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THE SOLAR ECLIPSE
OF JUNE 29, 1927

REPORT OF OBSERVATIONS MADE BY THE EXPEDITION OF THE ASTRONOMICAL OBSERVATORY OF THE TARTU UNIVERSITY

BY

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TARTU 1928

K. Mattiesen'i trükk, Tartus.

The staff of the expedition consisted of Messrs. R. Livländer, P. Simberg, and the writer. Mr. O. Silde took active part in the preparations preceding the expedition.

The place chosen was Gällivare, in north Sweden. The expedition was located about 70 meters NW from the church of Gällivare. The following were the coordinates of the place of observation as measured upon a 1 : 200 000 chart of the swedish General Staff:

$$\varphi = +67^{0}7'39''; \quad \lambda = 1^{h}22^{m}40^{s}.3 \text{ E}; \quad H = 380 \pm \text{ meters}$$

above sea level.

The instruments were:

1) A long focused camera with a Zeiss Triplet objective of 4 inches diameter, focal length 4 meters, used together with a 5 inch clock-work driven heliostate mirror; the camera has a plate-holder that carries at once 3 plates 13×18 cm.; the plate-holder may be moved horizontally upon special rails; this device permits to obtain the three exposures quickly one after another; the plates used with this camera were Hauff Ultra Rapid.

2) Two equal photographic cameras, with triple apochromatic objectives of Steinheil, aperture 60 mm, focal length 60 cm, mounted upon a common equatorial mounting with a 4-inch guiding telescope of Fraunhofer; the guiding was executed by hand; the cameras had ordinary interchangeable plate-holders 9×12 cm. Two kinds of plates of different sensitiveness were used simultaneously with these cameras, Agfa Isolar, and Agfa Diapositiv (Lantern); in this way it was possible to obtain with a single exposure simultaneously two photographs of different strength.

3) Two chronometers; the clock corrections were determined according to the ordinary midday wireless signals from Nauen.

The intention was to use the photographs for a microphotometrical study of the solar corona. Unfortunately, light *CiS* clouds that covered the sun during totality rendered the photographs useless for this purpose. Before and after totality, during the partial phase the sky was perfectly clear.

The moments of the 1st and the 4th contacts were determined at the 4-inch Fraunhofer telescope. The begin and end of totality were determined by observing through a small obliquely placed tube the image of the sun projected upon the shutter of the plate-holder of the large camera.

The moments of the contacts were found as follows;

	G. M. T.	Observer
1st contact	4h 45m 59.s5	R. L.
2nd „	5 46 11. 9	E. Ö.
3d „	5 46 55. 6	E. Ö.
4th „	6 50 29. 5	R. L.

With the large camera the following plates were obtained.

1. At the beginning of totality, exposure 1s. One-half of the sun's limb shadowed by denser clouds. — (Figure 1.) —

2. At the middle of the totality, exposure 12s. This is the most successful photograph obtained. Figures 2, 3 and 4 are copies of different intensity of this exposure.

3. At the end of totality, exposure 3s. Again clouds interfered. Figures 5 and 6 are copies prepared from this plate.

With the small cameras the first exposure failed for lack of guiding, because the limb of the sun disappeared behind clouds. The second exposure of 5s duration, near the middle of totality, gave two plates, copies of which are represented by fig. 7 (Lantern), fig. 8 and 9 (Isolar). On fig. 9 the clouds surrounding the sun are clearly seen.

Figures 1—6 are mirror-images of the sun. The direction of the sun's axis is indicated upon all copies by a white line. On fig. 4 the effect of halation, produced by some prominences or by bright portions of the inner corona, is perceptible.

Figure 10 represents the camp of the expedition about 15 minutes before totality.

