

lector and receiver, detachable from each other, but it is poised on a pivot projecting from the floor below, into a conical cavity in the bottom of the receiver. It is also enclosed in a square box, from which, in each case, the cylinder is removable entire for emptying the contents, and the rainfall admits of being estimated in the same way by scales or glass vessels.

A full-sized model of this instrument has been made, and was exhibited at the annual meeting of the Scottish Meteorological Society in July last, and a notice of it appeared in the account of the proceedings of the meeting in the Edinburgh papers of July 4, 1872. It has likewise been exhibited at the Meteorological Office, Victoria Street, London, and its construction has been approved of by several naval officers, and others specially interested in rainfall.

I may add that some gauges are being constructed, with the view of being used on board such steamers as would permit of their being placed under the superintendence of interested and scientific officers.

I hope by-and-by to be enabled to present to the readers of NATURE some results of the observations made by these gauges, which may lead to an introduction of such instruments as part of a ship's equipment, and so to put them in possession of some trustworthy observations of the rainfall at sea

W. J. BLACK

Star Shower in 1838

I AM not sure that the following extract from my note-book may not have been printed by the British Association; but even in that case it may be thought suitable for reproduction at the present juncture.

"1838. Dec. 7.—A great number of falling stars were observed between 6^h and 7^h. In about half-an-hour 40 were counted, sometimes by one, sometimes two, sometimes three observers—two at a medium. They were of all magnitudes up to the first: the larger dissolved into a train of light, but left no train behind them: the S. and W. quarters were chiefly observed, but their prevalence seemed to be universal: they all fell in nearly a vertical direction, but those in the N.W. and S.E. quarters inclined towards the S.W. The colour of the more conspicuous ones seemed to verge towards orange. Their courses were of no great length. There was at the same time a pale auroral light along the N. horizon from N.W. to N.E., apparently equally extended on each side of the true meridian. The Meteors were not watched after 7^h, but about 11^h upon looking out again I saw one, the only one in several minutes, in the S.W.; but it had no longer a vertical direction, its course pointing now to the N.W.

"For account of this phenomenon as observed by Mr. Mavery at Gosport, see 'Proceedings of the Meteorological Society during the session 1838-1839,' p. 9."

T. W. WEBB

Salmonidæ of Great Britain

IN reply to the Rev. W. S. Symonds's questions (NATURE, Vol. vii. p. 162) regarding the occurrence of certain salmonoids in Welsh and non-glacial lakes, I beg to draw his attention to the sixth volume of the "Catalogue of Fishes," published by the trustees of the British Museum, which, I believe, contains the information for which he asks. I would with pleasure extract this information for him if I were not ignorant as regards the glacial or non-glacial character of some of the lakes. The geographical distribution of the various kinds of Charr is given in detail on pp. 125-154, and that of the *Coregoni* on pp. 172-199. The group of Charr and that of *Coregoni* are by no means limited to lakes, many true charr, like *Salmo fluviatilis*, *fontinalis*, &c., being more or less exclusively river-fish; and *Coregonus oxyrhynchus* being common in salt water on the coasts of Holland at certain seasons of the year. In addition to Sir Philip Egerton's observation that he has taken *Salmo ferax* in Lake Bala, I may mention that the British Museum possesses an example from the Lake of Llanberis, presented by S. P. W. Ellis, Esq. (Catal. Fish, p. 93.)

ALBERT GÜNTHER

British Museum, Jan. 6

M. Figuier and the Origin of American Indians

ON page 484 of Figuier's work, "The Human Race," the author speaks of the Mohawk Indians of the Rio Colorado, and

on the opposite page reproduces M. Mollhausen's drawing of two Mojave Indians, as described in vol. iii. of Pacific R. R. Reports, by Messrs. Whipple, Ewbank, and Turner. As the Mohawk Indians of New York and the North-west are so totally distinct from the Colorado Mojaves, I thought it desirable to call attention to the error.

