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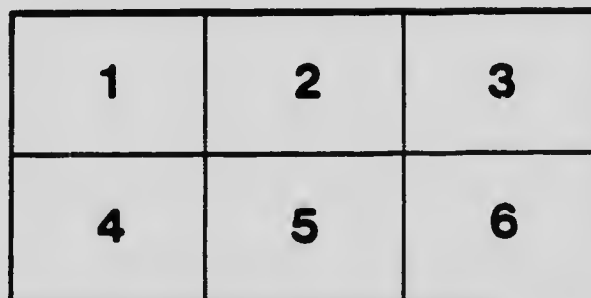
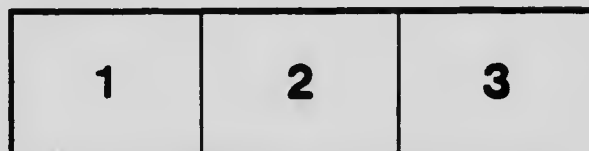
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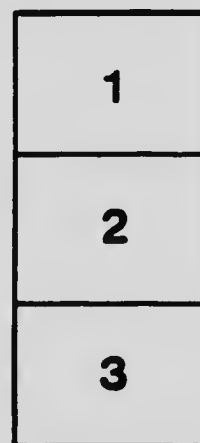
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THE SOLAR HALO OF FEBRUARY 4TH 1918

BY

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AND

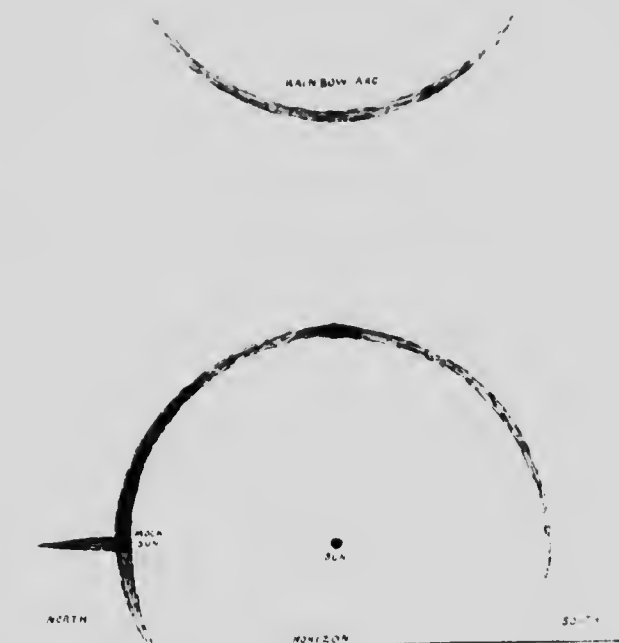
A. L. HUNTER

THE SOLAR HALO OF FEBRUARY 4TH, 1918

I.—BY J. P. HENDERSON

A SOLAR HALO was observed in the eastern part of Toronto on the morning of February 4th, 1918. It was first seen about 8.10 a.m. and was prominent till after 8.25 a.m. (E.S.T.), although by that time the sun was beginning to shine very brightly. The temperature was one of the lowest of the season, the mercury hovering at nearly 10° below zero F., and the sky was clear except for a few cirrus clouds in the west, but it had a rather milky appearance. The sun was about 10° above the horizon, getting just too bright to look at directly. The primary circle (primary circle) at about 23° from the sun appeared, but of the two parhelia or "mock-suns," only the one to the north of the sun was visible; the halo was much fainter toward the south and no trace of the other "mock-sun" could be detected. The one to the north was particularly bright with a beam of white light stretching out 10° or more at times to the northward of it; the part next the sun was rather chocolate or reddish colored which extended slightly along the halo itself. An intense part above the sun (the upper tangent arc) was fainter and uncolored. A "rainbow arc" was also present and seemed about 25° directly above the highest part of the primary circle. It was distinctly spectrum-colored, the red being on the lower and convex edge. Its curvature could only be conjectured to be about the same as that of the primary circle, as only about 25° of it was visible. The fine ice crystals in the upper atmosphere which were responsible for the halo phenomena probably also caused the slight milky appearance of the sky.

