of students. But this may well be in a country largely constituted of altered and igneous rocks, and among students who have reason to look for evidence of geological history as well in the original conditions and successive changes of rock-material as in the character and position of organic remains. The valuable abstract notices of contemporaneous books and memoirs treating of geology and mineralogy are abundantly and carefully given as heretofore.

CORRESPONDENCE.

THE POSSIBILITY OF CHANGES OF LATITUDE.

SIR,—The question discussed in the article on Changes of Axis in the June Number of this MAGAZINE was,—"The earth being rigid, could a deformation tilt the axis in space, or shift the position of the Poles?" The answer was that a tilt was impossible and a shift improbable. Mr. Fisher, in the July Number, asks for a discussion of the question—"Assuming that a thin crust surrounds a fluid substratum, could then a deformation shift the crust over the nucleus?

An obvious reply is, that if the Earth's rigidity has been proved, the discussion would be fruitless. Mr. G. H. Darwin, who has been investigating this point, concludes that the Earth is "enormously stiff" (Proc. Royal Soc., No. 188, 1878).

However, the nature and consequences of the objection to Dr. Hopkins's demonstration may be noticed. His argument was in effect that if there existed a very large fluid nucleus, since the shell would slide freely over it, the Earth's crust could not oppose to the tilting forces so great a resistance as we find from the amount of Precession that it does oppose. To this it is now answered that if the fluid nucleus be spheroidal and rotating, it would resist the tilting force which produces Precession, and the shell would not slide freely. But then would it not also resist the tilting tendency resulting from a deformation? If Dr. Hopkins's proof from Precession collapses, does not also the supposition become untenable that a fluid nucleus would render easy a shift of the crust? The suggestion of a fluid substratum seems to lead to the same dilemma; either the fluid could resist any shift of the crust, or it could not, and so Dr. Hopkins's disproof remains valid.

A question prior to all this is, Will a change in Latitudes give the best explanation of the phenomena? E. HILL.

ST. JOHN'S COLLEGE, CAMBRIDGE, *August 22nd.*

GEOLOGICAL TIME.

SIR,—The great difficulty encountered by the geologist, in reducing a section of Geological Time to years, from the want of data, is so well known, that bringing the following before your readers may be pardoned, as an attempt to measure a small section of time.

In the parish of Beith, North Ayrshire, the Lower Carboniferous Limestone is extensively wrought as a surface stratum. In some quarries the limestone is preserved by a thick covering of Boulder-clay, and here the surface is ice-polished and finely striated, retaining