

limited area, and mostly in unconsolidated beds, and it is quite probable that they would not outlast the destructive influences to which they are subjected if these were continued throughout a geological period. The coast-line occupied by flint-shingle is almost limited to portions of Western Europe, and is relatively insignificant.

J. S. GARDNER

Science Club

The Great Comet of 1882

M. RAOUL GAUTIER, of Geneva, has recently published, in *Astronomische Nachrichten*, No. 2519, three sets of elements of this comet, calculated from a few observations before perihelion. He says that, as it is possible to represent with the same curve, either a parabola or an ellipse, the nearest observations before and after perihelion, he believes "que si la comète a subi une perturbation dans son mouvement lorsqu'elle a passé à son périhélie, cette perturbation a dû être insensible."

As I am not so far advanced with my calculations, for I have begun a thorough discussion of the movement of that comet, I do not know whether there has been or not any considerable perturbation during the passage near the sun; but can the simple fact alluded to by M. Gautier give us much information on that point?

In fact, we can easily understand that although the orbit after perihelion might be quite different from the orbit before that point, still the positions of the comet at a short distance from perihelion may be pretty well represented, within the limits of the errors of observations, by a single curve, which of course will be of second order, but which will not certainly give the calculated positions of the comet at a certain distance from perihelion agreeing with the observations. If we could prove that the orbits calculated, for instance, from observations between September 7 and 12 and between the 22nd and the 30th of the same month agree together, and give the positions of the comet immediately before and after perihelion according to the observations, then we could say that the movement of the comet was not perturbed during the passage near the sun. But this fact is not proved at all, and instead it seems that the passage through the corona has had some effect upon the movement of that remarkable comet.

E. RISTORI

13, Pembroke Crescent, Baywater, June 16

THIS comet was visible here with the naked eye up to February 28. I so saw it myself on the evening of that day. Owing partly to cloudy weather, partly to moonlight, I had not seen it for ten days or a fortnight previously, but found it on that evening with little difficulty and without any optical help. In my telescope (4-in.) it appeared, roughly, like a long, flat-sided, oval nebula, the central part of the major axis being the brightest of the whole. Two cloudy evenings intervened, and on the following night (March 3) I could not see it with the naked eye, even after finding it with the telescope and knowing exactly where to look, and though the optical condition of the air seemed the same. During April I saw it, with the same telescope, on sixteen evenings, cloudy weather and moonlight interfering on the others. In the present month (May) I saw it five times, that is, up to the 6th certainly, and I believe I saw it on the 9th, but decreasing visibility and increasing moonlight prevented verification. I have just received a somewhat larger instrument (5-in.), with which after the moon has passed I hope to see it again.

A. S. ATKINSON

Nelson, N.Z., May 19

Sun Pillar seen in Jamaica

AT sunset on May 15 I saw for the first time in my life the phenomenon called the *Sun Pillar*. A few days later the mail-packet arrived from England, and in *NATURE* I found much correspondence on its appearance on April 6 at several places in England and Wales between Hull and St. David's.

Major Gibney's admirable description of its general appearance on April 6 (vol. xxvii. p. 605) was so fully confirmed on May 15 in Jamaica that a very brief description may here suffice.

At 6h. 30m. p.m. Kempshot mean time it appeared as a bright ray of light of a faint roseate hue, 2° in width and 30° in height above the horizon, vertical, but not passing through the sun. A rough sketch was made at the time, and the circles of the equatorial were afterwards employed to determine the azimuth of the point where the pillar cut the horizon. This was 70° from the

north towards the west; and as the sun's azimuth was 69° at the same time, the pillar passed 1° to the west of the sun. In the sketch the pillar is represented as passing its own breadth to the west of the sun, but as the sun was then just below the horizon the former measure is likely to be more correct.

Now with regard to the nature of the phenomenon, it certainly was not the usual display of the zodiacal light. The light is here seen to perfection; every fine night when there is no moonlight the zodiacal light may be seen following the ecliptic from the one horizon to the other with but little variation, except perhaps as to the *gegensehein* or stronger illumination near the point in the heavens diametrically opposite to the sun. And so clearly is it seen, that some years ago I carefully measured its breadth at different distances from the sun, and so formed the following table:—

Ang. dist. from Sun.	Breadth of Z.L.	Ang. dist. from Sun.	Breadth of Z.L.
0	0	0	0
30	41.4	110	20.3
40	38.7	120	17.8
50	36.1	130	15.3
60	33.4	140	13.0
70	30.7	150	10.8
80	28.1	160	8.9
90	25.5	170	7.6
100	22.9	180	7.0

From various considerations based upon the figure corresponding to these measures I consider the zodiacal light a terrestrial phenomenon—rays of light are swept back from the sun, chiefly from the tropical parts of the earth, and tend to accumulate at the point in the heavens diametrically opposite the sun.

If there be any truth in this theory, the sun pillar may be a strong and comparatively local development of the same light; this is the only explanation I can give; the explanation given by Mr. G. J. Symons, the well-known meteorologist, "that it is merely a portion of a halo passing through the sun" (vol. xxviii. p. 7), will not apply to the Jamaica observation at all; the sky was far too pure and transparent at the time, and there was not the least trace of *cirrus* cloud.

MAXWELL HALL

Kempshot Observatory, Jamaica, June 7

Error in Hutton's Tables of Logarithms

AT the end of Hutton's "Mathematical Tables" (new edition, 1858, Longmans and Co., London) there is a very useful table containing the logarithms of certain constants frequently used in calculation. The tropical revolution of the earth in days is there given as 365.24226, and the logarithm of this most important constant is given as 2.5625910 instead of 2.5625810.

I would be glad to know from any of your readers whether there are any other important errors in this edition, especially among those tables of logarithms in frequent use.

Jamaica, June 4

MAXWELL HALL

Palæozoic Sclerotic Plates

IN the course of my researches among the coal shales of Northumberland I discovered two specimens of ossicular rings known as sclerotic plates. The external diameter of one ring is five-eighths of an inch, and the orbital orifice is one-quarter of an inch; this ring of sclerotic plates consists of nine bones arranged as are the eye bones of *Ichthyosaurus*, *Plesiosaurus*, and eagles, viz. in tolerably uniform segments. The second specimen is a quadrant of a ring, and consists of six plates of larger size than the other specimen. I shall be glad to learn if any of your readers have discovered similar sclerotic plates in the Palæozoic rocks of the British Isles, as specimens are not exhibited in the British Museum, Jermyn Street Museum, or Edinburgh Museum.

T. P. BARKAS

Newcastle-on-Tyne, June 25

Graft-Hybridisation

ST. PAUL, in his Epistle to the Romans, says (ch. xi. v. 17), in illustration of the admission of the Gentiles to the religious privileges of the children of Israel, "If thou, being a wild olive, wert grafted in among them, and didst become partaker with them of the root of the fatness of the olive tree," &c. Olshausen, in his commentary on this epistle, says (English translation, p. 369),