

Phenomena of Jupiter's Satellites

May	h. m.	II. ecl. reap.	May	h. m.	I. ecl. reap.
3	... 23 35	I. occ. disap.	7	... 0 4	I. tr. egr.
5	... 2 3	I. tr. ing.	9	... 1 38	II. tr. ing.
6	... 23 24	I. tr. egr.	23	56	III. tr. ing.
	... 1 44	I. occ. disap.			
	20 32				

The Phenomena of Jupiter's Satellites are such as are visible at Greenwich.

Saturn, May 3.—Outer major axis of outer ring = $38''.3$; outer minor axis of outer ring = $17''.4$; southern surface visible.
 May 4, 17h.—Venus in superior conjunction with the Sun.

GEOGRAPHICAL NOTES

THE Austrian African explorers, Prof. Frederick Paulitschke and Dr. Dominik Kammel von Hardegger, have returned from their expedition to Africa. They started from Trieste on December 30, 1884, and chiefly explored the interior of the Gallas country. The Austrian explorers have established meteorological stations at Harrar and Zeila, which will be looked after by the English Consuls Pitten and King. The collections they have brought with them, filling several cases, will constitute a very valuable addition to the Austrian Imperial Museum.

AT the January meeting of the Royal Swedish Geographical Society, Dr. F. Svenonius gave a very interesting account of his visits to certain remote parts of Swedish Lapland last summer. The speaker could not accept the theory set forth by some authorities that the word "Lapp" was derived from the Lappish *loap* or Finnish *lappi*, i.e. "end" or "finish," signifying the inhabitants of the end of the European continent. He believed that the word was derived from *lappa* or *lappah*, i.e. "cave" or "recess," a name given by the Scandinavians to this race from the habits of the Lapps in earlier times living or taking refuge in caves or recesses. It was a common thing, even now, for Lapps to take refuge in such places in bad weather, or for the night when travelling. Having referred to the remarkable structure which forms the dwelling of the Lapp, he proceeded to describe the mountains, glaciers, lakes, and waterfalls of Swedish Lapland. The mountains were more imposing seen from the Swedish than the Norwegian side, as in the latter place they were too close to the spectator. They were of two kinds, the so-called "alpine" and so-called "grass" mountains. The former were lofty and jagged, and the latter—the most common—low and rounded. The alpine mountains were composed of hornblende, gabbro, and eklogite, and the grass mountains of schist impregnated with chalk. The highest parts of Swedish Lapland were those around the sources of the river Rapaadnos, the highest top of which, Sarjektjåkko, was once believed to be the highest mountain in Sweden, and west of the Lake Pajtasjärvi, where there are two lofty peaks, Kaskasatjåkko and Kebnekaisse. The greatest glaciers in Sweden were found within these parts, the former having been named the "ice-depôt of Lapland." He estimated that about 180 square kilometres, or one-seventh of the whole area, were covered with "eternal" ice, the depth of which reached several hundred feet. It was impossible to say whether the Lapland glaciers were increasing or decreasing. Judging by other European glaciers, they should be decreasing very fast. The fact that the flora of Lapland was actually receding, which pointed in the opposite direction, and seemed to indicate a deterioration of the climate, he believed was due to the circumstance that the Lapland glaciers had an "heirloom from the Glacial Age" still to get rid of. The lakes covered a vast portion of Lapland chiefly between the mountains and the so-called "forest-land." The surface area of the lakes here was one-third of the whole of Swedish Lapland. But there were also many great lakes in the alpine districts. Of the waterfalls the most imposing were the Stora Sjöfall, 130 feet high, and Harsprånget, 70 feet high, and with a volume of water estimated at 500 cubic metres per second. There were besides several beautiful but smaller falls in the Gellivara Lappmark. In conclusion, Prof. von Düben, who has travelled much in Lapland, stated that he believed that the word "Lapp" was derived from the old Finnish word *lappaa*, i.e. "roam about," as suggested by a great authority, viz. Prof. Friis, Professor of Lappish at the Christiania University.

