

shown that the picks of mechanical coal-cutters can strike sparks which will ignite firedamp. In a recent report (No. 62) issued by the Safety in Mines Research Board, M. J. Burgess and R. V. Wheeler report experiments which show that sometimes the impact of a hand-pick on suitable hard stone will ignite firedamp. It was not easy and the work suggests that the production of suitable conditions is a rare occurrence in practice.

MESSRS. Francis Edwards, Ltd., 83 High Street, Marylebone, W.1, have just issued a useful little list of some 350 second-hand works dealing with the arctic and antarctic regions.

APPLICATIONS are invited for the following appointments, on or before the dates mentioned: An assistant aeronautical engineer in the Army Air Corps of the Irish Free State—The Secretary, Civil Service Commission, 45 Upper O'Connell Street, Dublin, C.8 (Feb. 24). An adviser in greenkeeping at the St. Ives Greenkeeping Research Station—R. B. Dawson, St. Ives Research Station, Bingley, Yorks (Feb. 28). An assistant woman demonstrator

in physics at Royal Holloway College—The Principal, Royal Holloway College, Englefield Green, Surrey (Mar. 4). A professor of mechanical engineering in the University of Birmingham—The Registrar, The University, Edgbaston, Birmingham (Mar. 9). A director of the Institute of Plant Industry, Indore, and agricultural adviser to States in Central India and Rajputana—The High Commissioner for India, India House, Aldwych, W.C.2 (Mar. 14). A head of Biological Department of Epsom College—The Headmaster, Epsom College, Surrey (Mar. 31). A professor of philosophy at King's College, London—The Academic Registrar, University of London, South Kensington, S.W.7 (May 7). A part-time assistant master, qualified to teach biology, at the Technical Institute, Gillingham—C. Colles, Medway Technical College, Gillingham, Kent. A resident engineer at the Rotherhithe Works of the South Metropolitan Gas Company—The Secretary, South Metropolitan Gas Company, 709 Old Kent Road, S.E.15. A science master for physics at the Newport, Isle of Wight, Secondary School—The Director of Education, County Hall, Newport, Isle of Wight.

### Our Astronomical Column.

**Jupiter without its Satellites.**—Mr. W. F. Denning writes: "The planet Jupiter will be observed apparently without visible satellites on Feb. 14. On that evening at 8.51 P.M. the first satellite will commence its transit across the disc of its primary. The fourth satellite will have previously begun its transit; while the second satellite will be hidden behind the planet, and the third will be suffering eclipse. The temporary obscuration of the satellites will continue for more than 2 hours and 15 minutes, for at 9.6 P.M. the first satellite will complete its transit. Jupiter has nine satellites; all but five are so faint that small telescopes cannot reveal them. To view the planet devoid of all visible satellites is a somewhat rare spectacle. The writer was privileged to witness it on Aug. 21, 1867, with a 4½-in. refractor, and a delineation of the appearance presented was afterwards given in the *Astronomical Register*. Repetitions of the phenomenon will occur in 1932, and one of these which occurs in November may possibly be seen at Greenwich."

**Pluto.**—A recent *Daily Science News Bulletin* issued by Science Service, Washington, D.C., reports that Dr. S. B. Nicholson and N. U. Mayall, of Mount Wilson, have been studying the mass and orbit of Pluto. They first obtained corrections to Pluto's orbit by applying perturbations by the large planets; the period appears to be very close to 248 years. With the orbit thus obtained they investigated the mass that was indicated by the observations of Neptune. The two planets were in conjunction in longitude in 1891, and at their least distance apart, 19 units, in 1895. They made use of the data given by Dr. J. Jackson in his paper on Neptune's orbit (*Mon. Not. Roy. Ast. Soc.*, June 1930). Two different methods of treatment, one including, the other excluding, Lalande's observations of 1795, gave for Pluto's mass 1.08 and 0.72 in terms of the earth's mass.

Even the smaller of these masses would require the diameter of Pluto to be at least 7000 miles, assuming that the density is unlikely to exceed that of the earth. Such a diameter is not impossible. With an

albedo the same as that of the planet Mercury, it would make the visual magnitude in opposition about 14. The visual magnitude was stated to be brighter than the photographic one, and some of the estimates made it as bright as 14. M. Baldet, using the 33-inch Meudon refractor, estimated the diameter as 0.2", or about 4000 miles. But the limbs would be so feebly illuminated that the real diameter may be greater than his estimate.

**Solar Physics Observatory, Cambridge.**—The eighteenth annual report of the director of the Solar Physics Observatory, Cambridge, covering the period Aug. 1, 1929–July 31, 1930, shows satisfactory progress, although much of the routine work has been hampered by somewhat extensive instrumental alterations, which, however, should greatly assist the work in future. In particular may be mentioned the installation of an electric Gerrish drive for the 36-inch Common reflector in place of the old clock drive, and the re-designing of the spectroheliograph. The loss which the observatory has sustained through the sudden death of the first senior observer, Mr. F. E. Baxandall, in October last, is referred to in appropriate terms. Mr. Baxandall's chief unfinished investigation, on the spectrum of  $\beta$  Lyrae, has been edited by the director, with the collaboration of Dr. F. Hogg, director of the Amherst Observatory, and published as vol. 2, part 1, of the *Annals of the Solar Physics Observatory*. An important addition to the instrumental equipment is a registering microphotometer, specially designed by the Cambridge Scientific Instrument Co., in close collaboration with the assistant director, Dr. Carroll, the purchase of which was facilitated by a generous donation from Mr. J. H. Reynolds, honorary treasurer of the Royal Astronomical Society. A full description of the instrument has recently appeared in the *Monthly Notices of the Royal Astronomical Society*. On the meteorological side, the results of a study, during the last five years, of the discharge of electricity from an elevated metal point during periods of disturbed weather conditions have been discussed in a paper presented to the Royal Society. An extension of this work is now in progress.