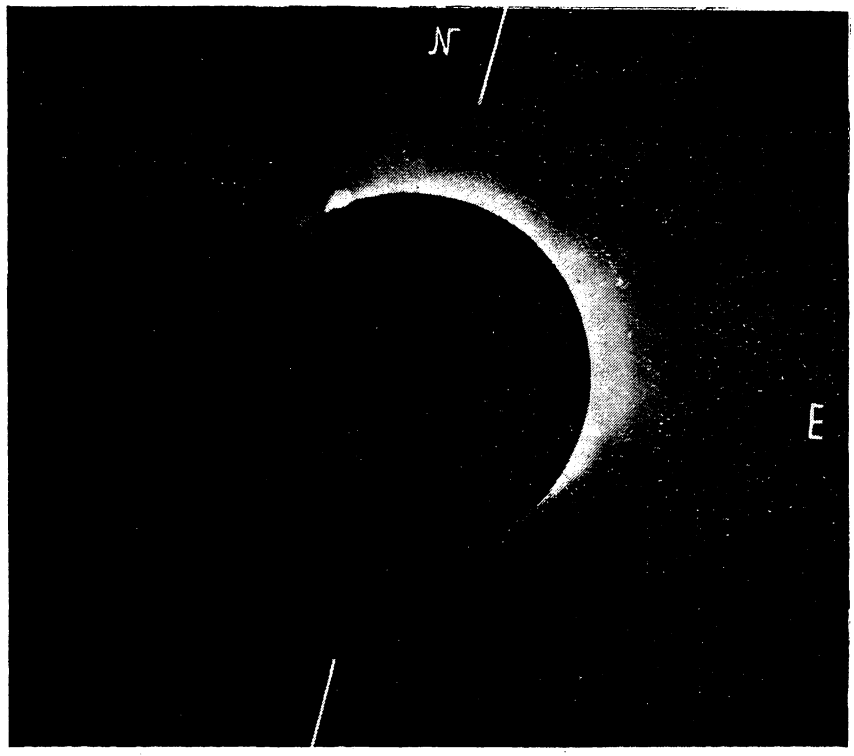

Fig. 1.

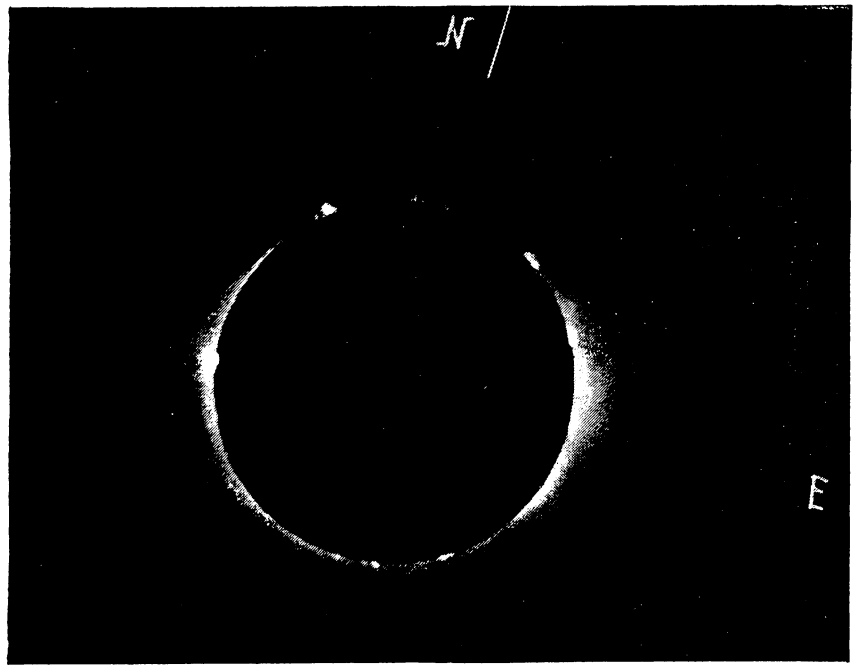

Fig. 2.

