Lockheed Electronics Company 16811 El Camino Real Houston, Texas 77058 March 19, 1970

Dear LION Associate:

The enclosed guidelines for amateur lunar observers were prepared as a result of numerous requests for such information. We hope that these suggestions will assist those members with limited experience improve their use of the telescope and camera.

Again, we solicit the assistance of all observatories with the equipment for spectral photography, in obtaining spectra of TLP.

May you have clear skies and good luck during the April mission.

Sincerely yours,

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Louis E. Schneider, LION Coordinator

GENERAL GUIDELINES FOR LUNAR OBSERVING AND PHOTOGRAPHY

A number of LION members have requested suggestions for obtaining good lunar photographs. There have also been requests from inexperienced observers for general guidelines for observing the moon.

The following suggestions were received from Mrs. W. S. Cameron, Goddard Space Flight Center.

Observing for TLP

If several colors are noted, this is undoubtedly due to chromatic aberration of the objective and eyepiece of a refractor and of the eyepiece of a reflector. (Particularly if purple is on one side and red on the other.) One should always have the object of interest in the center of the field of the telescope. If color is observed, it should be tested in several ways for verity. (1) Examine other similar features in size, albedo and same <u>dis-</u> tance from terminator as the features in question, for similar color and behavior or lack; (2) rack telescope to inside of focus for color fringes and examine features, then rack telescope outside of focus and examine feature again. Observer must know how a reddish object behaves in this procedure as well as how a blue object behaves. He can test it on red and blue stars. Two or three good examples are Beletguese in Orion, Aldebaran in the Hyades in Taurus, for red stars (now well placed for observation), also Jupiter's red spot, Mars and Rigel in Orion, and Sirius in Canis Major for blue stars. If the feature survives all these tests, it is probably genuine. Of course, haze and cloud must be ruled out, too. Photographs and spectra would be valuable. Amateurs can at least get visual spectra by use of a hand spectroscope which is inexpensive. If they buy or have one, they can become familiar with the appearance of the normal spectrum of the moon; then, in case of an LTP, perhaps they can spot abnormalities such as emission lines, heavier absorption, shifts toward red or blue, washing out of lines, etc.. If the LTP has color, changes in that part of the spectrum could be expected and looked for especially.

For brightenings, it would be helpful for each observer to set up his own brightness scale for each feature (probably concentrate on about 1/2 doz. features). He could set up an arbitrary scale from 1 to 5 or 1 to 10 for the brightness scale of each feature through a lunation. Then if the feature is rated at some obviously different brightness, this would be evidence of a real change. Polaroid filters might help, too, in sorting out changes.

Any atmospheric (seeing and scintillation) or instrumental (ghosts, chromatic aberration, spurious glints, etc.) effects should definitely be eliminated before reporting a LTP.

Lunar Photography

The most desirable LTP photos would be of blue or red events, which will require films sensitive to the red (all are sensitive to blue). Probably, in order to obtain these, a high magnification will be needed; therefore, photograph with the eyepiece in place. This will entail the observer testing out the proper focus for sharp photos for each eyepiece he uses.

The type of film used should be fast panchromatic films which are sensitive from the blue to the red. Kodak 103-F plates and film are sensitive out to 670μ (= 6700 Å) with a cutoff at 720μ (7200 Å). Infrared films are sensitive out to 900μ .

Each individual has to establish for himself what the exposures will be for a given phase. Times of exposures and f-openings have to be tested.

Mr. N. C. Allen, LEC, Houston, suggested the following general rule for amateurs:

For photographing the illuminated surface of the moon, use the same F and time settings that would be used if the instrument were focused on an earth object in sunlight. When photographing the lunar surface in earth-shine or in shadow, apply the same corrections to F and t that would be applied for an earth object in deep shade or shadow.

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We sincerely hope that these suggestions may be of assistance to members of LION who have requested guidelines for observing and photographing TLP.

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Louis E. Schneider, LION Coordinator