

to a rigorous examination in the seclusion of his palace, and he is much disquieted at the result. The people, he finds, are poverty-stricken, and await relief, and the present is a time of great anxiety and embarrassment. The crisis must be met with prompt measures and a reverent heart; the ministers are accordingly enjoined to exhibit loyalty and justice, and to strenuously guard themselves against the thralldom of official routine. They are to discover the real state of the country, and to make such dispositions as may give rise to all possible advantage, and eradicate all possible evil. If all this be done, we have the Imperial assurance that the people will live in peace and quietness, till heaven be in harmony with earth, and all harmful influences allayed. If decrees were always obeyed, the comet will have exercised a beneficent influence on the condition of the Chinese people.

ALL interested in photography will find much that is useful and curious in Mr. Baden Pritchard's Year-Book of Photography for 1883.

MR. E. ROBERTS has sent us his handy and useful Tide Table for 1883, containing the times of high water at London Bridge, and showing the possible overflows; to all Londoners interested in any way in their river, this table will prove serviceable. We have also from Mr. Roberts Tide Tables for the Indian ports, and Tide Tables for the port of Hongkong, in handy little volumes, containing many carefully compiled tables calculated to be of great service.

THE total number of visitors to the Royal Gardens, Kew, for the year 1882, was 1,244,167. This is 407,491 in excess of the numbers for 1881, which in its turn was greater by 111,254 than the number of visitors in any previous year. As in 1881 the Sunday visitors (606,935) were about equal in number to those on all the other days of the week put together (637,232).

A NEW natural history magazine in the Flemish language is announced. It is published at Ghent, and the title is *Natura Maandschrift voor Natuurwetenschappen uitgegeven door het Natuurwetenschappelijk Genootschap van Ghent*. The editors are J. MacLeod, Ed. Remonchamps, and L. Baeklandt. The natural sequence is that another Belgian magazine, in Wallon, will appear. The "gift of tongues" is daily becoming more and more a necessity for a working naturalist, and De Candolle's assertion that English is destined to become the language of science seems gradually more remote in realisation.

THE December number of the *Agricultural Students' Gazette*, Royal Agricultural College, Cirencester, contains an article by Sir J. B. Lawes on the future of agricultural field experiments, in which he points out that the time when isolated field experiments were of value has passed, and that now the questions to be solved in this way are such as can only be answered by carefully conducted experiments lasting over many years. Miss Ormerod contributes a paper on the Gooseberry Caterpillar, the larva of *Nematus Ribesii*, in which she suggests the best mode of preventing its ravages. A readable summary of the recent work of Leuckart and Thomas on the life-history of the Fluke is given by Mr. Ozame. The other papers in the number are on Contagious Diseases, by Prof. Garside; on the Harvest of 1882, by Prof. Little; on Butter-making, by Mr. Weber; besides much matter of more purely College interest. We notice that the College has commenced a series of field experiments on corn crops, in conducting which doubtless the advice of Sir J. B. Lawes will be followed. This *Gazette* in its new form promises to become of permanent value, and is exceedingly creditable to its editors, students of the Royal Agricultural College.

THE third expedition fitted out by the Milan Society for the commercial exploration of Africa, will leave early this month for Massana. The leader of the expedition is Signor Bianchi,

who knows Abyssinia thoroughly. Count Salimboni accompanies him as engineer, and Prof. Licata as naturalist.

PROF. DOMENICO LOVISATO and Lieut. Bove, who jointly undertook the last Italian Antarctic expedition, are about to undertake another Antarctic journey for scientific purposes.

NEWS has been received from the German traveller, Robert Flegel, who was sent out to explore the Niger-Binue district. It appears that on April 10 last the traveller crossed the Binue River to the southern shore, and reached the large town of Wukari on April 13. By way of Bantadchi he proceeded, in four days' journey, to the decaying government city of Bakundi, in one and a half days more to Beli, and thence he reached Kontcha in the Adamnua district on May 26. From Kontcha to Jola is only a seven days' route. Flegel, whose health has much improved, strongly advises the establishment of a German station in that healthy and fertile country.

