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XI. *Remarks and Suggestions, as to the State and Progress of the Government Trigonometrical Survey, with regard to the Dimensions, Figure and Structure of the Earth.* By Mr. JOHN FAREY, Sen.

To the Editor.

SIR, — A SELECT Committee of the House of Commons, on *Weights and Measures*, after considering the three several Reports\* of the late Government Commissioners on the same subject, have made a Report to the House (which was ordered to be printed on the 28th of May, and which doubtless will find a place in your present or some early Number†) in which Report, after a well-merited compliment paid to Capt. Kater, for his elaborate and gratuitous Experiments on the Pendulum, in London, and for similar Observations on the principal Stations of the Trigonometrical Survey of Great Britain, the Commissioners remark as follows, viz., “From these observations, deductions have been made, of great importance with respect to the general figure of the Earth, its density and internal construction. So that your Committee are decidedly of opinion, that it will be highly proper to extend similar Observations over a still larger surface, so as to connect the measurements and astronomical observations made by the different Nations of Europe, as much as possible, into one whole.”

I am sorry not to be able to concur with the Committee in thinking, that deductions of any great importance, as to the exact *figure or structure* of the Earth, have yet resulted from the Trigonometrical Survey of these Islands, or that much, if any, of the wished-for information on these points would be derived, from *more widely* extending the Pendulum observations, until after such Mineralogical or *stratigraphical Surveys* and investigations shall have been made in England, as I have in your 48th volume, p. 430, recommended, around the Stations, where already the Standard Pendulum has been swung; *Arbury Hill* in particular.

It appears to me also essential, that most or all of the several Observations that I have recommended in the volume quoted, including those of the Pendulum, should be very carefully made,

\* The First of these Reports will be found in p. 172, of our 54th volume, and the Third of them, in p. 359 of our 57th volume, and its Appendix in p. 420; the intermediate Report, as well as two Appendixes, detailing the incongruous mass of *legal* provisions existing on this subject, and the still more incongruous and numerous *local denominations* of Measures and Weights *in use*, will doubtless ere long be printed in a separate form.—EDITOR.

† See our Number for June, p. 432.—EDIT.

and

and repeated, at so many others of the British Stations, as to be able to institute rigid calculations, of the lengths of degrees of Latitude, on two or three other Meridians, besides that already calculated, which passes through *Dunnose* in the Isle of Wight; and also degrees of Longitude, (or-else of great circles perpendicular to some particular meridian) in several different Latitudes: in order, that by the consistency and agreement or otherwise, amongst the results, with the known fact of the Earth nearly approaching in figure to an *Ellipsoid* slightly flattened at the Poles, it may be seen, and duly appreciated, what degree of dependence can be placed on the methods of observations and calculations, which hitherto have been adopted or recommended.

In particular I am anxious, that the District around and to the northward of *Arbury Hill*, wherein Capt. Kater has concluded, that a *mass of the Stratification of great comparative specific Gravity*, must be situated, at no great depth below the surface, should be surrounded and crossed by several lines or degrees of latitude and of longitude, and by those also of oblique Arcs or Rhombs, between the several Stations surrounding the district under investigation: from which, and the proposed minute Stratigraphical Surveys, to try the practicability, of consistently deducing the *magnitude, shape, position and specific Gravity* of the supposed heavy or *deflecting Mass*, which is assumed to have occasioned such a deflection of the plumb-line at *Arbury Hill* Station, as to have presented the anomaly, of degrees of the Meridian, increasing in length, in the contrary direction to those of the Ellipsoid, above alluded to: and whether or not, a *mass of Granite*, the top of which presents itself at *Mount Sorrel, Grooby*, and other places\* in and near to the south part of Charnwood Forest, is sufficient to account wholly, or in considerable part, for the deflection alluded to.

Until the facts as to our own country shall have been settled beyond dispute or doubt; or at least, until the attempt shall seriously have been made, to explain or remove the *Arbury-Hill* anomaly in the lengths of meridional Degrees, it would, I submit to your Readers, be premature, and likely to perpetuate rather than to remove errors, if the Observations, merely as hitherto conducted, and without going more deeply into the subject, were extended to the other countries of Europe, with the view, as the Committee appear to propose, of thereby coming to definitive

\* See my Derbyshire Report, vol. i. p. 151: observing, that this was written, before the *unconformableness* of numerous local parts of the English stratification, had been made out, or the effects of such unconformableness sufficiently considered by myself or any other Writer. See P. M. vol. xliii. p. 330 Note, vol. xlv. p. 169, &c.

