geophysical institute, which is to deal with geodesy, tidal phenomena, seismology, and allied matters, has been approved, and a small committee is now formulating a definite scheme.

WE notice the following among forthcoming books of science:—"Air Navigation Notes and Examples," Instructor-Capt. S. F. Card; "Tacheometer Tables," Prof. H. Louis and G. W. Caunt; "The Principles of Electrical Engineering and their Application," Prof. G. Kapp, vol. ii., Application (*Edward Arnold*); "The Pituitary," Blair Bell; "The Heart: Past and Present," Dr. E. Lea; "Injuries to the Head and Neck," Dr. H. Lawson Whale (*Baillière, Tindall, and Cox*); "The North Riding of Yorkshire," Capt. W. J. Weston; "Dumbartonshire," Dr. F. Mort, each in the Cambridge County Geographies Series (*Cambridge University Press*); "Economic Farm Buildings," E. P. Lawrence; "The Universal Wages Calculator," C. E. Lewton (*The Library Press, Ltd.*); "Kræpelin's Psychiatry," vol. iii., Dementia Præcox, translated by Dr. R. Mary Barclay, edited by Dr. G. M. Robertson; "A Handbook of Surgery (Civil)." C. R. Whittaker (*Edinburgh: E. and S. Livingstone*); "The Principles of Child Physiology, Pure and Applied," Dr. W. M. Feldman (*Longmans and Co.*).

OUR ASTRONOMICAL COLUMN.

DETERMINATION OF PROPER MOTIONS.—In Circular No. 43 of the Union Observatory, Johannesburg, Mr. Innes publishes the result of an examination with the blink microscope of pairs of plates of eighty astrographic fields lent to him for the purpose by the Astronomer Royal, the plates of each pair being separated by an interval of nearly twenty years. The fields cover the zone of the sky from declination 65° to 67° N. through the whole twenty-four hours of right ascension, and out of the whole number of stars examined, estimated at 20,000, Mr. Innes has found nearly four hundred which have a measurable P.M., the large majority of which were previously unknown. The largest motions are 290″, 179″, and 167″ centennial on a Great circle. There are five between 50″ and 100″, sixty-seven between 20″ and 50″, and more than 300 less than 20″ centennial. Two hundred and fifty of the stars are in the Bonn Durchmüsterung, and are, therefore, of all magnitudes down to 9·5 or 10 visual, whilst the remainder are of photographic magnitude 10 to 12, with a few fainter. It will be realised that the motion of a star thus determined is relative to the stars in a limited area surrounding it, and not to the heavens as a whole. The systematic character of the figures in the table gives assurance that Mr. Innes's work forms a useful contribution to stellar statistics.

THE BLINK MICROSCOPE.—The fundamental principle of this instrument is somewhat obscured by its name. Having two similar photographs of the same field of stars taken at some interval of years apart, the obvious method of determining motion would be to superpose these plates with identical images fitting one on the other so far as possible, and then to search for those images which do not fit. As actual superposition is difficult, or impossible, for practical reasons, a method only slightly less simple is to adjust the plates side by side and measure the distances between identical images with a measuring bar. This is the principle of more than one type of instrument now being used to determine proper motion. In the blink microscope the images of the same star on the two plates are seen alternately by rapidly closing and opening shutters. Hence the name. Two images which fit fall on the same spot of the retina, but those of a star which has motion do not, and give the sensation of a jump. The method of detection is therefore simple, but it is clear that the measurement must be made with discretion lest errors occur because of imperfect adjustment or lack of exact similarity of the plates.

CALCULATION OF OCCULTATIONS OF STARS BY THE MOON.—Mr. Arthur Snow publishes some tables for this purpose in *Popular Astronomy* for February, which should be of great use to those who do not live near one of the stations (Greenwich, Washington, etc.) for which special lists are available. He directs attention to the fact that the region of visibility of an occultation is a belt about half as wide as that for a total solar eclipse, crossing the parallels of latitude at a considerable angle, so that by no means all the places that lie between the published latitude limits enjoy a sight of the phenomenon. He gives full directions, which enable the limits of visibility to be laid down on a map.

X-RAYS AND BRITISH INDUSTRY.

THE war has furthered the progress and development of many industries, but probably no department of science has received greater impetus than that of radiology, using the word in the general sense which it ought usefully to convey, and not in that restricted sense which the medical world has attached to it. The science and art of X-rays have developed enormously during the war, and nothing but good can result from the fact that the general medical practitioner has had his eyes opened to the vista which the X-rays have revealed. He now realises, as never before, that radiology is a new instrument of attack for him—a veritable handmaiden, whether he be physician or surgeon. The new diploma of radiology which Cambridge and other universities are about to establish is tacit recognition of the importance of X-rays in a medical curriculum. We welcome the suggestion that a chair of radiology should be established at one of the universities in memory of the late Sir James Mackenzie Davidson.

But it is not our purpose at the moment to dwell on the medical aspect of the rays. We are more concerned with a development to which the Germans, Americans, and ourselves have given considerable attention during the past year or more. We refer to the examination of materials and built-up structures by X-rays—a subject to which a joint meeting of the Röntgen and Faraday Societies in the meeting-room of the Royal Society devoted its attention on April 29.

It is a very far cry from the days of Röntgen's famous discovery some twenty-two years ago to the present time. The technique has advanced amazingly, but it can scarcely be said that apparatus and equipment have made corresponding strides, although it is, of course, not denied that considerable progress has been made. We refer to this point later, but the question is tied up with the attention the subject has received at the hands of the physicist and electrical engineer.

The meeting to which we have referred served admirably to set out the development and present limitations of the industrial uses of X-rays, and those of our readers who are interested may be referred for details of the meeting to the journals of the two societies concerned.

The great advantage of radiography is, of course, the fact that we can spy out the interior of an opaque body without injuring it in any way. Chief among the materials which have been examined by the X-rays is steel, both carbon and alloy. Naturally, the question of blow-holes and flaws in castings and