

The names and nationality of these two unfortunate travellers have not been ascertained yet, according to our contemporary.

FROM a Japan paper we learn that at the Botanical Garden in Aichi ken, an Indian tea-plant, has been planted as an experiment. The leaves have lately been gathered and treated in the same manner as the Uji tea, and it has been found that the product of dried tea is greater in proportion to the quantity of leaves used than in the case of Japanese plants. Tea-growers are, in consequence, said to be devoting their attention to the new plant.

THE additions to the Zoological Society's Gardens during the past week include a Plantain Squirrel (*Sciurus plantani*) from Java, a Smooth Snake (*Coronella levis*) from Hampshire, presented by Mr. D. Tober; a Plantain Squirrel (*Sciurus plantani*) from Java, presented by Mrs. Elliot; a Common Spoonbill (*Platalea leucorodia*), European, presented by Mr. W. H. St. Quintin; a Common Kestrel (*Tinnunculus alaudarius*), European, presented by Mr. J. Young; two Central American Agoutis (*Dasyprocta isthmica*) from Central America, a Variable Squirrel (*Sciurus variabilis*), a Common Boa (*Boa constrictor*) from South America, two West African Pythons (*Python seba*) from West Africa, a European Pond Tortoise (*Emys europæus*), European, two Glass Snakes (*Pseudopus pallasi*), a Lacertine Snake (*Coleopeltis lacertina*), a Common Snake (*Tropidonotus natrix*-var.), South European, deposited; a Fraser's Squirrel (*Sciurus stramineus*) from Ecuador, a Ring-tailed Coati (*Nasua rufa*), a Cayenne Lapwing (*Vanellus cayennensis*) from South America, three Californian Quails (*Callipepla californica*), purchased; two Gayals (*Bibos frontalis*) from Assam, two Sumatran Porcupines (*Hystrix longicauda*) from Sumatra, an Indian Crocodile (*Crocodilus palustris*) from India, received in exchange.

OUR ASTRONOMICAL COLUMN

HARTWIG'S COMET.—Prof. Winnecke, in a circular issued from Strassburg on October 5, expresses the opinion that it is highly probable the comet discovered by Dr. Hartwig on September 29 was observed in the year 1506, and at his request Dr. Hartwig has submitted the point to calculation, using the first approximation to the orbit which we gave last week. Laugier computed elements of the comet of 1506, from the rough accounts left by European chroniclers and one in the Chinese annals, but his places were necessarily very arbitrarily fixed in this case, as may be seen on referring to his communication presented to the Academy of Sciences at Paris on January 26, 1846. It has not been consequently from any striking similarity between the orbits that Prof. Winnecke has been led to conjecture the identity of the comets, but rather, it would appear, from a general resemblance of track, allowance being made for the somewhat later appearance in the year of the comet of 1880. The Chinese observations do certainly in some cases enable us to make reliable approximations to the orbits of comets, as, for instance, in 568 and 1337; indeed for the latter comet they furnish a remarkably good outline of its apparent path, considering the difficulties which in many cases attend the interpretation of the Chinese accounts: nevertheless for the great majority of comets recorded in their annals the descriptions are unfortunately totally insufficient for this purpose, one very common failing being the omission of dates corresponding to the positions given, as for the comet of A.D. 178, which must have passed very near the earth from the long track it described in the heavens.

As regards European observations of the comet of 1506, Pingré tells us (on the authority of the Chronicles which, according to his excellent custom, are named in his margins), that a comet was seen in the month of August in the north, or between the north and east, or lastly between the west and north, and as the comet was not distant from the Pole, so that it appeared in the evening after sunset, and in the morning before sunrise, it may have had at different hours of the night the various positions mentioned by the historians. It had a long and bright tail which extended "between the fore and hind-wheels of the chariot." On August 8 a Polish historian, an eye-witness, says it was seen near the Pole above "the seven stars or the stars of the great chariot;" on the following night it was

situated amongst the same stars, and later, on several nights, it was seen below them; declining by the signs Cancer, Leo, and Virgo, it attained the northern part of the horizon and disappeared on August 14. Some writers limit its appearance to eight days; others say it was visible for three weeks, or even a month.

With respect to Chinese observations, Pingré quotes from Gaubil's manuscript, of which he made so much use, which was preserved in the Dépôt de la Marine at Paris in his time, but since understood to be lost, and from Mailla and Couplet. We have now the fuller translations by Biot and Williams. We read that in the first year of the epoch Ching Tih, in the reign of Woo Tsung, on the day Ke Chow of the 7th moon (1506, July 31), a star was seen to the west without the boundary of Tsze Wei (the circle of perpetual apparition). . . . After some days it had a short tail. It was seen between the sidereal divisions Tsan (determined by δ Orionis) and Tsing (by μ Geminorum), the Chinese sidereal divisions, it must be remembered, being intervals of right ascension with wide limits of declination reckoned from the determining star of the division, which we have here taken from Biot. It gradually lengthened, extending in a north-westerly direction towards or to Wan Chang (θ, ζ, φ Ursæ Majoris). On August 10 it was bright, and moved to the south-east, it lengthened to about 5° and swept the upper of the stars Hea Tae (ν, ξ, Ursæ Majoris), and entered within the space Tae Wei Yuen (Biot's *Thai-Wa*), a space between stars in Leo and Virgo, to which, as also to Tsze Wei, the circle of perpetual apparition mentioned above, constant reference is made in the Chinese cometary observations. For the limits of this space Williams may be consulted. Biot and he substantially agree in their translations. Dr. Hartwig assumes the perihelion passage in 1506 to have occurred on July 1, old style, and with the elements of 1880 finds a track of which it is remarked, "Die Uebereinstimmung des so gefundenen Laufes mit dem wirklich beobachteten ist eine vollständige." The track is thus given:—

