ashes underneath. It appears by a letter from Mr. Greene, "that a gentleman brought two Indian snakes to Ballinrodan, both of which escaped six or seven years ago; one of them was found half eaten by a pig shortly afterwards, and this might be the other, though how it lived through the winters I do not know."

It would be interesting to ascertain whence the snake came and how it found its way to the proscribed island.

London, Sept. 28 J. FAYRER

Origin of the Numerals

IN the novel "David Elginbrod," by George Macdonald, p. 45, is a suggestion of the origin of the forms of the numerals in daily use, very similar to that indicated by Mr. Donnisthorpe in last week's NATURE, p. 476. The disposition of the lines in some of the figures is very ingenious. G. W. WEBSTER

Chester, Oct. 4

IF your correspondent will refer to Leslie's "Philosophy of Arithmetic," p. 103 *et seq.*, he will find that very much is known respecting the origin of the numerals. By referring to p. 107, same work, he will find that the numerals he gave are wonderfully like the Sanskrit.

Newcastle-upon-Tyne, Oct. 4 WM. LYALL

Scalping

MR. CHARLES C. ABBOTT, in NATURE, vol. xii. p. 369, wishes to learn what other men, if any, besides the North American Indians, have the practice of scalping among them. The question is answered in Southall's "Recent Origin of Man," chap. ii. p. 40. "In this connection we may mention that the custom of *scalping* is not peculiar to the American Indians. Herodotus mentions that it was one of the most characteristic practices of the ancient Scythians. But this is not all; it is stated that the practice prevails at this day among the wild tribes of the frontier in the north-eastern district of Bengal. The *Friend of India*, commenting on this statement, adds: 'The Naga tribes use the scalping-knife with a ferocity that is only equalled by the American Indians, and the scalps are carefully preserved as evidences of their prowess and vengeance over their enemies. On the death of a chief, all the scalps taken by him during his warlike career are burned with his remains.'" G. PEYTON

University of Virginia, U.S.A., Sept. 22

OUR ASTRONOMICAL COLUMN

THE DOUBLE STAR Σ 2120.—As mentioned last week, M. Flammarion advocates the binary character of this star, identifying it, as Sir John Herschel had already done, with H. III. 89. Sir W. Herschel's observation runs thus:—

"III. 89. Ad 63^{am} Herculis. In linea per δ et ε ducta.
1782 Nov. 26. Double. About 4 degrees from δ towards ε Herculis, near the 63rd. Very unequal. L. r.; S. r. Distance 11″ 53″. Position 47° 48′ n. following."

There is a contradiction here; a position "4 degrees from δ towards ε Herculis," which pretty well agrees with that of Σ 2120, would not be near 63 Herculis, which is little more than 1° s.p. δ.

The formula given in NATURE, vol. xii. p. 147, assigns for the position of the small star at Sir W. Herschel's date—

Angle ... 36° 39′ ... Distance 10″·72
The observation has ,, ... 42 12 ... ,, 11 ·18

It is by the difference between these positions, which however it may be remarked is not larger than we occasionally meet with on comparing Sir W. Herschel's measures with recent ones, in cases of stars which there is reason to suppose merely optically double, that the binary nature of the object is considered to be proved by M. Flammarion, as it had been by Sir John Herschel in the paper upon his father's measures, which appears in vol. 35 of the "Memoirs of the Royal Astronomical Society." Until that single observation is supported by curvature in the path of the small star subsequent to its nearest approach to the primary, which if this be really a binary system must probably become sensible within a few years from the present time, the suspicion of rectilinear motion of the small star as the cause of the change of position, representing as it fairly does the measures between 1829 and 1873, is not one perhaps that can be legitimately abandoned. The apparent fixity or nearly so of the principal component to which reference was made in our former remarks, is supported by Dr. Engelmann's comparison of the place deduced from meridian observations at Leipsic in 1867, with Struve's position in "Positiones Mediæ," for which the mean date is 1836·1; for secular proper motion he found $\Delta\alpha = +0^{s}\cdot192$, $\Delta\delta = +2''\cdot40$—very insignificant quantities, and showing that if proper motion, as we have surmised, enters into the question, it is mainly the smaller star that is affected by it. M. Flammarion, relying as stated upon Sir W. Herschel's measure of 1782, concludes: "C'est donc un système orbital très-incliné, et c'est peut-etre celui dont l'aspect ressemble le plus aux systêmes de perspective." We leave it for the measures that may be made during the next few years to decide between these opinions.

