

accuracy, but having three, the readings of them cannot be questioned by the most sceptical.

We left Sandy Hook on the forenoon of April 10, with a light north-west wind and pleasant weather. Temperature of the air 46, barometer 29.82. From that date to the 16th the ship steamed 2,210 miles, and the mercury, with the exception of a slight fluctuation which never exceeded $\frac{1}{100}$ of an inch, fell steadily until it reached 29.14 on the latter day. Throughout this period the wind veered and backed between N.N.W. and E.N.E., never exceeding in force a whole sail breeze, and frequently light or calm for hours together. The sky was generally overcast until the meridian of 32° W. was passed; light rain fell once, but no snow or sleet. Temperature of the air ranging between 34° and 57°.

Until the ship was to the eastward of Cape Race (passing 300 miles south of it), as no gale blew I expected a heavy fall of snow; but as it did not come, I assumed that the snow-covered ice on the Grand Bank of Newfoundland caused this unusual depression of the mercury. Great was my surprise, therefore, to see it falling lower as the distance increased from the supposed cause of the depression, while the wind gradually died away, the clouds opened out and assumed softer forms, the horizon cleared, and the long northerly swell subsided. The latter is always a sign of fair weather on this troubled sea. If a storm be advancing towards a ship, the swell usually comes before the wind, so quickly is the motion of the water translated.

While on the subject of waves, I may state that I have been investigating the cause of the greater height of the waves raised by a north-west wind above those raised by a south wind. The observations were made while crossing several offshoots of the Gulf Stream, and I found that in every instance the sea was smoother in the warm water than in the cold. If this view be correct, then the waves in tropical seas should be inferior in height to those of the temperate zone. The question is, Are they so?

Snow has an extraordinary effect on the barometer, but its action is most mysterious, as in this case the ship was several hundred miles from any locality where snow could have fallen.

In March 1872 I witnessed a similar instance of great depression in the barometer, with no wind and a clear sky. On reaching the land it was found to be covered with snow. In that instance there was scarcely a cloud visible during the last 400 miles, and not a single flake fell on the ship. I believe the remarks of an old seaman on the weather of the Atlantic are very true, viz., "The longer one sails on it the less one knows about it."

The presence of heavy field-ice in the month of April, so far south as 41° 40' N., only fifty miles north of the latitude of Naples, has excited considerable astonishment amongst Atlantic navigators, since many steamers were entangled in it as early as the 24th of January.

The Admiralty Chart of 1873 indicates March as the first month of its arrival, and further gives lat. 42° 13' N. as the extreme southern limit of its existence, whereas it has already been met with twenty-seven miles south of that parallel, forming a dangerous barrier to ships on the great highway to America; and the commanders of those vessels, relying implicitly on the correctness of a survey which should be above suspicion, have seriously injured their vessels, thereby jeopardising many lives and valuable property in a locality where every feature of it should be as well known as the waters of the Serpentine or the Thames above bridge. It is, moreover, notorious that this is not the only defect in the chart of 1873. The northern limit of the Gulf Stream is laid down from 100 to 150 miles south of its true position; and the existence of another important current (the Labrador), which plays no mean part in the economy of the globe, is entirely ignored, although its line of demarcation from the adjacent waters is as well defined as that of its great neighbour.

It is stated by the old residents of Canada that such a severe winter as this has not occurred in the Dominion for forty years. During the months of January and February at Montreal the wind only blew from the south for six hours. Not only was the thermometer low, but the northerly gales were incessant, rendering outdoor exercise almost an impossibility. These storms broke the ice of Newfoundland and Labrador from its moorings before the summer sun could soften it, and hence the reason of its floating down south. Being almost as hard as granite, and with the sea water at 30°, it will not readily decompose.

The recent severe winter must affect the fortunes of the polar expedition for good or for evil. Channels into which ice has

drifted will become inaccessible until late in the season, but, on the other hand, the pack-ice will be less inconvenient from its solidity and compactness. It is not probable that many large bergs will reach the Atlantic this season.

Celtic

W. W. KIDDLE, R.N.

The late W. J. Henwood, F.R.S.

MR. G. T. BETTANY is no doubt very nearly, if not quite, correct in saying of Mr. Henwood (NATURE, vol. xii. p. 293), "I believe that scarcely one of his cherished objects in this respect [the arrangement of his stores of facts and observations] remains unfulfilled."

In a letter to me, dated July 31, 1875, Mr. Henwood remarked: "I believe all I have done since [I wrote you last] has been to make some preliminary calculations regarding the corrections for temperature of the results of my observations on magnetic intensity, made on the surface and near the bottom of Dolcoath Mine in 1832. I think they hold out promise of something if I have only strength to put them in order." On the fifth day after writing this he died. M. Y.

