

On the Constitution of the Solid Crust of the Earth. By Archdeacon Pratt, F.R.S. (Phil. Trans., 1871.)

ANOTHER contribution to a subject on which the author has laboured for many years—never perhaps very brilliantly, but always in the main soundly. Such unmitigated nonsense has been talked on the subject of the thickness of the solid crust of the earth, even by scientific men of real power—generally mere mathematicians, sometimes geologists, rarely indeed physicists—and such extravagant views on the subject are still propounded and defended by men like Delaunay, who have done good work in closely allied questions, that it is really refreshing to read Archdeacon Pratt's paper. Yet its tone is somewhat hesitating, almost apologetic, and he finally arrives at the conclusion that what seems to us to be at least a natural assumption to make at starting (*viz.*, that a level surface may be drawn, not very many miles under the surface of the earth, such that in spite of hills and ocean beds the amount of matter shall be the same in every vertical line between these two surfaces) leads to results not after all very inconsistent with those derived from actual pendulum observations made over the Indian Continent. Sir W. Thomson's bold investigation of the tides in the solid earth, due to elastic yielding, furnishes us with by far the most powerful mode of attacking the general question which has been devised since Hopkins's celebrated suggestion of the information to be derived from precession and nutation; and it is to be hoped that the labours of the Tidal Committee of the British Association will soon furnish, from observation, the data required for its numerical application.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

Instruction in Science for Women

IN thanking you for the useful account given in your last number of the various attempts being made in different parts of England to improve the scientific education of women, may I give you a few more details of the effort now being made at Cambridge to assist the training of those ladies who live too far from any educational centre to be able to get oral instruction?

Correspondence classes have been formed in some of the subjects selected for the University Examination of Women, and the teachers (chiefly resident fellows of colleges) are attempting to assist the reading of their correspondents by means of advice, examination papers at fixed intervals, and free criticism.

Of course this scheme cannot offer the advantages which the lecture systems of London, Edinburgh, and Cambridge itself afford; but that it does meet a real want in what I may venture to call the "rural districts" is shown by the fact that more than seventy women have joined the scheme within a month. Among the subjects of which you take notice in your article, Mr. Stuart of Trinity has undertaken the higher mathematics, Mr. Hudson of St. John's the arithmetic (how woefully ill-taught in the average girls' school no one but the examiner can appreciate), Mr. Bonney of St. John's the geology, and myself the botany. I should add that it is not at all the wish of the promoters to limit the scheme to possible candidates for the Cambridge examinations, but as far as possible to assist any woman who may be struggling with the difficulty of reading a new subject by herself.

All women who wish to avail themselves of this scheme are requested to communicate with the Hon. Sec., Mrs. Peile, of Trumpington, near Cambridge. F. E. KITCHENER
Rugby, Nov. 25

True and Spurious Metaphysics

DR. INGLEBY is evidently a strategist of no mean order. The appalling suddenness of his totally unexpected personal attack, and the skill with which he has almost made it impossible for me to reply without laying myself open to the charge of Egotism (second only in gravity to a charge of Immorality), shows that he is a good deal more than a mere metaphysician. Of metaphysics anon—meanwhile about mathematicians.

I altogether repudiate the Trichotomy, as Dr. Ingleby gives

it. The man is either a Mathematician or a Non-Mathematician. There is no intermediate class. Merely to be able to integrate, to solve differential equations, to work the hardest of Senate-House Problems, &c., &c., is *not* to be a Mathematician. To deserve the name a man *must* have some of the creative faculty; must be the Παιστής, if ever so little. And to be a Creator in this sense it is not necessary that one should have devised a new Calculus. Are Stokes, Thomson, Clerk-Maxwell on the one hand, or Cayley, Sylvester, Clifford on the other mere Experts? Yet there can be no doubt that, in Dr. Ingleby's classification, this is their rank.

As regards Hamilton's having placed Metaphysics higher than Mathematics, I may avail myself of the remark, which I heard not long ago in conversation, that "what Hamilton thus exalted was the Metaphysics of the great thinker (and Mathematician) Kant, not the common Cant of Metaphysicians." The distinction implied in this poor pun is one of enormous importance. For there are Metaphysicians and Metaphysicians. Here I am happy so far to agree with Dr. Ingleby, and I shall dichotomise, but not quite as he proposes.

Metaphysicians A. The genuine article. To this class all men worthy of the name of Mathematicians necessarily belong, as do the higher Physicists, &c., &c., such as Faraday. Hence, of course, Archimedes, Descartes (Cartesius, not *Cartes*!) D'Alembert, Hamilton, &c., &c., appear in the list. Leibnitz was, I fear, simply a thief as regards Mathematics, and in Physics he did not allow the truth of Newton's discoveries; so he does not belong to this class.

Metaphysicians B. The spurious article, which has somehow managed to arrogate to itself the title belonging of right to the genuine one. Test this class by what it has to show "even in the present advanced state of metaphysics" (as Dr. Ingleby has it): what have we but stagnation, ropes of sand, bitter quarrels as to the meaning of unintelligible words, and, above all, complacent pride in being "not as other men" but dwellers in a sublimer sphere? Even Longfellow's idiotic "Youth," who ascends the Matterhorn when "the shades of night are falling fast," carrying a pompous "banner with a strange device," does not so ridiculously contrast with the practical Whympyer and Tyndall carrying their ropes and ice-axes, as do the Metaphysicians B with the Metaphysicians A:—the Drones with the Working-Bees.

When I asked for the name of a Metaphysician who was also a Mathematician, it was of course of Class B that I spoke, the class containing Hegel and Sir William Hamilton, Bart. (the former of whom proved that Newton did not understand Fluxions nor even the Law of Gravitation, while the latter asserted that the pursuits of the Mathematician reduce him either to passive Credulity or to absolute Unbelief!), the class which is popularly, and (almost *therefore*) erroneously, known by the name. P. G. TAIT

"Wormell's Mechanics"

I REQUEST to make a few observations upon Mr. Wormell's letter in your last number. I shall refer to the paragraphs he has numbered.

1. It is true that, by a collation of two passages, a really intelligent student might be able to eliminate the error from the first statement in Mr. Wormell's book to which we have taken exception. I consider that such collation should be unnecessary in a text-book.

2. A mathematician would, of course, understand what Mr. Wormell means, however he might disapprove of its logic; but Mr. Wormell writes for beginners, and should state his demonstrations without ambiguity.

4. "Curious" is not the adjective we are tempted to apply to such a blunder as that on p. 112. This has not been corrected in even the second edition of the book, notwithstanding the "schoolboy's" aid.

5. We had read Sec. 71, and consequently made the remark about the block and tackle to which Mr. Wormell objects. We now re-assert that the effect of friction upon the mechanical powers is too important to have been omitted in a book professing to treat of Theoretical and *Applied* Mechanics.

Nov. 25

THE REVIEWER

Solar Halo

THE following description and drawing of a solar halo and mock suns seen on the morning of the 13th inst., by the Rev. J.