

# OBSERVATIONS OF THE EFFECT OF A SOLAR ECLIPSE ON BIRD ACTIVITIES

by **Glen A. Fox**, Saskatoon

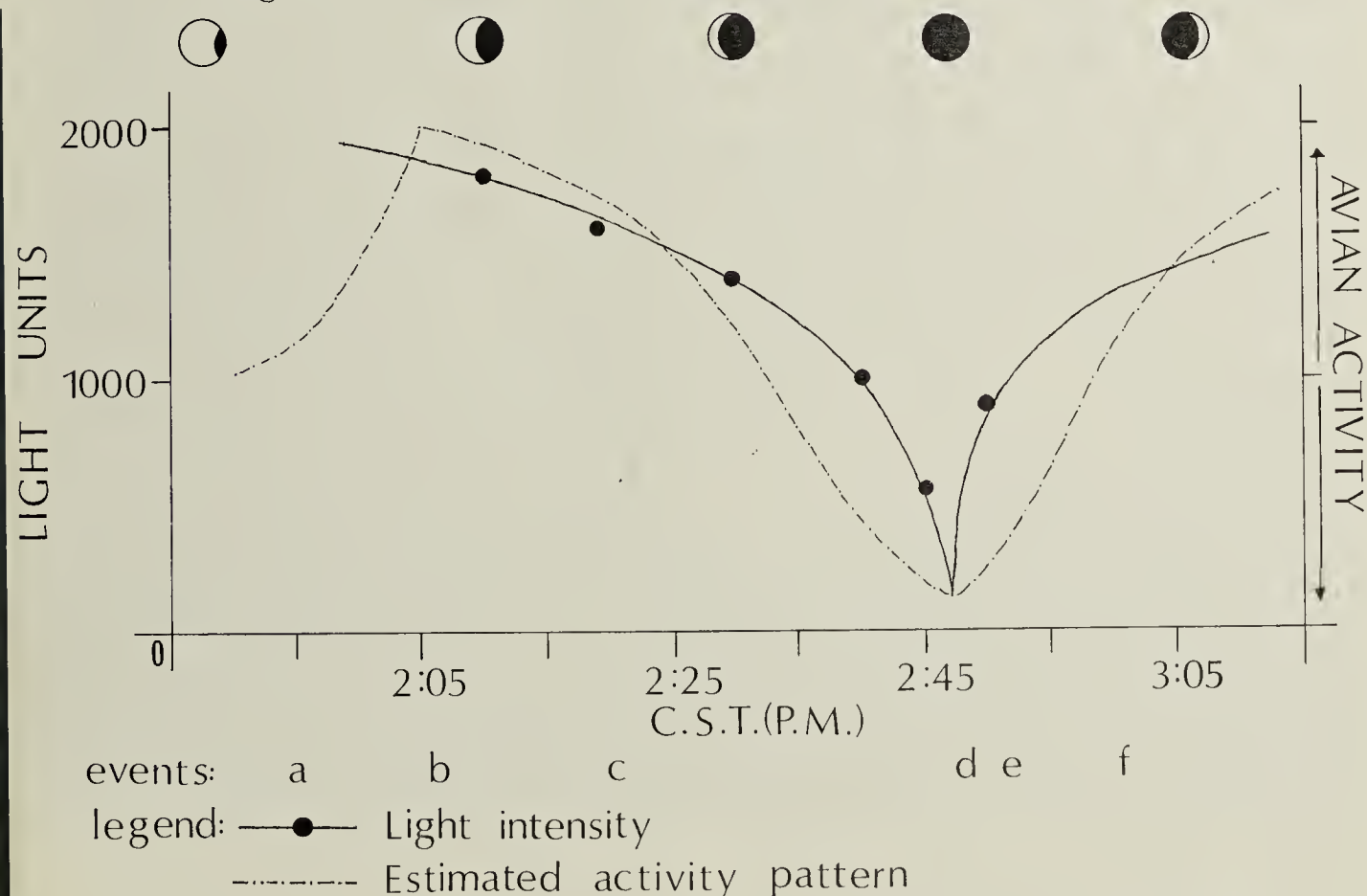
On July 20, 1963 the author and Gary G. Anweiler observed the total solar eclipse at Stony Rapids, Saskatchewan as part of ornithological investigations under the direction of Dr. Robert W. Nero. It was our intent to observe the behaviour of birds in response to this phenomenon. We chose as a site for these observations an R.C.M.P. building in the settlement, where there was a colony of Cliff Swallows (*Petrochelidon pyrrhonota*). The areas adjacent to this property provided varied habitat rich in bird life. We attempted to record the avian activity, for the most part frequency of song, at various times throughout the period of observation, and to estimate the relative light intensity with a photographic light meter. These observations of activity should be regarded as semi-quantitative.

