

bromides have been obtained in good crystals. When selenious acid is dissolved in hydrobromic acid and to the solution of selenium tetrabromide thus formed a solution of potassium bromide is added, and the mixture evaporated and allowed to cool, a deep orange-coloured precipitate is produced, consisting of small regular octahedrons of potassium selenium bromide,  $K_2SeBr_6$ . These crystals are decomposed by water like those of the tellurium salts previously described, a colourless solution being obtained which contains selenious and hydrobromic acids and potassium bromide. They dissolve without decomposition, however, in dilute hydrobromic acid and separate from the solution again upon evaporation. The ammonium salt  $(NH_4)_2SeBr_6$ , is likewise readily obtained by employing ammonium bromide instead of potassium bromide. A precipitate of minute dark-coloured regular octahedrons is usually at once obtained upon adding the ammonium bromide, and the mother liquor after filtration yields by spontaneous evaporation beautiful garnet red octahedrons, modified by faces of the cube, which frequently exceed half a centimetre in diameter and exhibit a brilliant semi-metallic lustre.

NOTES from the Marine Biological Station, Plymouth.—Last week's captures include a number of the Lücernarian *Depastrum cyathiforme* (one individual exhibiting a lateral bud), several varieties of the Actinian *Thoë* (*Sagartia*) *sphyrodeta*, the Mollusca *Sepiola atlantica*, *Philine aperta* and *Æolidiella Alderi*, and species of the Cumacean genera *Diastylis*, *Iphinoë* and *Pseudocuma*. There has been no noteworthy change in the floating fauna. The following animals, in addition to the larger number of those already recorded, are now breeding:—the Actinian *Urticina felina* (= *Tealia crassicornis*), the Cumacean *Pseudocuma cercaria*, the Brachyura *Xantho floridus* and *rievulosus* and the Echinid *Echinus miliaris*.

THE additions to the Zoological Society's Gardens during the past week include a Chacma Baboon (*Cynocephalus porcarius*, ♂), a Lion (*Felis leo*, ♀) from South Africa, presented by Mr. Frederick Vaughan Kirby; a Mozambique Monkey (*Cercopithecus pygerythrus*, ♂) from East Africa, presented by Mr. Lewis Atkinson; a Sykes's Monkey (*Cercopithecus abigularis*, ♂) a Garnett's Galago (*Galago garnetti*) from East Africa, presented by Mr. Thomas E. C. Remington; a Diana Monkey (*Cercopithecus diana*, ♀) from West Africa, presented by Surg.-Major S. J. Flood; a Japanese Deer (*Cervus sika*, ♂) from Japan, presented by Mr. C. J. Lucas; two Emus (*Dromicus novæ-hollandiæ*) from Australia, presented by Mr. Charles E. Milburn; four Sociable Marsh Hawks (*Rostrhamus sociabilis*) from South America, presented by Mr. G. R. Gibson; two Madagascar Weaver Birds (*Fondia madagascariensis*) from Madagascar presented by Mr. Ginn; a Laughing Kingfisher (*Dacelo gigantea*) from Australia, presented by Mr. W. B. Brett; a Radiated Tortoise (*Testudo radiata*) from Madagascar, presented by Mr. B. Smith; a Bonnet Monkey (*Macacus sinicus*, ♂) from India, (two Mexican Guans (*Penelope purpurascens*) from Central America, a Wattled Guan (*Uburria carunculata*) from United States of Columbia, deposited; a White-lipped Peccary (*Dicotyles labiatus*, ♂) from South America, an Orange-winged Amazon (*Chrysotis amazonica*) from South America, twelve Spotted Salamanders (*Salamandra maculosa*) European, purchased; a Reindeer (*Rangifer tarandus*, ♂) born in the Gardens.

#### OUR ASTRONOMICAL COLUMN.

THE TOTAL SOLAR ECLIPSE (APRIL, 1893).—In *Comptes Rendus* for March 15 (No. 20) M. Deslandres gives a brief preliminary account of some of the main results that he has been

able to gather from the photographs taken by him during the recent total solar eclipse. The instrumental equipment that he had, enabled him to obtain photographs of the corona, to study its spectrum, to examine the coronal light in the most refrangible part of the ultra-violet region, and to measure the rotation of the corona by the method of the displacement of lines in the spectrum. The coronal photographs showed luminous jets of a length equal to twice the diameter of the sun, while the general outline had a form somewhat usual at times of maxima spot frequency. With regard to the spectroscopic results, the large dispersion that was employed in one case was found to have been too great; but from the photographs taken with the small dispersive instrument at least fifteen new coronal and chromospheric lines have been discovered. Perhaps the most interesting results obtained relate to the rotation of the corona. The negatives showed the spectra of two points exactly on opposite sides of the corona, situated in the equatorial plane of the sun, at a distance equal to two-thirds of his diameter. The lines in the spectra indicated large displacements, which on measurement were found to correspond to velocities of 5 and 7 kilometres. The conclusion to be gathered from such a result as this is that the corona must travel nearly with the disc in its motion and thus be subject to its periodical rotational movement.

