The object of the book, to give an account of the Lepidoptera of Teneriffe which will enable students to identify their specimens, is certainly accomplished. Another edition should be enlarged to include brief descriptions and, if possible, figures of all the moths known to occur in Teneriffe. The systematic arrangement of the moths in the text should also be revised to correspond with that of the list.

Samuel Henshaw.

A Treatise on the Morphology of Crystals. By N. Story-Maskelyne, M. A., F. R. S., Professor of Mineralogy, Oxford. Octavo xii.+521. New York, Macmillan & Co. 1895. $3.50.

Although the constancy of angle between like planes of crystals furnishes the basis for a purely mathematical treatment, students in mineralogy, chemistry and petrology, to whom some knowledge of crystallography is essential, have rarely had the high mathematical training essential to the understanding of works like those of Liebisch, Mallard or Klein, and they will appreciate this treatise of the veteran Oxford professor, in which the principles and problems of crystallography are designedly treated in the 'simplest form compatible with strict geometrical methods.'

The work deals solely with the morphology of crystals, and is to be followed by a volume treating, in a similar manner, the physical problems necessary to a thorough knowledge of crystallography. After a brief statement of the general properties of crystals, especially the physical characters, the author proceeds to the logical development of his subject. The expressions for the position of a plane and of an origin-edge or zone axis are first deduced and the principles of stereographic projection clearly and simply stated. The practical application of the stereographic projection is then made possible by the solving of certain problems, such as: 'Given the projection of a great circle, to find that of its pole;' 'To determine the magnitude of an arc of a great circle from the projection of that arc;' 'To draw the projection of a great circle in which two points are given,' etc.

The properties of zones, the relation connecting tautozonal planes and the relations between edges and normals are examined, and the necessary expressions deduced by purely geometrical methods and also by the methods of analytical geometry. Preliminary to a discussion of symmetry, it is clearly brought out that the only angles possible between consecutive normals in isogonal zones are 90°, 60°, 45° and 30°.

Chapter IV. deduces expressions for changing parametal planes and axes, and proves that axes are not arbitrary diametral lines but are necessarily origin edges or face normals.

The possible varieties of symmetry, holo and mero, and composite and twin crystals, are elaborately treated. The author's wording of the law of symmetry or second fundamental law of crystallography is new and very thorough. "On a crystal the extant or absent features of a form must be extant or absent in the same way in respect to equivalent systematic* planes." The six systems are separately considered each under the headings: holosymmetrical forms, hemisymmetrical forms, combinations of forms, and twinned forms. The balance of the book is taken up with methods of measurement, calculation and representation.

The work is clearly printed and the diagrams are well conceived. The mathematical deductions can usually be followed by any one with a working knowledge of geometry and analytical geometry. The statements and definitions are very exact but not always concise. For instance, the definitions of a crystalloid system of planes

*Planes of symmetry.

is one sentence of eighty-five words (p. 23). There is no doubt that the work is in every way one of great value to students.

A. J. MOSES.

SCIENTIFIC JOURNALS.

THE ASTROPHYSICAL JOURNAL, JUNE.

The Measurement of Some Standard Wave-Length in the Infra-red Spectra of the Elements: EXUM PERCIVAL LEWIS.

In a review of the previous work in this field, the writer shows that very little has been done toward the identification and accurate measurement of lines due to the elements in the infra-red, and that the means employed have been comparatively crude. In the present investigation, a grating of high dispersive power was combined with the radiomicrometer, which was found to be more reliable and of greater sensitiveness than the bolometer. Results are given for sodium, lithium, silver and calcium lines.

On the Distribution in Latitude of Solar Phenomena Observed at the Royal Observatory of the Roman College in 1894: P. TACCHINI.

The faculæ and spots of 1894, and especially the prominences, have been markedly more frequent in the southern hemisphere, like similar phenomena since the summer of 1892.

A Review of the Spectroscopic Observations of Mars. W. W. CAMPBELL.

The writer replies to some critics of his former paper on the spectrum of Mars, and makes a critical examination of previous work along this line. He concludes that many of the former observations were made under circumstances extremely unfavorable, and that between the different sets of results there is not a satisfactory close agreement.

Preliminary Table of Solar Spectrum Wave-Lengths. VI. H. A. ROWLAND.

The table is continued from λ 4674.648 to λ 4903.502.

On the Electromagnetic Nature of the Solar Radiation and on a New Determination of the Temperature of the Sun. H. EBERT.

A comparison of the form of the solar energy curve with that of a strongly damped electric oscillator shows that in sunlight we are dealing with electromagnetic vibrations. But with respect to electromagnetic radiation the principal mass of the Sun acts like a black body. Hence, applying Rubens' formula for the maximum energy of the radiation of blackened bodies, $\lambda \sqrt{T} = 123$, and using 0.6 μ for the value of λ as found by Langley for the maximum energy of the solar spectrum, a temperature of 40,000° C. is found for the more interior regions of the Sun. This is in good agreement with values previously determined by other methods.

Photographs of the Milky-Way near 15 Monoceros and near ϵ Cygni: E. E. BARNARD.

On the Limit of Visibility of Fine Lines in a Telescope: ALBERT A. MICHELSON.

A theoretical discussion proves that a line subtending an angle of one-fiftieth of the limit of resolution may be distinctly seen. This is verified by experiment and applied to the 'canals' on Mars. Supposing them to be quite dark, and distinguishable by an objective of not less than eighteen inches aperture, their width is calculated to be about one mile.

Conditions affecting the Form of Lines in the Spectrum of Saturn: JAMES E. KEELER.

The effects of instrumental displacements are considered, limiting the question to the case where the slit is parallel to the major axis of the ring.

A displacement of the image at right angles to the slit gives a disproportionate exposure to the middle parts of the lines, but unless the displacement exceeds one-fourth the semi-axis minor, there is scarcely any change in direction produced. A drift in the direction of the slit broadens the