

the comet near its old track were equally unsuccessful, and it was not till the grand meteoric shower on the evening of November 27 in that year that further light was thrown upon the subject. As is well known, the meteors of that great shower were found to be moving in an orbit sensibly identical with that of Biela's comet in 1866. Intersecting, or at least passing very near to the earth's orbit on November 27, the comet must have been descending to a perihelion passage a month later, or about December 27'6; such at least would be the date when the meteoric shower would arrive at its least distance from the sun. In this fact appears the only ground upon which we can now work to obtain an idea of the probable position of the comet in the present year. If we apply Dr. Michcz's perturbations from 1852 to 1866 to the late Prof. Hubbard's elaborately-determined elements of the south-following nucleus in 1852 (assumed to be identical with the principal comet in 1846), we find the following orbit for 1866:—

Longitude of perihelion	...	...	109 39 48	} Mean equinox January 27.
" ascending node	...	...	245 43 42	
Inclination to ecliptic	...	...	12 22 3	
Angle of excentricity	...	...	48 46 19'35	
Mean daily motion	...	...	529''9157	
Revolution	...	...	2445'67 days.	

And bringing up the longitudes to the equinox of 1879 we have the following heliocentric co-ordinates to be combined with the X, Y, Z of the *Nautical Almanac* in the preparation of sweeping-ephemerides on different hypotheses as to time of arrival at perihelion:—

Time from perihelion.	x.	y.	z.
- 50 days	... +0'8145	... +0'7263	... +0'4119
40 "	... 0'6150	... 0'7914	... 0'3916
30 "	... 0'4041	... 0'8379	... 0'3621
20 "	... +0'1755	... 0'8593	... 0'3218
- 10 "	... -0'0562	... 0'8497	... 0'2699
0 "	... 0'2855	... 0'8053	... 0'2070
+ 10 "	... 0'5025	... 0'7261	... 0'1352
20 "	... 0'6990	... 0'6171	... +0'0578
30 "	... 0'8704	... 0'4857	... -0'0218
40 "	... 1'0161	... 0'3397	... 0'1008
+ 50 "	... -1'1379	... +0'1856	... -0'2510

If the meteoric cloud of November 27, 1872, was moving in the orbit given above, a revolution counted from December 27'6 in that year will bring us to about September 8, 1879, as the epoch of next perihelion passage. Assuming September 7'5 we should have the following sweeping-line for that date:—

Time from perihelion.	Right ascension.	North declination.	Distance from earth.	Intensity of light.
0 days	... 140'2	... 10'8	... 1'66	... 0'47
- 20 "	... 125'9	... 17'4	... 1'42	... 0'57

It may, however, be regarded as by no means improbable that the perihelion passage of the body which caused the shower of meteors may take place much later, and a very close and extended search will be required.

Sweeping-ephemerides to the extent desirable would occupy too much space here, but they will be easily prepared in the manner indicated from the above co-ordinates.

It is impossible not to admit the justice of a remark made by M. Otto Struve at the Stockholm meeting of the German Astronomical Society, when urging further attention to this comet: "Kein Comet gebe mehr Ansicht, über die Natur der Cometen im Allgemeinen etwas zu erfahren, als der Biela'sche;" and if due preparation be made this year for an exhaustive examination of the heavens in those regions where it is possible any portion of the comet may be found, further light may be thrown upon what yet appear the mysterious agencies which have affected its constitution and motions.

GEOGRAPHICAL NOTES

In the place of Prof. Geikie's lecture on geographical evolution which was promised for this month, the June number of the Geographical Society's monthly periodical contains the anniversary address by Mr. Markham on the progress of geography. This is followed by a short paper on the "Mardian Hills and the Lower Indravati in the Bustar Dependency," contributed by Capt. T. H. Holdich, R.E., who also furnishes a sketch-map of the region. As regards quantity, at any rate, the geographical notes show a great improvement on previous numbers, and many of them supply information of considerable interest. Attention may be especially called to Mr. Keith Johnston's remarks on the employment of elephants in African travel, and regarding his own movements, Russian topographical labours in the Kirghiz Steppe and in Turkistan, the Russian Trans-Caspian territory, recent topographical survey by the Russians from the Oxus to Herat, new maps of Afghanistan, and a singular cave-formation in Queensland. There is also a good summary of Lieut. Wheeler's survey work in Oregon in 1878, based on an account drawn up by Mr. T. W. Goad, who was himself an active partaker in the work. Under the head of "Proceedings of Foreign Societies," we find a report of the Inter-Oceanic Canal Congress up to May 23. The last thirteen pages of the number are occupied by notes on new books and maps.

