

LEEDS ASTRONOMICAL SOCIETY.—The Journal and Transactions of this society for the year 1916 has been received. The number of members was fifty-two, and in view of the prevailing conditions, an average attendance of fourteen may be taken as an indication that the meetings continued to be interesting and helpful. Numerous observations of interest are recorded, and among the contributed papers, one by the Rev. I. Carr-Gregg on "The Invisible Universe," and another on "Sir William Herschel," by Miss C. A. Barbour, call for special mention. The editor is Mr. C. T. Whitmell, who has also made numerous contributions.

WAVE-LENGTHS OF HELIUM LINES.

ON account of its great intensity and the convenient distribution of the lines, the spectrum of helium furnishes a valuable source of standard wave-lengths in spectroscopic and optical work. A new series of determinations of the wave-lengths of the brighter lines which has been made by Mr. P. W. Merrill at the U.S. Bureau of Standards, Washington (*Astrophysical Journal*, vol. xli., p. 357, December, 1917), will therefore be generally welcomed. The highest possible precision has been aimed at, and as lines belonging to all the six series which constitute the spectrum of helium were included in the measurements, the new wave-lengths will also provide valuable data for computations of theoretical interest.

An interferometer of the Fabry and Perot type was used, and nine of the lines were compared directly with the fundamental standard—the red line of cadmium—by photographing the helium and cadmium spectra simultaneously on the same plate. Other wave-lengths were then determined from photographs of the helium spectrum alone. The adopted values for the twenty-one lines measured are given in the appended table, which also includes the values given by previous observers. The values given by Lord Rayleigh (two sets) and Eversheim were derived from interferometer observations, but those by Runge and Paschen were determined in the more usual way from grating photographs; the latter have been corrected from Rowland's scale to the international scale in order to make them directly comparable with the other values.

Wave-lengths of Helium Lines (in Å.).

| Bureau of Standards | Rayleigh | | Eversheim | Runge and Paschen |
|---------------------|----------|---------------|-----------|-------------------|
| | a | b | | |
| 2945.104 | | | | 106 |
| 3187.743 | | | | 701 |
| 3613.641 | | | | 641 |
| 3705.003 | | | | 007 |
| 3819.606 | | | | 605 |
| 3888.646 | | | | 638 |
| 3964.727 | | | | 727 |
| 4026.189 | | | | 192 |
| 4120.812 | | | | 821 |
| 4143.759 | | | | 766 |
| 4387.928 | | | | 934 |
| 4437.549 | | | | 549 |
| 4471.477 | ... | (478) ... 480 | ... 493 | ... 475 |
| 4713.143 | ... | (171) ... 142 | ... 154 | ... 074 |
| 4921.929 | ... | 925 ... 928 | ... 922 | ... 919 |
| 5015.675 | ... | 680 ... 678 | ... 683 | ... 556 |
| 5047.736 | | | | 641 |
| 5875.618 | ... | 616 ... 623 | ... 639 | ... 650 |
| 6678.149 | ... | 144 ... 147 | ... 151 | ... 14 |
| 7065.188 | ... | 189 ... 197 | ... 207 | ... 22 |
| 7281.349 | | | | 53 |

In the case of double lines the wave-lengths are those of the stronger components. From the general agree-

ment of individual determinations it is considered probable that the error is in no case so much as 0.003 Å., and that in most cases the errors are smaller than that amount. It is shown that the Kayser and Runge formula for spectral series, based upon three consecutive lines, will not reproduce accurately even the next member in any one of the six helium series.

THE CORAL-REEF PROBLEM.

FROM time to time recent work on the topography of coral-reefs has been referred to in NATURE, and the existence of submarine platforms from which atolls and encircling reefs rise has been very generally demonstrated. Prof. R. A. Daly regards these platforms as wave-cut plains, produced from coral banks and volcanic isles when the level of oceanic waters was lowered by ice-accumulation in Glacial times. The melting of the ice caused a general submergence of the platforms and of the adjacent coasts, giving rise to drowned valleys and all the features that have been attributed to a subsidence of the ocean-floor. The existing coral-reefs are thus for him post-Glacial, and grew up on the submerged platforms when warmer conditions were renewed.

In a summary of his views in *Scientia* (vol. xxii., p. 188, 1917) Daly points out that flat, reefless banks occur "in every ocean, inside and outside the tropical belt . . . covered with 45 to 100 metres of water." He urges that the inner walls of reefs are not well graded to the floors of the lagoons, and that the upper wall thus indicates a rise of water-level (whether we attribute it to flooding or subsidence) since the formation of the level inner floor. He believes that this floor is part of the platform, and is not due to infilling, though it is not clear why he should demand "millions of years" for such deposition within the wall (compare also his paper on "A New Test of the Subsidence Theory of Coral Reefs," *Proc. Nat. Acad. Sci.*, vol. ii., p. 664, 1916). He holds that "the mean depths of water above the flat floors of wide lagoons are nearly equal to the mean depths found on reefless banks," and that there is a close similarity of depth in the greater lagoons throughout the reef areas of the Pacific and Indian Oceans. Daly regards the reefs as "peripheral growths on wave-cut platforms," those nearer the centres of the platforms having been extinguished by mud and sand swept over the shoals.

On the other hand, Prof. W. M. Davis, in a series of critical papers, based on a recent visit to the Pacific isles, has greatly strengthened the Darwinian view. Thanks largely to his reasoning, even those who cannot find evidence for a general subsidence of ocean-floors are inclined to invoke block-faulting to explain the drowning of certain areas. Davis ("A Shaler Memorial Study of Coral Reefs," *Amer. Journ. Sci.*, vol. xl., p. 223, 1915) urges that if the lagoon floor is part of a wave-eroded plain from which the reefs rise, the sea would have cut cliffs in the surviving volcanic isles, the tops of which should appear as truncations of the spurs that bound the subsequently drowned valleys. Such cliffs occur in Tahiti ("Cliff Islands in the Coral Seas," *Proc. Nat. Acad. Sci.*, vol. ii., p. 284, 1916), but are very exceptional features. Davis regards them as emphasising the general absence of cliffs, even if they "are the work of abrasion during the lowered sea-stands of the Glacial period" ("Problems Associated with the Study of Coral-Reefs," *Sci. Monthly*, vol. ii., p. 564).

Davis, in his three papers in the *Scientific Monthly* (1915) and elsewhere, lays stress on the mature forms of the valleys in the reef-encircled isles as indications of their antiquity. These valleys cannot have been