THE *Johns Hopkins University Circular*, No. 106, is chiefly taken up with morphological notes from the biological laboratory of the Johns Hopkins University. Prof. William K. Brooks contributes two important notes on the Salpa embryo, and Mr. M. M. Metcalf describes an apparently new species of Octacnemus, a deep-sea, Salpa-like tunicate. A memoir on the genus Salpa, by Prof. Brooks, will shortly be published. It will contain about three hundred and fifty quarto pages, with sixty coloured plates. The memoir is based for the most part upon material collected by the United States Fish Commission.

"ELECTRIC Light Installations and the Management of Accumulators," by Sir David Salomons, Bart., has reached a seventh edition. This edition has been, to a large extent, rewritten, and is now published by Messrs. Whittaker and Co. under the title "The Management of Accumulators," as the first volume of a series dealing with electric light installations.

TWO further papers upon azoimide, N_3H, are contributed to the current number of the *Berichte* by Prof. Curtius. In the first, a brief but important communication, it is shown that azoimide may be prepared directly from hydrazine, $\begin{matrix} NH_2, \\ | \\ NH_2 \end{matrix}$ by the action of nitrous acid.

$$\begin{matrix} NH_2 \\ | \\ NH_2 \end{matrix} + ON{\cdot}OH = \begin{matrix} N\diagdown \\ \| \\ N\diagup \end{matrix} NH + 2H_2O.$$

It is only necessary to lead the red oxides of nitrogen evolved from a mixture of nitric acid and arsenious oxide into an ice-cold aqueous solution of hydrazine hydrate until a vigorous evolution of gas, due to decomposition, commences. A dilute aqueous solution of azoimide is thus obtained with which most of the reactions of the substance can be performed. It is preferable, however, to first condense the red gaseous mixture by means of ice and salt, and to pour the blue liquid, a few drops at a time, into the cold hydrazine solution until the evolution of gas begins. The experiment is unattended by any danger, and is therefore admirably adapted for lecture purposes. Now that hydrazine is so well known and so readily obtained, the sulphate being already a commercial article, this mode of obtaining azoimide will doubtless be adopted by most lecturers for class demonstration, especially as the reaction is one of such fundamental theoretical importance.

IN the second communication Prof. Curtius describes an interesting new organic synthesis of azoimide. When hydrazine hydrate is caused to act upon a salt of diazobenzene, a fugitive compound is obtained of the constitution indicated by the formula $C_6H_5N : N.NH.NH_2$. This compound might be expected to decompose in two ways, breaking up either at the double linkage or at the single linkage between the NH and NH_2 groups. According to the former mode there would be a migration of two hydrogen atoms from two different nitrogen atoms to a third nitrogen atom with production of aniline and azoimide, $C_6H_5N : N.NH.NH_2 = C_6H_5NH_2 + N_3H$. According to the latter mode of decomposition one hydrogen atom would migrate and form ammonia with the last amido group, leaving diazobenzene imide, thus: $C_6H_5N : N.NH.NH_2 = C_6H_5N_3 + NH_3$. As a matter of fact both decompositions occur, the latter somewhat predominating. It is quite easy, however, to isolate 10 per cent. of the theoretical yield of azoimide. Equi-molecular saturated aqueous solutions of hydrazine sulphate and diazobenzene sulphate are mixed and poured into a 3 per cent. solution of sodium hydrate. A turbidity is at once produced, which eventually coalesces into an oil. This is extracted with ether and ammonia, expelled from the aqueous solution by boiling. The liquid, which contains the sodium salt of azoimide, is then rendered slightly acid with sulphuric acid and distilled, when azomide passes over along with the steam. The ethereal extract contains the aniline together with diazobenzene imide produced according to the second mode of decomposition.

NOTES from the Marine Biological Station, Plymouth.—The arrival of Midsummer renders desirable a summary of the records which have been made in this paragraph during the past six months of the breeding seasons of marine animals at Plymouth. The records have approximately indicated the *commencement* of the breeding seasons; but it should be premised that in the great majority of instances the period of reproduction is prolonged throughout the summer months, and is already at an end only in a few isolated cases. The following have been recorded:—The Gymnoblastic Hydroids *Tubularia bellis*, *Clava multicornis* and *cornea*, *Eudendrium ramosum* and *capillare*, together with the Anthomedusæ *Rathkea octopunctata* (now over), *Bougainvillea ramosa*, *Amphinema Titania*, *Sarsia prolifera* and *tubulosa*, *Podocoryne carnea* and *Corymorpha nutans*; the Calyptoblastic Hydroids *Halecium* (*halecinum* and *Beanii*), *Plumularia setacea* and *pinnata*, *Antennularia ramosa* and *antennina*, *Sertularella* (*Gayi*), *Sertularia argentea* and *pumila*, *Hydrallmania* (*falcata*), *Gonothyræa Lovéni*, together with the Leptomedusæ *Obelia lucifera*, *Clytia Johnstoni*, *Irene pellucida*, *Phialidium variabile*, *Laodice cruciata*, *Thaumantias octona*, *Forbesii*, and *Thompsoni*; the Ctenophore *Hormiphora plumosa*; the Actinians *Cereanthus* (*Arachnactis*,—now over), *Halcampa chrysanthellum*, *Cereus pedunculatus*, *Bunodes verrucosa*, *Urticina felina* and *Actinia equina*; the Nemertines *Cephalothrix linearis* and *bioculata*, *Amphiporus dissimulans*, Riches (= *pulcher* of previous record, March 30), *Nemertes Neesii*, and *Lineus obscurus*; the Polychæta *Phyllodoce maculata*, *Cirratulus cirratus*, *Polydora* (*flava ?*), *Sabellaria spinulosa*, and various *Terebellidæ* and *Serpulidæ*. The Polynoïd larvæ which swarmed in the Sound in the early Spring are no longer to be obtained. The Mollusca, Crustacea, Echinodermata and Chordata will be summarised next week.

