

In a paper read at the last meeting of the Librarians' Association, Mr. J. R. Boosé describes the progress of Colonial public libraries. Commencing with those in the Dominion of Canada, he stated that as far back as 1779 there was a public circulating library at Quebec. He then traced the progress of the public library system up to the present, giving a detailed account of the Parliamentary Library at Ottawa, and also referring to the recent establishment of free public libraries. He then traced the progress made in the Australasian colonies, dealing separately with the libraries of Victoria, and stated that the establishment of public libraries in those colonies only dated from the second decade of the present century. Their growth, however, had been of extraordinary rapidity; the statistics for Victoria showed that there were 143,073 volumes in the public library of Melbourne, 317,295 in the libraries of the colony, and that these institutions were visited in 1883 by 3,100,000 persons. Mr. Boosé, after describing the libraries of the other Australian colonies, referred to those of the Cape Colony, Natal, Singapore, Jamaica, British Guiana, Trinidad, the Bahamas, &c., and, in conclusion, observed that it was scarcely possible to overrate the advantages of these institutions, inasmuch as, in addition to their existing collections of books, every effort was made to enrich them by such valuable works of reference as were too costly to be purchased privately, and were only presented to libraries having a recognised status. He thought therefore that the Colonial Governments should provide means annually for their proper maintenance, and not throw the cost of them on the municipal authorities.

THE additions to the Zoological Society's Gardens during the past week include two Barbary Apes (*Macacus inuus*) from North Africa, presented respectively by Mrs. Allison and Mrs. D. Fox Tarratt; two Common Marmosets (*Hapale jacchus*) from Brazil, presented by Col. Howell Davis; two Brown Bears (*Ursus arctos*) from Russia, presented by Mr. Walter Holdsworth; two Bandicoot Rats (*Mus bandicota*) from India, presented by Col. C. S. Sturt, C.M.Z.S.; an American Robin (*Turdus migratorius*) from North America, presented by Mr. H. Keilich; two Partridges (*Perdix cinerea*), British, presented by Mr. H. J. Snelgrove; an Azara's Fox (*Canis azaræ*) from South America, a Pleasant Antelope (*Tragelaphus gratus* ♀) from West Africa, six Common Chameleons (*Chameleon vulgare*) from North Africa, purchased; a Japanese Deer (*Cervus sika* ♂), three Canadian Beavers (*Castor canadensis*), a Chiloe Wigeon (*Mareca chilensis*), seven Australian Wild Ducks (*Anas superciliosa*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN

THE PERIODICAL COMETS OF DE VICO AND BARNARD.—As was first pointed out by Prof. Weiss, there is a certain degree of resemblance between the elements of the comet discovered by Barnard in July, 1884, and those of the comet of short period detected by De Vico in August, 1844, which Leverrier considered was probably identical with the comet observed by Lahire at Paris in 1678, though not known to have been seen in the long intervening period. It appears from Brünnow's minute investigation of the orbit of De Vico's comet that the mean motion at perihelion passage in 1844 is not determinable from the observations within very narrow limits, as might rather have been expected, considering the degree of precision with which that comet was observed from the beginning of September to the end of December, Mr. Otto Struve's observations in particular being of remarkable excellence. According to Brünnow's later calculations, the results of which were published in his "Ann Arbor Notices," the mean motion was close upon 650" daily, but he considered that it might be as small as 640" or as large as 660", or, in other words, that the period of revolution at perihelion passage in September, 1844, might be as long as 2025 days, or it might not exceed 1964 days. Dr. Berberich finds the period of Barnard's comet 1959 days, and Mr. Egbert, of Albany, U.S., 1970 days, so that the periods of the two

comets are pretty accordant; but the interval 1844-1884 does not correspond thereto, and the differences that exist in the other elements, notwithstanding the general similarity remarked by Weiss, point to considerable perturbation in this interval, supposing the identity of the comets. De Vico's comet in the orbit of 1844 could not have approached near to the planet Jupiter, to which body we are accustomed to look, as the great disturber of cometary orbits, but there is the possibility of a very close approach to the planet Mars, and this is also the case in a striking degree with Barnard's comet, which, in Dr. Berberich's last ellipse, is less than 0.008 of the earth's mean distance from the orbit of Mars in about 350° 50' heliocentric longitude; as already pointed out in this column, there may have been a close approach of the two bodies at the end of 1873 or beginning of the following year. The nearest approximation of the orbits of 1844 and 1884 is 0.043 in heliocentric longitude 310°, and there is another approximation, 0.065, in 143°. At present, however, the identity of the comets of De Vico and Barnard is to be regarded as at least doubtful.

THE DOUBLE-STAR 19 (HEV.) CAMELOPARDI.—The annual proper motion of the principal component of this double-star, which is 2.634, resulting from a comparison of Groombridge's Catalogue (mean year of observation 1808.4) with the Greenwich Catalogue of 1872, appears to be -0".297 in right ascension, and +0".164 in declination, the accurate trigonometrical formula being employed. For the relative motion of the smaller component with respect to the principal one, we may compare Struve's epoch for 1834 with a mean of the measures of Dembowski, Flammarion, and Asaph Hall between the years 1875 and 1879, viz.—

1834.15	...	Pos. 348.57	...	Dist. 34.042
1877.29	...	" 1.11	...	" 20.303.

Whence we find for the annual relative motion in right ascension +0".858 and in declination -0".302, and we have thus a confirmation of the opinion expressed by M. Flammarion in his "Catalogue des Étoiles Doubles et Multiples en Mouvement relatif certain," that the smaller component has a real motion, more rapid than that of the principal star, of contrary sign, and not far from parallel to it.

A DAYLIGHT OCCULTATION OF ALDEBARAN.—On July 9, civil reckoning, Aldebaran will be visibly occulted in this country about noon. If the distribution formulæ of Littröw and Woolhouse are applied, the following expressions result for finding the Greenwich mean times of disappearance and re-appearance, and the angles from north point—

Disappearance	...	July 8, 23h. 26.7m.	- [0.2369] L + [9.5144] M
Reappearance	...	July 9, oh. 15.3m.	+ [9.1126] L + [9.4189] M
Angle at Disappearance		49°.3	+ [0.542] L - [8.004] M
" Reappearance		321°.6	- [0.528] L - [8.701] M

Here the latitude of the place is put = 50° + L, and M is the longitude in minutes of time, positive towards the east. If we apply the formulæ to Oxford, we have L = +1°.76, and M = -5.043 m., and hence

Disappearance,	July 8, 23h. 22.0m.	at 55°.
Reappearance	July 9, oh. 14.2m.	at 316°.

It should be added that the above quantities within square brackets are logarithms.

ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, JUNE 28 TO JULY 4

(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 June 28

Sun rises, 3h. 48m.; souths, 12h. 2m. 58.7s.; sets, 2oh. 18m.; decl. on meridian, 23° 16' N.; Sidereal Time at Sunset, 14h. 46m.

Moon (one day after Full) rises, 19h. 58m.*; souths, oh. 27m.; sets, 4h. 58m.; decl. on meridian, 18° 1 S.

Planet	Rises		Souths		Sets		Decl. on meridian	
	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.		
Mercury	...	3 43	...	12 8	...	20 33	...	24 33 N.
Venus	...	4 56	...	13 8	...	21 20	...	22 55 N.
Mars	...	1 50	...	9 53	...	17 56	...	21 25 N.
Jupiter	...	8 45	...	15 50	...	22 55	...	11 45 N.
Saturn	...	3 19	...	11 29	...	19 39	...	22 31 N.

* Indicates that the rising is that of the preceding day.