GUIDO CORA's *Cosmos* for 1884 (vol. viii.) contains an attractive paper on Tahiti and the natives of Polynesia, recently visited by Dr. Filippo Rho of the Italian Royal Marine, who

sailed from Callao for the Pacific waters on board the *Caracciolo* in June, 1883. The "Kanaka," or Polynesian race proper, is described as presenting many points of resemblance to the Malays, from whom the writer supposes them to have originally sprung. But the type can be best studied in Tahiti and the other eastern islands of the Pacific, where it is found in its purest state and least affected by Papuan elements. It is subdolichocephalic, with cephalic index 76.2 ; keel-shaped skull; mesorrhine nose (index 49.3); not prognathous if unmixed, although in Tahiti the facial index is 75.0 , and in general conformation not far removed from the white or European type. The nose, sometimes straight, sometimes aquiline, sometimes rather short and flat, is always characterised by wide nostrils. The jaw-bones, though strong, are not prominent; face oval; eyes black, well shaped, never oblique; complexion variable from light brown or copper to olive yellow, but always fairer than that of the Malays; hair black, often coarse, generally straight, but sometimes wavy; beard scant; stature very tall and slim, although a tendency is shown here and there towards obesity. The Tahitians are of a cheerful temperament, passionately fond of song and dance, and some favourable specimens are given of their *himené*, a term derived from the English word "hymn," a relic of the days of the Protestant missionaries before the French occupation. These *himené* are chiefly historical, religious, warlike, or amatory, the latter often extremely pathetic, as, for instance, the elegy of the distressed maid, who flies to the woods, crowns herself like Ophelia with flowers, and dies with the name of her faithless lover on her lips. "I turn weeping from side to side of my grassy couch; alas! he is away! we are severed for ever, and I alone keep my love. I stand in the shade of the Tu tree, and wreath myself in the flowers he loved, to bear the grief of my beloved who has forsaken me. Thou forsakest me, never to return, and I die alone like the bird that finds no branch of any tree whereon to perch." There is an amusing description of Queen Marau's visit to the Italian man-of-war, whose officers were afterwards invited to a banquet, the *menu* of which is given in Tahitian and Italian. It began with roast pork, followed by raw fish *à la taiera* (a kind of pickle made of grated coco, sliced lemons, and salt water kept in a bamboo cane), prawns, salt fish, bananas, taro, a species of mango (*Spondias dulcis*), concluding with a dessert of cocoa-nuts and oranges. A native banquet is thus a sort of *résumé* of the fauna and flora of the Society Islands.

THE *Bollettino* of the Italian Geographical Society for April publishes two interesting letters from the engineer, Count Augusto Salimbeni, who had accompanied the third Bianchi expedition to Gojam, which had such a disastrous termination. These letters, addressed to Sig. Grimaldi, Minister of Agriculture, and to Prof. Tacchini, are dated from Dildil-Jimma, Gojam, December 27, 1884, and January 2, 1885, and describe the commencement of a stone bridge over the River Temcha, the first of the kind in the country since that thrown some two centuries ago across the Abai (Upper Blue Nile) by the Portuguese. This work, so far carried out under great difficulties with the assistance of Giuseppe Andreoni from the Swiss Canton of Ticino, will consist of three arches with a total length of 50 m. and 20 m. above the stream. King Tekla-Haimanot, at whose request it was undertaken, was greatly surprised at the progress already made, and expressed his satisfaction to Count Salimbeni in these terms:—"At first I did not believe you. But it was not altogether my fault. Europeans coming here have talked to me about the splendours of their lands, have brought me handsome presents, but have never shown me any of their works in stone and mortar. Our history relates how the Portuguese, to build the bridge over the Abai, brought down fire from heaven, with which they dammed up the water. It is also said that they required a thousand oxen daily to mix the mortar. But you have asked for nothing but stones, sand, wood, and water. Your work is better than that of the Portuguese. Now I believe you." It was expected that the bridge would be finished in March.

