OUR ASTRONOMICAL COLUMN.

THE ECLIPSING BINARY RX HERCULIS.—An extended series of observations of photographic magnitudes of this variable has lately been made and discussed by R. H. Baker and Edith E. Cummings (Laws Obs. Bull., No. 25). The observations were made by the extra-focal method and, in combination with the spectroscopic evidence, lead to the following conclusions:—The two stars are slightly ellipsoidal, and each has a radius about one and a half times that of the sun. The mass of each star is a little less than that of the sun, and the density is about one-fourth of the sun's density. The star eclipsed at principal conjunction is of magnitude 7·96, and is brighter by 0·12 magnitude than its companion; its surface brightness, mass, and density are greater than those of the fainter star by 12, 6, and 9 per cent. respectively, and it is of slightly earlier spectral class (A). The distance between the centres of the two stars is about five times the radius of either star, or about 5,280,000 km. At conjunction 70 per cent. of the disc of one star is eclipsed by the other. The period is 1·7785740 days (Shapley), and the semi-duration of eclipse 2h. 53m. The photographic magnitude of the system is 7·264, and the magnitudes at primary and secondary minima 7·84 and 7·71 respectively. Outside eclipse the intensities generally increase towards secondary minimum, showing that the light of the star eclipsed at this time is augmented by radiation of its brighter companion.

SPECTROSCOPIC RESOLVING POWER.—The resolving power of a spectroscope is limited by the diffractional broadening of the geometrical images of the slit, and, following Lord Rayleigh, the limit of resolution usually adopted is determined by the condition that the maximum of the central band corresponding to one of the lines should fall on the minimum of that of the second line. Under these conditions, for two lines of equal intensity, the intensity at the centre of the combined bands is 0·81 of that of the maxima. An experimental investigation made by C. M. Sparrow at the University of Virginia (*Astrophysical Journal*, vol. xliv., p. 76) has led to the result that the limit of resolution is given by the "undulation condition"—that is, by the condition that the central minimum shall just disappear. The theoretical resolving power thus derived is about 26 per cent. greater than that given by the Rayleigh criterion. Among other matters of interest, a simple approximate formula is given for the resolving power of the Fabry and Perot interferometer.

THE MINIMUM RADIATION VISUALLY PERCEPTIBLE.—Adopting the light from a 6th magnitude star as the smallest amount perceptible, Dr. H. E. Ives has made an interesting calculation of the corresponding least quantity of radiant energy capable of exciting the sensation of light (*Astrophysical Journal*, vol. xliv., p. 124). Taking Russell's estimate that a candle at one metre distance is of stellar magnitude −14·18, it is easily deduced that the brightness of a 6th magnitude star is $0{\cdot}849 \times 10^{-8}$ of this. Since a metre-candle is equivalent to 1·59 ergs per sec. per sq. cm., it follows that the least power corresponding to illumination from a light-source of the above brightness is $1{\cdot}35 \times 10^{-8}$ ergs per sec. per sq. cm. Assuming 6 mm. as the diameter of the pupil, the radiation entering the eye from a light-source of maximum efficiency of the brightness of a 6th magnitude star would be $0{\cdot}38 \times 10^{-8}$ ergs per sec. On the assumptions made, this is the smallest amount of radiation perceivable by the eye, but it is important to note that the figures given only apply to radiation from a distant point-source, such as a star. At this rate of energy-reception the eye would receive through the pupil the elementary energy-quantum in one-thousandth of a second.

METEOROLOGY IN WAR.

LONG before the outbreak of the world conflagration of the past two years war and the weather was a subject which captivated many minds, mainly of non-scientific or semi-scientific people who were prepared to accept as proof the most superficial circumstances which seemed to substantiate any popular belief. Even during the progress of the present war there have been many discussions in the Press and before societies in this and in other countries which have had for their object the perpetuation of the old belief that gun-firing causes rain, though round Shoeburyness, our great gun-firing station, less rain falls than in any other part of the British Isles! These quasi-learned discussions have been of no assistance to the fighting forces on sea or land.

Scientific investigators, however, have not been idle, though little or nothing of their activities is known outside official circles. The meteorological establishments of the various countries involved in the great war have been doing their utmost to utilise the now very greatly increased knowledge of the physics of the atmosphere for the immediate benefit of the armies. Perhaps, at first sight, it would be natural to infer that meteorologists can go no further than prepare, on the lines familiar to us during the past half-century, predictions of the weather changes likely to take place within the coming twenty-four hours. But the matter has got far beyond this. As is stated in the eleventh annual report of the Meteorological Committee for the year ended March 31 last, just issued (Cd. 8381, price 1*d.*):—"The variety of ways in which the weather affects warlike operations in all parts of the world has become very apparent from the diversity of the information which the Office is called upon to supply at short notice. The results of meteorological inquiries initiated in what appeared to be the remote interest of the theory of the circulation of the atmosphere have turned out to have important practical bearings."

Both for naval and military operations accurate forecasts have been greatly enhanced in value, yet probably they are not more important than other tasks now undertaken by the meteorologists—for example, the behaviour of the upper atmosphere for the information of the flying services, and the condition of the surface atmosphere and its relation to gun-sighting and range-finding. According to the official report referred to above a separate unit of the Royal Engineers was created for a meteorological field service, that with the Expeditionary Force in France being under the command of Major Gold, one of the Meteorological Office superintendents, and that in the eastern Mediterranean under Capt. Wedderburn, honorary secretary of the Scottish Meteorological Society, assisted by Lieut. Kidson, of Canterbury College, New Zealand, and magnetician in the service of the Carnegie Institution of Washington. In view of the importance of an adequate knowledge of the weather to the proper conduct of naval and military operations in the Mediterranean generally, Major Lyons, R.E., formerly Director-General of the Egyptian Survey Department, was appointed to take charge of this section. Further, the importance of co-ordinating the experience of flying officers with the work of the Office and observatories in order to obtain more effective knowledge of the structure of the atmosphere has led to the appointment of Major G. I. Taylor, Schuster reader in meteorology, to the professorship of meteorology to the Royal Flying Corps.

That the responsible authorities appreciate the work performed by the meteorological services is evidenced by the Distinguished Service Order conferred on Major Gold, and the inclusion of some of his assistants in the Commander-in-Chief's despatches; while the