

the period of this variable, which was 281 days during 1891-1894, has changed for 1896.

Eclipse of Jupiter's Fourth Satellite, February 19, 1895: E. C. PICKERING.

A photometric observation before and after eclipse, compared with the second satellite.

Spectrum of Mars: LEWIS E. JEWELL.

A spectroscopic study of the water vapor of the earth's atmosphere shows that, unless the amount of water in the atmosphere of Mars is greater than that in the earth's atmosphere, it is useless to look for it there, with our present instruments. The chances for detecting oxygen and chlorophyl are better.

On a New Method of Mapping the Solar Corona: GEORGE E. HALE.

A method for using the differential bolometer. Evidence is offered that the heat radiation of the corona could be differentiated from that of the adjacent sky. If one member of the bolometer be exposed to a portion of the sky just beyond the coronal region, and the other member set successively on different parts of the coronal image, the galvanometer would indicate the varying radiation of heat intensity. Methods are also proposed for reducing the galvanometer readings to a form suitable for comparison with actual photographs of the corona.

On a New Form of Spectroscope: C. PULFRICH.

A translation from the *Zeitschrift für Instrumentenkunde*, describing a modification of the Littrow spectroscope.

Minor Contributions and Notes.

Photographic Correcting Lens for Visual Telescopes: JAMES E. KEELER.

The Color of Sirius in Ancient Times: W. T. LYNN.

On the Variability of Es.-Birm. 281: T. E. ESPIN.

The Displacement of Spectral Lines Caused by the Rotation of a Planet: JAMES E. KEELER.

Dr. Pulfrich's Modification of the Littrow Spectroscope.

A list of the titles of recent publications on astrophysical and allied subjects appearing since the last number is a feature of each issue.

THE PHYSICAL REVIEW, MARCH-APRIL, 1895.

THE leading article in this number of the *Review* is one by Dr. A. S. Mackenzie, *On the attractions of Crystalline and Isotropic Masses at Small Distances*. The primary object of the paper is to give in detail the methods and results of an investigation made for the purpose of determining whether, within the errors of observation, there is any deviation from the law of Newton in the case of attracting crystalline matter with reference to its optic axis, and the author gives also the results of some experiments made with a view to testing the application of the same law in the case of isotropic matter at small distances.

Physicists do not yet fully appreciate the value of the ingenious device suggested by Professor Boys through which they have lately been able to use quartz fibres, which furnish a mode of suspending small masses far ahead of anything before made use of in stability or constancy of torsional resistance. Like many other apparently minor discoveries or inventions, the introduction of the quartz fiber has greatly enlarged the opportunities of the experimentalist, in that it provides a ready means of measuring forces so minute as to have been thought until recently quite beyond our reach. The solution of problems relating to near attractions has especially been forwarded by this device, as Professor Boys has himself shown in several able and important investigations. In the paper under consideration Dr. Mackenzie describes the apparatus used in studying the attraction of crystalline

masses. It is simple but effective, and so delicate in its indications that the utmost care was necessary to avoid interference for external causes, often difficult to control. Full details are given, as they are of great interest, especially to those who contemplate the use of a quartz torsion fibre. It is interesting to note that the author was never able, throughout a long series of experiments, to control absolutely the zero point of his balance. Although quartz is enormously superior to any other suspension thus far proposed, it is still defective in this respect. For some cause which Dr. Mackenzie is unable to give, the zero was constantly shifting. He does not clearly say whether this partakes of the nature of a 'drift' in one direction or not. In a long series of experiments, made by direction of the writer of this notice, for the purpose of trying to improve the existing form of the vertical force magnetometer, quartz fibres were used. Although apparently well protected from convection currents and changes in temperature, the mirror attached to them *was never actually at rest*. When this shifting and drifting is small, as it usually is, and observations are of the nature of those described by Dr. Mackenzie, that is, not in themselves extending over long periods, the error arising from it may be readily and correctly eliminated.

The apparatus used for observing the attraction of isotropic masses was of the same character, and similar to that used by Professor Boys. The conclusion reached, the experimental results being in agreement within one or two-tenths of one per cent., is that neither in the case of crystalline nor isotropic masses was any deviation from the law of Newton detected. The author fails to note the very ingenious and interesting method of attacking the problem of the attraction of crystalline masses proposed by Poynting in his Adams Prize Essay on the Density of the Earth. Poynting proposes to test the

question of there being different properties as to attraction along different axes of crystals by the *directive action* which must exist when one sphere of a crystal is in the field of another. He made some experiments along that line, and his work probably preceded by a year or two that of Dr. Mackenzie. At the present moment, with library out of reach, I am unable to say whether he has published any further results.

The *Influence of Temperature on the Transparency of Solutions*, by E. S. Nichols and Mary C. Spencer, is another prominent article of the Review. Transparency to various wave-lengths was tested and a number of color solutions were examined. There are also papers on the Electric Conductivity of Certain Salt Solutions, by A. C. MacGregory, a continuation of the paper on Forces between Fine Solid Particles totally Immersed in Liquids and among the minor contributions is one interesting and useful on the Variation of Internal Resistance of a Voltaic Cell with Current, by Professor Carhart.

T. C. M.

NEW BOOKS.

Die Chemie des Chlorophylls. L. MARCHLEWSKI. Hamburg und Leipzig, Leopold Voss. 1895. Pp. iv + 82. M. 2.

Les Aurores polaires. ALFRED ANGOT. Paris, Felix Alcan. 1895. Pp. vii + 315.

Lehrbuch der Allgemeinen Psychologie. JOHANNES REHMKE. Hamburg und Leipzig, Leopold Voss. 1894. Pp. 582. M. 10.

Iowa Geological Survey, Vol. III. Des Moines, Published for the Iowa Geological Survey. 1895. Pp. 501.

Magnetismus und Hypnotismus. G. W. GESSMAN. Vienna, A. Hartleben. 2d edition. Pp. xiv + 205.

Bulletin of the Geological Institution of the University of Upsala. Edited by H. J. SJÖGREN. Upsala, Almqvist & Wiksells. 1893-1894. Pp. 95, 293.