

These distinctions between antlers and the different types of horns are certainly the clearest and neatest that have come under our notice; and they naturally lead the author to the conclusion that the *Cervidae* form one group, and the other three families mentioned a second division of the Pecora. If his views obtain acceptance, they refute the late Prof. Garrod's theory of the near relationship of the musk-deer to the *Bovidae*.

Whether or no his predilection for abnormalities will bear any good fruit, the author has evidently devoted much pains-taking labour to the present fasciculus; and the issue of the remaining parts of the work will be awaited with interest. R. L.

*Recent Advances in Astronomy.* By A. H. Fison, D.Sc. Pp. vi + 237. (London: Blackie and Son, 1898.)

IN the course of half a dozen essays the author of this volume of the "Victorian Era Series" has attempted to give an account of a few of the more interesting problems of modern astronomy. While the book is admirably written throughout, the subject-matter is in some respects not sufficiently up to date. For example, in the essay on the "life of a star," which is otherwise exceedingly interesting, there is practically no reference to the spectroscopic evidence bearing on the subject; and again, in that on the "analysis of starlight," there is no account of the different kinds of stellar spectra and their probable relationship to each other, most of this chapter being concerned with motion in the line of sight.

One of the best essays is that on Mars, which summarises what we know of that planet, as well as the various speculations to which such knowledge has led.

The book is notably free from errors for a first edition; but we may point out that the discovery of carbon in the sun was not made in 1887, as stated on p. 187, but was announced by another investigator altogether in 1878.

It is unfortunate that, either for want of time or opportunity, the author has not gained a closer acquaintance with recent spectroscopic investigations. Had he done so, his book would have been much improved. Nevertheless, the selected subjects are treated in an able manner, and the book deserves to be widely read.

*Among the Celestials.* By Captain Francis Young-husband, C.I.E. Pp. 261. (London: John Murray, 1898.)

THE inspiring volume entitled "The Heart of a Continent," in which Captain Younghusband gave a straightforward record of ten years' travel in Manchuria, across the Gobi Desert, through the Himalayas, the Pamirs, and Chitral to India, was reviewed at length in these columns in 1896 (vol. liv. p. 130). The present volume has been abridged from the original work, by omitting geographical details which, though of service to geographers and travellers, are not of interest to the general public. The previous book will be published in two parts. The first part, now before us, deals with Captain Younghusband's travels in the Chinese Empire, a chapter on the outlook in Manchuria being added. The second part will describe experiences and impressions obtained during travels in the borderland between British and Russian territory in Central Asia.

There should be many readers for Captain Younghusband's interesting narrative in the form it is now presented.

*A Cotswold Village: or, Country Life and Pursuits in Gloucestershire.* By J. Arthur Gibbs. Pp. xvi + 431. (London: John Murray, 1898.)

FIELD naturalists, and all other admirers of natural life and scenes, will read this volume with pleasure. The book is of the gossipy kind, and village characters and customs figure prominently in it; but many keen observations are recorded, and the descriptions of pastoral scenes will delight all who love the country.

#### LETTERS TO THE EDITOR.

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#### Production of Magnetisation by Circularly Polarised Light.

IN NATURE for January 5, Prof. Fitzgerald points out that a beam of circularly polarised light sent through a substance absorbent in consequence of syntony with the vibration ought to produce magnetisation of the substance. The result of the experiments he has set on foot will be awaited with much interest.

In the *Proceedings* of the Royal Society for February 17 of last year Prof. Fitzgerald pointed out also that the Zeeman and Faraday effects are related phenomena. I may mention that in the *Phil. Mag.* for December 1890, I gave a very slight sketch of experiments I had carried out from time to time during several years previously, with the view of discovering the effect which theory had seemed to me to prove ought to be produced by the passage of circularly polarised light through a medium showing the Faraday effect. I have made many experiments of this kind with a bar of Faraday's heavy glass, looking for the production and disappearance of a magnetic field (with the excitation and quenching of the beam) by means of an induction coil wrapped round the bar. Calculation shows that the effect in such a case should be very small—so small as perhaps to be quite inappreciable. The investigation is, however, being resumed with improved apparatus and arrangements which I hope may not be entirely without result.

ANDREW GRAY.

#### Magnetic Perturbations of the Spectral Lines.— Further Resolution of the Quartet.

FOR some time past I have been in hope that, with the strong magnetic field now at my disposal in the Physical Laboratory of the Royal University of Ireland, I might perhaps be able to effect some further resolution of the spectral lines. For example, in the case of a line which is converted into a triplet (normal type) by a magnetic field of strength 20,000, or thereabouts, it is possible that each constituent of this triplet may become further resolved into a doublet, or a triplet, when the strength of the field is increased to 40,000 or 50,000 C.G.S. units.

Although I cannot yet affirm that the normal triplet becomes further resolved in very intense fields (but symptoms of a further resolution into doublets are sometimes seen), yet, on the other hand, it has been placed beyond all doubt that the "quartet" form becomes further resolved when the strength of the field is increased.

The quartet form, it will be remembered, consists of two strong side lines with two fainter lines between them—the latter pair corresponding to the middle line of the normal triplet. When the strength of the magnetic field is gradually increased, the side lines begin to separate into pairs; and ultimately, what was at first a quartet stand forth as a sextet of well-defined sharp lines. We may take it, therefore, that the quartet form has ceased to exist as a distinct type, except for this one peculiarity, viz. that in it the separation of the middle pair is considerably greater than that of the side pairs.<sup>1</sup> The exact ratio of these separations I have not yet determined with precision, but I hope to give measurements on this and some other matters at an early date.

It is not to be understood that this further resolution raises any new difficulties in the way of theoretical explanation, for, as I have already pointed out (*Phil. Mag.*, February 1899), the purely precessional perturbation of the orbit which gives rise to tripling pure and simple is by no means likely to be unaccompanied by other subsidiary perturbations of more or less intensity, such as oscillations of the plane of the orbit, apsidal motions, and so on, and such perturbations as these explain the existence of types other than the normal triplet. In fact, things appear very much more natural, as well as more interesting, now that we know that the triplet pure and simple is likely to become the exception rather than the rule.

THOMAS PRESTON.

Dublin, February 9.

<sup>1</sup> On the contrary,  $D_2$  is a sextet of equally spaced lines.