WE have on our table the following books:—Sydney Observatory, Double-Star Results, 1871-81 (Sydney); *Der Electricität und der Magnetismus*, vol. i., Clerk Maxwell (Springer, Berlin); *Cutting Tools*, R. H. Smith (Cassell, Petter, and Galpin); *A New Theory of Nature*, D. Dewar (W. Reeves); *Transactions of the Sanitary Institute*, vol. iii. (Stanford); *The Great Pyramid*, R. A. Proctor (Chatto and Windus); *Microbes in Fermentation, Putrefaction, and Disease*, Ch. Cameron (Baillière, Tindall, and Co.); *The Nebulæ, a Fragment of Astronomical History*, A. E. Garrod (Parker); *Relative Mortality of Large and Small Hospitals*, H. C. Burdett (Churchills); *To the Gold Coast for Gold*, Burton and Cameron (Chatto and Windus); *Physical Optics*, R. T. Glazebrook (Longman); *Essays in Philosophical Criticism*, Seth and Haldane (Longmans); *Year-Book of Photography, 1883*, H. B. Pritchard (Piper and Carter); *Report on the Oban Pennatula* (A. M. Marshall and W. P. Marshall); *Catalogue of *Batrachia gradientia**, G. A. Boulenger (British Museum); *The Brewer, Distiller, and Wine Manufacturer* (Churchills); *The Churchman's Almanak for Eight Centuries*, W. A. Whitworth (Wells, Gardner, and Co.); *Celtic Britain*, Prof. J. Rhys (S.P.C.K.); *Zoological Record*, vol. xviii. 1881 (Van Voorst); *Rankine's Useful Rules and Tables*, sixth edition (Griffin); *Madeira Spectroscopic*, C. Piazzi Smyth (W. and A. K. Johnston); *Ragnarok, the Age of Fire and Gravel*, Ig. Donnelly (Sampson Low and Co.); *The Electric Lighting Act, 1882*, Clement Higgins and E. W. W. Edwards (W. Clowes).

THE additions to the Zoological Society's Gardens during the past week include a Black-eared Marmoset (*Hapale penicillata* ♂) from South-East Brazil, presented by Miss Tilleard; a Grey Ichneumon (*Herpestes griseus*) from India, presented by Mr. W. L. Brodie; a Rose Hill Parrakeet (*Platycercus eximius*) from Australia, presented by Mr. Geo. Lawson, F.Z.S.; a Black Tortoise (*Testudo carbonaria*) from St. Thomas', West Indies, presented by Viscount Tarbat, F.Z.S.; an Indian Cobra (*Noia tripudians*) from India, presented by Capt. Braddick; two Common Curlews (*Numenius arquata*), a Common Lapwing (*Vanellus cristatus*), a Golden Plover (*Charadrius pluvialis*), British, purchased.

BIOLOGICAL NOTES

ON A NEW GENUS OF CRYPTOPHYCEÆ.—It would appear that the interesting fresh-water genus of Algæ described by Bornet and Grunow as *Mazæa* (*vide NATURE*, vol. xxvi. p. 557) is without doubt the same as *Nostochopsis* of Wood. This genus of Wood was first briefly described in the *Proc. Amer. Philos. Soc.*, 1869, and more fully, and with good figures, in the "Fresh-water Algæ of the United States," 1872. The Philadelphia species, *N. lobatus*, Wood, is referred by its discoverer to the Rivulaceæ, and is apparently a different species from that described by Bornet and Grunow from Brazil.