Another somewhat different solar halo was seen in the same place and about the same time of day as the above, on February 18th, 1918. The air was slightly misty but the sun was bright and the temperature only a few degrees above freezing. In this one, two "mock-suns" were present, one to the north and one to the south, the latter being rather the brighter, but neither attaining any considerable luminosity. They were both slightly



SOLAR HALO OBSERVED AT TORONTO ON FEBRUARY 4, 1918,
8.15 A.M. (E.S.T.) BY J. P. HENDERSON
Scale 0.1 in. = 2"

spectrum colored, red toward the sun. The main arch was very faint and could be detected only with difficulty, and the "rainbow arc" was not seen.

II. BY A. F. HENDER

There is a passage in Warburton Pike's book "The Barren Ground of Northern Canada," page 97, (Macmillan, London, 1892), in which he speaks of sun-dogs (*i. e.* "mock-suns") appearing above the horizon before the sun showed above it. Referring to the neighborhood of Great Slave Lake (about 63 degrees N. latitude) he says:—"The sunrise was often very beautiful and the effects of long duration, as the sun is close to the horizon a considerable time before he shows above it. . . .

Often a sun dog is the first thing to appear and more or less of these attendants accompany the sun during his short stay above the horizon." Within a few days after my attention had been called to this passage, I had the good luck to witness a halo of the sun at Barrie, Ont., in which mock-suns seemed to be visible above the horizon before the sun appeared. On February 11th, 1918, at 7.30 a.m., (E.S.T.), what appeared to be two mock-suns were quite distinct before sunrise, as Warbinton Pike describes. There was also a notable sun pillar, before sunrise, and after rising the sun was the centre of a cross. The mock-suns, however, on this occasion, were the more interesting parts of the



SOLAR HALO, FEBRUARY 11, 1918, 7.30 A.M. (E.S.T.) OBSERVED
AT BARRIE BY A. F. HUNTER

The parts of the circle shown above the horizon had the appearance of two
"mock-suns."

halo. First appearances and first impressions are not always safe guides. If I had seen no more than what I saw before sunrise, I should have been willing to corroborate Mr. Pike's observation. But I was able to keep the phenomenon under observation for two hours, by the end of which time the explanation of the appearance had become clear. The visible parts that first looked like mock-suns were actually ends of segments of the primary circle in the neighborhoods of the mock-suns, as became evident when the whole phenomenon had risen with the mock-suns showing no higher than the sun. When the halo was first to be seen before sunrise, the horizon did not make a sheer edge

where it cut off the risen parts of the segments, but for half a degree or more the bank of haze at the horizon was dense enough to absorb the light of the halo, and the risen parts seemed to stand well up in the sky with a blank space between them and the horizon, and to be complete objects in the field of view. This was not really the case, but on account of the absorption of light they had the appearance of being complete mock-suns. Mr. Pike's own statement suggests why he failed to note the real facts of the case, for he says :—"The effects (of the sunrise were) of long duration, as the sun is close to the horizon a considerable time before he shows above it." The duration was evidently too long for the whole phenomenon to be visible as a single feature, or to be kept under observation by one person until it explained itself, as it can do to better advantage here in more southern latitudes where the sun rises more abruptly with reference to the horizon. The phenomenon on each occasion showed the great distance of the halo, whose light was so completely absorbed by the haze of the horizon.

Dr. Leslie G. Pearce, of Brantford, Ont., in a letter to Professor Chant, recorded the same halo as it appeared at that city, by means of a diagram. He adds this remark :—"On February 4th, at 7.30 a.m., we had a very fine display of solar halos. What we saw in Brantford was like the following sketch."



SOLAR HALO, FEBRUARY 4, 1918, OBSERVED AT BRANTFORD BY
LESLIE G. PEARCE

It becomes evident from the diagram sent by Dr. Pearce, that at Brantford, just after sunrise there was absorption of the lower parts of the halo by the haze of the horizon, similar to the absorption phenomenon observable at Barrie.

