

stars of the 4th or 5th magnitude could be distinctly seen through the tail. The tail pointed in a direction about midway between Sirius and Procyon. M. Dechevrens, the director of the Zi-ka-Wei Observatory (near Shanghai) has devoted a good deal of attention to this comet, the result of which will directly be published.

*Amateur Mechanics* is the name of a new illustrated monthly Magazine, conducted by Mr. P. N. Hasluck, and published by Trübner and Co.

WE have received from the U.S. Naval Observatory the results of the observations made to determine the longitude of the observatory of the J. C. Green School of Science, Princeton, N.J. The final result is that the latter is oh. 9m. 34s. 538 east of the central dome of the observatory.

THE earthquake in Panama on November 7 was followed by a violent shock on November 13 at 2.30 a.m. It was observed also at Taboga and Colon. It is remarkable that all the Central American earthquakes since August last have occurred between midnight and daybreak. Their general direction was invariably from north to south, and it is supposed that they proceeded from one and the same cause. The West Indian cable broke, at a point about thirty miles from land, during a violent shock. The centre of the disturbance seems to lie near the West Indian Isles. During the second week of December seven shocks were felt in the Spanish province of Almeria. On December 8 at 10.1 p.m. a fearful shock lasting four seconds was felt at Tecuci (Roumania). Its direction was from south-east to north-west. Another earthquake is reported from Hermagor (Carinthia). It occurred on December 10 at 2 a.m., and was preceded by a terrible thunder-storm.

AN "Illustrirte Bienenzeitung," organ for the propagation of rational apiculture, will be edited by Prof. Adolphson of Zürich, beginning on the 1st inst.

IN the Pelion district a moderately violent earthquake occurred on December 11, but no damage was done. Upon the island of Santorin new volcanic activity has recently been noticed; also in the subterranean volcano which formed near Missolonghi.

THE additions to the Zoological Society's Gardens during the past week include a Himalayan Bear (*Ursus tibetanus*) from Burmah, presented by Capt. Connor; two Bronze Fruit Pigeons (*Carpophaga aenea*) from India, presented by Mrs. A. H. Jamrach; four Barred-shouldered Doves (*Geopelia humeralis*) from Australia, presented by Mr. Ernest L. Bentley; a Lesser Sulphur-crested Cockatoo (*Cacatua sulphurea*) from Moluccas, presented by Mr. K. Digby; a Gannet (*Sula bassana*), British, presented by Mr. Thomas Keen; a Cape Bucephalus (*Bucephalus capensis*) from South Africa, presented by Mr. H. Pillans; a White-fronted Lemur (*Lemur albifrons* ?) from Madagascar, four Wood Thrushes (*Turdus mustelinus*), a Golden-winged Woodpecker (*Colaptes auratus*) from North America, two Cirl Bunting ( *Emberiza cirrus* ), two Crested Grebes (*Podiceps cristatus* ), a Razorbill (*Alca torda* ), a Bar-tailed Godwit (*Limosa lapponica* ), a Red-throated Diver (*Colymbus septentrionalis* ), British, purchased.

#### OUR ASTRONOMICAL COLUMN

THE TOTAL SOLAR ECLIPSE ON MAY 6.—The right ascensions and declinations of the moon for 1883, both in the *Nautical Almanac* and the *American Ephemeris*, depend upon Hansen's Tables, with the recent corrections of Prof. Newcomb. They furnish as accurate positions as are obtainable from existing tabular data, and it will be of interest to trace their bearing upon the circumstances of the total eclipse of the sun which crosses the Pacific on May 6. On laying down the belt of totality upon the Admiralty chart of this ocean, it appears that the following islands are included within it, viz. :—Rance, Buffon, Beveridge,

Flint, Caroline, and Chanel Island (in the Marquesas); the positions read off from the general chart or for Flint, Caroline, and Chanel Island, from the enlarged Admiralty charts are as follow :—

	Long. $176^{\circ} 22'$ West.	Lat. $24^{\circ} 20'$ South.
Rance Island,	176 22	24 20
Buffon "	170 0	20 39
Beveridge, "	167 50	20 0
Flint "	151 50	11 25
Caroline "	150 6	9 54
Chanel "	140 31	7 55

From direct calculation for each of these points the following local mean times of beginning of totality, the duration of the same, and the sun's approximate altitude at the time, result :—

	Totality begins			Duration.	Sun's Altitude.
	May 6.				
	h.	m.	s.	m. s.	°
Rance Island,	8	47	36 a.m.	3 27	29
Buffon "	9	22	18 "	4 20	38
Beveridge, "	9	34	48 "	4 1	41
Flint "	11	19	43 "	5 26	61
Caroline "	11	33	4 "	5 7	63
Chanel "	0	43	32 p.m.	1 47	63

It should be mentioned that the semi-diameter of the sun has been taken from the *Nautical Almanac*; that of the moon was obtained from her horizontal parallax, using the factor 0.2725. The duration of totality at Sohag in Egypt in the eclipse of last May was exactly given by this arrangement.

THE MINOR PLANETS.—The part of the *Berliner Astronomisches Jahrbuch* for 1885, containing ephemerides of the minor planets for 1883, has been issued to the various observatories in advance of the publication of the annual volume. It contains approximate places for every twentieth day of 224 of these bodies, the latest being No. 225, with accurately calculated opposition ephemerides of 43, each extending over about five weeks; this division of the *Jahrbuch* occupies upwards of one hundred pages.

There are six cases during the year where the planets approach the earth about opposition, within her mean distance from the sun. On June 22 *Phocæa* is at a distance of 0.93, declination +16°; on July 12 the distance of *Clio* is 0.96, declination -35½°; on August 1 that of *Isis* is 0.90, declination -28°; on October 1 that of *Polyhymnia* is 0.98, declination +8½°; on October 20 that of *Virginia* is 0.98, declination +13°, and on December 11 *Flora* in perigee is at a distance of 0.97, with declination +18°. Galle's method of determining the solar parallax, so strongly advocated and ably applied by Mr. Gill, is not likely to fail for want of opportunities of applying it. As regards the magnitude near opposition we have in the case of *Phocæa* 9.0; *Clio*, 10.2; *Isis*, 8.8; *Polyhymnia*, 9.7; *Virginia*, 9.9; and *Flora*, 8.2.

During the year 1883 four of these planets descend below 14m., from coming into opposition not far from aphelion.

COMET 1882 c.—Mr. Gill has secured five complete observations of this comet (discovered by Mr. Barnard in September) on the meridian S.P., with the transit-circle at the Cape of Good Hope, between November 11 and 30, so that places for upwards of a fortnight after the perihelion passage will be available for calculation.

#### THE EDUCATION OF OUR INDUSTRIAL CLASSES<sup>1</sup>

IT is, I believe, according to precedent, now that another year's work of the Science Classes here has been crowned by the award of prizes, that I should address you on some topic allied to the matters which have brought us together to-night. I need not search long for a subject, for the scientific education of those engaged in our national industries—upon the success or failure of which, in the struggle for existence, the welfare of our country so largely depends—is now one of the questions of the day. I propose, therefore, to lay before you some facts and figures bearing upon the education of our industrial classes, and I shall attempt to make what I have to say on that special point clearer, by touching upon some preliminary matters, which will show how it is that such a question as this has not been settled long ago; and further, that we can, if we wish, settle it now in

<sup>1</sup> An address delivered in presenting the prizes at the Coventry Science Classes, by J. Norman Lockyer, F.R.S.