THE additions to the Zoological Society's Gardens during the past week include a Feline Dourocouli (*Nyctipithecus vociferans*) from Brazil, presented by the Right Hon. H. Hugh Childers, M.P.; an Ocelot (*Felis pardalis*) from British Guiana, presented by Mr. G. Whitmore Christie; a Little Grebe (*Podiceps minor*), British, presented by Mr. Thos. Edward Pryce; five Undulated Grass Parrakeets (*Melopsittacus undulatus*) from Australia, deposited; a Black Lemur (*Lemur macaco*) from Madagascar, a Tamandua Anteater (*Tamandua tetradactyla*) from Brazil, purchased.

OUR ASTRONOMICAL COLUMN

SOLAR PARALLAX FROM THE VELOCITY OF LIGHT.—Mr. D. P. Todd, of the *American Nautical Almanac* Office, publishes an interesting note upon this subject. Remarking that the opposition of Mars in 1862, when the planet approached near the earth, and the experimental determination of the velocity of light in the same year, mark the beginning of a new era in the history of the determination of the solar parallax, he refers to the many values of this constant which have since been worked out, and the fact that although theoretically the better class of these determinations should yield values in consistent harmony with each other, there are at present singular and unaccountable discordances. Prof. Newcomb's mean value of the parallax, 8·848, he observes, was regarded with caution only because it was considered too small, the researches of Hansen, Leverrier, Stone, and Winnecke appearing to place the parallax considerably outside Newcomb's value. Within the last two or three years, however, Mr. Todd remarks that "the parallactic pendulum has swung quite to the lesser extremity of the arc until the true value of the solar parallax has appeared possibly below 8″·8, and that, too, with good reason." But now there seems to be a slight gravitation towards a central value, and he thinks it is not possible to say that the mean equatorial horizontal parallax of the sun is so much as the hundredth part of a second different from the old figure, 8″·813 (27″·2 centesimal) adopted by Laplace in the *Mécanique Céleste*, and resulting from the early discussions of the transits of Venus in 1761 and 1769.

Fizeau made the first experimental determination of the velocity of light in 1849, but the earliest which can lay claim to the merit of trustworthiness is that of Foucault in 1862, who found it 298,000 kilometres per second, expressing confidence in it to about one-six-hundredth part, though Mr. Todd estimates the probable error twice as great. Next we have the first determination by Cornu, detailed in the *Journal de l'École Polytechnique*, 1874, which is 298,500 kil. ± 1,000. The second determination by Cornu, related in the *Annales de l'Observatoire de Paris*, t. xiii., 300,400 kil. ± 300; Helmert's rediscussion of these experiments in 1876 assigns 299,990 kil., the probable error of which value Mr. Todd estimates at 200 kil. Then follow two determinations by Mr. A. A. Michelson, U.S. Navy, to the first of which, 300,100 kil., he assigns equal weight with the earlier value of Cornu; the second, briefly described in the *American Journal of Science* for November, 1879, Mr. Todd interprets, giving equal weight to the one hundred separate determinations, to imply a velocity of 299,930 kil. ± 100. Assigning weights to these various values, he finally deduces for the velocity of light, 299,920 kilometres, or 186,360 miles per second.

The next step for the determination of the distance of the sun from the earth is the combination of this value with astronomical constants: (I.) Theory and observation of Jupiter's satellites afford a result of the interval of time required by light in traversing the mean distance of the earth from the sun, but there are only two precise determinations of this interval, astronomically speaking; the first by Delambre in his Tables of the satellites, which was also adopted by Damoiseau in his later tables, published in 1836, the second by M. Glasenapp, of the Observatory of Pulkowa, in 1874, from twenty-five years' observations of the first satellite of Jupiter, ending in 1873; the values are respectively 493·2s., and 500·84s. + 1·02s.; the latter value rests upon a much smaller number of observations than Delambre's, but Mr. Todd remarks that it is difficult to form a just estimate of the worth of an average observation of an eclipse of a satellite of Jupiter in the last century, and moreover, we have not the means of knowing the process of discussion followed by the French astronomer; he combines the result by giving double weight to Glasenapp's result, which depends upon observations of definite excellence, discussed with modern precision, and thus adopts 498·3s. for the time-interval required for light to reach the earth from the sun at her mean distance; he then combines the distance thus obtained with the value of the equatorial radius of the earth derived by Listing ("Neue geometrische und dynamische Constanten des Erdkorpers," Gottingen, 1878), and there results for the mean equatorial horizontal parallax of the sun 8″·802.