56 *Mr. Farey's Remarks on the Trigonometrical Survey.*

conclusions as to the dimensions, figure and structure of the Earth.

Entertaining as I do, a high respect for the person, abilities and labours of Dr. MacCulloch, and not being by any means desirous of undervaluing the Services to Mineralogy and Geology which he has performed, and on which I understand him to be yet engaged in *Scotland*, and with respect to a *mineralogical Map* and description of that Kingdom, as is briefly mentioned in p. 228 of your 56th volume, I hope and trust, that what I am going further to remark, may not give offence to that Gentleman or any of his Friends. It was naturally to be expected from the announcement made in 1816, which is quoted in p. 427 of your 48th volume, that the making of minute *stratigraphical Maps and Sections* around each principal Station of the Trigonometrical Survey, in Scotland, at the least, was then intended: I have not however yet been able to learn, that any such *materials for calculation*, as to the existence and extent of local deflecting causes on the plumb-line in Scotland, have resulted from Dr. MacCulloch's appointment; or that anything has been attempted of this kind in England, by him or any other person.

If Government have seen it right to devote a part of the public Money to the making of a Mineralogical Survey and Map of Scotland, (in addition to the sums devoted to its Canals, Bridges, Roads, &c.), it cannot surely wish to withhold the means, of completing the Trigonometrical Survey of England, and of Wales and Scotland, which it has so long and laudably supported, in those remaining points connected with the Stratification, on which evidently so much of the minute accuracy of the whole is dependent, with reference to the dimensions, figure and structure of the Earth.

Let me presume to hope, that the present season of Peace, when Expeditions are so liberally fitted out and appointed, for exploring distant regions, and when so many public Works are carrying on, may not pass away, without the services to Science being performed, which I have ventured to suggest:—I am not like Captain Kater, able to offer gratuitous assistance to any considerable extent; but as far as prudence can warrant, I would be ready to co-operate in the stratigraphical Surveys and investigations recommended, if through the medium of any friends of Science amongst your Readers, such recommendation should be approved and acted on, by that department of Government to which it belongs.

I am, your obedient servant,

37, Howland-street, Fitzroy-square.

JOHN FAREY *Sen.*

June 17, 1821.

P. S.

P. S.—MR. WILLIAM SMITH, after the considerable interruption to the publication of his series of *County Geological Maps*, which has originated in the unhandsome treatment received, in the quarter from whence he should have expected effective patronage, has completed his Map of *Yorkshire*, in four sheets, and the same is now in course of delivery by *Cary* of St. James's street: this Map, from embracing almost the whole series of the British Strata, and from the ample details which it contains, cannot fail of being acceptable to Land and Mineral Owners, and to all those anxious to become acquainted with the structure of the very interesting and valuable part of our Island which it embraces.

## XII. Hints for the approaching Harvest.

A RESIDENCE of two years in Switzerland, and particular attention directed to the rural œconomy of the country, amongst other things brought me acquainted with a method of harvesting which to me was quite new. Since my return home I have made many inquiries without having learned that a similar method was ever practised in England, though it is by no means improbable that it may already be known, either in local custom of old date, or from having been introduced by travellers who had equal opportunities with myself of observing what passed before their eyes. I am not aware, however, that any written description of this method has already appeared: and it is under a persuasion of its great utility that I now endeavour to give it every possible publicity.

In harvesting, two important matters present themselves to the consideration of the farmer:—expense of labour, and time. A saving in *labour*, if it protracts the time, is rarely beneficial, as it exposes the crop to additional risk and accident from bad weather; but every saving in *time* is a positive advantage.—The Swiss method saves both time and labour; and the loss from shedding, in handling the corn, appears to be less than with us. The main principle of their system consists in the use of the *scythe* instead of the *sickle*. Every one must be aware of the very superior powers of the former instrument; but in the ordinary mode of using it, notwithstanding the various contrivances of bows, sweeps, cradles, &c. which have been attached to the scythe to remedy the inconvenience, the corn is thrown down in such rude heaps, and the ears become so entangled, that a great loss follows from shedding: and hence farmers have conceived it better to employ six sickles than one scythe. Nay, I have heard it argued, when prices were high, that there was good œconomy in *reaping* even barley.