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SOLAR ECLIPSE PROBLEMS¹

By Dr. J. H. MOORE

ASTRONOMER IN THE LICK OBSERVATORY

A TOTAL solar eclipse affords an opportunity to study the faint outer portions of the sun, invisible under ordinary conditions. Several serious attempts have been made to observe the solar corona without an eclipse, and although partial success has recently attended certain observations of this character we still are confined to the fleeting moments of totality for a study of its detailed structure. Moreover, at the time of a solar eclipse we are able to investigate most efficiently the spectrum of the chromosphere, and from such studies to obtain important information, not only concerning the distribution of the elements within the sun's atmosphere, but also of the physical conditions that obtain there. These two fields of research in solar physics may be regarded as preeminent among those associated with a total eclipse of the sun, and

it is to certain of the problems related to the constitution of the chromosphere and the corona that I wish to direct your attention, stressing the observational more than the theoretical aspect.

THE CHROMOSPHERE

Immediately preceding and following totality when the glaring photosphere is hidden behind the moon's limb, the outer portion of the solar atmosphere appears as a narrow brilliant scarlet-colored crescent. To this envelope of the sun, Lockyer gave the name of chromosphere. Its spectrum was first observed at the eclipse of 1870 by Young, who found it to consist of bright lines on a dark background, which flash out as the photosphere is hidden, and remain for a few seconds, until covered by the advancing moon. This "flash spectrum" was regarded by Young as a reversal of the Fraunhofer lines whose origin was ascribed to

¹ Address of the retiring vice-president and chairman of Section D—Astronomy, American Association for the Advancement of Science, Atlantic City, December, 1932.

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