THE same number of the *Bollettino* brings to a conclusion the important and timely paper by L. Paladini on the foundation of European colonies in Africa, and especially in Algeria and Tunis. The object of the writer is to warn Italy against rash enterprises of this sort, nearly all of which have hitherto proved to be financial and even political failures. Speaking more particularly of Algeria, he describes the results, after fifty-four years of occupation, as almost nothing compared with the vas

expenditure of blood and treasure incurred by the French Government. The military expenditure alone, he calculates, at about a year average of 3,000,000*l.*, or 162,000,000*l.* to the present time. To this have to be added nearly 4,000,000*l.* for some eighty fortresses and stations of all sorts required to overawe the native; about 1,800,000*l.* yearly for the civil administration; 8,000,000*l.* for caravanserais to develop the trade of the interior; 6,000,000*l.* for the ports of Bona, Philippeville, Algiers, Bougie, Oran, and one or two others; 8,000,000*l.* or 10,000,000*l.* for arsenals, canals, dredgings, and other hydraulic works, besides many other incidental expenses, the whole far exceeding any profits hitherto realised by the trade of the country. The writer dwells upon the rivalries and heart-burnings that have sprung up between the military and civil sections of the European community, which hate each other almost more intensely than both are detested by the natives. He shows that even agriculture has yielded no returns at all commensurate with the outlay incurred, and concludes that, if not actually insoluble, the problem how to found useful and profitable colonies in Africa will always remain one of the most difficult questions for the statesman and political economist.

THE *Boletín* of the Madrid Geographical Society for February gives a complete list of the recent acquisitions of Spain in West Africa. These comprise the west coast of the Sahara between Cape Bogador (29° 9' N.) and Cape Blanco (20° 45' N.), both included; in the gulf of Guinea, the coast-line stretching from the Muni River, forming the northern limit of the French possessions on the Gaboon, northwards to the Rio Campo (0° 43' to 2° 41' N.). On the Sahara coast six stations have already been established, and all points giving access to shipping will be permanently occupied. The old treaties with the chiefs on the Rio Benito have also been renewed, with a view to prevent the threatened advance of the French in that direction.

PROF. ESCRICHE, of Quadalajara, recently described, before a conference at Madrid, his project for "geographical parks." The geographical park is a public garden, reproducing on a certain scale, according to its extent, the geographical features of a country. It is a kind of map in relief; the principal towns would be represented by places surrounded by trees, the main ways of communication by winding paths; a succession of hillocks would act for the ranges of mountains, streams of water for the rivers. The clumps of trees within the network of roads would form varied pastures, in which the natural products of each locality would find its place among the flowers, and in the centre, where the towns should be, would be placed small structures, in which would be photographic views of the principal monuments, but especially the most important astronomical, geographical, historical, and artistic information with regard to the town represented.

BEFORE the last meeting of the Verein für Erdkunde, at Halle, Dr. Alfred Hettner described the United States of Columbia, their characteristics, and present condition, based on recent journeys there. After deducting the disputed territory on its borders, Columbia is half as large again as the German Empire. Its main geographical divisions are the isthmus region, the mountainous districts in the west belonging to the Andes system, and the low-lying plains of the Amazon and the Orinoco in the east. To the last belongs the Meta, which is very suitable for navigation, but is little used for that purpose; while the Magdalena, which is navigable for 640 kilometres to the Honda Cataract, belongs to the first division. The forest region, with palms in the lower and tree-ferns in the upper parts, extends up to 2900 m., the snow-line being 4600 m. in height. The Indian population, amongst which the Muysca (Tschibitscha) rank only behind the Incas and Aztecs in civilisation, was estimated in the sixteenth century at ten millions, but are said to have been reduced by the Spaniards to one-fiftieth of that number. The whole population now is given at three millions, and, according to the estimates of the Columbians themselves, 10 per cent. of these are whites, 40 Mestizos, 35 Indians, and 15 Negroes. Trade is hampered by the bad condition of the roads. Gold, silver, coffee, and hides are the chief articles of export. Railway construction, like trade, is prevented by natural difficulties and the indolent, unpractical nature of the people.

THE *Mittheilungen* of the Vienna Geographical Society for March (Band xxviii. No. 3) contains papers on the movements of the Dachstein glacier during the period 1840-84, by Dr. Simony; an account of the latest explorations in Eastern Equatorial Africa, by Dr. Le Mounier; and the first part of a paper

on the geographical work of the German Lighthouse Department in Hamburg, by Prof. Geleisch. At the meeting on March 24 Dr. Lenz read a paper on the German colonies in Eastern Africa and Oceania, which is not printed in the present number.