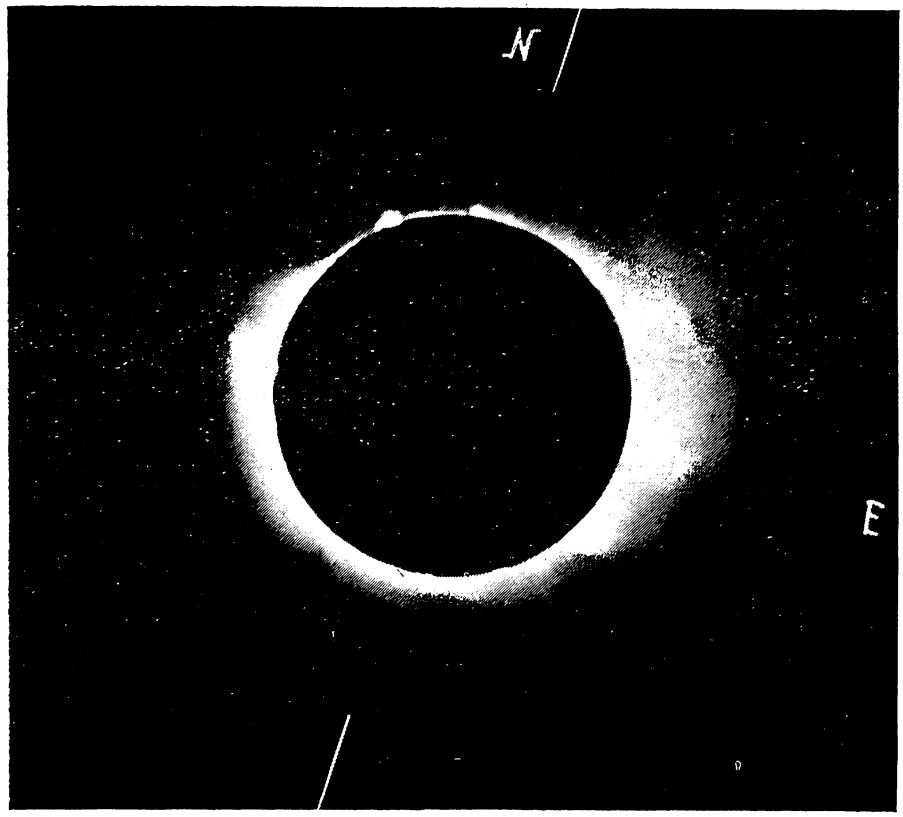

Fig. 3.

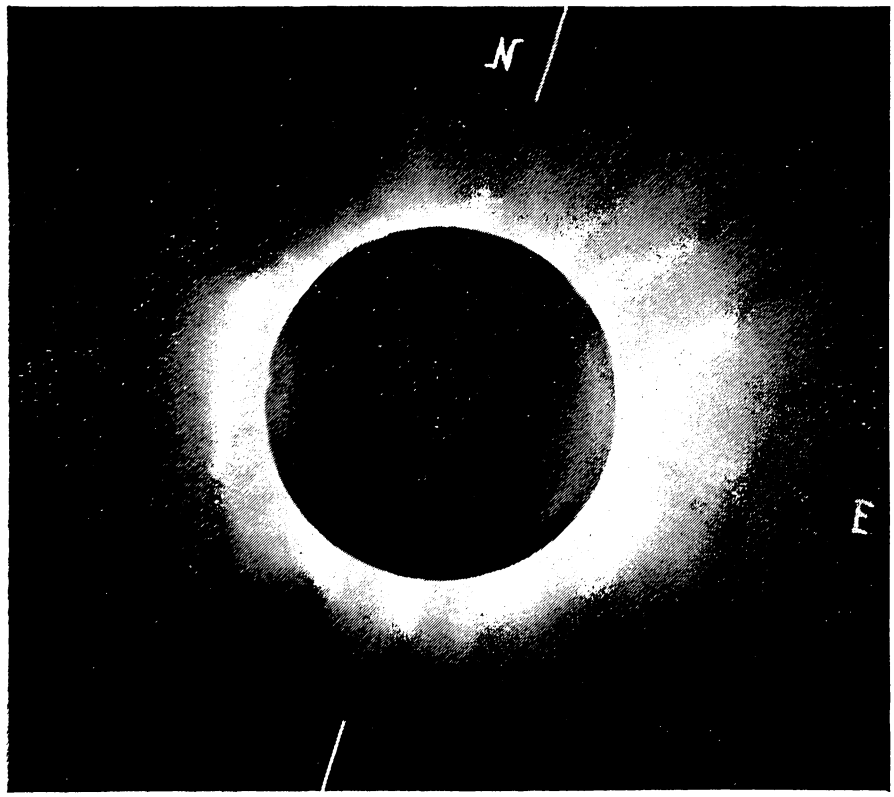

Fig. 4.