THE additions to the Zoological Society's Gardens during the past week include three Peba Armadillos (*Tatusia peba*, ♂ ♂ ♀) from South America, presented by Mr. Woodbine Parish; two Brazilian Cariamas (*Cariama cristata*) from Paraguay, presented by Mr. A. E. Macalister Hadwen; five Spotted-billed Ducks (*Anas pœcilorhyncha*, 4 ♂ 1 ♀) from India, presented by Sir E. C. Buck, C.M.Z.S.; a Guillemot (*Lomvia troile*) British, presented by Mr. T. A. Cotton, F.Z.S.; two Chiff-chaffs (*Phylloscopus rufus*), two Yellow Wagtails (*Motacilla flava*) British, presented by Miss McGill; a Naked-necked Iguana (*Iguana delicatissima*) from the Caicas Islands, West Indies, presented by Lady Blake; a Lobed Chameleon (*Chamæleon parvilobus*) from Barberton, Transvaal, presented by Dr. Percy Rendall; two Capybaras (*Hydrochærus capybara*) from South America, purchased; an English Wild Bull (*Bos taurus*, var.), a Burrhel Wild Sheep (*Ovis burrhel*, ♀), a Derbian Wallaby (*Halmaturus derbianus*, ♀) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

A NEW VARIABLE *u* CYGNUS.—In photographing the region of α Cygni, Dr. Max Wolf (*Astronomischen Nachrichten*, No. 3168), on examining the plates, has found a new variable, its position for 1893·0 being R.A. 20h. 47·2m., Decl. + 45° 49′. The star, he says, is very easy to find, lying as it does in the south right-angle corner of a right-angled triangle, the stars in the other corners being B.D. stars + 45°·3300 and + 45°·3302.

The brightness, as obtained from the plates, gave the following numbers:—

				m.
1890	...	Dec. 12	...	13
1891	...	June 1	...	12
1891	...	Sept. 7	...	12
1893	...	May 14	...	12·5

FINLAY'S COMET (1886 VII.).—The following ephemeris for this comet is continued from *Astronomischen Nachrichten*, No. 3164:—

12*h*. *M.T. Paris.*

1893.	R.A. app. h. m. s.	Decl. app. ° ′
June 22	2 19 1	+11 14·5
23	23 47	11 40·6
24	28 33	12 6·3
25	33 19	12 31·6
26	38 4	12 56·5
27	42 50	13 21·0
28	47 35	13 45·1
29	52 20	14 8·7

The comet during this week lies towards the southern part of the constellation of Aries, passing near Aries 38 on the 26th.

A BRIGHT COMET?—A telegram which we have received from Kiel contains the following data obtained on June 5 and 12 with regard to a probable comet:—

1893.	R.A. h. m.	Decl. ° ′
June 5	9 57·1	+14 21
12	10 4·3	+20 56

This object lies somewhere in the region of η Leonis.

OBSERVATIONS OF NEBULÆ.—In *Astronomischen Nachrichten*, No. 3167-68, Dr. Rudolf Spitaler communicates the observations of nebulæ that he has recently made with the 27-inch Grubb refractor of the Observatory in Vienna. He also compares the brightnesses obtained by him with those in Dreyer's new General Catalogue of Nebulæ and Clusters. In addition to the mean places of these objects and of the comparison stars employed for the years 1891 and 1892, he gives several notes and a plate illustrating many of the nebulæ.

THE YERKES TELESCOPE.—*Astronomy and Astrophysics* for June gives some particulars about the Yerkes telescope, from which we make the following few notes. The great tube pier and clockwork are being built by Messrs. Warner and Swasey, the makers of the Lick 36-inch. The column will be made in five sections, each section except the base one (which will weigh about 18 tons), weighing about 5½ tons each. The column rises 31 feet 4 inches from the base. The pier head weighs 5½ tons; thus the total weight of the column and head reaches about 45 tons. The polar axis, which is of steel, is 15 inches in diameter, 13 feet long, and weighs about 3½ tons, the declination axis measuring 12 inches in diameter and weighs 1¾ tons. The length of the sheet steel tube (exclusive of eye end) measures 62½ feet, its greatest diameter reaching 52 inches, and weighs 6 tons. The focal length of the objective is about 64 feet. All quick and slow motions and clamps can be operated either from the balcony, eye end, or floor, by hand or by electricity as may be required. The floor will be an elevating one like that at the Lick. The telescope weighs in all 75 tons, and an idea of its size may be gathered from the fact that "when the telescope is pointed to the zenith, the object glass will be 72 feet in the air, or about as high as a seven-story house."