THE Norwegian Government have decided to dispatch an expedition this summer to Finnmarken, in the gunboat *Lougen*, for the purpose of effecting hydrographic researches and soundings along the coast. The cost is estimated at 1000*l.* The Swedish Government grant for this year to various scientific publications amounts to about 700*l.* A sum of 50*l.* has also been contributed towards the expenses of Mr. O. Nordstedt's geological researches in England and Scotland this summer.

FURTHER NOTES ON THE GEOLOGY OF PALESTINE, WITH A CONSIDERATION OF THE JORDAN VALLEY SCHEME¹

THE subject was divided as follows:—(I.) The Geological Formations of Palestine and Egypt; (II.) The Wady Arabah and the Dead Sea Basin; (III.) The Jordan Valley Canal Scheme.

Since the date of the previous communication in November, 1882, much attention had been directed to the geology and physical structure of Palestine and the adjacent regions, especially Egypt. Besides the discussions in the press relative to the suggested Jordan Valley canal, an important expedition was sent out by the Palestine Exploration Fund during the winter of 1883-84, whilst about the same time Sir J. W. Dawson visited Egypt, Suez, the Lebanon, &c., and gave his results in the *Geological Magazine*. Important information relative to the Libyan Desert has lately been published by Prof. Zittel in the "*Palæontographica*."

I. (a) *Schists, Gneiss, Granite, and Porphyries*.—Dawson describes the relations of the crystalline rocks and Nubian sandstone at the First Cataract (Assouan-Syene). A lower crystalline series, which he refers to the Laurentian, penetrated by dykes of granite and diorite, is covered in almost horizontal beds by a second crystalline series consisting mainly of porphyries permeated by dykes of felsite and basalt. Incidentally it was mentioned that, according to Russegger's map, all the Nile cataracts occur where the river is passing over such crystalline areas, whilst the more tranquil stretches of water belong to the system of his Nubian sandstone. An immense mass of crystalline rocks prevails at the great bend of the Nile which has Abu Hamed for its apex: the axis of this system occurs in the Monassir country, which is the wildest region between Assouan and Khartoum. Dawson thinks that the porphyries of Mount Hor may belong to his second series of rocks, which, in more northern countries, is represented by the Arvonian and Huronian.

(b) "*The Nubian Sandstone*."—This exhaustive division of the rocks between the Crystallines and the Upper Cretaceous may be resolved into three sections of different geological age. The Carboniferous age of the lower sandstone and overlying limestone of Wady Nashb has been known for certain ever since the discoveries of Mr. Holland; but Prof. Hull's party has traced this section up the Arabah, and almost as far as the Dead Sea. The middle division is Cenomanian: it is probably in the main the original Nubian sandstone of Russegger, is widely extended in Egypt, occurs in great force at Petra, and constitutes the cliffs on the east side of the Dead Sea. There remains the Lebanon division of the *soi-disant* Nubian sandstone, and this in all probability is really newer than either of the others, being well up amongst the Cretaceous limestones, and possibly on the horizon of certain ligniferous beds occurring at Edfou on the Nile.

(c) *Cretaceous and Nummulitic Limestones*.—The Cretaceous beds are the most important factors in Syria, whilst in Egypt those of Eocene age are much the thickest. Sir J. W. Dawson gives a section of Jebel Attârah (partly after Le Vaillant), where the two systems are faulted together. He considers this position on the shores of the Gulf of Suez an important one as presenting an intermediate phase in both systems, thus linking the Syrian to the African types. The Cretaceous beds in Egypt are much less calcareous than in Palestine; an abundance of rock salt, gypsum, and bitumen is noted on certain horizons (Zittel). This last circumstance is noteworthy, for it will be remembered

¹ Abstract of paper read at the meeting of the Geologists' Association, on Friday, March 6, by W. H. Hudleston, M.A., F.R.S., F.G.S., &c.