

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.