

view of the student. It may be said finally that the book is not merely useful as a work of reference, but it is thoroughly readable throughout. M. S.

Pleasures of the Telescope. By Garrett P. Serviss. Pp. vi + 200. (London: Hirschfeld Brothers, 1901.) Price 6s. net.

THIS book is the result of the collection under one cover of a series of articles originally published in serial form, after considerable revision and insertion of matter necessary to bring the information up to date.

Chapter i. deals in a very interesting manner with advice on the choice of telescopes, special characteristics of refractors and reflectors, principles underlying the achromatic corrections of refractors, and methods of testing the performance of astronomical instruments.

Following this, six chapters are devoted to a series of descriptions of the constellations, numerical particulars being furnished for all the more interesting objects. A very liberal supply of star-maps—twenty-six—serves for the identification of all the objects mentioned in the text.

The main features of the planets are also described, small cuts indicating the details to be seen with powers usually at an amateur's command. Four charts of the moon are given, showing the more important formations only, so as to avoid the confusion inseparable from the complete maps. This section is made exceedingly interesting by the various formations being compared with each other, the reader passing from one to another much more readily than by merely going over a list of objects. Users of the book will recognise the treatment of the subject as similar to that in "Astronomy with an Opera-glass," by the same author, and it will doubtless be welcome to many workers who only require information concerning objects within reach of the instruments usually possessed by amateurs; but the size of telescope catered for, of 5 inches aperture, is sufficiently large to render the information of service to the more advanced astronomer as well. There is only one slight criticism which may be suggested regarding the preparation of the star maps. On these there is no indication of either the coordinates of right ascension or declination. In actual practice, either in learning the constellations or in passing from one map to another, it is impossible to over-estimate the help which is furnished by the graduated position lines. The legibility and general arrangement of the maps, however, are excellent and add greatly to the value of the book, which there can be no hesitation in recommending to the notice of all interested in observational astronomy. C. P. B.

Introductory Physics for Irish Intermediate Schools. By R. A. Gregory and A. T. Simmons, B.Sc. Pp. ix + 218. (London: Macmillan and Co., Ltd., 1901.) Price 2s.

THIS little book, as its emerald-green covers and title suggest, is for the use of Irish boys and girls preparing for the examination on the new syllabus in introductory physics issued by the Department of Agriculture and Technical Instruction. A glance at the book shows that Irish physics is the same as English, and those familiar with the other books prepared by the same authors will find here practically the same exercises. S. S.

Algebraical Examples. By H. S. Hall, M.A. Pp. viii + 172. (London: Macmillan and Co., Ltd.) Price 2s.

IT will be a convenience to many teachers to possess this collection of algebraical exercises to supplement those given in Hall and Knight's "Algebra for Beginners" and "Elementary Algebra," up to quadratic equations. The exercises are carefully graduated, and are classified so that the teacher can easily select those referring to the subject with which he is dealing. In addition, there are a number of test-papers containing miscellaneous examples to test the pupil's grasp of the principles of algebra in which he has been exercised.

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LETTERS TO THE EDITOR.

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The FitzGerald-Lorentz Effect.

IN the January number of the *Philosophical Magazine* I published a discussion of the general theory underlying the experiment of Messrs. Michelson and Morley on the drift of the æther. As one result, it appeared that the effect to be expected in their special case was just the opposite of that usually supposed, and that consequently the FitzGerald-Lorentz explanation of the observed null effect would not hold. Mr. H. M. Macdonald has pointed out the source of this discrepancy in an algebraic slip in my paper; when this is corrected, the result comes into agreement with the special case treated by Michelson and Morley. The exact effect on the displacement of the interference-bands arising from a vertical component in the æther-drift has not been hitherto directly considered. It is probably null; but this requires verification, which I hope to be able to take up shortly on the basis of my analysis. As the question stands at present, the corrected result shows that the FitzGerald-Lorentz shrinkage would completely annul the shift when the drift is tangential. Although Dr. Larmor has not directly discussed the effect of an oblique drift in his "Æther and Matter," I understand from him that he has come to the conclusion (*cf. loc. cit.* § 34) that complete annulment results in all cases on the FitzGerald-Lorentz hypothesis. I think further discussion on the lines of my own method of analysis will verify that this is the case.

Meantime I send this intimation in order that others may not spend time in tracking out a discrepancy which has already been cleared up. W. M. HICKS.

University College, Sheffield, February 10.

Birds Attacking Butterflies.

ON July 22, 1901, a dull, sunless day, I pointed out to Prof. Gotch a fine fresh male specimen of the "Holly Blue" (*Lycæna argiolus*) at rest on the leaf of a shrub behind the Oxford University Museum. Touching it with my finger, the butterfly rose and fluttered feebly along the curved walk in the Parks. At that moment a swallow (or a martin) came down the walk from the opposite direction at full speed. It must have seen the butterfly fluttering towards it from a considerable distance; for with the most perfect ease and control it diverted its course and took the insect in its sweep. I felt, as I saw it, that only by good fortune was it possible thus to obtain the most direct evidence of events which are probably continually occurring.

There are, however, other means by which evidence can be obtained. One is the examination of the crops of dead birds. Although we should be sorry for British birds to be killed with this object (except in special circumstances), it is much to be hoped that the observations will be made when birds are killed, whether accidentally or otherwise. Mr. R. Newstead, of the Chester Museum, has done excellent work in this way; but there can be no doubt that, taking the country as a whole, only an insignificant proportion of the obtainable evidence is utilised.

Another line of evidence is afforded by specimens of butterflies which have their wings injured in a manner which is inconsistent with any interpretation except the snip of a bird's beak. Thus it is common to find fresh and unworn specimens with a notch or tear on the right side which exactly fits a corresponding injury on the left side, indicating that the wings had been torn when they were in contact. In one extreme instance, presented to the Hope Department by Dr. F. A. Dixey, a deep little notch had been cut out of all four wings of a "Red Admiral" (*Vanessa atalanta*), the four injuries exactly coinciding in the true position of rest adopted by this insect.

Oxford, February 2.

EDWARD B. POULTON.

P.S.—Mr. W. Holland, of the Hope Department, tells me that about the middle of June 1901 he saw a swallow swoop down from a great distance and catch a white butterfly (almost certainly *Pieris rapae*) flying in front of the Museum. The bird took the insect in a single sweep and then dextrously avoided a