	R.A.	Decl.	R.A.	Decl.
July 19 ...	97°1	+39°3	Aug. 18 ...	250°1 ... +54°5
29 ...	106°6	61°3	28 ...	258°1 ... 37°0
Aug. 8 ...	201°9	77°9		

We should incline to characterise the presumed identity of the comets of 1506 and 1880 as one rather of possibility than of high probability.

From observations at Strassburg on September 29 and October 1, and one at Leipzig on October 3, Mr. Hind has deduced the following elements:—

Perihelion passage, September 6<sup>g</sup> 182 G.M.T.

Longitude of perihelion ... ..	81° 1' 37"	} App. Eq.
„ ascending node ... ..	44 19 47	
Inclination of orbit ... ..	38 28 11	
Logarithm of perihelion distance ...	9°558048	
Motion—retrograde.		

As regards position the comet may be observed for many weeks, but the brightness will be rapidly declining. Since it was not detected till three weeks after perihelion passage, it is desirable that observations should be continued as long as practicable, if the character of the orbit is to be decided at this appearance.

GEOGRAPHICAL NOTES

THE newly published volume of the Geographical Society's *Journal* contains some useful and even valuable contributions to geography. The veteran traveller, Capt. R. F. Burton, furnishes a memoir respecting the new map of Midian constructed by the officers of the Egyptian General Staff. Capt. Burton however, as might be expected, supplies geographical information beyond that given by the Egyptian officers. He also contributes a second paper of a different character on the subject of a visit to Lissa and Pelagosa. Even more valuable than Capt. Burton's first paper is Lieut. R. C. Temple's account of the country traversed by the second column of the Tal-Chotiali field-force in the spring of 1879, with his sketch-map of part of the country passed over by it between Candahar and India. This memoir has evidently been drawn up with elaborate care, and embodies a mass of important information. The notes upon some astronomical observations made in Kordofan and Darfur

by Major H. G. Prout of the Egyptian Staff are also of value, and are accompanied by a map of routes in the two provinces, constructed by the Society's draughtsman from the reconnaissances of various officers in the service of the Khedive. Mr. E. Colborne Baber, lately your Consular representative at Chungking in Western China, also communicates through the Foreign Office some brief remarks under the heading of "Approximate Determination of Positions in South-Western China," to which are appended a number of tables of observations for latitude, &c.

In the middle of last January Mr. W. S. Jerdan and a small party started from the Elderslie station on the Diamantina River, in Western Queensland, for the purpose of exploring the Mackinlay Ranges for gold. Leaving the Booker-Booker Mountain, with its dark fringe of gidya scrub, on their left, and Mount Munro on the right, they travelled up the Diamantina over splendidly grassed downs, and as they advanced up the river they found that the grasses became even finer and herbs more plentiful. After eight days' marching the party reached the neighbourhood of the Mackinlay River, and they report that the country passed over for some time previously was principally level plain, and just at that season perfectly bare, with the exception of a few tussocks. After about another week they got out of the low country and obtained their first good view of the Mackinlay Ranges, which they describe as presenting a very picturesque appearance in the distance, with their numerous pinnacles, peaks, and flat-topped mountains. The country along the ranges is covered with granite boulders, or else consists of decomposed granite flats infested with spinifex, with numerous sandy creeks running through it in all directions. The party spent about two months in searching for gold, but met with little success.

SIGNOR BIANCHI has reported to the Milan Society, which sent him out to Shoa and other parts of North-Eastern Africa for the purpose of making commercial explorations, that he has been able to make some corrections in the position of places as given in our existing maps. Antotto he places in  $8^{\circ} 53' N.$  lat.,  $36^{\circ} 15' E.$  long., instead of its present position further north. Fanfini is really north-north-east and not south of Antotto, while the Salala Mountains are fifty kilometres from Fanfini, and not close to it. Lake Zouay he has not met with, though his route ought to have taken him to it, according to the map.

THE United States Navy Department have received through the Russian Government a letter from the Captain of the Arctic Exploration steamer *Jeannette*, dated from Cape Serdze Kamen, August 29, 1879, which reports the arrival of the *Jeannette* at that place on the afternoon of the above date. The letter states that the members of the expedition were all well, and that they expected to sail that night for Wrangell Land, by way of Kaliutchin Bay. This news has taken more than a year to reach America. The *Corwin* has arrived at San Francisco, and is reported to have searched all the region between Point Barrow and Herald Island, without finding any trace of the expedition. Still he thinks there is no reason yet to give up hope.

