

Partial Prepotency—This not very happy title is given by Mr. Hurst to a law which he puts forward as explaining, at least so far as the genus *Paphiopedilum* (= *Cypripedium*) goes, the varied results in the inheritance of characteristics. The law one takes to mean that in one part of an individual hybrid the mother, say, is seen to be prepotent; in another individual the same structure is inherited from the father; while in a third both parents are represented by an intermediate form of the special feature under consideration. We are then asked to imagine a real case where the combinations and permutations of all the component structures must be reckoned with. No doubt this brings the possibilities for variation very forcibly before us; but surely it is only giving another name to what must be expected whenever two parents representing two strains produce young. Although Prof. Ewart's zebra hybrids were mentioned by Mr. Hurst in another connection, yet little heed was given by any one to the possibilities of hybrid plants throwing back to ancestors in the dim past, as undoubtedly appears to be the case with animals.

Prepotency of Varieties, Species, and Genera.—Mr. Hurst's paper, which, indeed, was the only one that in any way systematically attacked the broad headings of hybridisation, contained much information deduced from the Orchidæ as to the inheritance by hybrids of the characters which are commonly valued as varietal, specific and generic. As might be imagined, the generic are most difficult to efface; the specific again are less lasting but more persistent than varietal, which are fleeting. Mr. Hurst had, however, to allow that distinct variations may transmit their qualities, and it would be difficult for him to do otherwise in the face of Mr. Bateson's examples; he gave exceptions, which he said are by no means rare—these come in when the variations are slight or the ancestry variable, and an abnormality he found to be transmitted either wholly or not at all. The case given by Prof. Hugo de Vries of the twisted variety of teasel (*Dipsacus sylvestris*) when crossed with *Dipsacus fullonum* being prepotent as regards the abnormality, exemplifies the former of these two alternatives. Prof. de Vries, it should be called to mind, explains it as a case of pangenic infection. Finally, Mr. Hurst said that when the same variations are found in both strains, they may be traced in the second or following generations, but seldom otherwise. Prof. Vries' second experiment is at first opposed to this; but the latter stage confirms it. He desired to obtain artificially a hairless variety of *Lychnis diurna*, similar to one found in nature, and known as *L. presli*. To do this he crossed the ordinary hirsute variety with his glabrous form of *L. vespertina* already mentioned, and the hybrids were all uniformly hairy. The offspring of these again showed the characters of one or both parents in all degrees. Taking two glabrous examples and crossing them, a constant variety of *L. diurna* without hairs was forthwith obtained, starting with a batch of 390 plants, all glabrous.

Parthenogenesis and Polyembryony.—Prof. Henslow, among the many interesting details which he contributed, mentioned how pollen tubes are sent out even when the pollen of a pea is placed upon the stigma of a lily, and how on more nearly allied forms, although no fertilisation may take place, yet the irritation is enough to cause the empty ovary to swell and appear to contain seeds in a way comparable to the formation of galls (partial hybridisation). To explain cases where in crossing a species of one Orchid genus with others, e.g. *Epidendrum* with *Cattleya*, *Laelia* and *Sophranites*, the first was completely prepotent, Mr. Hurst advanced the theory that the occurrence was due to a kind of parthenogenesis, the pollen encouraging the egg-cells to develop into seeds without absolutely having the power to fertilise them.

A difficulty met with in the raising of hybrid races of oranges, which Mr. Webber described, is due to the fact that in the genus *Citrus*, adventitious embryos arise from the cells of the nucellus outside the embryo sac containing the normal egg. The result is that the latter only is affected by pollen, and from the seed arise several seedlings as shown in lantern pictures, only one of which can be the hybrid, the others reproducing the mother plant exactly.

Vigour.—The exceptional growth of hybrid plants being a well-known phenomenon was referred to again and again, and was put down by Mr. Hurst to the effect of out-crossing, as in-breeding he found in his experiments reduced the vigour at once.

Diminution of Fertility.—Dr. Wilson's results point to this being due to the poor development of pollen, and the lessened

fertility of the male was shown by Mr. Hurst's statistics for *Paphiopedilum*. Of crosses in this genus between pure species 95·05 were successful; hybrids fertilised with pollen from pure species produced seeds in 91·82 per cent. of the cases; while pure species were only fertilised by the pollen from hybrids in 60 per cent. of the experiments. The case of male elephants being usually sterile in captivity seems worthy of mention in this connection. Mr. Hurst's generalisation that diminution of fertility is due to conditions of life rather than to any difference in the form or constitution of hybrids gains support, which is added to by the evidence given above under the headings II. (*Special cases*) and III.

Microscopic Structure.—Allusion was made to Dr. Macfarlane's work on the structure of primary hybrids, but what little was said about the microscopic conformation of secondary hybrids in *Albua* (Dr. Wilson), and in *Rhododendron* (Prof. Henslow in the discussion), points to their possessing no internal characters of the importance of specific ones.