MR. J. F. BROMTON, the agent of the China Inland Mission at Kweiyang-fu, in the Kweichow province, recently accompanied Mr. Cameron, on his way from Yunnan to the sea-board, as far as Kweilin-fu, in Kwangsi. Their route lay through the regions occupied by the Miao-tsze, or aboriginal tribes, who are very numerous in the south-east of Kweichow, and practically independent of the Chinese. Mr. Broumton visited a place called Pa-tsia, near which there are many Miao-tsze, but they are very shy and do not mix with the Chinese, only coming to the town on market-days to buy cotton, cloth, salt, &c. Their villages consist of mud cottages, usually hidden among trees and situated in places among the hills, which are difficult of access. From what he saw, Mr. Broumton thinks that the Miao-tsze are thrifty and industrious, for their land seemed well cultivated and the people well clothed. There is another interesting class of people in the Kweichow province, viz., the Tsung-kiatsze, who, it is thought, originally emigrated from Hunan and Kiangsi, and in course of time intermarried with the Miao-tsze. Now they are a distinct class, speaking a language differing from both the Chinese and the Miao-tsze. Like the latter, they do not bind their girls' feet, and they are described as a sturdy, hardy race and thriving agriculturists.

In the annual statement of the British Museum, just presented to Parliament, we find a report by Mr. Major on the department of maps, charts, plans, and topographical drawings. We do not learn very much as to the nature of the accessions made during the year, but Mr. Major particularises a photographic reproduction of a hydrographical chart on parchment (dated 1385) in the Royal Archives at Florence, comprising the Atlantic as far as Cape Bojador, then the furthest point of geographical discovery southwards, to Syria and the Black Sea, on the east. On this chart, which is earlier by half a century than the effective discovery of the Azores by Diego de Seville and other navigators, we find the islands of San Miguel and Santa Maria laid down, but with an illegible description, while the islands of San Jorge, Fayal, and Pico are described as Insule de Ventura and Columbia, and Terceira is named Insula de Brazi, so called from the Brazil wood with which it abounded, thus preceding its famous namesake in South America by a century and a quarter. The chart bears the following epigraph:—

"Gulielmus Solerij civis Maioricarum me fecit anno a Nat. Domini Mccclxxxv."

As considerable difficulty is often found in fixing the position of places in the interior of Australia, the following note of the distance in miles from Adelaide of each station on the overland telegraph line which terminates at Port Darwin on the northern coast, will be found useful:— Beltana, 355; Strangway Springs, 565; Peake, 636; Charlotte Waters, 804; Alice Springs, 1,036; Barrow's Creek, 1,207; Tennant's Creek, 1,354; Powell's Creek, 1,467; Daly Waters, 1,605; River Katherine, 1,771; Pine Creek, 1,825; Yam Creek, 1,854; Southport, 1,934; Port Darwin, 1,973. Considerable progress is being made with the trigonometrical survey of South Australia. We also learn that an exploring expedition from Queensland has just completed a flying survey across the northern portion of both colonies, large tracts of which are still practically unknown.

EXCELLENT news from Abbé Debaise has arrived in Marseilles.

THE Inter-Oceanic Congress has adopted, by 98 votes against 8, the proposal in favour of cutting the canal through the Isthmus of Panama, by the Bay of Limon, to Panama.

DR. MICLUCHO MACLAY, the Russian explorer, with an Italian, Chevalier Bruno, and Capt. Leeman, have sailed from Sydney for New Guinea, in the American schooner *Laddie*, F. Caller, chartered for a twelvemonth's cruise. 2,500*l.* has been spent on the equipment. The expedition is intended to be both scientific and commercial. New Caledonia, New Britain, and other islands are to be visited.

THE first part of Dr. Nachtigal's new work: "Reisen in Afrika," comprising his journey across the desert to Bornu, is about to be published by Messrs. Wiegandt, Hempel, and Parey, Berlin.

A TELEGRAM from Gordon Pasha to the Italian Geographical Society, announces that Capt. Martini, the leader of the Italian expedition which is going to assist the Marchese Antinori, has obtained permission to enter Abyssinia, that he had left Gedowa, and had landed at Massanah.

