UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—A small revolution has been effected in the teaching of geometry by the adoption of a regulation allowing any proofs of the propositions in Euclid to be given in the "Little-Go" or previous examination. No proof, however, of any proposition occurring in Euclid will be admitted in which use is made of any proposition which in Euclid's order occurs subsequently.

The estimates for the new plant-house (£2760) and research laboratory (£250) at the Botanical Gardens are accepted, Messrs. Boyd, of Paisley, being engaged for the former, Mr. Sindall for the latter. Sir Joseph Hooker, Mr. Thiselton Dyer, and several skilled horticulturists have inspected the plans, and they meet with general approval. The proposed fern-house, stove, and orchid-house, have a combined area of 2660 square feet, as compared with 2290 square feet, the area of the corresponding present houses.

The apparent boycotting of the Cambridge mechanical workshops by the Museums and Lecture-Rooms Syndicate, and other Cambridge authorities has led to a considerable diminution of work, and consequently to a serious reduction of profit in the workshops, which have also suffered to some extent by the unfortunate rejection of the Engineering Tripos scheme. In a recent discussion Prof. Cayley expressed the opinion that it ought to be as much a matter of course to send University mechanical work to the University workshops as to send University printing work to the Pitt Press. He considered the work done by the workshops compared very favourably with similar work done by contractors. Mr. Lyon, superintendent of the workshops, claimed that, while much of the work done outside for the museums had to be frequently repaired, none of the mechanical workshops' work had required this. They had done the work for the Morphological Laboratory for £1000 less than was estimated. A good deal of testimony was given to the excellence of their work, against which it was stated that the Syndicate thought they could get their work done cheaper and better by a professional builder.

A scheme has been prepared for the future fitting up of the old Botanic Gardens site with University buildings in extension of the museums and lecture-rooms. The most salient points are that the site between the new Chemical Laboratory and the Museum of Human Anatomy is declared sufficient for the new Museum of Geology, and that the next buildings to be taken in hand should be those for Human Anatomy and Physiology. It is also proposed to accommodate the Department of Pathology in the old Chemical Laboratory.

Mr. Wilberforce will deliver a course of lectures on Dynamo-Electric Machines at the Cavendish Laboratory during the Easter term.

Among the Fellows elected at King's College last week were Mr. A. P. Laurie, who obtained a first class in the Natural Sciences Tripos, Part II., June 1884, and Mr. H. W. Richmond, Third Wrangler 1885, and placed in Division I. in the third part of the same Tripos, 1886.

Mr. R. Pendlebury, Fellow of St. John's, has been appointed a University Lecturer in Mathematics for five years.

Open Scholarship examinations in which natural science Scholarships may be awarded will be held at Downing College on May 29, and at Peterhouse in October. The Clothworkers' Exhibition in physical science will be competed for in connection with the Oxford and Cambridge schools examination in July.

SCIENTIFIC SERIALS.

IN the *Journal of Botany* for February, Mr. G. S. Boulger calls attention to the exceedingly loose way in which the term "endosperm" is applied by botanical writers to structures in Angiosperms, in Gymnosperms, and in Vascular Cryptogams which have no real homology with one another.—A very interesting new fern from New Guinea (*Polypodium Annabellæ*) is described and figured by Mr. H. O. Forbes, belonging to the small group in which the fertile portion of the frond is only an extension of the lower barren portion.—In this, and in the number for March, Mr. J. G. Baker continues his synopsis of *Tillandsieæ*, and the editor commences an exceedingly useful alphabetical biographical index of British and Irish botanists no longer living.

