with a rich source of phosphate of lime of organic origin, for manure, the remnants of faunas of Secondary and Tertiary age, for the utilization of which we are indebted to the Rev. Prof. Henslow, and which may be referred to specially, as an instance of the practical application of Geology to the benefit of agriculture.

The relation of Geology to Agriculture forms, of itself, a most interesting chapter of this book; it is a subject of the greatest national importance, and we are glad to know that the Government Geological Surveyors are also becoming convinced that the superficial deposits are deserving of their attention and mapping.

The present book contains: Part I. "The Natural History of the Raw Materials of Commerce."—Part II. "The Commercial Products of the Vegetable Kingdom."—Part III. "The Commercial Products of the Animal Kingdom."—Part IV. "Raw Mineral Produce;" and, lastly, an Appendix, containing a Vocabulary of the Names of Natural Productions, in the Principal European and Oriental Languages. The Geographical Distribution of Food and Industrial Plants is illustrated by a small coloured map, showing the Botanical Zones of the world.

Dr. Yeats announces that the present volume will be followed by "The Industrial and Political History" and by "The Technical History" of the same subject.

Among the list of contributors to the present volume we observe the name of Mr. Ralph Tate, F.G.S., F.L.S., a good guarantee for the careful execution of the geological part of the volume.

We heartily wish the author and his book all possible good, and trust that the future volumes may turn out as agreeable and readable as the present one.

CORRESPONDENCE.

AVANTURINE QUARTZ IN BRITAIN.

SIR,—In the GEOL. MAG. for Sept., p. 444, you announce that Mr. G. W. Traill has discovered "Avanturine Quartz" in Orkney, on the shores of Inganess Bay. It is spoken of as "a scarce *variety* of quartz," but it is really not a scarce mineral, nor is it a *variety* of quartz, but only ordinary quartz inclosing scales of mica. It is commonly met with in micaceous sandstones all over the world, and has no more right to a distinctive title than a quartz crystal containing any other foreign body entangled in its mass. B. J. R.

LONDON, *3rd Sept.*, 1870.

ARCHDEACON PRATT ON THE INTERNAL FLUIDITY OF THE EARTH.

SIR,—All Geologists must rejoice to see a question of such interest as that of the Internal Fluidity of the Earth discussed in the pages of the Magazine by authorities like M. Delaunay and Archdeacon Pratt. I confess that M. Delaunay's arguments, as given to us by Mr. David Forbes,[1] staggered my faith in Mr. Hopkins's

[1] GEOLOGICAL MAGAZINE, vol. v., p. 511.

method; although I saw that they did not establish the opposite to his conclusion, which was, that the solid crust of the earth cannot be much less than 1,000 miles thick.[1] Now, however, the Archdeacon comes to the rescue with the communication given in the September Magazine. What he proves appears to me to be this,—that if the crust of the earth is devoid of rigid connexion with the nucleus, and if a force acts upon it so as to give it a motion of rotation different from that which the nucleus already has, (in the case before us, the new rotation is given about a diameter of the equator, say that which momentarily coincides with the equinoctial line,) then the new rotation given to the crust will not *at first* be communicated to the nucleus. I say devoid of *rigid* connexion, for the effect of such connexion as arises from viscidity, or friction, or any similar cause, will simply be to communicate the new rotation to the nucleus less gradually than if the nucleus was absolutely fluid, and, therefore, the connexion *nil*. But in any case short of rigid connexion, the new rotation will not be communicated to the nucleus at all, *at first*. I mean at the moment at which it is communicated to the crust. Some time will be necessary for that result.

Now, the "precessional force," as the Archdeacon calls it, is "ever alive and active;" that is to say, we are obliged to consider at every moment its effect at that moment, or *at first*. And that effect is, to be producing at every moment a rotation in the crust, which will not have time to communicate itself to the nucleus before, by combining with the pre-existing rotation of the crust, it has caused the precession of the pole. The result will be that the amount of precession of the pole will be different in the case in which the nucleus is not rigidly connected with the crust, from what it would be if it were so. This is the conclusion that Archdeacon Pratt insists upon, and it seems certainly a just one. But, nevertheless, I cannot but think that the viscidity must have some effect upon the precession; and I should be very glad if your Correspondent would explain of what kind. What seems to me the case is this. The effect of the precessional force on the crust is to set it rotating about a generating line of the cone in which the axis moves, always a little in advance of the line round which the nucleus is rotating, and the viscidity will cause the axis of rotation of the crust to drag that of the nucleus after it. Will not this dragging effort have the effect of retarding the rotation of the crust in an extremely small degree, so that in the case of a viscid nucleus, the effect of the action of the sun and moon on the protuberant matter, as the equator is, in truth, indirectly to lessen the angular velocity of the earth, contrary to what is stated to be the case upon the usual supposition of the earth's rigidity?

If the rotation of the earth is diminished gradually, the precession will be increased accordingly.

O. FISHER.

HARLTON, NEAR CAMBRIDGE.

[1] See my paper on the elevation of mountains, &c. Cambridge Philosophical Transactions, vol. xi., part iii., p. 2. See also GEOL. MAG., 1868, Vol. V., p. 493.