

had learned to adore him. Mr. Musters was a fearless explorer, and a man of unflinching tact and winning manners. Two or three years ago Mr. Musters returned from Bolivia, with which little-known country he had made a thorough acquaintance, and had, we believe, collected material for an interesting work. He recently received the appointment of Consul at Mozambique, and was to have left this month for his post, from which, he was delighted to think, he would be able to do some valuable exploring work in the African interior. By his death Her Majesty has lost a faithful and able servant, and science an eager explorer. Musters was loved by every one who had the pleasure of his acquaintance.

THE prosecution of marine surveys on the coasts of India has been for a long time much hampered by the want of a proper surveying steamer, and we are glad to learn from a Bombay paper that a new vessel—the *Investigator*—has just been launched, which will supply the defect. The steamer is well provided with all the necessary appliances for chart-making, deep-sea sounding, &c.

THE November number of the *Bulletin* of the French Geographical Society contains Dr. Jules Crevaux's account of his exploration in the interior of French Guiana in 1877. Dr. Crevaux, with little assistance and in the face of not a few difficulties, ascended the River Maroni, and striking the River Yary, traced its course to its junction with the Amazon. The two main results of his journey are the crossing for the first time of the Tumuc-Humac chain at the level of the sources of the Maroni, and the discovery and complete delineation of the Yary, an important affluent of the Amazon. The Maroni he describes as a fine river of about 140 leagues in length, with a breadth of 1,200 to 1,500 metres at 20 leagues above its mouth, and from 400 to 500 at 90 leagues. The River Yary, Dr. Crevaux considers as more important than the Maroni; it is 150 leagues long, and both rivers are much obstructed by falls and cataracts. Dr. Crevaux gives some very useful notes on the forests of Guiana and the different species of trees which they contain. The highest summits of the Tumuc-Humac range do not exceed 400 metres above sea-level. In summing up his observations on the geology of the region traversed, he says that all the formations met with from the mouth of the Maroni to that of the Yary have an ancient physiognomy. They are mainly composed of schistose rocks which may be divided into three systems, which are, in order of age—1. The gneiss of the mouth of the Maroni. 2. The schists and mica schists of the middle course of the river. 3. The ferruginous schists and quartzites of the Man-Bari and the Yary; these latter are very wide-spread. All these are frequently traversed by granites and trachytes.

THE possibility of water communication between the Obi and the Yenissei seems to be more and more confirmed by further explorations. Baron Aminoff, after having explored the water-parting between these rivers, arrives at the conclusion that the hydraulic works which would be necessary for the construction of a canal with sluices would not present serious difficulties. The canal would be very short, and the marshes at the sources of the Kas and Yazevaya rivers afford a sufficient amount of water.

THE *Golos* of January 22 says it learns that authentic intelligence respecting Prof. Nordenskjöld's Arctic expedition has been received from Baron Frederichs, Governor-General of Eastern Siberia. According to these advices the steamer *Vega* is ice-bound forty miles from East Cape. The authorities at Jakutsk have been instructed to inform the natives of the dangerous position of the steamer, and to issue a general summons to the people to render assistance to the expedition. At the same time a special expedition has been organised which will attempt to reach the *Vega* by a journey over the ice

with the aid of reindeers or dogs. Herr Sibiriakoff has telegraphed to Baron Frederichs, asking him to send a party to the assistance of the Swedish Expedition. He has received a letter from Dr. Lindemann, of Bremen, in which the former says that at the coast where the *Vega* is believed to be lying there is a large native village, and from this village the nearest post of white merchants is distant only about 200 English miles, which may be traversed in winter in three or four days.

A REPORT has been received of a journey by Mr. Baber in the north-west of the Chinese province of Szuchuen. The original intention was to examine, between Suchow and Kiating, the River Tatu, which falls into the Yangtze-Kiang, and then to cross the mountains from Kiating to Fu-lin in long. 103°. At Fu-lin, however, Mr. Baber was induced to extend his exertions into the country further west, and he travelled onwards to a place called Tzu-Tati, the head-quarters of a Sifan chief. Here he heard of the existence of a mountain path to Ta-chien-lu, the French missionary station lying nearest to Tibet. After travelling three days through pine forests, the mountain range was crossed by a snowy pass, and on the northern slope yaks were found grazing, and many slates, inscribed with Sanskrit characters, were noticed. The appearance and language of the people also pointed to the fact that though Tibet proper is many hundred miles west of this point, yet tribes of the Tibetan race and language extend up to the banks of the Tatu River. This confirms the views already expressed by Mr. T. T. Cooper and other travellers.

