

Shipboard Visual and Photographic Observations of the 30 June 1973 Total Solar Eclipse

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Abstract

Equipment was developed for photographic, photoelectric and visual detection of shadow bands, for photographing the flash spectrum and the corona at the total solar eclipse of 30 June 1973. Observations were made aboard the French ship, the M.S. Massalia, off the west coast of Mauritania, Africa. Very good photographs of the total eclipse are presented.

Introduction

Eclipses afford opportunities for various studies associated with the sun, the moon and the earth's atmosphere. At each eclipse new information is obtained and each eclipse is different which adds great interest to the subject. In this project equipment for photographic, photoelectric and visual detection of shadow bands and for photographing the flash spectrum and the corona was developed. Air freighted heavier equipment did not arrive on time but very good photography of the eclipse itself was obtained using hand carried equipment aboard the French ship, the M.S. Massalia, off the west coast of Mauritania, Africa, where the eclipse lasted for 5 min and 40 sec.

Photographic Results

Figure 1 shows the outer corona in a 1/15th-sec exposure (upper left) and the inner corona in a 1/125th-sec exposure (upper right). A prominence is visible at the top of the 1/250th-sec exposure (bottom left) while coronal streamers and a prominence are seen in a 1/250th sec exposure (bottom right).

Figure 2 is a sequence of photographs taken approximately one second apart as the sun emerges. A prominence is visible (left), followed by the chromosphere shining through the valleys of the moon (second from left). Next are seen Baily's Beads, followed by a view of the chromosphere emerging. The first three exposures were 1/60th sec, the fourth 1/125th sec and the last 1/250th sec.

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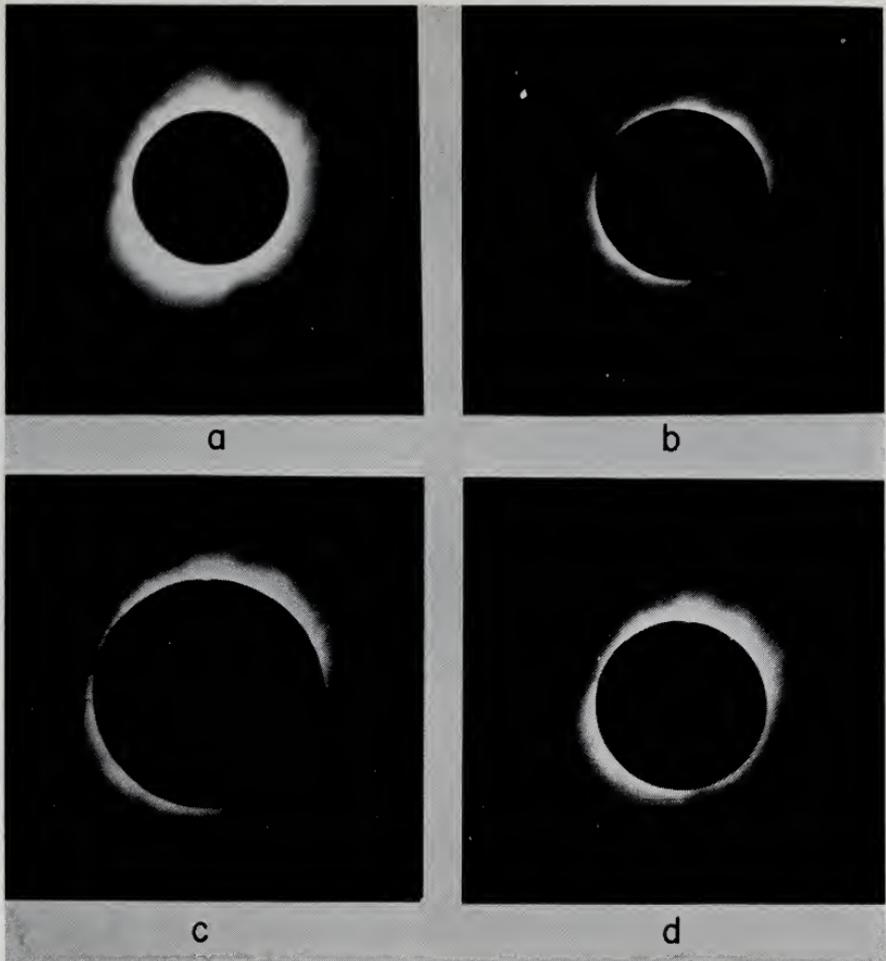


FIGURE 1. a) Outer corona; b) Inner corona; c) Prominence; d) Coronal streamers and a prominence.

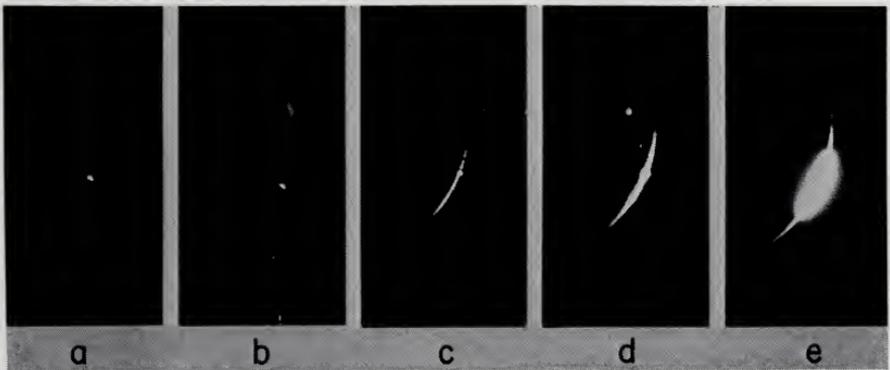


FIGURE 2. a) Single prominence; b) Chromosphere shining through the valleys of the moon; c) Baily's Beads; d) First emergence of the chromosphere; e) Chromosphere shining brightly.

The diamond ring effect is seen in Figure 3. The diamond ring is quite difficult to photograph due to the very short period of time that this phenomenon occurs.



FIGURE 3. *Diamond ring effect.*

The photographs in Figures 1 and 3 were taken by one of us (K.B.) using a Praktica Nova camera with a 400 mm focal length, f/6.3 Spiratone telephoto lens. The sequence in Figure 2 was taken by another member of the team (D.M.) using a Miranda "F" camera with a 500 mm focal length MTO lens and a 2X teleconverter giving an effective focal length of 1000 mm at f/16.

Comments and Conclusions

Observing aboard ship produced some unique problems and advantages as compared with the usual land based observations. One obvious advantage is the mobility of already prepared set-ups which is valuable for avoiding adverse weather conditions. Disadvantages are poor visibility due to sun haze, the roll of the ship, vibrations due to the ship's engines and smoke from the engine smoke stacks.

The unfortunate miss-routing of equipment afforded the opportunity to concentrate on photography with relatively inexpensive hand carried equipment. For example, the Spiratone 400 mm focal length lens costs only approximately \$40.

The photographs presented in this paper show that quite good results can be obtained by using ordinary cameras with relatively inexpensive telephoto lenses.