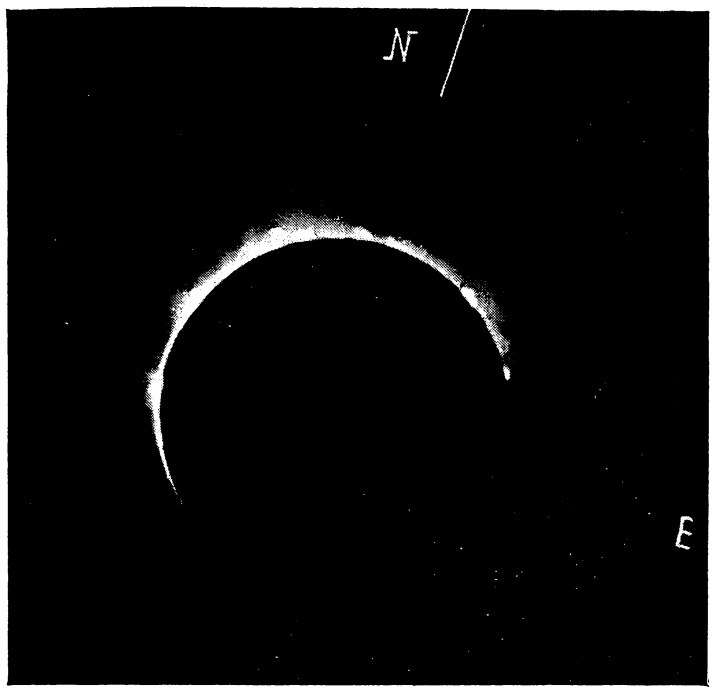

Fig. 5.

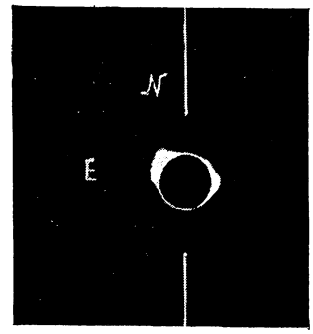

Fig. 7.

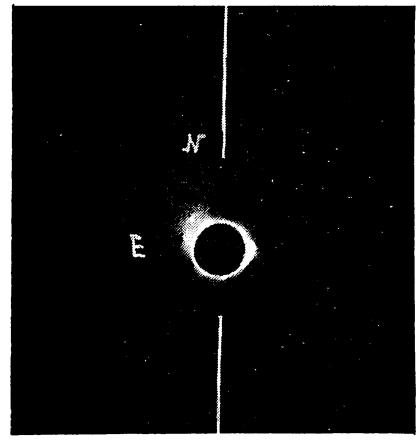

Fig. 8.

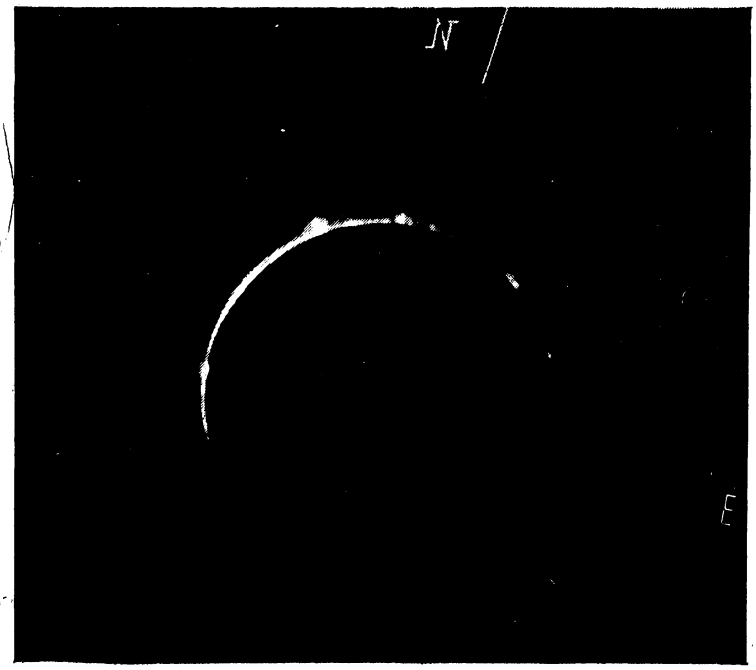

Fig. 6.