THE NEBULA IN THE PLEIADES.—In No. 5 of "Publicazioni del Reale Osservatorio di Brera in Milano," Herr Tempel has laid down the stars in the Pleiades, from the "Durchmusterung," and traced the outline of the nebula near Merope as it appeared to him with a magnifying power of twenty-four on a telescope of four inches aperture. The outline is shown to be elliptical, one extremity of the longer axis, the northern one, at Merope, and the inclination of this axis to the circle of declination about 18°, so that as referred to Merope, the angle of position of the longer axis is 198°; the greatest and least diameters of the ellipse are roughly 35′ and 20′.

M. Wolf, of the Observatory of Paris, observing with the telescope of $0^{m}\cdot31$ aperture in March 1874, perceived two nuclei, one almost concentric with Merope, the other and brighter of the two at a distance of about seven seconds, on the same parallel, following. From the month of November 1874 to the end of February 1875 the nebula could not be seen notwithstanding the very favourable atmospheric conditions, and at the same time M. Stéphan was unable to detect it with the telescope of $0^{m}\cdot80$. M. Wolf concludes that the nebula is certainly variable, and that its period is pretty short.

Herr Tempel remarks that generally the nebula has been much more readily seen with small telescopes than with large ones, and doubt has been expressed as to any real variability of light; yet it is not easy to understand, except upon this supposition, why the nebula should be visible at certain times in a particular telescope and invisible at others, the circumstances of sky appearing to be about the same in all cases.

This nebula was first remarked by Herr Tempel, at Venice, on the 23rd of October, 1859.

THE SATELLITES OF URANUS AND NEPTUNE.—An elaborate and highly interesting investigation of the elements of these satellites from observations with the 26-inch equatorial of the United States Naval Observatory, Washington, and of the masses of the primaries thereby indicated, has been received from Prof. Newcomb during the past week; it forms an appendix to the Washington Observations for 1873. The most probable value of the mass of Uranus derived from these observations is $\frac{1}{22900}$, with a probable error of 100 in the denominator of the fraction. For Neptune the value of the mass by satellite-observations is $\frac{1}{19380}$; the mass deduced by Prof. Newcomb from the perturbations of Uranus

having been $\frac{1}{1570}$: the value resulting from the satellite-observations is preferred. A further account of this important memoir by the eminent American astronomer is reserved for next week.

THE MINOR PLANETS.—M. Leverrier's *Bulletin International* of Sept. 30 mentions the observation of a small planet, on Sept. 21st, by M. Perrotin at Toulouse, 13th mag., which may possibly be new, though at present there is a chance of its identity with No. 77, which is in the same quarter of the sky and has not been observed since 1868, or with No. 137, of which no elements have yet appeared. Its place at 8 P.M. was in R.A. 23h. 16m. 8s., and N.P.D. 95° 12′.

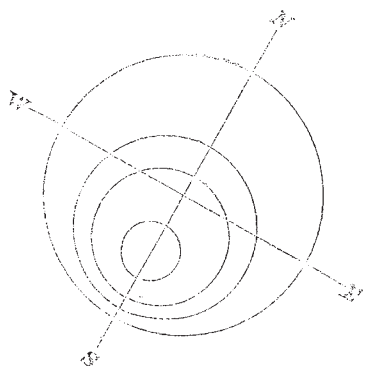
THE TOTAL SOLAR ECLIPSE OF 1878, JULY 29.—The *American Ephemeris* for 1878 is published. The elements of the total eclipse of the sun on July 29, derived from the Lunar Tables of Prof. Peirce, which are adopted for the calculations in that work, are almost identical with those of the *Nautical Almanac*, founded upon the Tables of Hansen, Denver. Colorado appears to be one of the principal places within the limits of the shadow, though some distance from the central line. The sun will be centrally eclipsed on the meridian, according to the *American Ephemeris*, in long. 139° 8′ W., lat. 60° 32′ N.; and according to the *Nautical Almanac*, in long. 139° 10′ W., lat. 60° 27′ N.