M. Figuier, I notice, in other portions of his work, finds the origin of the original peoples of America a difficult problem to solve, and I think contradicts himself. He states, on page 16, that, "unless we regard men as a solitary exception among all living beings, unless we withdraw them from the operation of the universal laws of nature, we must come to the conclusion that they do but form a certain number of races of one and the same species, and all descend from one primitive unique species." I do grant that it must have been a very unique species, whose descendants could have varied to the extent that man has. But it is not the question of variation of species that I wish to allude to, but the geography of the question. In speaking of what M. Figuier calls "the red race," pp. 404-406, he states—"The Indians cannot be accurately brought into connection with either the white, yellow, or brown race;" and again, "Probably the population which existed in the new world before the arrival of the Europeans was made up of several types different from those that are extant at present in the other regions of the globes, types having a great tendency to modify themselves, and which were obliterated whenever they came in contact with the races of Europe. But to re-ascend back to this primordial population would now be impossible." There is here a plain acknowledgment of a strictly autochthonic American people, modified since by contact with European races. This latter contact we believe, of course, to be purely imaginative; but if there was an autochthonous people in America, as the "primordial population" of Figuier is supposed to be, how then can "all (men) descend from one primitive unique species?" M. Figuier does not believe in the evolution of man from some pithecoïd creature; he claims to have "shown . . . that man is not derived . . . from any animal." How this stand can be taken, and still the unity of the race asserted to be true, we cannot understand: for surely it cannot be denied now, that man was once lower than the lowest savage, although different from modern savages; and, as in America, there have been found traces of man's presence, as old geologically as those found in Europe; as fossil men have been found in California; and drift implements in the river gravels of the Delaware Valley, on the opposite side of the Continent; and as these implements, in part, show that their fashioners were little, if any, in advance of the beings first worthy to be called men, how could they have descended from a stock in common with the European and Asiatic races? It must have been, indeed, a unique species, whose nearest relations spread over the whole continent of North America; or starting somewhere on the Pacific coast, finally reached the Atlantic, yet made no advance—learned nothing in a slow overland journey of three thousand miles. The "primordial population," of which M. Figuier speaks, we doubt not originated in America; its pithecoïd ancestry may have been European or Asiatic, but if so, the "old world" monkey was somewhat Americanised before it evolved that peculiar red-race which we call the Indians. If there ever was land communication between South America and the "old world" tropics, this pithecoïd man may have reached the shores of the Southern Continent, and lost the ape-like characters after his arrival. Either evolved thus, or created *de novo*, as M. Figuier claims, the American savage is purely an American institution, and upsets that unity which M. Figuier claims for every race, tongue and condition, savage and civilised, throughout the world.

CHARLES C. ABBOTT, M.D.

Trenton, New Jersey, U.S.A., Dec. 23, 1872

THE ZODIACAL LIGHT

FOR several nights lately the zodiacal light has been exceedingly bright and well-defined, and more particularly on the nights of November 24 and 27; on the evening of the 24th I found an explanation of what had often perplexed me before, viz. the existence of a faint,

isolated, band of light across the zenith, but as soon as it was dark that evening, the zodiacal light was distinctly seen to stretch across the whole sky, forming that faint band of light previously observed; I then began to note its position, but the best observations were made on the night of the 27th, when it was most distinct.

On that night it passed centrally over the planet Venus, and then over the stars δ Capricorni, γ Aquarii, α Piscium, and reached a point between the Pleiades and the Hyades, so that the central portion of the light traced out the course of the Ecliptic with wonderful precision; it was brightest in the central part of the band, and gradually faded off towards the edges; its illumination about Venus was somewhat greater than that of the Milky Way, but became fainter and fainter as the light proceeded along the Ecliptic; it was impossible to trace it beyond the Hyades, where it seemed absolutely to terminate; at midnight, however, a feeble glow could be seen above the eastern horizon in Leo and Cancer, but nothing was certain about this branch.

Returning to the western and brighter branch, at Venus its breadth was about 40° , and as the longitude of the planet was 280° while that of the sun was 246° , its breadth was 40° at a distance of 34° from the sun; at δ Capricorni its breadth was 20° , at γ Aquarii 16° , and at α Piscium 10° , so that we get the following results:—

Distance from sun	Breadth
34°	40°
66	20
93	16
139	10

and its extreme distance from the sun was about 177° , where it was too faint to note anything but its existence. The light seemed perfectly fixed in the heavens, and there was no sign of any displacement such as might be caused by parallax combined with the earth's rotation; and when the brighter part had set and was far below the horizon, the band across the zenith was quite as distinct as before.