Hybrid Races.—That secondary hybrids differ more than primary ones from the parent species was the opinion of M. de la Devansaye and Mr. Hurst, and the latter speaker gave a series of figures showing the stability of the former kind; for out of 500 seedlings of a hybrid *Berberis*, 90 per cent. reproduced the immediate parent form, while in no instance was there complete reversion to either of the grandparent species. It is possible that many of our so-called wild species are stable hybrid races.

V. THE ECONOMIC SIDE OF HYBRIDISATION.

Mr. Webber, in his remarks, and Prof. Bailey, in his paper, both told the same tale with regard to the United States. The bulk of the hybridisation on the other side of the Atlantic is carried on with a view to producing plants that will stand the particularly disadvantageous conditions of frost and drought, and so on, that occur in the wide tracts of land that must be cultivated, or to improving the yield or quality of special vegetable productions upon which many persons depend for their living. Ornamental hybrids are bought for the most part in Europe. The Government does a great part of the work of production, and the experiment stations carry out the work of testing new varieties, be they privately raised or otherwise, which at the same time allows the growers to see the value of the plants before they are distributed. Mr. Hays, in the discussion with regard to the little benefit accruing in this country to the raiser of a new plant, pointed out the opportunity given in America by the system just described for the said plant to be taken up. The Rev. G. H. Engleheart, as an amateur, and Mr. George Paul, as a nurseryman, talked of legislation whereby some sort of copyright should be established in new varieties. Mr. Bunyard pointed out objections, and showed how a man might raise sufficient stock before parting with any to ensure a profit he had calculated beforehand. This presupposes a fairly large sale, and might not be possible to the grower in a small way of business. Mr. Engleheart also alluded to there being no book in which the scattered facts so useful to the hybridist had been brought together.

Perhaps the time will come when there may be State authorities in this country to consider the scientific side of horticulture (as well as entomology and fisheries) in a modern way. At present the annual examination of the Royal Horticultural Society, upon the results of which certificates are granted, includes a theoretical test not only on the practical but on the scientific side. This certificate is the only recognised one which the gardener can obtain, and its value would be much enhanced if the examination were accompanied, or say followed, in the case of candidates who obtain a sufficient number of marks, by a practical examination in both branches of the subject.

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UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

MR. W. A. HOUSTON, has been appointed to the post of assistant lecturer in mathematics in University College, Liverpool.

THE Agriculture and Technical Instruction (Ireland) Bill was read a third time in the House of Commons on Monday, and a first time in the House of Lords on Tuesday.

THE *University College School Magazine* announces that Mr. R. Tucker, who has guided the mathematical fortunes of the

school since 1865 with great success, will retire from his post at the close of this session.

DR. W. SOMERVILLE, professor of agriculture and forestry at the College of Science, Newcastle-upon-Tyne, in connection with the University of Durham, has been elected to the new professorship of agriculture in Cambridge University.

PARTICULARS concerning British, Continental and Canadian Universities, with special reference to institutions having courses open to women, are given in a "Handbook" compiled by Dr. Isabel Maddison for the Graduate Club of Bryn Mawr College, and published by the Macmillan Company, New York. We notice that Queen's College, London, which celebrated its jubilee last year, has been omitted. As the volume is primarily intended to indicate colleges for women students, the omission of a college of this kind possessing a Royal Charter is unfortunate.

THE departmental committee appointed by the Lord President of the Council to consider the question of the reorganisation of the Education and Science and Art Departments consists of Sir Horace Walpole, K.C.B. (chairman), Sir G. W. Kekewich, K.C.B., Secretary of the Education and Science and Art Departments, Captain W. de W. Abney, C.B., principal assistant-secretary of the Science and Art Department, Mr. S. Spring Rice, C.B., of the Treasury, and Mr. W. Tucker, C.B., principal assistant-secretary of the Education Department.

THE ninth summer meeting of University Extension Students will be opened at Oxford on July 29. Many prominent members of the University have arranged to take part in the meeting. In the scientific section Prof. Gotch will deal with "The Physiology of Sensation," Prof. Sollas will lecture on "The Geology of Oxford," Prof. H. A. Miers on "The Growth of a Crystal," Mr. H. N. Dickson, New College, on "The Influence of Climate," Mr. G. C. Bourne, University lecturer in Anatomy, on "The Growth of the Living Organism," Mr. G. J. Burch on "Wireless Telegraphy," and Dr. Arthur Ransome on "Microbes and Disease."

MR. A. F. STANLEY KENT has been appointed professor of physiology in University College, Bristol. Mr. Kent received his scientific training at Oxford, which he left upon being appointed demonstrator of physiology in Owens College, Manchester. In 1889 he was invited by Sir J. S. Burdon-Sanderson to take charge of the histological department at Oxford, to lecture on special points in physiology, and to assist in the teaching of general physiology. Since 1892 he has been assistant lecturer in physiology and histology at St. Thomas's Hospital, and has carried out a number of researches, the results of which have been published in various journals, proceedings, and reports.