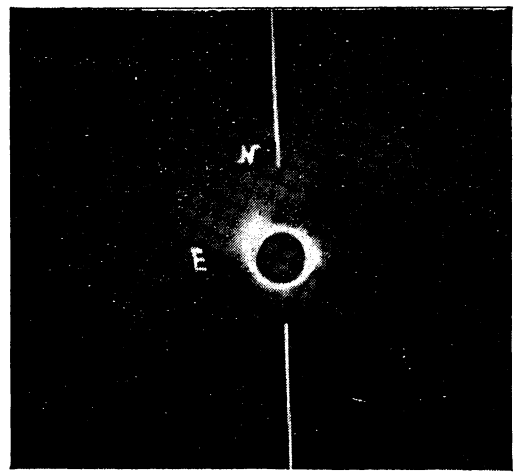

Fig. 9.

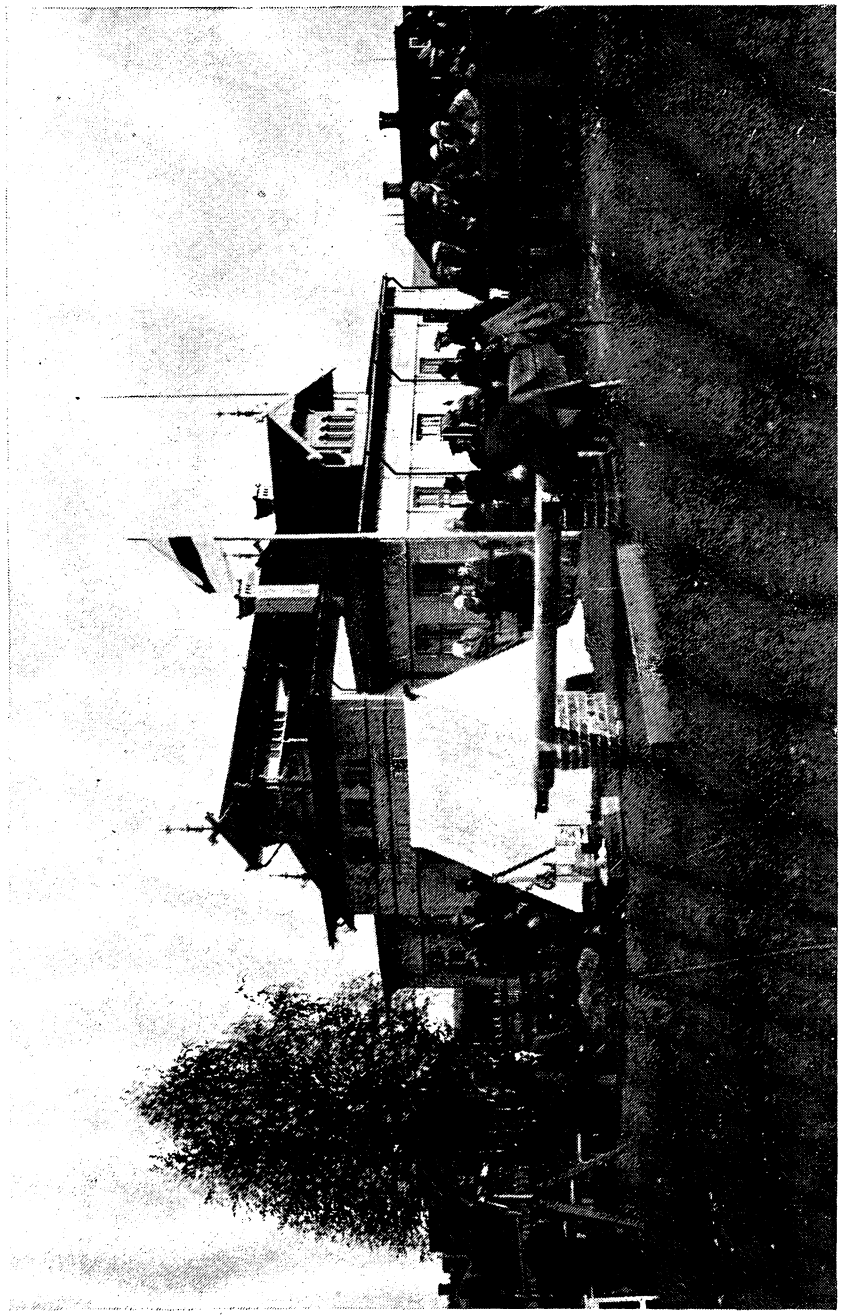

Fig. 10.