FEMALE FLOWERS IN CONIFERÆ.—Quite recently Celakovsky has published a very elaborate criticism (on the structure of the female flowers in Coniferæ, as detailed in Eichler's well-known treatise). To this ("Zur Kritik der Ansichten von der Fruchtschuppe der Abietineen," &c. Prag, 1882), Eichler has replied in a paper read before the Gesellschaft der Nat. Freunde zu Berlin, in which he re-states the chief points of his proof and answers *seriatim* the objections brought against it. Dr. Peters sums these up as follows:—1. In all the vegetative buds of the pine, the two front leaves (Vorblätter) converge forwards towards the bract; it is hence improbable that in the fruit scale they should be turned backwards. Celakovsky, from the fact that in weak buds the former arrangement is somewhat modified, concludes that on the complete falling away of the bud from between the front leaves, these latter are enabled to push themselves backwards and cohere: an opinion not proved. 2. While in the vegetative bud, the leaf immediately following the front leaf falls backwards in abnormal fruit-scales, the portion interpreted as the next leaf falls forwards. To the representation of Celakovsky's, that owing to the fact that the front side being, in the course of development, preferentially assisted, the leaf of the assisted front side first reaches its development, Eichler opposes the statement that in the ordinary buds there is not a trace of such a preferential furtherance. 3. The part that is regarded as the third leaf of the bud cannot be a leaf, because it has its xylem on the dorsal, and its phloem on its ventral surface. Celakovsky takes a twist of 180° for granted. This Eichler denounces as an evasion which would bring all serious scientific discussion to an end. 4. If the fruit-scale were formed by the growing together of two front leaves upon the hinder end of their axis, the latter if it developed further, would come to stand on the front side of the fruit-scale, but *de facto* it under such conditions stands behind. As Celakovsky however thinks that the middle piece of the front scale is half turned round, and is a leaf on the front side of the bud, to which both front leaves on the front side of the bud have adhered, by which means the axis comes to be posterior: therefore this opinion stands irreconcilably contradicted by his own supposition of the simultaneous pushing back of the front leaves. 5. The simplest explanation of the bud-arrangement, and of the bud itself, is got by supposing that the bract and the fruit-scale form together a single leaf which has produced an axillary bud. Here Eichler considers himself compelled to deny the charge of having set out with pre-formed notions. The change in his former opinions was brought about by a more intimate knowledge of the facts. 6. By pressure and excitation (Reiz) the axillary bud causes further changes in the fruit-scale, the formation of the keel and wings, while the central piece which is bounded by them, can separate itself from the side portions and assume the appearance of a special leaf. To Celakovsky's objection, that through the pressure of the bud-axis, only a circumscribed depression, and not a long furrow would be formed, there is this reply, that such a furrow must be produced by the growth of the scale past the early developed bud, and that this furrow can become wider as the scale becomes broader. 7. These keels (midribs) of the fruit-scale press past the bud on both sides, and hinder the development of the first lateral bud-leaves, so that the first bud-leaf now arises upon the hinder side. This explanation, characterised by Celakovsky as a forced hypothesis, is supported by the fact that the leaves could not become formed in a place where there is no room, and because on the other hand the two lateral bud-leaves show themselves if the mid-ribs are wanting or remain feebly developed (*Botan. Zeitung*, December 8).

THE TRACHEÆ IN LAMPYRIDÆ.—Heinrich Ritter v. Wielowiejski publishes in the November number of the *Zeitschrift für wissenschaftliche Zoologie* a very detailed account of the light-producing organs in *Lampyrus splendidula* and *L. noctiluca*. His investigations were carried on at Jena, in Prof. Oscar Hertwig's laboratory. He sums up the most important results as follows:—1. The tracheal-terminal-cells of *M. Schultze*, which become black under osmic acid, are by no means—as their name would imply—the terminations of the respiratory tubes; for these branch out further on into brush-like masses of much finer capillaries, which are without the chitine spiral; they are very attenuated, and, making their way in the peritoneal layer (peritonealhaut), are numerously distributed to phosphorescent tissue. 2. The tracheal capillaries very rarely end abruptly (blind) in the phosphorescent organs, but most frequently anastomose with one another, forming an irregular meshwork. 3. The capillaries do not seem to enter into the structure of the parenchyma-