THE ECLIPSE OF APRIL, 1893.—It is very satisfactory to hear that the photographs taken by the English party situated at Fundium, on the west coast of Africa, have, on closer examination, turned out very excellent. There seems great reason also to believe that many old points may be cleared up, while hope is also entertained of raising some new ones.

FINLAY'S PERIODIC COMET.—A telegram from Kiel informs us that Finlay's comet has been found. It runs as follows:—  
18 May, 16h. 15m. 6s., Capetown  
R. A. 355° 30' 18" N. P. D. 95° 1' 50"  
Dim.

VARIABLE STAR NOMENCLATURE.—Now that a systematic means has been adopted for numbering the minor planets until their orbits are fully recognised, much unnecessary confusion has been avoided. Just as it was with asteroids so it is with variable stars, many stars being termed such although their variability has not been confirmed. To correct such errors and to eliminate various other sources of misnotation, such as that of putting a catalogue letter in front of the constellation in which the star is situated, when another star in the constellation is so known in the star maps, Prof. Chandler adds a few notes with reference to the catalogue which will now soon be forthcoming (*Astronomische Nachrichten* 3161). He also gives a partial list of some of the letters that will be adopted to avoid further complexity.

JUPITER'S SATELLITES.—In this column, vol. xlvii., p. 518, we referred to the important work that was being carried on at Arequipa by Prof. Pickering with reference both to the telescopic appearances of Jupiter and his system of satellites. Since that time further observations, more especially of the satellites, have occupied his attention, and an account of them is given in the current number of *Astronomy and Astrophysics* (No. 115). The first investigation he undertook was to find out whether the rotations of the satellites on their axes were retrograde or direct. To do this the alternate lengthening and shortening of the discs were minutely observed, use being made of the revolution of the earth, since it is on this account that after opposition with direct motion of rotation a given phase will be presented earlier, and with retrograde motion a given phase will be presented later than if the observations had been made from the centre of the sun. Working with the first satellite it was found that a series of observations occupied about two hours, and upon the hypothesis of a direct rotation the synodic period was 13h. 3m. 25.8s., and upon a retrograde motion hypothesis, 13h. 3m. 10.8s. The conclusion of the discussion of the observations here given is that the rotation is probably retrograde. In the clear air of Arequipa, and with excellent instrumental equipment, Prof. Pickering has been able to make many quite unique observations. We have mentioned before the flattening of the disc of the second satellite when about to undergo an occultation. This observation has later been confirmed, and thus shown to be a genuine observed fact. The reappearance of the third satellite on January 27 has given perhaps a better series of observations of this atmospheric effect. When the satellite was half uncovered "it was noted that the cusps were distinctly rounded as in the case with the sun when

near the horizon, as seen from a high mountain peak." That Jupiter is not self-luminous, and that outside its cloud surface is situated a rare atmosphere capable of producing a measurable refraction, are two of the results of these observations, and taking the refraction at the cloud surface, the value  $0''\cdot50 \times 0''\cdot05$  probably is not far from the truth.

**THE MOON'S SURFACE.**—Under the title of "The Moon's Face," a study of the origin of its features, we have before us a small book of fifty pages, containing the address, as retiring President, of Mr. G. K. Gilbert, before the Philosophical Society of Washington (*Bulletin*, vol. xii., pp. 241-292). After giving a short survey of the various theories that have from time to time been suggested as explaining the origin of the features on our satellite's surface, Mr. Gilbert has been led to put forward what he terms a "moonlet theory," which "not only harmonises with the varied details of crater character, but aids in the explanation, and even in the history, of the other features of the moon's surface." The hypothesis may be stated as follows:—Previous to the existence of the moon the earth was circled by a ring analogous to that which surrounds Saturn. The small bodies or satellites constituting this ring in time gradually coalesced, first into a large number of nuclei, and finally into one, this nucleus being our moon. The lunar craters are, to use Mr. Gilbert's own words, "the scars produced by the collision of those minor aggregations, or moonlets, which last surrendered their individuality." In discussing this hypothesis the inquiry is carried on three lines: an investigation of the ellipticity of the lunar craters, experimental investigation of the relation between the angle of incidence and ellipticity of impact craters, and of the orbital relations affecting the incidence angles of moonlets. With regard to some of the peculiar features of the lunar surface, let us briefly refer to some of the explanations given here. In the production of small craters small moonlets were employed, the cups being moulded as the result of collision. For large craters, greater moonlets are supposed to have been in action, the rims round the cups being raised partly by the overflow at the edges of the cup, or resulting in the upheaval of the surrounding plain in all directions. The central cone is accounted for by supposing that the top parts of the walls of the cup are so "weakened by the efforts of heating," that they consequently fall into the centre of the cup from all sides. In the region of the Mare Imbrium he supposes that a collision of great violence occurred, dispersing in all directions a deluge of material "solid, pasty, and liquid." The outrush from the Mare Imbrium thus introduces the elements necessary to a broad classification of the lunar surface. Smooth planes were produced by the liquid matter, parts were ground or sculptured by the solid matter, while some features were left entirely untouched. Such are one or two of the origin of surface features as put forward by Mr. Gilbert in his moonlet theory. That they are ingenious and lack not interest is true, but that the hypothesis itself is likely to be received with anything like favour seems very doubtful, since our present knowledge of the way nature works shows us that the last minor aggregations or moonlets could not very probably act in the way indicated above, because the state of the nucleus about that time would be one of intense heat in consequence of the collisions, and therefore would not be capable of receiving lasting impressions as required by the hypothesis.

