

The first two sections, both of them on Ancient Bristol, are by Mr. J. Taylor, of the Bristol Library. Section 3, on Modern Bristol, is by Mr. J. F. Nicholls, of the City Library. The fourth section, on Local Government and Taxation, is by Mr. H. Naish: and then follows a section on Educational Organisations, to which there are several contributors. Mr. D. Davies, the medical officer of health, has supplied the section on Sanitary Condition and Arrangements, after which comes Section 7, on Physical Geography and Geology. This occupies sixty-four pages, and would perhaps have been of more practical use if printed as a separate pamphlet that could be conveniently carried in the pocket. Mr. Tawney has written the Introduction; the Silurian, the Carboniferous, and Millstone Grit is by Mr. Stoddart; the part on the Coal Measures and "New Red Period" is written by Mr. Tawney; that on the Rhætic and Liassic by Mr. Ralph Tate, and the concluding part on the Inferior Oolite is again by Mr. Tawney.

Bristol is better off for geological maps than any other part of the country, for not only are there the sheets of the Geological Survey, but there is Mr. Sanders' splendid map of six inches to the mile, which includes the whole of the Bristol coal-field.

It is a pity there was not a sketch map introduced in the guide, with just the names given of the places referred to and an indication of the spots where the sections are taken from. As it is, strangers to the district will experience some difficulty in following the text, as many of the names are not on the published maps. With regard to the sections, too, there is no indication of the direction in which they are taken, nor of the scale to which they are drawn. One of the most useful features of the geological portion is that which gives the localities where the sections of the strata can be seen; and, as the district within a short distance contains from the Silurian up to the Oolites, omitting the Permian, is of interest. There are many references to the more important papers that have been printed, and in cases of difference of opinion the writer has added his own views. The much vexed question of the age of the "dolomitic," "triassic," "magnesian," or "reptilian" conglomerate, is duly referred to.

The notes on anthropology have reference to the tumuli and chambered barrows, and to the present condition of Bristolians. "A certain amount of physical degeneration has taken place among the native Bristolians, as among the natives of other British cities; 300 of them yielded to me an average stature and weight of 5 feet 5.8 inches and 132½ lbs., after deductions made for shoes and clothing. The average height of men in the surrounding counties may fairly be put at half an inch more."

The book has one serious defect, for which the compiler and not the authors are responsible; there is no index.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

"Climate and Time"

THE review of "Climate and Time" in NATURE, vol. xii. p. 121, contains some remarks in reference to my tables of the eccentricity of the earth's orbit, to which, in justice to myself, I must refer, the more so as they relate to points which comparatively few of your readers have it within their power to determine whether or not the reviewer was justified in making the remarks in question.

"We have repeated," says the reviewer, "the calculations for two of the most remarkable dates, viz., 850,000 and 900,000 years ago respectively, and find that at the former date the eccentricity was .0697 instead of .0747, and at the latter date was .0278 instead of .0102 as expressed in the table."

What proof does the reviewer give that his results are correct and mine incorrect? The following is the reason he assigns:—"To satisfy ourselves," he says, "that the mistakes are Mr. Croll's and not ours, we have recalculated also one of Mr. Stone's and one of M. Leverrier's, and in both instances have exactly verified them." This can hardly be accepted as sufficient evidence, for I had myself recalculated one of Mr. Stone's and no fewer than five of M. Leverrier's, "and exactly verified them."

I suspect that the reviewer has made his calculations somewhat too hastily; for if he will go over them a little more carefully, he will, I have no doubt, find that after all my results are perfectly correct, excepting only a trifling typographical error, to which I shall presently refer.

The value for 900,000 years ago ought to be .0109 instead of .0102, as stated in the table. This mistake arose out of the curious circumstance of a small speck of ink having been dropped on the tail of the 9, which led to its having been substituted for a 2, ten years ago when the tables were first published—a fact of which I was not aware till a week or two ago, when looking over the manuscripts of my original calculations, all of which I have preserved. Since my calculations were called in question by your reviewer, I have had them examined by three experienced mathematicians, and the conclusion at which each of them has arrived is that they are perfectly correct.

The reviewer continues:—"The fact that the eccentricity was large when he represents it so, and small when he makes it small, seems to indicate that some approximating progress [progress?] has been followed, and that possibly his diagram may give a rough idea of the changes of eccentricity for past time."

I can assure the reviewer that nothing could be further from the truth than this assumption. I have computed the eccentricity and longitude of the perihelion for no fewer than 129 separate periods, and in every case Leverrier's formulæ have been rigidly followed, and I have every reason to believe that the diagram gives not a rough but an accurate idea of the changes of eccentricity. The values given in the tables will, I trust, be found to be perfectly accurate up to at least the fourth place of decimals, which is as far as these formulæ can be relied upon to yield correct results.

The following are the results which, considering the trouble that has been given to their verification, I think will stand the most severe scrutiny:—

Period 850,000 years ago.	Period 900,000 years ago.
$h^2 = .00413927$	$h^2 = .000059858$
$l^2 = .00144124$	$l^2 = .000059812$
$h^2 + l^2 = .00558051$	$h^2 + l^2 = .000119670$
$\sqrt{h^2 + l^2} = .0747 = \text{Eccentricity}$	$\sqrt{h^2 + l^2} = .010939 = \text{Eccentricity}$
Edinburgh, August 10	JAMES CROLL

A Lunar Rainbow, or an Intra-lunar convergence of Streams of slightly illuminated Cosmic Dust?

ABOUT 8.30 P.M. yesterday a large zone of the sky, from the horizon at W.N.W. to the horizon at E. by S., was illuminated in a very remarkable manner, and this illumination lasted about three-quarters of an hour, when it gradually died out.

During all this time the sky was very clear and cloudless, thereby forming a dark background, on which the phenomenon, whether lunar rainbow, or many rainbows, or intra-lunar converging streams of cosmic matter, was splendidly projected.

This exhibition consisted of one grand central feather springing out of the horizon at W.N.W. and crossing this meridian at about 20° north of the zenith. The width of this stream, with little variation throughout its length, was 7° or 8°. Its light was that of a very bright white cloud, its edges most beautifully defined; its form that of a very elongated feather, but without any shaft. On either side of this main feather was a system of seven or eight minor and fainter streams, threads, or beams of light, all more or less extending from the western to the eastern horizon, subtending a chord common to themselves and to the main stream of light, and converging towards the axis of the central stream so as apparently to intersect it at a point about 30° or 40° below the western horizon, at which the whole system subtended an azimuth of about 20°; and near the zenith, where its transverse section was a maximum, that section subtended an angle of about 40°. At this time the moon was about 15° east of the meridian, and her declination about 9° S. Both systems of the minor streams of light on the sides of the main stream appeared to have a slight