THE last *Bulletin de la Société de Geographie* (1er Trimestre, 1885), contains a paper by M. de Mailly-Chalon on a journey in Manchuria. With two countrymen he left Peking for Newchwang, and thence passing to the east of Moukden, through Kirin to Ninguta, where the party turned to the south-east along the Tiumen, towards the ocean, and reached Vladivostock. The journey the whole way was along the Corean frontier. Leaving Vladivostock the travellers crossed Siberia to Tomsk, from which they went to Samarkand. From this point the story of the journey is taken up by another member of the party, Baron Benoist-Méchin, whose paper on the journey across Turkestan succeeds M. Mailly-Chalon's. This journey led them from Samarkand through Karshi, to Bokhara, thence to the Amou-Darya at Charjui. They followed the river then down to Petro-Alexandrovsk, whence they deviated to Khiva. From the latter town they retraced their steps up the river, and from Kurgan-Chin started across the Kara-Kum to Merv, and so to Sarakhs and Persian territory at Meshed. The journey, here barely indicated, lasted two years, *i.e.* from the departure from Japan for Peking to the arrival in Teheran. M. Rabot writes on Nordenskjöld's expedition to Greenland, the paper being compiled from the Professor's reports to Mr. Oscar Dickson, published in the *Journal* of the Swedish Society of Anthropology and Geography. M. Charles Huber brings to an end his long journeys in Central Arabia, between 1878 and 1882, to which we have adverted in noticing previous numbers of the *Bulletin*.

AT the meeting of the Paris Geographical Society on the 7th inst., M. Giraud was received with great distinction, and detailed his recent travels in Africa. The explorer has received the gold medal of the Society and the Cross of the Legion of Honour.

ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, APRIL 19-25

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on April 19

Sun rises, 4h. 57m.; souths, 11h. 59m. 07s.; sets, 19h. 1m.; decl. on meridian, 11° 20′ N.: Sidereal Time at Sunset, 8h. 53m.

Moon (at First Quarter on April 21) rises, 8h. 10m.; souths, 16h. 4m.; sets, 23h. 58m.; decl. on meridian, 18° 14′ N.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian ° ′
Mercury ...	5 4	12 44	20 24	18 2 N.
Venus ...	4 57	11 45	18 34	8 47 N.
Mars ...	4 36	11 7	17 38	5 21 N.
Jupiter ...	12 45	20 2	3 19*	14 3 N.
Saturn ...	7 22	15 28	23 34	22 3 N.

* Indicates that the setting is that of the following day.

Occultations of Stars by the Moon

April	Star	Mag.	Disap. h. m.	Reap. h. m.	Corresponding angles from vertex to right for inverted image ° °
20 ...	λ Geminorum ...	3½	22 59	23 20	187 232
22 ...	B.A.C. 3122 ...	6½	21 4	22 4	127 255
23 ...	π Leonis	5	18 46	19 42	14 290
24 ...	*d* Leonis	5	23 7	23 58	135 238

Phenomena of Jupiter's Satellites

April	h. m.		April	h. m.	
20 ...	1 12	I. tr. ing.	22 ...	2 24	III. occ. disap.
	22 19	I. occ. disap.		20 14	I. ecl. reap.
21 ...	1 45	I. ecl. reap.	23 ...	2 28	II. occ. disap.
	19 39	I. tr. ing.	24 ...	20 34	II. tr. ing.
	21 59	I. tr. egr.		23 30	II. tr. egr.
			25 ...	19 55	III. tr. egr.

The Occultations of Stars and Phenomena of Jupiter's Satellites are such s are visible at Greenwich.

April	h.	
19 ...	1 ...	Saturn in conjunction with and 4° 1′ north of the Moon.
22 ...	3 ...	Jupiter stationary.
23 ...	19 ...	Jupiter in conjunction with and 4° 37′ north of the Moon.

ON A REMARKABLE PHENOMENON OF CRYSTALLINE REFLECTION[1]

Introduction.

IN a letter to me, dated March 29, 1854, the late Dr. W. Bird Herepath enclosed for me some iridescent crystals of chlorate of potash, which he thought were worth my examination. He noticed the intense brilliancy of the colour of the reflected light, the change of tint with the angle of incidence, and the apparent absence of polarisation in the colour seen by reflection.

The crystals were thin and fragile, and rather small. I did not see how the colour was produced, but I took for granted that it must be by some internal reflection, or possibly oblique refraction, at the surfaces of the crystalline plates that the light was polarised and analysed, being modified between polarisation and analysation by passage across the crystalline plate, the normal to which I supposed must be sufficiently near to one of the optic axes to allow colours to be shown, which would require no great proximity, as the plates were very thin. To make out precisely how the colours were produced seemed to promise a very troublesome investigation on account of the thinness and smallness of the crystals: and, supposing that the issue of the investigation would be merely to show in what precise way the phenomenon was brought about by the operation of well-known causes, I did not feel disposed to engage in it, and so the matter dropped.

But more than a year ago Prof. E. J. Mills, F.R.S., was so good as to send me a fine collection of splendidly coloured crystals of the salt of considerable size, several of the plates having an area of a square inch or more, and all of them being thick enough to handle without difficulty. In the course of his letter mentioning the despatch of the crystals, Prof. Mills writes: "They [the coloured crystals] are, I am told, very pure chemically, containing at most 0·1 per cent. foreign matter. They are rarely observed—one or two perhaps now and then in a large crystallisation . . . I have several times noticed that small potassic chlorate crystals, when rapidly forming from a strong solution, show what I suppose to be interference colours; but the fully formed crystals do not show them."

Some time later I was put into communication with Mr. Stanford, of the North British Chemical Works, Glasgow, from which establishment the crystals sent me by Prof. Mills had come. Mr. Stanford obligingly sent me a further supply of these interesting crystals, and was so kind as to offer to try any experiment that I might suggest as to their formation.

On viewing through a direct-vision spectroscope the colours of the crystals which I had just received from Prof. Mills, the first glance at the spectrum showed me that there must be something very strange and unusual about the phenomenon, and determined me to endeavour to make out the cause of the production of these colours. The result of my examination is described in the present paper.

Section I.—*Preliminary Physical Examination.*—1. It will be necessary to premise that chlorate of potash belongs to the oblique system of crystallisation. The fundamental form may be taken as an oblique prism on a rhombic base, the plane bisecting the obtuse dihedral angle of the prism being the plane of symmetry. Rammelsberg denotes the sides of the prism by P, and the base by C, and gives for the inclinations of the faces PP = 104° 22′ and CP = 105° 35′. The face C, which is perpendicular to the plane of symmetry, is so placed as to bring three obtuse plane angles together at two opposite corners of the parallelepiped. The salt usually forms flat, rhombic or hexagonal plates parallel to the C plane, the edges of the rhombus being parallel to the intersections of the P faces by the C plane, and the hexagons being formed from the rhombic plates by truncating the acute angles by faces parallel to the intersection of the C plane by the plane of symmetry.

The plane angles of the rhombic plates, calculated from the numbers given by Rammelsberg, are 100° 56′ and 79° 4′, while the hexagonal plates present end-angles of 100° 56′ and four side-angles of 129° 32′. These angles are sufficiently different to allow in most cases the principal plane of a plate, or even of a fragment of a plate, to be determined at once by inspection. But in any case of doubt it may readily be found *without* breaking the crystal by examining it in polarised light. There are

[1] Paper read at the Royal Society on March 19 by Prof. G. G. Stokes, M.A., Sec. R.S., Lucasian Professor of Mathematics in the University of Cambridge.