

effected only by diminishing its height; in which case it would hardly correspond to his description of its form as that of an egg cut in two. The question can only be fairly tested by the weighing of a model constructed as nearly as possible in accordance with Tavernier's figure, and of such lateral dimensions as to be capable of including the Koh-i-noor. It may be that such a model, of the specific gravity of the diamond, would be found much to exceed Tavernier's reported weight of the stone, in which case the importance of his figure as an item of evidence, would be greatly invalidated.

Whatever may be the final outcome of this controversy, Mr. Ball has done a good service to literature and science in re-translating Tavernier's work, in its careful editing, and in throwing light on much that has hitherto remained obscure. The result will certainly be that which he has anticipated, the vindication of Tavernier's claim "to be regarded as a veracious and original author."

H. F. B.

OUR BOOK SHELF.

Star Land. By Sir Robert S. Ball, LL.D., F.R.S. (London: Cassell and Co., 1889.)

THE author of this work is now so well known as a popular expounder of astronomical subjects that it is quite sufficient praise of his new book to say that it fully sustains his reputation. The book is described as "talks with young people about the wonders of the heavens," being founded chiefly on notes taken at his courses of juvenile lectures at the Royal Institution. Astronomy gives plenty of scope for the exercise of the imagination, and Dr. Ball takes full advantage of this. The book abounds with anecdotes and homely illustrations, calculated to impress the facts on the memory as well as to excite wonder at them. The startling figures dealt with in astronomy are, as usual, converted into railway train notation, and otherwise illustrated. One new illustration of the distances of the stars is that it would take all the Lancashire cotton factories 400 years to spin a thread long enough to reach the nearest star at the present rate of production of about 155,000,000 miles per day. The irregularities in the motion of Encke's comet are explained in an interesting dialogue between the "offending comet" and the astronomer, in which the comet explains that his delay was due to the fact that Mercury was "meddlesome."

The only disappointing parts of the book are those which deal with astronomical physics. One point not sufficiently insisted upon is the now generally acknowledged meteoritic constitution of comets; a connection is certainly suggested, but that comets are now supposed to be simply dense swarms of meteorites is not stated at all. Nebulæ, again, are described as "masses of glowing gas," notwithstanding the recent researches on the subject. The theory that meteorites are the products of ancient terrestrial volcanoes is also still adopted by Dr. Ball, without any consideration of the objections to such a view.

The book is well illustrated, and will undoubtedly awaken an interest in the subject in all intelligent readers.

The Magic Lantern: its Construction and Use. By a Fellow of the Chemical Society. (London: Perken, Son, and Rayment.)

THE third edition of this little book has been issued, and will be exceedingly useful to those who work with the lantern. Descriptions are given of the various lights used in lanterns, from the oil lamp to the electric arc; the methods of making simple slides are entered

into, and a few experiments, illustrative of elementary scientific principles, are well included. The work is thoroughly practical; none of the little details so necessary to beginners have been omitted, whilst many of the hints it contains may be of service to all who use this optical instrument, whether it be for lecture purposes or for recreation only.

LETTERS TO THE EDITOR.

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Acquired Characters and Congenital Variation.

I do not see that the Duke of Argyll's last letter in any way strengthens his position. The questions at issue with regard to evolution are now, I believe, thoroughly understood by biologists. Nothing, in my opinion, can solve them in the direction the Duke desires but the evidence of fact. And that, I can only repeat, is precisely what is not forthcoming. I am equally of opinion that the discussion has been worn threadbare. I should not myself have interfered in it, had it not seemed desirable to show that the motives attributed by the Duke to those who accept Darwinian principles were destitute of foundation.

This part of his position the Duke does not attempt to defend. As to the rest he merely restates what he has said before. His remarks fall under two heads, and I shall content myself with the briefest possible comment upon these.

(1) *Acquired Characters.*—The Duke gives what I presume he intends as a logical proof of the theorem that acquired characters are inherited. It may, I think, be formally expressed as follows:—

"It is always possible to assert" that acquired characters are developed latent congenital characters.

It is admitted that congenital characters are inherited.

∴ Acquired characters are inherited.

It will be observed in the first place that this is a mere *a priori* argument. And next that, while it is not denied by Darwinians that the organism is a complex of congenital tendencies, limitations, and possibilities, this is entirely beside the question. From Lamarck to Darwin, Weismann, and Lankester, the meaning of "acquired characters" has been clearly defined. They are those changes of hypertrophy, extension, thickening, and the like, which are obviously due to the direct physical action of the environment on the body of the individual organism. It was these changes which Lamarck asserted were transmitted to the offspring; and it is this transmission which it is now maintained needs demonstration as a fact.

Let me give another illustration. I read the other day in the newspapers that the police of Paris have carried out an extremely interesting investigation. They have carefully ascertained the recognizable changes in the normal human organism produced by the prolonged pursuit of any particular occupation. The object was to obtain data for the identification of unknown dead bodies. The changes proved more numerous and characteristic than could have been supposed. They supplied, in fact, diagnostic marks by which the occupation of the individual could be accurately inferred. It seems to me impossible to have a more admirable case of the direct action of external conditions. I ask, is there any reason to suppose that these acquired characters would be transmitted?

This appears to me an extremely plain issue, as it is certainly an extremely important one. There is not the least reluctance on the part of Darwinians to face it squarely. But the Duke appears to me to deliberately evade it.

(2) *Prophetic Germs.*—It seems to me that we are somewhat at cross-purposes. The Duke admits that I have correctly quoted him as saying: "All organs do actually pass through rudimentary stages in which actual use is impossible." When Prof. Lankester challenged the Duke to produce a single instance, he guarded himself by the remark: "The stages here alluded to are—if I understand correctly—ancestral stages, not stages in the embryological development of the individual." The Duke has never repudiated, as far as I am aware, that limitation of his meaning, if it be a limitation. And as he has