tous cells, but rather course along their surface, often irregularly winding around and enveloping these. 4. The tracheal-terminal-cells are nothing more than the outer elements of the peritoneal layer at the base of the tracheal capillaries, which radiate in a brush-like fashion from a chitine-spiral-trachea. Their peripheral processes represent the extension of the latter upon the capillaries, and this relationship is homologous with certain embryonic stages of the tracheal system. 5. The tracheal-terminal-cells are not the seat or point of departure of the light-development. If this appears first in their vicinity, it is only a consequence of the fact that these structures have, owing to their affinity for oxygen, stored up in themselves a supply of this gas, and give it off in greater quantity to the neighbouring tissues. 6. The light-producing function is peculiar to the parenchyma-cells of the light-producing organs. It results from a slow oxidation of a substance formed by them under the control of the nervous system. 7. The ventral light-organ was found to consist of two layers, the parenchyma-cells of which are quite similar to one another in their morphological characters, but they differ from one another in the chemical nature of their contents. 8. The parenchyma-cells (is this the case with all?) seem connected with fine nerve-endings. 9. The light-organs are the morphological equivalents of the fatty-bodies.

THE STONES OF SAREPTA (ASIATIC RUSSIA).—The remarkable masses of stone found in the white sand of the Ergent Mountains at Sarepta have often caused people to inquire how they were formed. Some of them are found of the size of a hazel or walnut, and even larger; others are cylindrical, of the thickness of a half to one werschok (16 werschok = 28 inches), and a quarter to a half arschin (28 inches) long; others again target-shaped are more than a half arschin long, and one to four werschok thick. All the cylindrical ones, which are often also forked and root-shaped, exhibit, when they are broken across, a brown kernel with a white spot in its centre. Their surface is rough, and resembles a number of drops heaped one upon and beside another. When Alexander v. Humboldt visited Sarepta, the then director, Zwick, showed him these stone formations, Humboldt, while declaring that they were worthless recent things, was unable to say how they arose. Zwick, on the other hand, regarded them as very old and very problematical. Göbel also, who was afterwards shown these stones by Zwick, was unable to explain how they were formed. When Auerbach, the secretary of the Moscow Natural History Society, paid Alex Becker a visit twenty-eight years ago, he was brought to the place where these stone deposits were. He looked for an explanation of the formation of these stones and the reason of each stone containing a brown kernel. He was told that the stones were formed by roots. Auerbach said that these would form hydrochloric acid by decomposition. Becker now believes that he can with certainty assert that these formations arise round the roots of several plants that contain milky juice. *Tragopogon ruthenicus*, *Scorzonera ensifolia*, and *Euphorbia gerardiana* grow plentifully in the white sand. Their long roots are inhabited and seamed by insects, and when their surface is once lacerated, their milky juice keeps perpetually flowing, and as it is sticky, the chalk-containing sand (the sand's colour is due only to the presence of chalk) settles firmly around the root. The root gradually dies, disappears, and there remains in its place a white, often hollow, kernel, together with the brown colour of the root-cortex. As the root is white under its cortex, the kernel also appears white, surrounded with the brown layer of the root-cortex. The round and target-shaped ones may originate from the milky juice running away into the sand, and therefore hardly any of them exhibit a brown kernel. Their guttiform surface can be explained by the drops of the milky juice. The cylindrical, forked, and root-shaped stones show clearly the form of the roots. *Euphorbia gerardiana*, to which these stone formations are chiefly ascribed, has very long roots, root-branches and root-fibres (Alec Becker, *Bull. de la Soc. Imp. des Natur. de Moscou*, 1882, No. i. p. 48).

AMERICAN RESEARCHES ON WATER ANALYSIS¹

THE chemical results as to animal in contrast with vegetable organic matter in water, support, in general, the conclusions that have been usually drawn as to the source of organic matter, based on the more highly nitrogenous character of that from animal than that from vegetable *débris*. Still the necessity

¹ Concluded from p. 213.