THE *Japan Gazette* translates an article of some interest from the *Osaka Nippon*, on the subject of Japanese relations with Corea. After commenting on the progress made by Japan during the past few years, the writer remarks that "the Coreans, on the contrary, obstinately cling to the customs of Gio, Wu, and Shin, three Chinese sages who lived 3,000 years ago, and they believe their country is a part of Paradise, next in rank to China, and that western countries are inhabited by barbarians and savages."

COUNT WILCZEK and Lieut. Weyprecht intend to visit the northern coast of Novaya Zemlya in the course of this year, and will remain at that station for a twelve-month in order to make a series of exact magnetic, electric, hydrographical, and meteorological observations. The cost of the expedition will be defrayed by Count Wilczek himself.

OUR ASTRONOMICAL COLUMN

THE VARIABLE-STAR ALGOL.—Considering the long period during which this star has been under observation, and the many investigations which have been made with the view to reduce its fluctuations of light within some law, much interest attaches to a remark by Prof. Winnecke that the times of *minima* of Algol in the last year have fallen about one hour earlier than those assigned in the ephemerides of variables published by the *Astronomische Gesellschaft*. Dr. Julius Schmidt, director of the Observatory at Athens, to whom we owe the greater number of recent observations on this star, has not yet made known his results for 1878, but we have his determinations of the times of *minima* in 1875-76-77. For comparison with them we may take the last formula given by Prof. Schönfeld in his second catalogue of the variable stars, which appeared in 1875, viz., for Paris mean time:—

Min. ... 1869, Nov. 9, 3h. 39m. 34s. + 2d. 20h. 48m. 53s.67E.

The following are the differences from the observed times of *minima*, during the last six months of each year, wherein the observations are most numerous:—

| 1875. | m. | 1876. | m. | 1877. | m. |
|---------|-------|----------|-------|----------|-------|
| Aug. 20 | +10.1 | July 29 | +26.1 | Aug. 20 | +62.1 |
| " 23 | -29.6 | Aug. 21 | +7.2 | " 23 | +18.5 |
| Sept. 9 | -7.2 | Sept. 10 | +9.4 | Sept. 12 | +33.3 |
| " 12 | -15.8 | " 13 | +21.9 | " 15 | +17.1 |
| Oct. 5 | +7.1 | Oct. 3 | +3.8 | Oct. 8 | +54.0 |
| " 28 | +17.2 | " 6 | +1.8 | Dec. 10 | +70.1 |
| Nov. 20 | -15.1 | " 9 | -1.2 | " 13 | +30.6 |
| | | " 26 | +52.0 | | |
| | | Dec. 11 | +53.9 | | |

If yearly means of the above differences are taken we have:—

| | m. |
|---------|--------------|
| 1875.76 | - 4.8 |
| 1876.76 | +19.4 |
| 1877.73 | +40.8 |

These figures appear to indicate that a perturbation of the period is taking place, which of late has increased the differences between observation and calculation at the rate of about twenty-two minutes annually; the star is evidently one which deserves close attention at the hands of those observers who are following up the variables. With reference to previous observations of Algol and results derived from them, the reader will best consult Argelander in the seventh volume of the Bonn observations, and Schönfeld in *Vierteljahrsschrift der astronomischen Gesellschaft*, vi. p. 60.

THE REAPPEARANCE OF BRORSEN'S COMET.—It is noticed that M. Tempel, director of the observatory at Arcetri, Florence, detected the short-period comet of Brorsen on January 14, in a position north following the nebula No. 4900 of Sir John Herschel's General Catalogue. The ephemeris by Dr. Schulze, of Döbeln, who has carried on the calculation of the perturbations from the last appearance of the comet in 1873 to the present year, does not commence until February 19, so that it appears to have occurred to M. Tempel that, with his advantages of climate and optical means, there was a possibility of an earlier observation of the comet, and he has taken steps to that effect accordingly. Dr. Schulze's elements for 1879 give for the place of the comet on January 14, at 6h. M.T. at Florence, R.A. 23h. 10m. 38s., N.P.D. 118° 57', which is north—following the nebula named, so that there is no reason to doubt that the object observed, which is described as small, but brighter than the nebula (one of Sir W. Herschel's second class) is really Brorsen's comet. In this case, however, M. Tempel has succeeded in observing the comet, when, according to theory, it possessed a much less intensity of light than at any previous observation. At the time of his observation it would be distant from the sun 1.42, and from the earth 1.915, whence the theoretical intensity of light, represented by $\frac{1}{r^2 \Delta^2}$, is 0.135; the smallest value with which it had previously been observed corresponded to the last glimpse of the comet at Berlin on June 22, 1857, viz., 0.337. Dr. Schulze's ephemeris will be found in No. 2220 of the *Astronomische Nachrichten*, commencing, as we have said, on February 19. On February 7 the comet's position at 6h. G.M.T. is in R.A. 23h. 59.9m., N.P.D. 109° 42', and on February 11, at the same hour, in R.A. oh. 9.9m., N.P.D. 107° 46'.