American Journal of Science, March.—Asa Gray, by J. D. Dana. The attention of the readers of NATURE has already been directed to this memoir, written by the friend and associate probably most competent to appreciate the life-work of the eminent American botanist.—Calibration of an electrometer, by D. W. Shea. In the various forms of the quadrant electrometer, and in the different methods of setting up the same instrument, the curves of calibration obtained are well known to correspond in a very irregular manner with the curves given by Maxwell's mathematical theory. In this paper are given some observations with an electrometer of the Mascart form, which show variations apparently due to change in the sensibility with variation in the temperature. The accompanying tables exhibit the changes in the form of the curves for various charges of the needle through the range of temperature attainable, at the time, in the room where the electrometer was set up.—On the so-called Northford (Maine) meteorite, by F. C. Robinson. One of the numerous specimens of this "meteorite" contained in various cabinets in Maine, and perhaps elsewhere, has recently been analyzed by Mr. Charles Fish in Mr. Robinson's laboratory. That it is not of meteoric origin seems settled by this analysis, which corresponds closely with some recorded analyses of copper-slag.—History of the changes in the Mount Loa craters; Part 1, Kilauea (continued and concluded), by James D. Dana. The subjects discussed in this paper are: the size of the Kilauea conduit; the ordinary work performed by this crater; the kinds and sources of the vapours concerned; the effect of the expansive force of vapours in their escape from the liquid lavas (projectile action), and within the lavas (vesiculation and its mechanical effect); lastly, work of vapours generated outside of the conduit—fractures, displacements, and other results.—The Taconic system of Emmons, and the use of the name Taconic in geological nomenclature, by Charles D. Walcott. In this first paper on the North American Taconic system, the author deals (1) with the Taconic area in general and the geological work within it; (2) with the geology of the Taconic area as known at the present time. The Taconic area, as here studied, is stated to comprise the Taconic range running north and south nearly along the border-line between the States of New York, Vermont, Massachusetts, and Connecticut, with the country immediately adjacent to the range on the east and west. The strata included within the whole area are grouped under six terranes, identified as Middle Cambrian (1 and 5), Upper Cambrian (2), Calciferous, Chazy, and Trenton limestones (3), and Hudson shales, sandstones, &c. (4 and 6).—On the crystalline form of polianite, by E. S. Dana and S. L. Penfield. The true crystalline form of the anhydrous manganese dioxide, MnO_2, from Platten, Bohemia, to which Breithaupt has given the name of polianite, has been the subject of much discussion. Köchlin's recent contribution to its elucidation has induced the authors to continue their own studies, which establish beyond all doubt the independent position of polianite as a tetragonal crystal isomorphous with cassiterite and the allied species of the RO_2 group.

NEARLY the whole of the number of the *Nuovo Giornale Botanico Italiano* for January is occupied by a monograph by Sig. A. N. Berlese of the genus of Fungi *Pleospora*, of which 104 undoubted species are described, several of them new to science, besides a considerable number of doubtful species. The eight plates, in which the essential characters of nearly all the species are illustrated, as well as monographs of the allied genera *Clathrospora* and *Pyrenophora*, are postponed to the next number.—Prof. A. Beccari also describes three new species of palm from New Guinea.

Rendiconti del Reale Istituto Lombardo, February 9.—On colour-hearing, by Tito Vignoli. A somewhat detailed account is given of this obscure psychological phenomenon, cases being described in which not only sound produced the sensation of colour and colour of sound, but also cases in which sensations of smell and taste were stimulated by sound and colour. Rejecting the explanations hitherto advanced, the author refers the phenomenon to the primæval condition of the brain itself before the various senses became differentiated and localized in this organ. These senses must be regarded as so many forms of the primitive and essential condition of the nerve-tissue in which they became gradually specialized. But although the protoplasmic substance of the brain was thus made the seat of distinct sensations by virtue of incident forces and slow selection, still it has never

ceased to possess the aptitude as a whole for receiving all kinds of impressions from without, and in fact it is this general aptitude that has rendered possible the evolution of the special senses in special centres. Thus the common origin of all the senses would seem to offer the readiest explanation of their occasional confusion even in the human brain itself, the highest development of all. Colour-hearing might in this way be regarded somewhat as a case of reversion or atavism.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 23.—"On Remnants or Vestiges of Amphibian and Reptilian Structures found in the Skulls of Birds." By W. K. Parker, F.R.S.