THE FIRST OBSERVATIONS OF SUN-SPOTS

AT p. 284 of NATURE, vol. i., the following paragraph occurs:—

"Dr. Kirkwood commences by reminding us that the most ancient observations of sun-spots of which we have any record, are those of the Chinese in the year 321 A.D.; the first notice of their detection by Europeans being found in the *Annals* of the Frankish Kings. A black spot, according to Adelmus, was seen on the sun's disk March 15, 807, and continued visible eight days. Similar phenomena were again observed from May 28 to August 26, A.D. 840. The year 1096 was also signalised by the appearance of spots so large as to be visible to the naked eye. The next date, in chronological order, is that of 1161, when a spot was seen by Averröes. Finally, on December 7, 8, and 16, 1590, 'a great blacke spot on the sunne' was observed at sea by those on board the ship *Richard of Arundell*. The foregoing are, we believe, the only undoubted instances in which these phenomena were observed previous to the invention of the telescope."

During the winter of 1877-78 the late Mr. Mayers, Chinese Secretary of the British Legation in Peking, purchased on behalf of the British Museum a large Chinese Encyclopædia, comprising 5,020 volumes, and containing the most valuable information, historical, literary, and scientific. Unfortunately, however, its records end with the *Ming* dynasty, A.D. 1628. Whilst preparations were being made for its shipment to London,

a sub-section of this immense work, entitled "Natural Phenomena," was placed at my disposal for purposes of research. I resolved to confine my attention to obtaining records (1) of the droughts and famines that had visited China, and (2) of the sun-spots observed by the Chinese.

The records of the droughts and famines are most minute. The years, months, and districts affected are given in detail.

With regard to sun-spots¹ [black spots on the sun²] I found that from B.C. 28 to A.D. 1617 fifty-six observations were recorded, and that ten other observations of what I have translated sun-shadows,³ four of them prior to the first sun-spot observation, were mentioned. These observations are exhibited in the annexed table, from which it will be seen that undoubted sun-spots were visible in China on three occasions previous to the year A.D. 321—the date given by Père Mailla in his "Annales de la Chine"—namely, in the years A.D. 301, 302, and 307. The solar phenomena observed in 807 and 840 are also mentioned in the Chinese record.

The remarks regarding the apparent sides of the sun-spots, &c., are literal translations of the Chinese text.

Year.	Moon.	Remarks.
B.C. 28 ...	3	} ... Black shadows.
20 ...	2	
A.D. 188 ...	1	
300 ...	1	...
301 ...	9	
302 ...	11-12	
307 ...	11	
321 ...	2	
322 ...	10	
342 ...	1	
344 ...	10	
345 ...	3	
359 ...	10	... Size of an egg.
360 ...	4	
361 ...	2	
372 ...	11	... Size of a plum.
373 ...	3, 11	... Size of an egg.
388 ...	2	... Two spots; size of plums.
389 ...	6	
395 ...	11	
400 ...	11	
499 ...	2	... Three spots; size of peaches.
501 ...	8	
502 ...	1-2	... Two spots visible.
509 ...	8	... Black shadows.
510 ...	2	... " "
513 ...	1-4	... " "
577 ...	11	
580 ...	2	
807 ...	10	
826 ...	3	
832 ...	3-4	
837 ...	11	... Size of an egg.
840 ...	2	... Black shadows.
841 ...	11	
865 ...	1	... Black shadows.
874 ...	—	
974 ...	1	
1077 ...	2	... Size of a plum.
1078 ...	1, 12	... " "
1079 ...	2	... " "
1104 ...	10	... date.
1105 ...	10	
1112 ...	4	
1118 ...	11	... Size of a plum.
1120 ...	5	
1129 ...	3	
1131 ...	2	... Size of a plum; visible four days.
1136 ...	10-11	... Size of a plum.
1137 ...	2-4	... " "

¹ See the *Journal* of the North China Branch of the Royal Asiatic Society for 1878: "Droughts in China, A.D. 620-1643," and "Sun-Spots and Sun-Shadows Observed in China, B.C. 28-A.D. 1617."

² This is a literal translation of the Chinese text.
³ The Chinese character translated "shadows" may also be translated "breath," "vapour," &c.