A diagrammatic representation of our observations is given in Figure 1. A summary of the events which we

observed follows:

- The behaviour and activity of all species was that expected at mid-day in this locality. Very little song occurred, and foraging was not extensive. The swallows were quietly feeding their young.
- The intensity of feeding activity about the swallow colony increased considerably and the swallows became quite noisy. Least Flycatchers (*Empidonax minimus*), White-crowned Sparrow (*Zonotrichia leucophrys*), Song Sparrow (*Melospiza melodia*), Yellow Warbler (*Dendroica petechia*) and Eastern Phoebe (*Sayornis phoebe*) were heard for the first time. Their singing was extensive and vigorous.
- A marked cooling of the air was noticed which was accompanied by a considerable decrease in the above activity.

Figure 1



Drawing by Glen Fox

- (d) The total eclipse lasted 42 seconds. The air was quite cold during this period. For a period of roughly five minutes before and after totality there was almost no activity, and during totality the only song heard was that of a single Swainson's Thrush (*Hylodichla ustulata*). The activity of the swallows at this time shifted from the immediate vicinity of the colony to the Fond du Lac River.
- (e) The swallows returned to the immediate vicinity of the colony and resumed the feeding of the young at what seemed a much more vigorous rate than that prior to their departure. As the light increased the air became gradually warmer. The other species resumed their singing. This resumption was gradual and varied from species to species.
- (f) The light conditions were much nearer normal and the avian activity had returned to what one would expect for mid-day.

The most noticeable change in activity which occurred in relation to the eclipse was the onset of song prior to the eclipse and after, the cessation of activity during totality, and the increased feeding activity by the swallows after the eclipse. The overall picture resembled the intense activity of birds usually observed at dusk and early morning. These observations are quite similar to those of Kellogg and Hutchinson who observed the same eclipse at Corinna, Maine.

The reader is reminded that, although it is well known that many birds respond to light changes in early morning and late evening by beginning or ending their songs, many factors influence song and it is the total effect of these factors which we must consider. "A solar eclipse causes variation in light intensity somewhat similar to approaching dusk or dawn and usually brings sudden

changes in temperature. The eclipse does not influence many factors which affect bird song—for example, time of year, and physiological condition of the bird . . . . Another factor, seldom appreciated is that the natural response of the human eye, and the bird's eye too, tends to lessen the response to the approaching darkness so that, when totality comes, one gets more the impression of turning off a light rather than that of the gradual normal twilight. It is also probable that the sudden interruption of an established diurnal routine is more confusing to some species or individuals than to others . . . . During a normal sunset the decrease in light intensity is gradual and fairly linear with respect to time . . . . During an eclipse, especially when the sun is well above the horizon, conditions are very different. In the first place, the decrease in light intensity accelerates with time, and the final disappearance of the sun's disc behind the disc of the moon is one of the most sudden events in nature. Secondly, the earth's atmosphere, away from the horizon, has much less of a diffusing effect on the light because the thickness of the atmosphere which the light must penetrate is so much less. Nevertheless, it is true that much light is reflected to an observer from the atmosphere outside of the path of the eclipse. This light greatly modifies the darkness so that the total light intensity during totality is approximately twice that of a full moon." (Kellogg, P. P. and C. M. Hutchinson. 1964. *The Solar Eclipse and Bird Song*. The Living Bird, Third Annual Cornell Lab. Orn., Cornell Univ., Ithaca, N.Y. 201 pp.)

The observations of the author lead him, like Kellogg and Hutchinson, to the appreciation of the need for a well-prepared, quantitative study that compares the behaviour of birds prior to, during, and immediately following the eclipse to that of individuals under similar quantitative light conditions at dawn and dusk on days preceding and following the eclipse.