(1) *Jacobson's Organ.*—This remarkable structure, which must be looked upon as an accessory olfactory organ, is present in certain of the higher Vertebrata, or *Amniota*. It consists of a paired cavity, which early becomes separated off from the proper nasal chamber, and which opens into the mouth by the anterior incisive foramen. It is innervated by branches from the olfactory and trigeminal.

Jacobson's organs are largest in Snakes, Lizards, and Monotremes, and next in order come the Marsupials, Edentates, Insectivores, and the Mammalia generally. Their presence in Man is doubtful, and what has been described as a rudiment of them has probably quite another explanation.[1] They are not known to exist in Chelonians, Crocodiles, and Birds.

In the Snake and Lizard, these structures lie each in a little dish, formed by the vomer of that side, covered in by another vomerine bone—the septomaxillary. They are also protected at the opening of the capsule by a pedate tract of cartilage, derived from the alinasal fold, which, in the Snake, frequently becomes detached from its root. In low Mammalia there are several vomers, and in most of the lower Mammals a pair of small anterior vomers lie on the inside of Jacobson's organ, but the capsule itself is formed by a peculiar fold of cartilage—the recurrent cartilage,—which closes in upon itself, and unites its edges round the organ. As a rule, these "recurrent cartilages" retain their union with the alinasal folds, as in the Lizard; in the Rabbit (Howes) they are distinct, as in the Serpent.

Now in Birds these cartilages not unfrequently appear, but no Jacobson's organ has been found with them. The Birds whose vomerine region comes nearest to that of a low Mammal are the Turnicidæ, or Hemipods, and the great group of the Passerine birds (Coracomorphæ, or Ægithognathæ of Huxley). It is not uncommon for the "ox-faced" vomer of these birds to be formed of two pairs of bony centres, and these become not only fused together, but actually grafted upon the floor of the cartilaginous nasal capsule, in the same manner as is common in the lower kinds of Mammalia.

Remnants of the cartilaginous capsule of Jacobson's organs are found not only in the Hemipods and in the lower Neotropical Passerines (*Homorus, Synallaxis, Anæretes*), but also in some of the highest of the singing-birds—namely, the Wren (*Anorthura troglodytes*)—and also in some of the Woodpeckers (Picidæ), outside the Passerine Order.

In a paper on the "Skull in the Ostrich Tribe" (Phil. Trans., 1886, pl. 10, Fig. 14, *a.i.t.*), the present author figured and described, but did not then fully understand, a peculiar cartilage perched right and left upon the large vomer of the *Rhea*. He, however, has for a long time been satisfied that this is one of the vomerine or Jacobson's cartilages, and this view is strongly corroborated by the recent description of the palate of *Apteryx*, given by T. Jeffery Parker (Proc. Roy. Soc., February 23, 1888). Now if the figure of the transversely-vertical section through these cartilages and the crura of the vomer in the *Apteryx*, be compared with various figures in the present author's "Memoirs on the Mammalian Skull" (Parts I., II., and III., "Phil. Trans."), it will be seen that it so nearly corresponds with sections of the skull of the Pig, the Edentates, and the Insectivores, especially those taken just behind Jacobson's organ, that without explanation it would be impossible to tell which figure belonged to the Bird, and which to the Mammal.

(2) *Parasphenoid.*—This bone forms a large superficial basicranial beam in Ganoidei, Teleostei, Dipnoi, and Amphibia. It corresponds to the subcutaneous part of a dermal scute formed inside the skin of the mouth, developed for support to badly ossified endocranium.

The parasphenoid of the Frog is dagger-shaped, and reaches from near the foramen magnum behind, to the nasal capsule in front, the "guard" of the dagger supporting the auditory capsules. Now in Serpents only the *blade* is present; in Lizards only a very fine thread of bone representing the blade; in some, *e.g. Trachydosaurus rugosus* (Cyclodontidæ), even this is wanting. It is not present in those very amphibian forms, the Chelonians; and only a small remnant of the "guard" right and left can be found in Crocodiles, consisting of two "basitemporal" plates, soon covered over by the huge pterygoid.