The new number of *L'Exploration* is an improvement on previous ones. We have a good article on the commercial relations between France and Russia; information as to the progress to their destination of MM. Revoil and Crevaux; an interesting analysis of an article on Ausland, on the country of Muata Yanvo, a letter from Dr. Quintin on a former expedition to the Upper Niger, and letters from Matteucci on the progress of his expedition in the Sudan. The notes are also much better edited.

CAPELLO and Ivens have furnished to the Portuguese Government a detailed account of their African explorations, a great number of drawings, and a comprehensive map containing an important part of Portuguese Africa, and also the adjacent territories. Next year Capello and Ivens will return to Africa to finish their explorations, and make a complete chart of the province of Angola.

THE death has just taken place at Pitminster, near Taunton, of Capt. Hobson, of the Royal Navy, who in his earlier days took an active part in the search for the remains of the late Sir John Franklin, and was the discoverer of the records which afforded the clue to the lamented explorer's fate. He was second in command, then holding the position of lieutenant to Capt. McClintock, who, in the year 1845, sailed in the *Fox* to search for the Franklin Expedition. Hobson was the leader of one of the parties which went in search of traces of Franklin, and he succeeded in finding the brief record which only too

clearly set at rest the conjectures which the public entertained as to Sir John Franklin's fate.

THE expedition which left France on October 5 for the exploration of the country between the Upper Senegal and the Niger, though mainly for military and commercial purposes, is likely, if successful, to add greatly to the fulness and precision of our knowledge of that region of Africa. Astronomical, geodetical, and topographical officers accompany the expedition, so that we may expect important scientific results. The terminus on the Niger will be either Bamakou or Dina, above Yanina and Segon.

COL. FLATTERS has returned from his explorations in the Touareg region.

THE Wellington correspondent of the *Colonies and India* states that the area of the Crown forest lands in New Zealand in 1879 was estimated at 10,158,870 acres, but it has been proved that some of the most valuable kinds of timber have been recklessly used, and it is said that at the present rate of consumption all the splendid *kauri* forests will be exhausted in twenty-one years, and that the value of the timber will be about 11,000,000*l.* He does not however appear to have taken into consideration the very serious effect which this wholesale destruction of forests will have upon the climate of New Zealand.

#### PROF. ASAPH HALL ON THE PROGRESS OF ASTRONOMY<sup>1</sup>

ASTRONOMY, in some of its forms, reaches back to the most distant historical epochs, and the changes that it has undergone during this long lapse of time give to this science a peculiar interest. In no other branch of human knowledge have we such a long and continuous history of the search after truth, of the painful struggle through which men have passed in freeing themselves from theories approved by the wise of their own times, and in overthrowing beliefs which had become incorporated into the life and culture of those times. Perhaps the grand array of the heavens, and the vast phenomena which they display, naturally led men to the invention of complicated theories; but these passed away at last before the test of observation and the criticism of sceptical men; and the Copernican theory of our solar system, Kepler's laws of elliptical motion, and the Newtonian law of gravitation, gave to astronomy a real scientific character.

The discovery of the laws that govern the motions of the heavenly bodies, and the construction of the theory of these motions, demanded from practical astronomy better observations and a more accurate determination of the orbits of the planets and the moon, or of the constants that enter into the problems of celestial mechanics; and this demand led to an improvement in the instruments, and in the art of observing. The astronomers and instrument-makers of England and France led the way in these improvements. The great national observatories of those countries were established, and in England, Flamsteed and Sharp, Bird and Bradley, were foremost in raising practical astronomy to the condition of satisfying the demands of theory. But theoretical astronomy was soon to receive a wonderful advancement. Perhaps no one contributed more powerfully to this progress than Lagrange. The writings of this man are models of simplicity and elegance; and yet so complete and general are his investigations, that they contain the fundamental theorems of celestial mechanics. By the invention and perfection of the method of the variation of the arbitrary constants of a problem, and by the establishment of the differential equations of a planetary orbit depending on the partial differential coefficients of a single function, Lagrange reduced the question of perturbations to its simplest form, and gave the means of deducing easily the most interesting conclusions on the past and future condition of our solar system. To supplement this great theorist there was needed another kind of genius. Combining the highest mathematical skill with unequalled sagacity and common sense in its application, Laplace gathered up and presented in a complete and practical form the whole theory of celestial mechanics. Besides his numerous and brilliant discoveries in theoretical astronomy, Laplace gave us some of the finest chapters ever written on the theory of attraction,<sup>2</sup> and a complete treatise on the calculus of probability.

<sup>1</sup> Address as Vice-President of Section A, at the Boston meeting of the American Association.

<sup>2</sup> "Ein schönes Document der feinsten analytischen Kunst."—GAUSS.