industries Government intends to offer scholarships to enable selected students to obtain technical instruction in Europe and America, and it invites the advice and aid of the commercial community in selecting the industries to be studied, in choosing the students, and in turning the knowledge acquired to practical account.

SOCIETIES AND ACADEMIES.

LONDON.

Zoological Society, March 15.—Dr. Henry Woodward, F.R.S., vice-president, in the chair.—Mr. R. **Lydekker** read a paper on the skull and markings of the quagga, in which he directed attention to vestiges of the face-gland of Hipparion in the skull, and expressed his belief that certain alleged differences in the colour and markings of various specimens of the quagga were due to feeding or to the manner in which such markings came out in photographs. Mr. Lydekker also read a paper on the wild ass of Mongolia, of which an example was in possession of the president at Woburn Abbey, and expressed his opinion that it was the true *Equus hemionus* of Pallas, and distinct from the ass of Tibet and Ladak. The latter he proposed should bear the name *Equus hemionus kiang*.—Mr. R. I. **Pocock** described a new species of spot-nosed monkey, of the genus Cercopithecus, from Benin, West Africa.—Mr. F. E. **Beddard**, F.R.S., read the first of a series of papers entitled "Contributions to the Anatomy of the Lacertilia." It dealt with the venous system of *Iguana tuberculata*, *Tiliqua scincoides*, and *Varanus griseus*.—Mr. Percy I. **Lathy** contributed a paper dealing with a collection of butterflies from Dominica, West Indies, of which three were described as new and thirteen had hitherto not been recorded from the island.

Faraday Society, March 21.—Dr. O. J. Steinhart in the chair.—On the electrolytic analysis of gold: F. M. **Perkin** and W. C. **Prebble**. The object of the researches described was to arrive at an electrolytic method of estimating gold which should be perfectly accurate and yet far more rapid than the ordinary double cyanide method. Solutions of sodium thiosulphate, of cyanide, of sodium sulphide, of potassium thiocyanate and of ammonium thiocyanate were all tried and the results compared. The first named was useless; of the others—which are all accurate—the thiocyanates gave the best results, and the ammonium salt was better than the potassium. With currents of 0·2 amp. per sq. dcm. the deposition of 0·05–0·08 gm. of gold was complete in 5 or 6 hours. With a current of 0·4–0·5 amp. 1½ to 2 hours sufficed.—Thin-film electrolysis, and a proposed application to printing: C. R. **Darling**. While investigating a process for letterpress printing by electrolysis without the use of ink—an extension of Bain's well known telegraphic printing—the author found that the final results of electrolysis, when the electrolyte forms only a thin film, often differ materially from those observed in an ordinary cell. In these experiments a carbon or metal plate (it was immaterial which) formed the anode; on this was placed an impression pad, consisting of some sheets of moist blotting-paper, upon this was the trial sheet, carrying the electrolyte film, and on this the kathode type or coin. The first experiments were made with saline solutions; silver nitrate gave a clear, permanent black image of the type, but the paper, of course, darkens on exposure; copper sulphate and nitrate yielded images that faded after a time; the same unexpected result occurred with lead, mercury salts and bismuth. The best images were obtained with manganese salts.

Physical Society, March 25.—Dr. R. T. Glazebrook, F.R.S., president, in the chair.—Note on the measurement of small inductances and capacities and on a standard of small inductance: Prof. **Fleming**. The author referred to a paper read before the society last year by Mr. W. C. Clinton and himself, in which a motor-driven commutator was employed to measure small inductances. It had since been found that very good results could be obtained in the measurement of small inductances by Prof. Anderson's method by using a telephone in place of a galvanometer and a buzzer in the battery circuit. The author had found that for long solenoids, at least 50 diameters long, the inductance could be calculated with an accuracy of about 1 per cent. by the rule:—Inductance in cm. = (length of wire in one unit length of solenoid) × (total length of wire in the whole solenoid in cm.).—A hot-wire ammeter for measuring very small alternating currents: Prof. **Fleming**. The author said that in alternating current work, particularly in taking the power factor of small transformers and of short lengths of cables, the need had been felt for an ammeter not involving the use of iron capable of measuring currents as small as 0·01 or less of an ampere. He exhibited an ammeter capable of being made to read currents as small as 0·002 with fair accuracy. The arrangement was as follows:—Two very fine platinoid or constantin wires, about 1 metre long and 0·05 or even 0·02 mm. diameter, are supported on a wooden rod with arrangements for adjusting their tensions. These wires are 5 mm. apart, and are held down at the centre by delicate spiral springs. The two wires are embraced at the middle by a small loop of paper carrying a very small plane mirror. These wires are enclosed in a box, the lid of which carries a lens. By this means the light of a straight carbon filament of a glow-lamp, or of a slit illuminated by an arc lamp reflected by this small mirror can be focused on a screen of ground glass. If a current is passed through one of these wires it sags down slightly, and the square root of the displacement of the image on the screen is almost exactly proportional to the current passing.—Dr. W. **Watson** exhibited and described a form of ammeter for small alternating currents. The current to be measured flows through a piece of iron wire bent into the form of a right angle. This is linked with a similarly shaped piece of nickel wire forming part of a galvanometer circuit. The thermo-E.M.F. at the junction, produced by the heating effect of the current, sends a current through the galvanometer which can be measured in the usual way. The current to be measured is practically proportional to the deflection of the galvanometer.—Energy of secondary Röntgen radiation: C. G. **Barkla**. To measure the intensity of radiation electroscopes were placed in a primary beam of Röntgen rays and in a secondary beam proceeding from air in a direction perpendicular to that of propagation of the primary rays. By comparison of the two rates of leak when no absorbing plates were used and when similar aluminium plates were placed before each electroscope, it was found that the absorbability of the secondary rays differed from that of the primary by less than 5 per cent. of its value. It was, however, found that a secondary beam of the same intensity as the primary would produce a slightly different number of ions in a given volume of air, consequently the radiations differ slightly in character. The difference in what may be called the "ionising powers" was evidently greater when the primary beam consisted of more penetrating rays. The fraction of energy lost in secondary radiation was very nearly, if not entirely, independent of the character of the primary radiation. The law which the author had previously found to govern the intensity of radiation from gases was found to be equally applicable to those light solids which are the source of a radiation differing little in character from the primary, *i.e.* the energy of secondary radiation from these substances situated in a beam of definite intensity is proportional to the quantity of matter through which the primary beam passes.

PARIS.

Academy of Sciences, March 28.—M. Mascart in the chair.—On the physical constants of some fluorides of phosphorus: Henri **Moissan**. Phosphorus trifluoride, pentafluoride, and oxyfluoride were liquefied after careful purification, and their melting points and boiling points determined by means of an iron-constant in thermo-couple.—On the production of quartziferous rocks in the course of the eruption of Mont Pelée: A. **Lacroix**. From an extended series of observations on Mont Pelée, the conclusion is drawn