

the smaller aperture of 24 inches, Dr. Voûte's measures must be considered to be of a remarkable accuracy.

September 6, 1935

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A FAINT ENVELOPE AROUND THE RING NEBULA IN LYRA

BY JOHN C. DUNCAN

On a photograph of the ring nebula in *Lyra* (NGC 6720) which I made with the 100-inch Hooker telescope on the night of August 6, 1935, there appears around the famous ring a faint envelope which seems not to have been recorded before. The aperture used was 84 inches, the plate a backed Imperial Eclipse, and the exposure time 30 minutes. The seeing was unusually good and the sky very clear, but there was scattered light from the 7-day-old Moon. The existence and appearance of the faint envelope are confirmed by a second photograph, obtained on the night of August 27 with the full 100-inch aperture, a similar plate, and an exposure of 58 minutes. The sky on this night was clear and moonless, with fog covering the valley lights, but the seeing was poor.

The first photograph, enlarged, and intensified by successive copying on slow plates, is reproduced in Plate XVI. In order to show the faint envelope, the bright ring is of course so overexposed as to lose most of its familiar appearance. The fine little spiral in the lower left (southeast) corner has been shown on a number of earlier photographs.

The newly discovered envelope appears rather sharply defined and roughly circular in form, with a diameter of about 145'' or nearly twice the mean diameter of the familiar bright ring. It shows a structure of looped filaments, the brightest of which is on the preceding side. Microphotometer tracings made on the negative of August 27 give some indication of a still fainter extension which fades gradually to a diameter of some 200'', but this has not been detected by direct inspection of the plates. This faint envelope gives to the *Lyra* nebula an appearance suggestive of that of the well-known planetary nebula in

*Andromeda*, NGC 7662, in which a bright ring and central star are inclosed in a fainter shell. The bright ring of NGC 7662, like that of NGC 6720, has a vivid bluish-green color; but the outer shell, seen with a large reflector on a favorable night, has a pronounced reddish hue, while Wright's spectrograms<sup>1</sup> show it to be rich in ultra-violet light of wave-length 3727. If the outer shell of the *Lyra* nebula emits similar radiation, its discovery may be partly attributable to the aluminum reflecting surfaces now used in the 100-inch telescope.

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### AN EXCEPTIONAL SUN-SPOT GROUP

BY JOSEPH O. HICKOX

The large sun-spot group (No. 5496) which was first seen at Mount Wilson on the morning of August 20, 1935, developed more rapidly than any other group so far observed in the present cycle. When first seen it was  $16^\circ$  west of the central meridian and  $28^\circ$  north of the solar equator, in a region that had been active for more than a solar rotation.

On July 18 another group (No. 4577) had developed in this same region when it was  $42^\circ$  east of the central meridian on the previous solar rotation. This group reached its maximum area, 350-millionths of a solar hemisphere (410 million square miles), on July 22, when it was near the central meridian. By the time it reached the west limb its spots were diminishing in area, and when the region returned to the east limb, on August 12, no spots were visible there, although bright hydrogen and calcium flocculi were photographed. On August 16 and 17 a few small spots were seen, but on August 18 and 19 the region was again without spots.

Twenty-four hours later a large group 63,000 miles long had developed. It was just visible without a telescope and consisted of two major spots accompanied by numerous small ones

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<sup>1</sup> *Publ. Lick Obs.*, 13, 193, 1918.