year extend their borders at the expense of neighbouring plants. In the vanguard of such colonies there is doubtless very keen competition for the space, and the weaker or less suitably adapted species will be slowly driven before the stronger. This, however, is unlikely to go on continuously, because the stronger species will sooner or later meet with physical or chemical barriers which it is ill adapted to overcome, but to which the weaker species may be better adapted. Quite commonly, it is not that competition for available space is so great, but that the local conditions favour the dominant growth of a few individual species. One frequently finds normal terrestrial or marsh species taking on the aquatic habit: instance *Ranunculus Flammula, Juncus supinus, J. acutiflorus, Peplis Portula,* &c., but always of their own free will, so to speak, *i.e.* by the exercise of the subtle power of adaptability, which is more or less the common possession of all plants.

From another aspect of this interesting subject it appears that other causes for variation, with the consequent production of new forms, lie in the fact that although the conditions for plant life are so often remote from the ideal, yet the plastic power possessed by plants, enabling them to adapt themselves to the various combinations of edaphic and climatic conditions, is so great that there are comparatively few spots, where existence is possible, in which some plant or other is not able to thrive and carry on its metabolic activities. Now in order to maintain a proper tone of health, a plant has of necessity to respond in suitable ways to all the varying external impressions. A plant is therefore in a constant and continual state of change, owing to the never-ceasing mechanical, physical, and chemical changes of its unstable environment. The plastic nature of many plants enables them to modify their organs in reciprocation to any fairly constant set of environmental conditions, and it is in this endeavour to accommodate themselves for the maintenance of healthy existence in places that are either inhospitable or too luxurious that certain deviations, either fixed or transient, from the usual forms of more normal environments are to be accounted for, and such variations occur in almost every loch. That some of such variants may doubtless be concerned in the origin of new species and varieties is the impression received, but other causes also contribute towards that process.

The rapid increase of aquatic and marsh plants in reservoirs that are used for the public water supply is occasionally a matter of anxiety and expense to the owners. Enormous sums of money are frequently paid by public bodies for advice respecting the construction of reservoirs to persons wholly unacquainted with the local geological features, as well as with the flora and fauna of the district. Whilst it is very unwise to construct a reservoir over a geological fault and expect it to hold water (and this has been done), it is equally vain to make a shallow reservoir in the line of the constant migration of water-fowl (*i.e.* between their resorts) and expect it to maintain a freedom from water plants. The greatest depth at which aquatic plants will flourish in Scottish waters is about 40 feet. It is very unlikely, however, that the species capable of growing at such a depth will ever become a nuisance in a reservoir; but at a depth of 20 feet it will be found that, in suitable water, many species capable of giving trouble will flourish. Upon consideration of these facts, it seems advisable, as a prevention against the development of water plants, to construct reservoirs with sides so steep that a minimum depth of from 20 to 25 feet will be maintained within a few yards of the margin. Moreover, the sides, unless of natural rock, should be faced with stonework, which will further impede the growth of plants, as well as prevent discoloration of the water by wave-erosion.

The 124 figures contained in the present paper, together with the 110 which illustrate the author's previous publication on the same subject, form an interesting and instructive series of views of the vegetation of Scottish lochs from an ecological aspect.

In a comparative table the plants are arranged in seven ecological groups, in each of which the species found in peaty and non-peaty lochs are indicated with the depths at which they grow. The list of plants contains some new records for the districts.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The Vice-Chancellor has published to the Senate a minute of the council of Trinity College supporting the plea for the establishment of a professorship of bio-chemistry, and stating that, with the view of making increased provision for higher teaching and research in that subject, pending the establishment of a professorship, the college has appointed Mr. F. G. Hopkins, at present reader in chemical physiology, to a prælectorship in bio-chemistry, and proposes to elect him to a fellowship.

The General Board of Studies will shortly proceed to appoint a university lecturer in mathematics in succession to Dr. Hobson. The appointment will be for five years from October 1, 1910. Candidates are requested to send their names, with testimonials if they think fit, to the Vice-Chancellor on or before Saturday, June 4.

Mr. R. H. Lock has been approved by the general board of studies for the degree of doctor in science.

Mr. A. J. N. Tremearne has been approved for the diploma in anthropology. This is the first time a diploma has been granted in this subject.

The board of agricultural studies, in consultation with the president of the Royal Agricultural Society, has nominated Mr. F. R. Salter to be the Gilbey lecturer on the history and economics of agriculture for one year from October 1, 1910.

AT the closing ceremony of session 1910–11 of the University College of North Wales, Bangor, to be held on Friday, June 24, Dr. J. J. Dobbie, F.R.S., principal of the Government Laboratories, London, will deliver an address on "Museums: their Aims and Methods."