THE SMITHSONIAN REPORT FOR YEAR ENDING 1892.—Among the many interesting points to which Mr. S. P. Langley, the secretary of the Smithsonian Institution, refers to in this report, we note the following: The Smithsonian Astrophysical Observatory still occupies the "temporary wooden shelter on the grounds." Although the money for the permanent building is in hand, the Institution is only waiting for the action of Congress to provide a site. With respect to the work that is being done and is proposed for the future, Mr. Langley makes a special reference. The branch of astronomy to which the resources of the Observatory will be devoted will be that of exploring the great unknown region in the infra-red end of the spectrum by the method recently improved by Mr.. Langley himself. The secretary refers also at some length to the recent gift of 200,000 dollars to the Institution by Mr. Thomas George Hodgkins, of Setauket, N.Y., the interest on 100,000 dollars of which is to be used for the general purposes of the Institution on the "increase and diffusion of knowledge among men," provided that the interest on the remainder be used in the investigation of the properties of atmospheric air considered in its very widest relationship to all branches of that science. The report contains the result of several communications on the subject. At some length are treated also reports on the National Zoological Park, which, by the way, seems to be in a not very flourishing condition, on the financial aid given to Research, the National Museum, Bureau of Ethnology, &c., which we must pass over, as they do not appertain directly to the subject of this column. One point we must refer to is the proposed plan of publishing a work on the moon which shall represent the present knowledge of her physical features. The Institution is already in communication with some of the leading observatories of the world, and it is hoped that "a series of photographic representations of hitherto unequalled size and definition, which shall represent the moon's surface as far as possible on a definite scale, and *entirely* without the intervention of the draughtsman." We heartily wish the co-workers in this scheme success, for have we not now, with the present state of photography and fine instruments, a good basis to work upon.

THE MORPHOLOGY OF THE VERTEBRATE EAR.[1]

I. THIS elaborate and important monograph monopolizes the first two parts of the sixth volume of the *Journal of Morphology*. It is the second of a projected series on "Vertebrate Cephalogenesis." Its predecessor was published in the same journal two years ago, and the instalment now under consideration has been anticipated by three shorter communications (Nos. 5, 7, and 8 of the literature cited) of a distinctly sensational character. The 320 pages of contents are illustrated by 26 simple woodcuts; and by 12 magnificent folding plates, printed in colour, and bearing the charmed names of Werner and Winter.

The monograph is subdivided into six sections, with a recapitulatory one, and is based upon the morphological study of the ears of adequate representatives of leading classes and orders of vertebrates, and upon experimental observations chiefly involving the pig and cat. The author's work bears every trace of extreme caution in manipulation, and he lays much stress upon deceptive effects produced by the action of reagents—for example, the knobbing and apparent collar-formation met with in the hair-cells of the avian basilar organ. In seeking to correct certain kindred errors which have arisen during the work of his predecessors, the author concludes (i.) that Retzius' "nerve plates" of the avian labyrinth are "products of the maceration process"; (ii.) that the "horseshoe figure," which the same investigator attributed to the mammalian hair-cell, is an "optical effect"; (iii.) that the continuity between the pillar-fibres and basilar membrane described by Noel "does not exist"; and (iv.) that the basilar membrane itself—defined as "a modified portion of the skin of the head which forms first and last the floor upon which the sense organs rest"—is not elastic enough "to serve for the transmission of the delicate undulations which it has been supposed to transmit." While denying the presence of "spiral nerves" in the cochlea, he concludes that they "exist in the living condition as delicate walled but relatively large lymph channels"; and concerning the very involved question of relationship between the nerve fibres and hair-cells, he asserts that the ultimate filaments are "continuations of the nerve into the hair processes." The "membrana tectoria" of the mammal is said to be but a "cupula terminalis-like structure produced by the gluing together of the hairs of the sensory cells of the organ of Corti, and the breaking away of the whole from the cells which bear them"; and it is incidentally remarked that as found in ordinary preparations it is but "an artifact produced by the use of reagents." However much disposed to accept this very revolutionary deduction, we await confirmation of certain of the author's detailed observations, before fully acquiescing in the belief that "the membrana tectoria, the membrana reticularis, Loewenberg's net, and the three or four main trunks of the system of spiral nerves of the cochlea" so-called, are one and all pure artifacts.

In the course of his inquiry the author has been led into a re-examination of the detailed relationships of the auditory nerves; and in this department he has done a lasting service by sufficiently emphasizing Breschet's long-recorded discovery that the auditory nerve of man is "divided into two branches, each of which supplies semicircular canal organs" (*i.e.* that

[1] "A Contribution to the Morphology of the Vertebrate Ear, with a Reconsideration of its Functions." By Howard Ayers, Director of the Lake Laboratory, Milwaukee, Wis., U.S.A.