Zoology of the "Erebus" and "Terror"

Palmar qui meruit ferat. Referring to the article on this subject (NATURE, vol. xii. p. 289), allow us, as the publishers of the botanical portion, to say that the indefatigable labours of Dr. Hooker, aided by the Government grant, resulted in six vols. 4to.; not two, as stated by the reviewer. This was published in three divisions, viz.: 1. Flora Antarctica, 2 vols.; 2. Flora Novæ Zealandæ, 2 vols.; 3. Flora Tasmaniae, 2 vols.; the whole comprising nearly 600 coloured plates.

L. REEVE AND CO.

5, Henrietta Street, Covent Garden, Aug. 14

The Rocks at Ilfracombe

COULD any of your readers state in your columns the nature of a curious appearance in the rock near Ilfracombe (North Devon), on the way to Coombe Martin, just where the road begins to descend to the latter place? Here on the right-hand side the bank is considerably excavated, and through the scaly and friable strata, whose cut surface is perpendicular to the road, rock of a harder kind seems to have been pushed, presenting a rounded surface, which gives the appearance of trees laid in the bank and partly uncovered; indeed, I first heard of them as "petrified trees," and from the road they look very much like the trunks of silver birches. Our Ilfracombe driver told me that a great many people came to look at them, some saying they were trees, others that they were not.

There are several of them, and various lengths are visible, from about a yard to twenty feet, I should think.

WILLIAM S. TUKE

OUR ASTRONOMICAL COLUMN

BINARY STARS.—(1) η CASSIOPEÆ.—Dr. Duner, of the Observatory of Lund, Sweden, has calculated elements of this binary from measures 1782-1874; the orbit is as follows:—

Peri-astron passage, 1748.413	
Angle between the lines of nodes and apsidæ 245° 91'	} Meridian of 1850
Node 50° 83'	
Inclination 68° 46'	
Angle of excentricity (= $\sin^{-1} e$) 38° 812	
Mean annual motion + 2° 04112	
Semi-axis major 10" 681	
Period of revolution 176° 374 years.	

The comparison with measures used by Dr. Duner in his calculation shows very small residual errors, but the elements here transferred from Leverrier's "Bulletin International" of the 12th inst., though representing the angles of Struve, Dawes, Jacobs, and Dembowski, with small negative errors give the distances measured since 1827, very sensibly in defect of the observations. Thus for Dembowski's measures we have—

1863.26	Error in position	- 0" 72	Error in distance	- 0" 69
1867.16	"	- 0" 71	"	- 0" 63
1871.05	"	- 0" 18	"	- 0" 46

For a normal founded upon measures by Jacobs, Dawes, and Dembowski, for 1854.20, the error in position

is, $-2^{\circ}4$, and in distance, $-0''74$. The elements above are perhaps affected by error of copy, but as they stand they will admit of some improvement.

With Dr. Duner's semi-axis and period, and Mr. Otto Struve's first approximation to the annual parallax, the mass of this system would be upwards of ten times the solar mass.

It will be remarked that the angles in the above orbit are expressed by Dr. Duner in decimals of degrees, and we may take this opportunity of directing attention to a very useful table of five-figure logarithms adapted to decimals of the degree published at Berlin in 1872 by Dr. C. Bremiker, which will be found available not only in double-star computations, but very generally for five-figure work. The figures closely resemble those in De Morgan's well-known tables (which are now apparently out of print), and consequently are exceedingly clear and readable, and the price nominal (one shilling). Several miscellaneous tables and various useful constants are appended. The work will be sent over in paper cover, and in binding this or any other set of tables for frequent use, we would recommend the strong gilding of all the edges as materially facilitating their working. When shall we have a table of *four-figure* logarithms to the same extent as tables for five figures are usually printed? Such a work would be by no means without its value.

(2) γ LEONIS.—Dr. Doberck, of Col. Cooper's Observatory, Markree, has calculated elements for this star, though the arc described is at present less than 30° , under which condition orbits widely different may be obtained. Peri-astron passage, 1741.11; period of revolution, 402.6 years; node, $111^{\circ}50'$; λ , $194^{\circ}22'$; γ , $43^{\circ}49'$; eccentricity, 0.7390; semi-axis major, $2''00$.

There are several of the revolving double-stars of which much better orbits than have yet been published might now be found; as, for instance, ω Leonis and λ Ophiuchi. Of the fairly determined orbits, the shortest period appears to be that of 42 Comæ Beren—25.5 years, according to Mr. Otto Struve; and the longest that of Castor, 997 years, according to the very complete investigation of Herr Thiele.