ON Monday evening, May 23, on the invitation of the Rector of the University of Berne, Prof. Schäfer, of Edinburgh, gave a lecture on the functions of the pituitary body in the aula of the University before a large and appreciative audience. The lecture formed one of a series which was designed to commemorate the seventy-fifth anniversary of the re-founding of the University. In proposing a vote of thanks the Rector announced that the University had conferred the honorary degree of M.D. upon the lecturer, who was thereupon duly presented with the diploma.

STEPS are being taken by the Government of Queensland to invite applications in London for the professorial staff of the university shortly to be opened in that State. The chairs to be filled are classics, mathematics and physics, chemistry, and engineering. Applications will shortly be invited by Major T. B. Robinson, the Agent-General in London, from gentlemen competent to fill the positions. The salary of each professor is to be 900*l.* a year. The Government of Queensland will contribute 10,000*l.* a year for the next seven years to the University. Arts, science, and engineering will be the three great faculties, and the proposal in the first Bill that commerce was to be a faculty, with a lecturer and a degree of B.Com., has disappeared.

PROF. RUDOLF TOMBO, jun., of Columbia University, contributes to *Science* of May 6 some interesting statistics of certain Continental universities. During the winter of 1909–10 there were 58,342 students in attendance at German universities, 93·5 per cent. of these being men and 6·5 per cent. women. The matriculated students constituted 90·8 per cent. of the grand total, the remainder being auditors. The largest number of German students were to be found at Berlin, which had a total of 10,319; the next six out of the 21 German universities with their number of students were Munich, 7321; Leipzig, 5630; Bonn, 3880; Breslau, 2759; Halle, 2660; and Göttingen, 2342. Berlin attracted the largest number of matriculated women, and was followed by Munich, Göttingen, Heidelberg, and Bonn. Vienna is by far the largest of the Austrian universities, being surpassed in point of attendance (9580) only by Berlin among German institutions, while the University of Berne (2507) is the most largely attended of Swiss universities. If the attendance at the German universities during the winter of 1909–10 be compared with that of 1893–4, it is found that the number of matriculated students has more than doubled during this period, the gain being one of 113 per cent., that is, from 27,424 to 58,342. There has been a marked change, too, in the relative position of the various German universities since 1893–4, when the largest universities were, in order, Berlin, Munich, Leipzig, Halle, Würzburg, Bonn, and Breslau. The only university that shows a decrease in the attendance of matriculated students as against 1894 is Würzburg, and there the loss is very slight.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 5.—Mr. A. B. Kempe, treasurer and vice-president, in the chair.—Colonel Sir David **Bruce**, Captains A. E. **Hamerton** and H. R. **Bateman**, and Captain F. P. **Mackie**: The development of trypanosomes in tsetse-flies. Until the end of 1908 it was believed that tsetse-flies acted merely as mechanical agents in the transference of trypanosome diseases. The parasite was supposed to be carried by the fly in the same way that vaccine lymph is carried—on the point of a lancet from one child's arm to another. The limit of time of infectivity of the fly was placed at forty-eight hours, and it was believed that if an infected area were emptied of its sleeping-sickness inhabitants for a couple of days, it would then be quite safe for healthy persons to enter it. At the end of 1908 Kleine made the discovery that a tsetse-fly could convey a trypanosome for some fifty days after the fly had fed on an infected animal. The experiments were carried out on these lines in Uganda. Both lake-shore and laboratory-bred flies (*Glossina palpalis*) were used, and various trypanosome diseases besides sleeping sickness were experimented with. Tsetse-flies are numerous on the lake-shore, 500 or more being caught every day by a few fly-boys. The flies brought up from the lake-shore were found to be naturally infected with at least two species of pathogenic trypanosomes, so that it was afterwards found necessary to use flies bred in the laboratory from pupæ gathered on the lake-shore. At first it was difficult to find these pupæ, but after some time the supply was more than sufficient, as many as 7000 being brought up in one day by a few natives. These experiments go to show that a late development of trypanosomes takes place in about 5 per cent. of the flies used. This development of trypanosomes in the inside of a fly renders the fly infective and capable of giving the disease to the animals it feeds on. The shortest time which elapsed before a fly became infective after feeding on an animal infected with sleeping sickness was eighteen days, the longest fifty-three days, and the average thirty-four days. An infected fly has been kept alive in the laboratory for seventy-five days, and remained infective during that time. It is not known how long the tsetse-fly may live under natural conditions on the lake-shore. Experiments made to test directly the duration of the infectivity of tsetse-flies show that they can retain their infectivity for at least two years after the native population has been removed from the fly area.—Dr. H. G. **Chapman**: The weight of precipitate obtainable in precipitin interactions.—Miss Ida F. **Homfray**: The absorption of gases by charcoal. The experimental portion of the work here summarised consisted in determining the volumes of gas absorbed by a known weight of charcoal, 3 grams, at definite temperatures, varying from that of liquid air to that of boiling aniline, and at pressures up to 80 cm. of mercury. The gases used were He, A, N_2, CO, CH_4, C_2H_4, CO_2, O_2, and mixtures of N_2 and CO. After making all necessary corrections, the isothermals were constructed, and from them points of equal absorption were read off, the family of curves so obtained being termed the isosteric diagram. The concentration for each isostere was calculated in the form