In all Birds basitemporals are large, as large as in Frogs and Toads; this is equally true of the *Dinornis* and of the smallest Humming-bird. There is a tendency for them to break up into lesser bony parts; thus for a day or two in the chick there are two "basitemporal" and one "rostral" centre; but in several species of the Ranidæ, *e.g.* the Bull-frog, the point of the dagger-shaped bone is separately ossified, and remains distinct.

In the Paradoxical Frog (*Pseudis paradoxa*) there is no "handle" to the dagger; the same form of parasphenoid is common among the water-birds, *e.g. Alca, Uria.* This is an ossification which is the earliest to appear in skulls that take on any kind of ossification; it is also the first bone to appear in an embryo bird, as in the larval Frog.

(3) *Prenasal Rostrum.*—Scarcely any Urodeles, and only a few of the Anura, show any special elongation of the "intertrabecula" or prenasal rostral cartilage; this must have been very long in the Ichthyosauria, as in the Selachii, and as in the embryos of all Birds.

(4) *Palato-pterygoid arch or arcade.*—In the Frog, after metamorphosis, during which the hinge of the jaw becomes shifted far backwards, three regions may be distinguished in the forepart of this arch; thus the suspensorial part or pedicle is the ethmo-palatine, the anterior free spike the pre-palatine, and the hinder part which runs into the pterygoid is the post-palatine.

The anterior part of the pterygo-palatine arcade is distinct from the pterygoid in Urodeles, and the pterygoid in them is an outgrowth of the quadrate which grows forwards towards the palatine, but does not coalesce with it, except in *Ranodon sibiricus.*[1] The "post-palatine" tract of cartilage is developed as a distinct nucleus in the Axolotl (*Siredon*).[2]

The only Reptiles in which the author has discovered any distinct trace of the *endoskeletal* palatine is in the Green Turtle, in which it is very small (see *Challenger* Reports, vol. i. part 5, plate 12, Figs. 9, 9*a*, 9*b* : *e.p.a.*).

This endoskeletal cartilaginous palatine, with its peduncle and fore and hind ray or *crus*, appears in several kinds of birds, in addition to their normal *parosteal* palatine—a mere membrane bone, as in Reptiles and Mammals. This vestige or remnant remains in the adult; it is of no apparent use, and occurs in the Families in the oddest way; sometimes, however, it is present in all the members of some particular Family-group, as for instance in the Musophagidæ or plantain-eaters (*Musophaga, Schizorhis*, and *Corythaix*).[3] It is also found in the Oil Bird (*Steatornis caripensis*) and in the Green Tody (*Todus viridis*), and it is also well developed in *Scythrops* (see Linn. Soc. Trans., ser. 2 (Zool.), vol. i. plate 23, Figs. 3 and 4, *o.u.*).

In that nearly extinct Neotropical type, *Steatornis*, this curious partly ossified remnant has the three crura, all well marked, and their morphological meaning is evident; albeit the whole piece is so small and feeble that it can serve no purpose in the solid palate of that remarkable bird.

To show how unexpectedly this remnant exists, a list of the Birds in which it has been found in a segmented state as a distinct bony element of the face is added below; it often shows itself as a mere process of the ecto-ethmoid, but these cases are not included in the list.

[1] See Gegenbaur, "Ueber das Rudiment einer septalen Nasendrüse beim Menschen," *Morphol. Jahrbuch*, Bd. xi., 1885. At the time when the present paper was read, the author was not aware of Gegenbaur's conclusions with regard to the supposed rudiment of Jacobson's organ in Man.

[1] See Wiedersheim, "Kopfskelet der Urodelen," Leipzig, 1877, Plate 5, Figs. 69, 70.

[2] See W. K. Parker, "On the Skull of the Urodeles" (Phil. Trans., 1877, Plate 24, Figs. 1–3).

[3] See Reinhardt, "Om en hidtil ukjendt Knogle i Hovedskallen hos Turakoerne (*Musophagides*, Sundev)," Copenhagen, 1871, Plate 7.