SUN-SPOTS AND THE NILE

ON the 21st instant Mr. Francis Cobb read a paper on the financial and economical condition of Egypt, at the Society of Arts, in which he of course referred to the periodical rise of the Nile, and spoke of the desirability of discovering some system in the variations of this rise. Mr. Cobb, in considering this subject, has been naturally drawn to an examination of the sun-spot period, and has attempted to discover if any relation exists between this period and the variations in the rise

of the river. The period of Mr. Cobb's examination extends from 1866 to 1878, and as might have been expected, he finds no relation whatever between any sun-spot maxima and minima, and the maxima and minima of the Nile floods. The years 1866-67 were sun-spot minima; the rise of the Nile in these years was 28½ and 24½ feet respectively; 1872 was a maximum sun-spot year, and the rise of the Nile was 25½ feet; 1877 a minimum sun-spot year, with 18 feet rise in the river; last year the rise was 30 feet. As some of the speakers in the discussion remarked, there is at present a desire to find relations between the stupendous cosmical phenomenon of sun-spots, and terrestrial occurrences, without considering local peculiarities. We do not know what might be the result if the records of Nile floods for a century were obtainable, and were compared with the various sun-spot periods during that time; but we should say beforehand that in considering so literally narrow an occurrence as the rise of the Nile, many local considerations would have to be taken into account.

"It is impossible to say," Mr. Cobb went on, "that the rule, maximum spots, maximum rainfall, applies to Egypt. The cause of the irregularities of the Nile must clearly be looked for locally, the Blue Nile and Nyanza lakes having probably more to do with the matter than sun-spots. The telegraph, combined with a vigilant series of the operations of the Upper Nile, especially at the confluence of the Blue Nile, will prove more reliable for the protection of Egypt another year than any calculations based upon solar physics."

We fear Mr. Cobb has but a vague idea of the application of solar physics to meteorology and other terrestrial phenomena. A perusal of the many letters which appear in NATURE from our Indian meteorologists, will show that without a careful consideration of local and regional conditions no deduction drawn from sun-spot periods *per se* are of much value.

In the discussion which followed Dr. Mann endeavoured to draw the attention of the meeting to the science of the subject. While he apparently endorsed Mr. Cobb's opinion that the spots on the sun would not be found to have any direct relation to the high and low Niles, he thought it would be perhaps as well to state exactly how this matter stood. The last development of the search after sun-spot influence, Dr. Mann said, took the form of the discovery that the constantly recurring financial crises in this country were due to the sun-spots; and he should like to point out what really was the influence of the sun upon the great physical changes going on in the world. There was no doubt that the presence of sun-spots had relation to the amount of force and energy issuing from the sun, and that when spots were abundant more solar energy was thrown out into space. When that was the case, the earth shared with all the other orbs in getting some increased force from the sun. There was no doubt either that movement of every kind on the earth was dependent on solar action; and when increased energy was thrown out from the sun it told immediately on the water of the earth, and raised more of it into the sky in the form of vapour. But this did not mean that there would be an increased rainfall in one particular spot, but only that, being more vapour, there would be a greater rainfall over the whole earth. In a case like Egypt, the amount of rainfall was due to the presence or absence of an ocean wind blowing over the high grounds of Abyssinia. Therefore, though no doubt the sun-spots had to do with the total rainfall, they had not necessarily anything to do with the local rainfall in one particular country like Egypt.

Dr. Mann explained that in these remarks he did not intend to imply that there was not a periodicity and regular order of some kind in social conditions and events which were connected with the requirements of finance, crisis, and things of that kind. He was quite satisfied that there was. But he thought there was too great an