(II.) The velocity of light, the constant of aberration, the excentricity of the earth's orbit, and the earth's mean anomaly, are connected by an equation which Mr. Todd employs for a further determination of the solar parallax, adopting for the constant of aberration Struve's value (20″·4451), with Listing's value of the earth's equatorial radius, and by this process the sun's parallax is found to be 8″·811. Duly weighing the probable variations of the elements which enter into these computations, Mr. Todd concludes that the experimental determinations of the velocity of light hitherto made, give, when combined with astronomical constants, the mean equatorial horizontal parallax of the sun = 8″·808 ± 0″·006, and hence the corresponding mean radius of the terrestrial orbit = 92,800,000 miles.

FAYE'S COMET.—Although, as lately remarked in this column, the only known comet of short period which will be actually in perihelion during the present year is that discovered by Prof. Winnecke in 1858, Faye's comet will arrive at its least distance from the sun in January, 1881, and may be observed during the last half of 1880. Thanks to the admirable investigations of Prof. Axel Moller, the theory of Faye's comet is known with such precision that the ephemeris for the approaching reappearance, which he communicated to the Swedish Academy in September, 1878, and which has been reproduced in the *Astronomische Nachrichten*, may be expected to deviate in a very slight degree only from the truth, and the comet's discovery will be simply a test of the optical capacity of the telescope. Prof. Axel Moller commences his ephemeris on July 1, 1880, and continues it to the end of the year. On July 1 the theoretical intensity of light is 0·04, about equal to that at the date of the last observation with the 15-inch refractor at Pulkowa in 1844, and the comet in about R.A. 23h. 6m., Decl. + 8°, may be then observable. The maximum intensity will be attained about the middle of October, and will be about the same as at the last observation in 1858 with the 9-inch refractor at Berlin, or 0·21; at the end of the year the intensity of light will have diminished to 0·14. Thus the comet will be always faint, nor does it appear likely to present itself under the favourable circumstances attending its first appearance in 1843 for several revolutions yet to come.

GEOGRAPHICAL NOTES

BY a postscript to the February number of the Geographical Society's periodical we learn that a telegram has been received from Mozambique, announcing the arrival of the East African Expedition at Lake Tanganyika on October 28; the distance from Lake Nyassa was found to be 250 miles, the country level, and the people friendly. Mr. Thomson's account of his journey from Dar-es-Salaam to Uhehe is given in the present number, and his notes of the route, though necessarily somewhat rough, will afford useful material for filling up a blank in the map of East Africa. We have also Mr. Wilfrid S. Blunt's description of his visit to Jebel Shammar (Nejd), and his journey through Northern Arabia, of which he gave but an outline at a recent meeting of the Society. The paper is illustrated by two maps, one of which is a sketch map of Jebel Shammar furnished by Mr. Blunt. Among the geographical notes is an interesting account of Norwegian exploration last year in the Spitzbergen seas, which appears to have hitherto escaped notice in this country. Under the head of obituary we find brief notices of Major Herbert Wood, R.E., and Mr. Hepworth Dixon, while the remainder of the number contains the usual routine matter.

ACCORDING to the *Colonies and India*, Mr. Mitchinson, who has travelled much among the natives of nearly all parts of Africa, and especially in Berguela, Ovampo-, and Darnara-lands, &c., states that he saw there wild beasts which had been tamed entirely by the natives, although they are usually supposed never to attempt it. On the River Cunene he found two perfectly tame cow hippopotami, which were not confined in any way, but always returned to the village. In a neighbouring place Mr. Mitchinson also saw an African elephant which had been tamed, and was entirely under control. This certainly goes to show that the