$$C = \frac{w \times 100}{W + w},$$

where w is the weight of gas absorbed and W that of the gas-free charcoal. The concentration of pure gas when W=0 thus becomes 100 per cent. Two relations have been obtained which hold, within experimental accuracy, for all these gases:—(1) each isostere follows Ramsay and Young's rule for saturated vapours,

$$\frac{T_0}{T_1} - \frac{T'_0}{T'_1} = R\,(T_0 - T'_0),$$

and is expressible by Bertrand's vapour-pressure formula; (2) at constant pressure $dT/d \log C = K$. Also, in all cases at low pressures, and in some cases at all pressures, when these straight lines are produced to $\log C = 2$, *i.e.* 100 per cent., the corresponding temperature is found to be the recognised boiling point of the liquefied gas at that pressure. By means of a simple formula the heats of absorption at various concentrations were calculated, and the thermodynamical relations are comparable to those of concentrated solutions. Calorimetric measurements were made in the case of CO_2, and found to agree well with the calculated values. The suggestion put forward, as a result of the experimental work, is that a homogeneous solution phase is formed in equilibrium with the gas phase, the presence of a large concentration of charcoal greatly raising the equilibrium temperature of the volatile component at a given pressure. This rise is not constant, as in the case of dilute solutions, but is itself inversely proportional to the gas concentration. If any other function of the quantity of charcoal, such as its surface area, were substituted for the mass in calculating the concentrations, the relations between the absorption results and the constants for the liquefied gases would be lost. For mixtures of two gases in charcoal the phase rule holds, and the relations can be deduced from those of the components.

Royal Meteorological Society, May 25.—Mr. H. Mellish, president, in the chair.—W. C. **Nash**: The daily rainfall at the Royal Observatory, Greenwich, 1841–1903. From the statistics given in this paper it was shown that the average annual rainfall for the sixty-three years was 24·19 inches with 157 rain days. The day with the maximum number of rain days to its credit is December 5, while the days with the least number of rain days are April 18, 19, June 27, and September 13. There were ninety-four occasions during the whole period on which the rainfall exceeded 1 inch in the day. The greatest fall was 3·67 inches, on July 26, 1867.—L. C. W. **Bonacina**: Low-temperature periods during the winters 1908–9 and 1909–10. It is often observed that if a given week, month, or other period in one year is marked by some very special meteorological character with respect to one or more elements of weather, the corresponding period the following year shows exactly the opposite character. Dealing with the last two winters, the author directed attention to four very remarkable frosts which stand out prominently, viz.:—(1) December, 1908, in the south of England; (2) March, 1909, in the south of England; (3) November, 1909, in Scotland and Ireland; and (4) January, 1910, in Scotland and the north of England.—R. **Corless**: The rate of rainfall at Kew in 1908. A method was described of obtaining information about the rate of fall of rain from the records of a self-recording rain-gauge, which yields a continuous trace showing, by the position of the pen, the amount of rain fallen.

PARIS.

Academy of Sciences, May 25.—M. Émile Picard in the chair.—Remarks by the president on the forthcoming meeting of the International Association of Academies at Rome.—H. **Deslandres**: The influence of comets on the terrestrial atmosphere according to the kathodic theory. The study of Morehouse's comet showed that the whole of the light emitted by the tail was of kathodic origin, and it is highly probable that the tails of comets emit penetrating rays analogous to the γ rays of radium. These rays could ionise the atmosphere and cause the immediate condensation of supersaturated water vapour. Hence a connection is at least possible on this theory between Halley's comet and the weather.—P. **Villard** and H. **Abraham**: The existence of two explosive potentials. For a given system of electrodes two explosive potentials exist. The first is the potential of the brush discharge; the second appears to be the normal explosive potential, and is more definite. Between these two limits there is a continuous silent discharge.—A. **Haller** and A. **Comtesse**: