

"CAMEOS from the Silver-Land," by Mr. E. W. White, F.Z.S., will shortly be issued in two volumes by Mr. Van Voorst. It relates to the author's experience in the Argentine Republic, and will be specially full on the natural history of the country.

WE regret to learn the death of Admiral La Roncière le Noury, president of the Geographical Society of Paris, who died on Saturday after a protracted illness. He was born in 1813. In 1856 he went to the Arctic Ocean in the *Reine Hortense* on a scientific exploration professedly conducted by Prince Napoleon, who was on board. On the death of M. Chasseloup Laubat the Admiral was elected president of the Paris Society of Geography, in which office he continued without opposition up to the last election. The Admiral took great interest in scientific geography, as well as in zoology and botany.

DR. GERHARD ROHLFS, who has been travelling in Abyssinia, has returned to Berlin.

THE HYPOPHYSAL GLAND IN ASCIDIANS

SINCE the publication of Kowalewsky's remarkable discovery of the course of development in Ascidiæ, and its confirmation, in all the leading features, by Kupffer and others, any morphological work on the Tunicata is naturally regarded with great interest on account of the possibility of its throwing light on the difficult problem of the relationship of that group to the Vertebrata.

Embryological investigations have clearly demonstrated that the fully-formed larval Ascidian (in most genera, at least) possesses an axis occupying the centre of the tail, and comparable with the vertebrate notochord; that the dorsal region of the body contains a neural canal—of epiblastic origin, and formed by the rising up, arching over, and coalescence of "laminæ dorsales"—expanding anteriorly as a vesicle, in the walls of which certain sense-organs are developed, and being continued posteriorly as a fine canal running along the tail on the dorsal surface of the notochord. The ventral region of the body is occupied by the alimentary canal, lying below the nerve vesicle, and, in its most posterior prolongation, below the anterior extremity of the notochord, which in this locality separates the neural and visceral canals. These developmental researches have also shown that in the adult Ascidian the branchial aperture must be regarded as homologous with the vertebrate mouth, and the branchial sac with the pharynx.

An excellent paper by M. Charles Julin¹ in the last number of the *Archives de Biologie* (tome ii. fascicule i., 1881), of which a preliminary account appeared lately in the *Bulletin* of the Académie Royale de Belgique (3^{me} ser., t. I, No. 2, Fevr. 1881), adds to this interesting list of homologous organs by showing strong grounds for the belief that the little-understood "neural gland" in the Ascidiæ represents the glandular portion of the hypophysis cerebri, or pituitary body of Vertebrates.

M. Julin gives a minute account of the structure and relations of the peripharyngeal bands, the dorsal lamina, the nerve ganglion, and that enigmatical organ generally known as the olfactory tubercle; the most important section of his paper, however, is that dealing with the neural gland. This structure was first discovered by Hancock, and more recently its glandular nature was demonstrated by Ussow, who called it the olfactory gland, and stated that it was connected with the olfactory tubercle by a narrow canal, an observation since confirmed by Nasonoff. Julin contends that the so-called olfactory tubercle is not a sense-organ at all, but merely the curiously complicated opening into the pharynx of the duct of his "hypophysis." He states that he has been unable to find any nervous connection whatever between the tubercle and the ganglion, and that the nerve which has frequently been observed and described as supplying the supposed sense-organ really passes behind it without communicating, and that therefore he cannot confirm the innervation described and figured by Ussow. The histological structure of the tubercle is also opposed to the probability of its sensory function, as no modified cells are present, the whole surface being covered by normal ciliated columnar epithelium.

The reasons which M. Julin advances in support of the homology of the neural gland with the pituitary body are its structure, its position on the ventral surface of the ganglion, and its rela-

¹ "Recherches sur l'Organisation des Ascidiæ simples—sur l'hypophyse et quelques organes qui s'y rattachent dans les genres *Corella*, *Phallusia*, et *Ascidia*." Par Charles Julin, Assistant du Cours d'Embryologie à l'Université de Liège.

tion with the pharynx. The glandular nature of this body was first shown by Ussow, and its minute structure has been investigated by Julin. It consists of branching glandular tubules surrounded by connective tissue richly supplied with blood-sinuses, while the excretory duct in its posterior part has a complete dorsal wall only, as ventrally it communicates freely with the ends of the tubules, just as is the case with the duct during the development of the pituitary body.

Julin points out that in the Ascidiæ the duct, in running anteriorly towards the olfactory tubercle, is in direct relation with the ventral surface of the nerve ganglion, no layer of connective tissue intervening; and this he states is also the case in Vertebrates.

The position of the neural gland, or "hypophysary gland," as Julin proposes it should be called, is constant. Wherever the nerve-ganglion may be,—and it varies considerably in its position in different species,—the gland is always situated on its ventral surface.

The excretory duct arising from the dorsal surface of the gland, runs anteriorly, directly below the nerve-ganglion, to the olfactory or hypophysary tubercle, where it communicates with the pharynx, probably within the region formed by the epiblast involved in the oral invagination.

It is evident that Julin's observations throw the gravest doubts on the always somewhat questionable olfactory nature of the dorsal tubercle. A ciliated pit having no apparent nervous relations, and connected by a duct with a body having a well-marked glandular structure, has no claim to be regarded as a sense organ. Its function, and that of the gland, remain a mystery; Julin states that he is unable to throw any light upon this question. From the large size of the gland and the constant presence and usually extraordinary complication of the tubercle one would imagine that they performed an important function in the economy of the Ascidian; but what that function is, and why the duct of a gland should have so elaborate an opening into the pharynx, are at present totally unknown.

Julin gives us no information as to the development of these organs. In 1871 Kowalewsky¹ described, in the course of the development of *Ascidia mammillata*, the formation of an aperture connecting the anterior end of the nerve vesicle with the region of the epiblast which was being invaginated to form the oral funnel, and he declared that this aperture of communication between the neural and visceral canals persisted in the adult as the ciliated tubercle. Kupffer,² in the following year, while referring to Kowalewsky's statement, declared that he had been unable to discover any such aperture in the larva of *Ascidia mentula*. If Kowalewsky's observation is confirmed, and if the canal is found to remain as the duct of the neural gland, the course of its development would seem to differ considerably from that of the hypophysis cerebri as described by Mihalkovics, Balfour, and Kölliker, which are the views approved of by Julin and confirmed from his own observations.

In conclusion, the arguments in favour of the homology of the Ascidian's neural gland with the glandular portion of the pituitary body are very strong. The structure, position, and relations of the two organs are, in a certain stage of development, identical—admitting, of course, that the branchial sac is a modified pharynx, and that the nerve-ganglion is homologous with the vertebrate brain—and the only point required for the proof of the hypothesis is the demonstration that the neural gland and its duct are epiblastic in formation, and that their development corresponds with that of the pituitary body.

W. A. HERDMAN

STORING OF ELECTRICITY

SECONDARY batteries to store up currents of electricity in the form of chemical work promise to play so important a part in the ultimate adoption of the electric light, that improvements in their construction are of peculiar interest. The latest innovation is due to M. Faure, who has modified with great success the secondary battery of Gaston Planté by covering the surfaces of the lead plates with a coating of minium, thereby increasing their capacity manifold. This device possesses the additional advantage that it obviates the necessity of "forming" the cells by the tedious process of charging and discharging them for many days, as in Planté's batteries. Two sheets of lead are separately coated with minium and are rolled together in a spiral, being kept apart by a layer of felt, and are then placed in a

¹ "Weitere Studien über die Entwicklung der einfachen Ascidiæ" (*Arch. f. microsc. Anat.*, vol. vii.).

² "Zur Entwicklung der einfachen Ascidiæ" (*Arch. f. microsc. Anat.*, vol. viii. 1872).

vessel containing dilute acid. When a current is passed into this cell the minium on one plate is reduced to metallic lead that on the other is oxidised to the state of peroxide. These actions are reversed while the charged cell is discharging itself. According to M. Reynier one of these cells made large enough to weigh 75 kilograms may store up energy sufficient to furnish afterwards one-horse power of work for an hour.

A correspondent of the *Times* of Monday gave an interesting account of an experiment he witnessed in Paris of storing electrical energy by the method adopted by M. Faure.

"A Faure battery, or *pile secondaire*," he states, "was charged with the electric fluid direct from the ordinary Grove battery and in my presence. It may be more economically done from a Gramme or Siemens machine. The receptacle consisted of four Faure batteries, each about five inches diameter and ten inches high, forming a cylindrical leaden vessel, and containing alternate sheets of metallic lead and minium wrapped in felt and rolled into a spiral wetted with acidulated water, and the whole placed in a square wooden box measuring about one cubic foot and weighing some seventy-five pounds. This was protected by a loose wooden cover, through which the electrodes (in lead) protruded, and were flattened down for convenience of transport. This box of 'electric energy' was handed to me by M. Faure at my request, with the object of submitting it for examination and measurement to our eminent electrician, Sir William Thomson, F.R.S., at the University of Glasgow. I had the box by me all through the journey from Paris on Tuesday night (last week), including a five hours' delay at Calais. I arrived at Charing Cross at 11 a.m. on Wednesday, after running the gauntlet of customs and police authorities, who suspiciously looked askance and seemed to doubt my statement that my box only held 'condensed lightning,' and contained no infernal machine or new explosive destined to illustrate some diabolical socialistic tragedy. From time to time on the journey I tested the force of the discharge and found it to have well maintained its energy. From London to Glasgow required only another ten hours, and finally, in about seventy-two hours from the time of charging in Paris, I had the satisfaction of presenting to Sir William Thomson M. Faure's rare offering of a 'box of electricity,' intact and potent, holding by measurement within that small space of one cubic foot a power equivalent to nearly one million of foot pounds! This wonderful box is now deposited in the laboratory of the Glasgow University, under the vigilant eye of its director, and being submitted to a series of tests and measurements, the results of some of which made Sir William exclaim, 'Why, it's a little witch.'" With reference to this Sir Wm. Thomson writes to us under date May 17:—"I had the marvellous box under trial for seventy-two hours before I left Glasgow yesterday, giving it successive charges, and discharging to various degrees, measuring approximately the whole quantity sent in during the charge, and taken out in the discharge. Thus I shall be able to calculate the amount of energy spent, and the amount recovered under various conditions. Mr. J. T. Bottomley continues the trials in my absence. A considerable time must pass before I have results to publish."

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

CAMBRIDGE.—The report of the Botanic Garden Syndicate, as it now stands, recommends the admission of members of the Senate into the Garden on Sunday afternoons from three to six during the present summer, and as an experiment only; three friends may be introduced at the same time, their names being written in a book. Only one entrance is required to be opened, and the curator or his deputy and one policeman are to be present. The number of signatures of residents in favour of this change is very large. Prof. Robinson objects, and so do the heads of Queen's, Pembroke, and St. Catherine's Colleges, Professors Cowell and Westcott, and several resident clergymen.

At Trinity College W. K. Sibley (second year) has been elected to a Foundation scholarship for Moral Science, and D'Arcy Thompson (first year) to a Scholarship for Natural Science; E. D. Ritchie (Winchester) and W. B. Kansom (Cheltenham) to Exhibitions of 40*l.* for Natural Science. At King's College S. F. Harmer has been awarded the Vintner Exhibition for Natural Science, and A. P. Laurie (Edinburgh Academy) an Exhibition of 50*l.* for two years.

Mr. Lea is lecturing, in Dr. Foster's advanced course, on the Physiology of Vision.

Mr. Hicks is taking an examination class in Elementary Botany at Sidney College.

Dr. Vines' course of botany this term is one of Morphology, chiefly cryptogamic, with practical work.

The first M. B. Examination commences on June 13, the second on June 7, the third on May 10; the M. C. Examination on June 13.

The open mathematical lectures this term are those of Mr. Dale (Trinity) on Heat, and Mr. Taylor on Higher Plane Curves, Mr. Besant (St. John's), on Sound and Vibrations, Mr. Webb (Emmanuel) on the Potential and Green's Theorem, and Mr. Temperley on Finite Differences.

The first part of the Natural Sciences Tripos begins on June 6.

IN the report of the last Local Examinations (December, 1880) it is stated that the juniors answered satisfactorily in Botany, while the descriptions of specimens by the seniors and their answers in Vegetable Physiology were very weak. In Zoology the seniors did better relatively than the juniors, but practical work was largely deficient. In Geology the answering was bad, and the practical knowledge of specimens extremely meagre.

LONDON.—At the presentation day last week at the University of London, when the certificates of degrees and honours won by the successful students at the late examinations were distributed, three ladies received certificates of matriculation, and four degrees of B. A. Earl Granville said that this year they had lost by death Sir Philip Egerton, a man of great cultivation, who had always shown the greatest interest in the work of the University. There were other losses which they regretted, but which carried some consolation with them, as being highly to the credit of the University—as, for instance, the departure of Dr. Greenfield, who had for so long been identified with the Brown Institution, to Edinburgh University. They were perhaps aware that in 1852 Mr. Brown had left a sum exceeding 20,000*l.* for the creation of an institution for the investigation and cure of diseases peculiar to animals useful to man, the donor expressing a desire that the University of London should appoint a committee of their body or of medical men outside to scientifically carry out his views. Ten years ago that institution was established, and during that period few or no cases of interest to it had been discussed in which it had not taken a leading part. These investigations had, he believed, been carried on in a manner which promised the greatest possible advantage, not only with regard to the diseases of animals, but also to those of man. During the past year 3870 animals had been cured, and as an example of the great kindness with which the patients were treated he would relate the following anecdote:—A distinguished member of the Senate was driving along the road in which the institution was situated when suddenly his hack cab came to a dead stop. He asked the driver whether his animal was lame or ill, but the driver answered, "No sir. I never can get him past this place since he had his corn cured here; he likes it so much that he always wants to stop." Results had shown that the University was justified in extending the limits of its operations to the Brown Institution. After careful consideration it had been determined to extend the examinations into the science and art of teaching, for which purpose a scheme had been prepared, which would shortly be carried out. As a member of a Government which adopted as its first principle economy of public funds he was glad to be able to give an instance that this did not always degenerate into niggardly stinginess. Their application to the Treasury for the establishment of a practical museum of natural history to enable them satisfactorily to carry on examinations on their own premises had been most liberally met, and he hoped that in a very short time such a department would be opened.

THE annual distribution of prizes to the successful students at the London School of Medicine for Women took place on Wednesday last week. The report stated that up to the present eighty-six pupils had been received, of whom forty-four are now attending. Nine of these were studying for the University of London, four were amateurs, and the remaining thirty-one were training for examination by the College of Physicians in Ireland. Altogether twenty-five ladies had now been declared qualified to practise. The report of the treasurer, the Right Hon. James Stansfeld, M.P., stated that the expenditure had been 2018*l.*, of which one-half had been provided by the students' fees. The subscriptions had been 626*l.* 17*s.* 6*d.*, as against 723*l.* 15*s.* 6*d.*