

A NEW method of illumination for photographic work, particularly for enlarging and for projection purposes where great magnification is not required, has been brought under our notice. The apparatus is known as the "Petrolite" photographic lamp, and is sold by Mr. A. J. Garrad, of 317 High Holborn, W.C. The lamp consists essentially of an ordinary Welsbach incandescent gas-mantle, which is raised to a condition of incandescence by the use of petrol gas. The petrol is contained in a metal chamber, but is all taken up by a highly absorbent material; consequently there is no loose petrol in the container. Once it is absorbed it does not escape, but is only given up again in the form of vapour as it is required at the burner. If from any cause the apparatus is overturned, the light goes out. The whole appliance will go inside an ordinary lantern body, and is obviously a good arrangement where either ordinary gas or any method of electrical illumination is unobtainable. The price is reasonable, and the cost of running is lower than that of any other similar method of incandescent gas lighting. The apparatus may be commended to those who require a source of light that must be independent of any extraneous supply of gas or electricity.

WE have received from the Bausch and Lomb Optical Co., of 9 Thavies Inn, Holborn Circus, E.C., its latest catalogue of microscopes, apparatus for photomicrography, and various projection appliances. From it we gather that the Bausch and Lomb Co. is now acting in close cooperation with Messrs. Carl Zeiss, of Jena, and that many of its products are based on the investigations carried out by the latter firm. The apparatus for photomicrography appears to be now of a very complete order, and is in general design much the same as that made by Messrs. Zeiss, the camera and the portion of the apparatus supporting the microscope and optical accessories being regarded as two separate appliances. While this is what some regard as an objection, the whole apparatus not being fastened to one single solid base, yet, on the other hand, it ensures that any movement of either component is not communicated to the other part. The apparatus for the projection of both opaque and transparent objects is of new design, and appears to be built in a very substantial way, and is arranged to carry out work of almost any description in this direction. As the Bausch and Lomb Co. is now fitting up new showrooms in London, where all these appliances may be seen under working conditions, a visit at the present time cannot fail to be of interest to those who contemplate purchasing such apparatus.

THE Colorado School of Mines Quarterly for April is wholly devoted to a short monograph on tungsten, by H. R. Van Wagenen. The first part, which is more of local interest, gives an account of the Colorado mines and mill practice. The second part deals with the physical properties and uses of tungsten, its mineralogy, chemistry, and metallurgy. The preparation and properties of the tungsten alloys are also described, and at the conclusion of the paper there is a useful bibliography. The main applications of tungsten are found in the preparation of various tungsten steels and of metallic filaments for lamps, other uses being found for tungstates as a mordant in dyeing, in the preparation of non-inflammable fabrics, and as a pigment.

ATTENTION has been directed more than once to the growth in size, year by year, of the "Statesman's Year-book," published by Messrs. Macmillan and Co., Ltd.,

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and edited by Dr. J. Scott Keltie with Mr. I. P. A. Renwick's assistance. The 1909 issue, which is now available, represents a successful attempt to reduce the bulk, without affecting the usefulness, of this valuable statistical and historical annual. This satisfactory reduction by some 300 pages has been accomplished by the introduction of uniform type, the elimination of superfluities, economies of space, and various re-arrangements. The present issue has several new features; some deal with recent changes in the altered constitutional character of several countries, others with new census returns and various other matters of public interest, while a new section gives a brief statement with reference to the Hague Tribunal, with a list of members. The plates, which are all new, include a diagram exhibiting British and German naval expenditure on new construction during the last decade; and maps illustrating the Anglo-Siamese Treaty, 1909; the Anglo-Abyssinian Boundary, 1902 and 1907; the Anglo-German and German-French Kamerun Boundary, 1906 and 1908; the All Red Route; and the military divisions of India. The price of the year-book remains 10s. 6d. net.

ERRATUM.—Mr. Hy. Harries informs us that on p. 403 of NATURE of June 3 the ship on which Dr. von Neumayer returned from Melbourne in 1864 was erroneously given by him as the *Sovereign of the Seas*; it should have been the *Garrwald*.

OUR ASTRONOMICAL COLUMN.

THE RINGS OF SATURN.—Prof. Levi-Civita has written an interesting pamphlet on the mechanics of the ring of Saturn ("Sulla Forma dell' Anello di Saturno," *Premiale Officine Grafiche Carlo Ferrari, Venezia*). His conclusion is that under certain hypotheses the angular velocity of each ring exceeds that of a satellite at the same distance. He points out that the differential equations applicable to a flexible substance are applicable, even in spite of Clerk Maxwell's demonstration that the ring consists of discrete particles. He therefore reverses the procedure of Stazio in Dante:—

"Trattando l'ombra come cosa salda."

CHANGES IN THE FIGURE AND DIMENSIONS OF THE SUN.—In a mathematical paper appearing in No. 4, vol. xxix., of the *Astrophysical Journal* (p. 257, May), Prof. Moulton discusses the possibility of observing changes in the form and dimensions of the sun from the dynamical point of view.

After reviewing briefly the practical methods previously employed to detect any possible variation, he attacks the problem from various theoretical standpoints, with reasonable assumptions, and arrives at several interesting conclusions. First, he shows that the difference between the equatorial and polar diameters must be less than $0.07''$ as seen from the earth, and is, therefore, beyond observation by any means yet employed. Then, considering possible oscillations, he demonstrates that, if they exist in the sun, their period cannot exceed a few hours, although different periods might combine to form "beats."

It seems possible, at first glance, that any possible shrinking might be demonstrated by the change in the rate of rotation before becoming directly measurable from the earth, but Prof. Moulton shows that this is unlikely. Variations of diameter would presumably produce corresponding variations of temperature, but it is surprising to find that a variation of the apparent diameter by $0.1''$ should produce a change of 1400° C. in the temperature. Considering the effect of such dilatational oscillations on the power of radiation, it is shown that, were the diameter undergoing changes amounting to $0.1''$, as seen from the earth, the rate of radiation at maximum would be 2.56 times that at minimum radius; in other words, the variation would be about one stellar magnitude. Langley and Abbot believed they had observational evidence of a 10 per cent. variation in the radiation, but this would correspond