THE MINOR PLANETS.—M. Leverrier, in his "Bulletin International" of the 8th inst., announces the discovery of No. 148 at Paris, by M. Prosper Henry, on the same morning. The planet is of 10.7 mag., and was found a little west of 70 Aquarii.—Circular No. 31 of the "Berliner Jahrbuch" contains new elements of Lachesis (120); the period of revolution at the next opposition in November is 2,028 days. In No. 30 appeared new, though still uncertain, elements of Austria (136); period 1,261 days.

THE AUGUST METEORS.—The extensive systematic plan of observation at the principal meteor epochs which has been for some time organised by the Scientific Association of France, at the instance of M. Leverrier, has again been attended with success, on the occasion of the Perseid shower. At Rouen on August 9, between 11h. and 15h., 200 meteors were noted, of which 180 came from the Perseus-radiant; at Rochefort, on the same night, 258 meteors were observed, nearly the whole conformable; and on the 11th, at the same place, 260, many with the same radiant.—About August 5th, in the neighbourhood of London, an unusual number of meteors, more than one as bright as stars of the first magnitude, diverged from Omicron in Andromeda.

Prof. Oppölzer's *definitive* elements of Comet 1862 (III.), with which the August meteor-stream is associated, are here subjoined:—

Perihelion passage, 1862, August 22.91192 G.M.T.	
Longitude of perihelion ... $344^{\circ}41'32''$	} M. Eq. 1862.0
" Ascending node ... $137^{\circ}27'10''$	
Inclination to ecliptic ... $66^{\circ}25'48''$	
Eccentricity ... 0.9607588	
Semi-axis major ... 24.53142	
Period of revolution ... 121.502 years,	

The point of nearest approach to the earth's orbit at the descending node is passed 19.357 days after perihelion; if in 1862 the comet had arrived at perihelion July 21.557, a little before noon on the 10th of August, it would have been distant from the earth less than twice the distance of the moon. It might not be without interest to determine the effect of so close an approach to our globe, upon the orbit of the comet; but in such an unusual computation it appears almost necessary that earth and moon should be treated as distinct disturbing agents; perhaps the ordinary methods might apply, if the intervals were taken sufficiently short and the elements changed with sufficient frequency.

THE SEPARATION OF THE ARAL AND THE CASPIAN

IN a note on the Hyrcanian Sea (vide NATURE, vol. xii., p. 51), it was stated that the waters of Aral, whose surface is now about 159 feet above sea level, formerly overflowed at their S.W. corner, when the lake possessed a depth of 50 feet more than at present. It is certain that the spur of Ust Urt, which formed a waste weir at the point in question, has been lowered by the action of escaping water; and the level at which the overflow took place, in the first instance, was probably some few feet higher than the figure of 209 which has been given. The greatest height ever reached by the water contained in the basin of Lake Aral may therefore be said with tolerable accuracy to be about 220 feet above the sea.

On the N.W., near the head of the Tchagan stream, where Aral must have overflowed to flood the country round the limits of Ust Urt, the barometrical height of a point situated in latitude $47^{\circ}7'27''$, and longitude (east from Greenwich) $58^{\circ}17'41''$, is 257 feet (a). This height approximates sufficiently to that which has been indicated for the overflow at S.W., to suggest that future levelling operations will find a point somewhere in this neighbourhood situated at less than 220 feet above the sea. There is, in addition, in latitude $43^{\circ}15'$, a cleft in the eastern cliff of Ust Urt, by which, and probably by other similar clefts yet to be discovered, the waters of Lake Aral may have overflowed to the west; and in such a case they would, as they travelled down to the lower level of the Caspian Sea, have submerged many extensive, depressed tracts, which occur on the surface of the intervening country. The separation of the two seas, which has afforded subject for much discussion, seems thus actually to have been due to the cessation of the overflow of the basin upon the higher level. Nor is, perhaps, that separation so entirely complete as has generally been thought, for Lake Aral could possibly be filled and made to overflow again; and under such restored conditions, the physical aspects of the country lying between the two seas would very nearly resemble those which are possessed at the present time by the country on the lower courses of the Amú Darya, and are caused by the annual flooding from that river. In such a drowned condition, the Aralo-Caspian region was naturally included in the water-spread of the Hyrcanian Sea by all the classical historians and geographers who have described it; and though, perhaps, no possible overflow from Lake Aral could now exactly reproduce the physical aspects of 2,000 years ago, such difference as would be observable is susceptible of explanation by considerations to be presently entered upon.

Since the accidental circumstance of more or less water having existed in several depressions upon the surface of the Aralo-Caspian region is the only known variation which has attached to its physical aspects from the earliest historical times, there is a strong presumption that no phenomena of upheaval have occurred, and that over-

(a) These figures are taken from the Catalogue of Trigonometrical and Astronomical points in the Russian Empire. Edited by the Director of the Geodesical Department of the Military Topographical Staff.