SECONDARY as well as elementary schools are now beginning to appreciate the advantage of having upon their staff one or more teachers who thoroughly understand the application of the theory and practice of hygiene in school life; and the desirability of emphasising the necessity of this knowledge in the code for elementary schools is now being pressed upon the Education Department by memorials from several important bodies. To encourage the systematic study of the subject, the Council of the Sanitary Institute have decided to arrange a thorough theoretical and practical examination, which will be open to both classes of teachers and to those preparing as teachers. The first examinations will be held during February and June next year.

THE first of a series of articles dealing with the provision made by local authorities for the technical education of miners appears in the July number of the *Record* of Technical and Secondary Education, the information given having reference to the County Councils of Cornwall, Durham, Northumberland, and the West Riding of Yorkshire. The permanent schools of mining in Cornwall are at Camborne and Redruth, in the centre of the Cornish mining district, and they thus afford exceptional facilities for the acquisition of a practical as well as a theoretical knowledge of mining and its allied subjects. As regards the provision of practical work other than that concerned with elementary scientific principles, the Committee of the Redruth School have made arrangements with the managers of neighbouring mines for the practical instruction of the students. The Committee of the Camborne School adopt the same system to some extent, but are also themselves the owner of a portion of a mine, having purchased the same in 1897 for the use of students. Cornwall thus furnishes a unique

instance of educational procedure by reason of this purchase of a mine by a local school committee.

As the result of a conference between representatives of the London School Board and London County Council, having for its object the prevention of overlapping of classes, the representatives of the former body have resolved to recommend the Board to adopt the following proposals among others:— (1) The School Board will limit its instruction in science and art in all its evening schools to such grades as can be conveniently taught in its premises, and will look to the Technical Education Board to give the advanced instruction in the premises under their control. (2) The School Board will not conduct classes in technological subjects, and will not offer instruction specially intended for university degrees. (3) The School Board proposes to conduct preparatory classes in elementary experimental science, in elementary freehand, geometrical, and model drawing, and in the drawing of simple pieces of mechanism; in mensuration and workshop arithmetic, and in algebra, to enable pupils to understand the meaning of an algebraical formula. (4) The School Board proposes to conduct evening classes in manual training, wood-work, and metal-work as part of a general education, and as preparatory to commercial workshops, but to refer students who are members of specific trades, and require trade teaching, to the Polytechnics and Technical Institutes.

SCIENTIFIC SERIALS.

Symons's Monthly Meteorological Magazine, July.—Meteorological extremes: Pressure. Mr. Symons has undertaken to give, in alternate numbers, a list of extremes of the various meteorological elements. The task is by no means easy, as the information is scattered, in many books and languages, and some of the statements will no doubt lead to useful criticisms. The highest recorded barometric pressures (reduced and corrected) are 31.78 inches at Irkutsk, January 14, 1893; 31.72 inches at Semipalatinsk, December 16, 1877; and 31.62 inches at Barnaul, December 14, 1877. Dr. Woeikof doubts the accuracy of the first reading, *inter alia*, because the temperature for reducing *up* to the freezing point had been taken at $-51^{\circ}34$ F., and had been assumed to prevail from Irkutsk to the sea. He maintains that the reading of 31.62 inches at Barnaul is really the best established barometrical maximum as yet on record. The reduction to sea-level from stations some thousands of miles from the nearest sea renders the statements more doubtful than readings taken near the sea-shore. The highest readings in the British Isles are 31.108 inches at Octertyre, and 31.106 inches at Fort William, both on January 9, 1896. The highest reading in the neighbourhood of London since 1858 (the date of commencing observations at Camden Square) is 30.934, January 9, 1896. The lowest pressures are those referred to in *NATURE*, vol. xxxv. p. 344, viz. 27.135 on September 22, 1885, at False Point on the coast of Orissa. In the *Quarterly Journal* of the Royal Meteorological Society, vol. xiii. p. 212, Mr. C. Harding pointed out that for comparison with English standards a further subtractive correction of 0.11 inch has to be applied, which would make the lowest reading 27.124 inches. The next lowest reading occurred at Octertyre on January 26, 1884, viz. 27.332 inches. The lowest reading at Camden Square is 28.295, December 9, 1896.

Bulletin of the American Mathematical Society, July.—The asymptotic lines of the Kummer surface, by Dr. J. I. Hutchinson, was read at the April meeting. These curves have been discussed by Klein and Lie, Reye, Segre and Rohn from the point of view of line geometry. This notelet gives a simple solution by making use of the parametric representation of the Kummer surface in terms of hyperelliptic functions.—On a definitive property of the covariant, by C. J. Keyser, was read at the same meeting. The writer refers to three proofs, due to Jordan, Elliott and Fiske respectively.—Yet another paper read at this meeting was the known finite simple groups, by Prof. L. E. Dickson. This is in part a *résumé* of previous work done by the author, and gives a table which should aid in the determination of the status of a newly-discovered simple group.—Reviews follow, viz. of Schoenflies' "Geometrie der Bewegung in Synthetischer Darstellung," and of Speckel's "La Géométrie du Mouvement Exposé: Synthétique," by Prof. F. Morley; a short notice of the second edition of the second volume of Weber's "Lehrbuch der Algebra," by Prof. Pierpont. Shorter notices