**AMÉDÉE GUILLEMIN.**—It is with great regret that we have to record the death of M. Amédée Guillemin, which occurred recently in France. Many of our readers will have read the most interesting and valuable books which he wrote, setting forth scientific facts in a popular light. Of his many writings perhaps that which is most familiar to us are the volumes entitled "The Heavens" and "The Forces of Nature," as translated into English, and it is only quite lately that we had occasion to notice a small volume, evidently his last work, dealing with astronomical subjects, and entitled "L'Autres Mondes."

#### GEOGRAPHICAL NOTES.

**LIEUTENANT R. PEARY**, the explorer of North Greenland, has been reluctantly compelled to relinquish his projected lecturing tour in Europe, as all his time must be devoted to preparations for his new expedition toward the North Pole, which he hopes to commence this summer.

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THE Governments of Sweden and Denmark have entrusted Prof. Otto Pettersson with the planning and direction of a series of simultaneous observations on the physical condition of the Skagerrack, Kattegat, and Baltic Sea. These observations are to be made on four days, three months apart, and commenced on May 1, 1893. Simultaneous observations between the Moray Firth and the north of Shetland would greatly enhance the value of the Scandinavian results, and it is possible that the Fishery Board for Scotland may undertake this work, at least on some of the observing days.

**CAPTAIN RICHARD PIKE**, well known as an Arctic navigator in recent American expeditions, died at St. John's, Newfoundland, in the beginning of May. In 1881 he conveyed the Greeley expedition to Lady Franklin Bay, and would have brought relief to the party, and saved the gallant explorers from their terrible experiences of starvation in 1883, had he not on that occasion been put under the orders of a United States cavalry officer, whose mismanagement ruined the expedition. Captain Pike's last Arctic work was the transport of Peary's expedition to McCormack's Bay, and his return for them in the sealer *Kite*. He had the reputation of being the best practical navigator of the Newfoundland Sealing Fleet, and his experience will be missed in connection with Lieutenant Peary's new expedition, which Captain Pike was to have taken north this summer.

THE anniversary meeting of the Royal Geographical Society will be held on Monday, the 29th, at 2.50 p.m. From the circular calling the meeting we observe that a very considerable change in the composition of the Council is contemplated. The President, Sir M. E. Grant Duff, does not seek re-election, in the hope, as he hinted at the anniversary dinner, that his "leap into the gulf in the cause of women" will heal the recent dissensions in the Society, and enable the scientific work in which it is engaged to be carried on without interruption. Mr. Clements Markham, F.R.S., has accepted the nomination of the Council as President. Captain Wharton, R.N., F.R.S., is proposed as a new Vice-President, and the following, amongst other names, are proposed as new members of Council:—Admiral Lindesay Brine, General T. E. Gordon, author of "The Roof of the World;" Mr. G. S. Mackenzie, of the British East Africa Company; Colonel C. M. Watson, and Mr. W. H. Hudleston, F.R.S., President of the Geological Society. These nominations are subject to the approval of the annual meeting, which is expected to be unusually large and representative.

#### BACTERIA, THEIR NATURE AND FUNCTION.<sup>1</sup>

A WELL-KNOWN English writer a short time ago informed the public that Prof. von Pettenkofer, the distinguished veteran in sanitary science in Munich, expressed the opinion that "the atmospheric envelope of this globe is at present in a bacillophilic humour." Expressions such as these have been repeatedly used in one form or another, some more, some less witty; the intention being, of course, to convey an exaggerated impression of the frame of mind of over-zealous enthusiasts. By such expressions more or less distinguished speakers and writers have been enabled to exhibit the smartness of their phraseology. Thus one distinguished professor relieved the anxiety of his students by the jocular observation that idleness and laziness will probably be found to be due to a specific bacillus, while another no less profound writer enunciated that crime and inebriety are probably due to bacilli. With regard to the distribution of bacteria, as well as with regard to their action, we meet with statements which are almost made humorous by smartness of exaggeration. Under the cover of the title "Science Notes," one of the London papers offered to its readers for breakfast the following palatable dish:—"In a grain of butter you have 47,250,000 microbes; when you eat a slice of bread and butter, you therefore must swallow as many microbes as there are people in Europe." Here it ought to be stated that a grain of solid matter of *London sewage* contains only a small fraction of this number of microbes. But leaving these silly exaggerations and those grotesque sayings to their authors for

<sup>1</sup> Lecture delivered at the London Institution, on February 27, 1893, by E. Klein, M.D., F.R.S., Lecturer on General Anatomy and Physiology at the Medical School of St. Bartholomew's Hospital, London.