

spectra have been shaded automatically during the process of reproduction so as to equalise the intensity throughout.

As systematic work the 8-inch telescope covers all parts of the sky north of declination $-12^{\circ}5'$ from two to four times a year; the Cooke lens covers all parts available two or more times a month, and the transit photometer records all stars visible to the naked eye crossing the meridian every clear night.

Arequipa Station.—The 13-inch Boyden telescope has been used for photographing clusters containing probable variable stars. With this instrument 140 plates have been obtained; 2269 with the 8-inch Bache telescope and 919 with the 24-inch Bruce lens. From the examination of these latter plates 298 new nebulae have been found, of which 9 are spiral and 3 ring nebulae.

The long focus telescope is now back from Jamaica, where a long series of photographs of the lunar surface has been obtained under five different illuminations. These will furnish material for a photographic atlas. The diameter of the moon's image is about fifteen inches.

Blue Hill Meteorological Station.—Continued experiments are being made in the exploration of the upper atmosphere by means of kites, altitudes up to 12,550 feet having been obtained. Considerable success has attended the endeavour to fly the kites from ocean-going vessels in order to record weather conditions away from land surfaces.

TOTAL ECLIPSE OF THE SUN, MAY 18, 1901.—In *Popular Astronomy* (vol. x. pp. 1-4, January), Prof. A. N. Skinner gives an account of the expedition to Sumatra from the United States Naval Observatory. Three stations were selected, at two of which the weather conditions were unfavourable. At the third, Fort de Koch, excellent photographs of the corona and the chromospheric spectrum were obtained. The former were taken with a lens of 5 inches aperture and 39 feet focal length; two of these are reproduced with the article; the spectroscopic equipment consisted of a 30-foot concave grating spectrograph, with which six photographs were obtained.

A MAGAZINE OF SCIENCE AND PHILOSOPHY.¹

"ANOTHER new magazine!" But the editor, in anticipating this exclamation, suggests that it is no more reasonable than would be "Another new flower in the fields!" or "Another new tree in the wood!" Still, one is not obliged to pluck the flower or to cut down the tree; but a new magazine makes a certain claim on the attention of the public, especially as it is addressed to the scientific public as well as to philosophers in the stricter sense of the word. Indeed, it is an attempt to induce men of science to interest themselves more in philosophy and students of philosophy to pay more attention to modern science. It is not intended to serve as a means of popularising either of these regions of thought, and the editor promises to exclude all purely speculative matter for which an experimental basis is wanting.

The first number contains an interesting article by Mach on "Similarity and Analogy as an aid to Investigation," in which Huygens, Faraday, Maxwell and Kelvin are held up as examples of investigators who have made sound use of analogy and have contributed, in consequence, greatly to the progress of human knowledge. Wald contributes "Critical Studies on the most important Fundamental Conceptions of Chemistry." It must be confessed that this introduction (for more is promised hereafter) is not very intelligible. "The Principle of Continuity in the Mathematical Treatment of Natural Phenomena" is the title of an article by Anton Scheyer. The first chapter considers the principle as illustrated in the calculus; the second deals with the principle of continuity in natural science; the third, in mechanics; the fourth, in electrical and thermal phenomena; in the fifth the kinetic theory of gases is discussed; and the sixth chapter treats of the hypothesis of matter and of energetics. Here objections are raised to Ostwald's conclusion that "Our senses tell us of differences in energy between them and their surroundings"; for it is remarked that if equal quantities of energy be imparted to two bodies of equal mass yet of different specific heat, having the same initial temperature, while the final temperature of each will be the same, heat will

¹ *Annalen der Naturphilosophie*. Edited by Wilhelm Ostwald. (Veit and Co.). Price 14 Marks, yearly.

have passed from the one of lower to the one of higher specific heat; and yet each will affect the sense of temperature equally, though they have gained different amounts of energy. He insists, therefore, that besides energy there must exist some other magnitude which must not only be capable of mathematical treatment, but must be as necessary for the true description of occurrences as energy itself. He also questions whether the doctrine of energy suffices to describe such a stationary condition as two equal light-rays polarised at right-angles to each other, or to picture the stationary state which exists when energy flows in a field of permanent magnets and charged conductors, according to Poynting's law. For these and other reasons he regards it as probable that an interpretation of the universe will be more complicated than would be the case were Ostwald's energetic conception possible.

Ostwald contributes a critical article on Kant's "Metaphysical Basis of Science." To Kant's statement that true science must treat its subject-matter according to *a priori* principles, and that only science falsely so-called deals with laws deduced from experiment, Ostwald replies by denying the possibility of *a priori* conclusions, and maintains that all knowledge is derived from experience. Another celebrated dictum of Kant's is that in any investigation of Nature only so much real science is present as is expressible in mathematical terms; Ostwald insists, however, that mathematics is only a language in which the results of experiments may be conveniently expressed, and that it can contain nothing more in its conclusions than what experiment lends to its premisses. And while Kant, although acknowledging that in principle his scientific treatise has a close connection with the ordinary province of metaphysics, to wit, God, Freedom and Immortality, distinguished them sharply, regarding the former "as a shoot from the same root as the latter, but one which hinders its regular growth," Ostwald maintains that no stronger argument can be found for the necessity of a purely experimental basis for all branches of knowledge.

A somewhat technical article by Arthur von Oettingen on "The Dual System of Harmony," and one by E. Sievers on "Melody of Voice in (Reciting) German Poetry," are followed by reviews of new books by the editor. Among these it is somewhat amusing to find Judge Stallo's "Concepts of Physics," which has only now reached the German public, through its translator, H. Kleinpeter. W. R.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Mr. T. H. Middleton, professor of agriculture in the Durham College of Science, Newcastle-on-Tyne, has been elected to the chair recently vacated by Dr. Somerville.

Dr. Barclay-Smith has been reappointed senior demonstrator of anatomy.

The Vice-Chancellor, Prof. J. J. Thomson, and Mr. R. T. Wright will represent the University at the jubilee of Owens College, Manchester, to be celebrated next March.

EDUCATION was given first place in the King's speech to the Commons at the opening of Parliament last Thursday. The words used were "Proposals for the Co-ordination and improvement of Primary and Secondary Education will be laid before you." It is to be hoped that a comprehensive measure will be introduced early in the session, and that nothing will be permitted to interfere with the settlement of the questions involved in it.

THE adoption of the metric system of weights and measures would be so much to the advantage of the work of education and commerce in this country that efforts should be made to bring the subject forward on every suitable occasion. We are, therefore, glad to see that the following resolution was passed at a general meeting of Convocation of the University of London on Monday:—"That this House is of opinion that, in the interests of commerce, science and education, legislation should be promptly undertaken to make compulsory in this kingdom, after a proper interval, the use of the metric system of weights and measures for all purposes."

PROF. ALFRED LODGE stated the case for reform in methods of teaching geometry at the annual meeting of the Mathematical Association held on Saturday last. He urged that a new text-book of geometry, framed more or less on the model