MAYER'S METHOD OF OBTAINING THE ISOTHERMALS OF THE SOLAR DISC

THE short notice which I published of my "Discovery of a method of obtaining thermographs of the isothermal lines of the solar disc" was so concisely written that the precautions which are necessary in this new method of research were omitted; but as the republication of my paper in NATURE (vol. xii. p. 301) and in other European journals may induce those engaged in astronomical physics to try the process, I think it proper that I should call attention to some very important experimental conditions to be fulfilled before accurate results can be reached.

1. Special precautions must be taken to prevent currents of air from acting on the film of double iodide.

2. If the image of the sun be formed on the blackened side of the paper, it is absolutely necessary that uniformity should be given to this coating of lamp-black. So difficult is this to achieve that I have generally formed the sun's image directly on the film of iodide. Slight irregularities in this film do not appear to affect the form of the isothermals; but the latter follow irregularities in the smoked surface.



3. The most important, and indeed absolutely essential, condition in these experiments is that the image of the sun shall be formed on a truly *horizontal surface*; for the centre of gravity of any isothermal formed on an *inclined* surface is always *above* the centre of the sun's image and in a vertical plane passing through this centre. Hence all isothermals thus formed are very excentric when referred to the sun's centre. They are also elliptical. The accompanying figure gives isothermals obtained on an inclined surface. *N S* is the solar axis. On obtaining these same isothermals on a horizontal surface they were, as near as could be seen, circular and concentric with the sun's image.

Of the influence of an inclined surface in displacing the isothermals there can be no doubt, and the same action has effected all of the results which have been obtained in the employment of thermopiles in connection with the sun's image received on screens attached to equatorial telescopes. This displacement would mislead an observer, and would cause him to be of the opinion that there existed a decided difference of temperature between the north and south solar poles, and between the portions of the periphery of the sun's image near the poles and near the solar equator. Do not these facts reached by me explain the difference in the results obtained by Secchi and Langley?

The above effects of inclined surfaces appear to be caused by a film of hot air which flows up over these surfaces, and especially on the lower surface of the screen. If the sun's image is received on a film of iodide enclosed between plates of glass or of mica, the excentricity of the isothermals is hardly apparent at first; but after some time it appears, produced by the action of the ascending film on the surface of the glass.

The proper method of research is to use a simple Fahrenheit's heliostat with a good plane mirror, and to throw the solar rays in the direction of the polar axis of the instrument. These rays traverse lenses of from 12 to 30 feet focus, and just before they have converged to form the solar image they are reflected perpendicularly, by another plane mirror, on to the horizontal surface of the iodide.

ALFRED M. MAYER

*FAYE ON THE LAWS OF STORMS**

Examination of the Theory of Aspiration.—After a somewhat detailed account of opinions held regarding waterspouts in the prehistoric and Roman epochs, and from the sixteenth century downwards, all agreeing in this, that the water of the sea is sucked up to the clouds by these meteors (Fig. 6), M. Faye inquires, How then could it be doubted that waterspouts, and consequently tornadoes, typhoons, &c. are simply phenomena of aspiration?† Such has been in reality, since the time of Franklin, the point of departure for meteorologists; and hence the prevailing notions regarding hurricanes, that they are centripetal and formed by horizontal currents of air flowing from all quarters towards the centre of aspiration.

Clearly in this case the conclusions have not been drawn with the caution which science demands. To accept, with the eyes shut, the most astounding assertions without examination or verification; to believe, for example, that a waterspout could suck up the water of the sea to a height of 2,000 feet when the most powerful pump could not raise it to the height of forty feet; to admit that insubstantial vapours could form a tube whose sides are capable of resisting the whirling masses of water supposed to ascend through it; to assert that deluges of sea-water are engulphed in the clouds where the clouds cannot retain simple drops of rain, is not in accord with the usage of science, and indeed can only be explained by the dominating power of an old preju-

* Continued from p. 459.

† It not being considered as disputed that a tornado is nothing but a large waterspout, a typhoon only a large tornado, and that there is no essential difference between a cyclone and a typhoon, M. Faye proceeds to test the theory of centripetal aspiration as regards waterspouts and tornadoes, and conceives that the conclusions thus arrived at will have equal weight when applied to the theory of cyclones.