Now these few facts go a long way towards explaining the nature of the zodiacal light, and a few more observations at different times of the year may be all that are necessary to do so satisfactorily; but as the light was so vivid here, it must have been seen in other parts of the world, and a comparison of the different accounts may bring about the desired result; hence these notes, and the following rough explanation.

The zodiacal light has generally been supposed to be a luminous ring, surrounding the Sun, and situated between the orbits of Venus and Mars; the fact that the light has often been seen in both the east and west at the same place and time does not affect the probability of this explanation, as we have only to suppose the earth to be just within the ring; but there are many difficulties to encounter, and the explanation never seemed satisfactory. The instant, however, that I saw the prolonged ray, I felt sure that the zodiacal light was similar in its nature to the rays issued from a comet towards the sun, which, drifting over the nucleus, are then forced backwards and form the tail; and that in the case of the earth, the light is generated in those regions to which the sun is vertical, and passing round the earth, the light is swept back in a direct line from the sun, thus forming a train which always tends towards a point in the heavens 180° from the sun, and which is therefore stationary with regard to the earth's axial rotation.

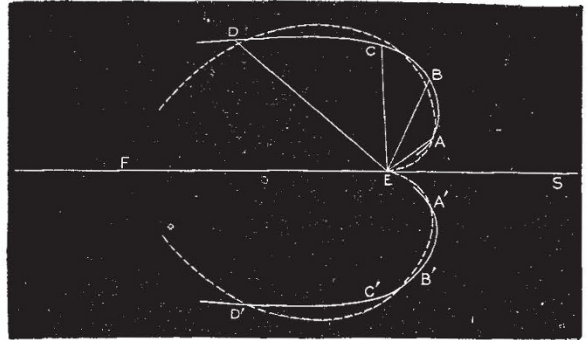
It is not easy, however, to test the truth of these ideas by means of the notes above, but the following attempt may not prove uninteresting.

If the zodiacal light were a ring, and the earth within it, we could compare the distances of the different parts of the ring by means of their apparent angular breadths, supposing the actual breadth of the ring to be uniform; in order to see whether that prolonged ray was part of a

ring or not, let E S be the line joining the earth and the sun, the plane of the paper coinciding with the Ecliptic; and at an angle of 34° (ϕ_1) measure off any length E A (r_1), in which direction the breadth of the light was 40° (ϕ_2); now, the distance r_2 of any point where the angular breadth is ϕ_2 , will be determined by the equation—

$$r_2 = r_1 \tan \frac{\phi_1}{2} \cot \frac{\phi_2}{2}$$

so that we can draw E B, E C, and E D, corresponding to the second, third, and fourth observations; but the



curve drawn through these points is by no means an arc of a circle, and very fairly represents what we have expressed in words above, so that the rays issuing from E towards S are swept to the right hand and to the left, and passing by the earth they form a train of light stretching out into space.

But to what an astonishing distance must this train proceed, in order to acquire an angular distance of 177° from the sun! It is, however, quite possible that the two branches close together near the point F, following the dotted curves; these curves are the positive and negative branches of the spiral of Archimedes, and fairly represent our curves for an angular distance of 90° from the sun.

Jamaica

MAXWELL HALL

THE LATE PROFESSOR W. J. MACQUORN RANKINE

THE death of Prof. Macquorn Rankine, which we announced a fortnight ago, will excite a pang in the hearts of many persons who had enjoyed actual intercourse with the genial spirit whose early loss we now mourn, and of a still greater number who were only acquainted with him through his published works. He died at his residence in Glasgow, on Christmas Eve, in his fifty-third year, the date of his birth being July 5, 1820. For several months he had been labouring under a serious derangement of his eyesight, coupled with heart disease; but it was confidently hoped for a time that his valuable life might be preserved for the benefit of science, provided that he rested himself from all his ordinary labours. Latterly he did take that rest which seemed to be so imperatively demanded by his physical nature, the chief portion of his ordinary work, namely, that of conducting his class in the University of Glasgow, being handed over to Mr. Bamber, C.E., who formerly distinguished himself as a student under the deceased professor; but the bodily system had evidently little power of resisting the ravages of the insidious disease under which it laboured; paralysis set in on Sunday, the 22nd ult., and in forty-eight hours Macquorn Rankine was dead.

The amount of space at our disposal is quite insufficient for the simple mention of the many important facts that