A.L.P.O. members submitted photographic records.

In Figure 5 the visual magnitude estimates are presented after reduction to a standard aperture according to Bobrovnikoff's system, and then to unit geocentric distance. The plot is then of heliocentric visual magnitude versus heliocentric distance. Since quite a bit of dispersion is present in the data, the normal points taken for the observations were difficult to obtain. The following points were finally chosen:

Date	H_r	r(A.U.)
Dec. 26, 1961	8.3	4.3
July 1, 1962	6.6	2.9
Nov. 2, 1962	5.3	2.2

These were chosen because they represent the longest time base and were obtained by observers who had previously submitted observations. These three points give a solution:

$$m_r = 1.9 + 10.1 \log r,$$

where m_r ($= H_r$) is the heliocentric magnitude (visual) and r is the comet heliocentric distance.

In Figure 6 the estimates of coma diameter are given versus the dates of observation. The diameters have been reduced to unit distance to permit useful comparison. The only notable feature is the sharp increase in coma size during the period of supposed plasma encounter, near August 1 and 2.

In Figure 7 the apparent tail length is given as a function of date. It is unfortunate that no reliable estimates of tail length were obtained during the critical period at the first of August, 1962. It is not known whether this lack was due to the fact that the comet had lost its tail, as proposed by Greenstein, or not. Nothing was found in available A.L.P.O. observations which would support such a view.

Finally in Figure 8 the heliocentric magnitude is given versus the date in an attempt to find some time correlation of the magnitude. The scatter is simply too bad to allow any definite conclusion. Although it is suggested that the comet varied over a wide magnitude range, it is more likely that large systematic differences between individual estimates exist. The simultaneous observations necessary to test this matter were not available. In spite of this, a definite brightening trend can be seen for the weeks following the supposed plasma encounter. The single observation on July 31 indicates that some brightening did occur <u>prior</u> to the enlargement of the coma. If the July 31st observation is correct as well as those made in the following days, it would indicate the encounter to have been a very brief one.

In any event it is unfortunate that more observations were not available. Observations by those in the southern hemisphere would have been particularly valuable.

A.L.P.O. COMETS SECTION 1962 FINAL REPORT, PART III

By: David D. Meisel, A.L.P.O. Comets Recorder

Comet Seki-Lines 1962c

In contrast to the situation with Comet Humason, there was plenty of material available on Comet Seki-Lines. The comet put on a spectular show in the evening sky in spite of its proximity to the horizon. A number of observers contributed and were mentioned in a previous report. (*Str. A.*, Vol. 17, pg. 233, 1963.) The Recorder would like to thank all those who submitted observations. So much material was submitted that it was hard to select topics for discussion in this limited space.

The number of visual estimates was gratifying. The total number was 124 from A.L.P.O. sources. From these a total of 19 normal points was calculated. The mean deviations of the normal points were computed for each date. Errors due to time averaging should not exceed 50% of the quoted deviations.

In the pre-perihelion period a total of 13 magnitude estimates was secured. These are plotted in Figure 9. Four estimates were on two dates, and hence averages were taken and are indicated by error brackets. Figure 9 shows the reduced unit heliocentric distance magnitude versus heliocentric distance. These observations give a photometric solution of

$$m_r = 6.1 + 8.9 \log r, \quad n = 3.55,$$

where m_r is the heliocentric magnitude and r is the heliocentric distance. The post-perihelion observations are given in Figure 10. The pre-perihelion points are also plotted again. Using the normal points listed below, the solution for the pre-perihelion period held for the post-perihelion period. In the post-perihelion period, however, enough normal points were available to give some definite outline of the actual time variations of the brightness. The following normal points were computed. All the photometric observations were reduced to the Bobrovnikoff standard aperture and then to heliocentric magnitudes before averaging and plotting.

Date	Magnitude (Hr)		Heliocentric Distance	Number of Estimates
April 1962				
8	2.0 ±	1.0	0.34 A.U.	4
9	2.4	0.8	0.38	3
10	3.0	0.7	0.42	5
11	3.2	0.2	0.45	7
13	3.6	0.7	0.52	2
14	2.4	0.3	0.56	3
15	3.0	0.6	0.58	10
17	3.6	0.5	0.64	11
18	4.0	0.6	0.68	8
19	4.4	0.8	0.69	5
20	4.6	0.3	0.72	8
21	5.0	0.2	0.75	3
22	4.1	0.8	0.78	8
23	4.8	0.3	0.80	7
24	5.0	0.4	0.83	6
25	4.0	0.7	0.86	5
26	4.6	0.8	0.89	3
29	5.83	0.05	0.96	2 } Extinction
30	5.94	0.05	0.99	2 } Photometer

On April 24, 1962 the color index C.I. was equal to $-0^{m}.4$.

Two definite maxima were observed, as can be seen from Figure 10. In checking the solar data, the following sequences were found:

Well-developed solar area passed the comet	Apr. 03 - Apr. 15, 1962
Well-developed area visible from earth	Apr. 14 - Apr. 25, 1962
Well-developed area visible from comet	Apr. 22 - May 5, 1962
Well-developed area visible from earth	May 3 - May 15, 1962

There is one interesting note. On the nights of comet brightness maxima, the final sunspot numbers for the whole disk (see J. Geo. Res., 68, 3301, 1963) were maximum. The whole period of comet brightness disturbance lasted from April 12 to May 2, 1962. The brightness maxima were on April 14 and April 24. It is interesting to note that the spot numbers were minimum on April 10 at 10; April 18 at 71; and May 7 at 31. The spot numbers were maximum on Apr. 16 at 90 and on April 22 at 78. A minor maximum was observed on Apr. 28. If one plots the residual of the observed magnitude and the calculated magnitude one obtains the top graph of Figure 11. In the lower graph of Figure 11 the final sunspot numbers are plotted. It can be seen

1964StAst..18...55M

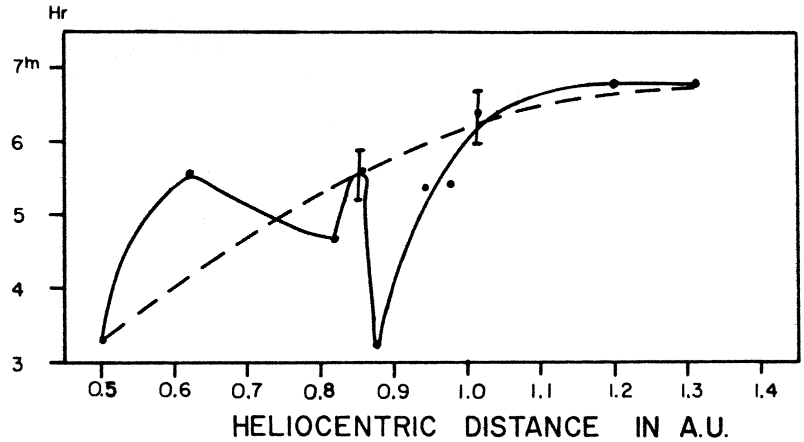

FIGURE 9. Heliocentric visual stellar magnitude of Comet Seki-Lines 1962c plotted against heliocentric distance. Pre-perihelion period. See also text. Figures 9-11 were contributed by Mr. David Meisel and were prepared for publication by the kindness of Mr. Ray Montes.

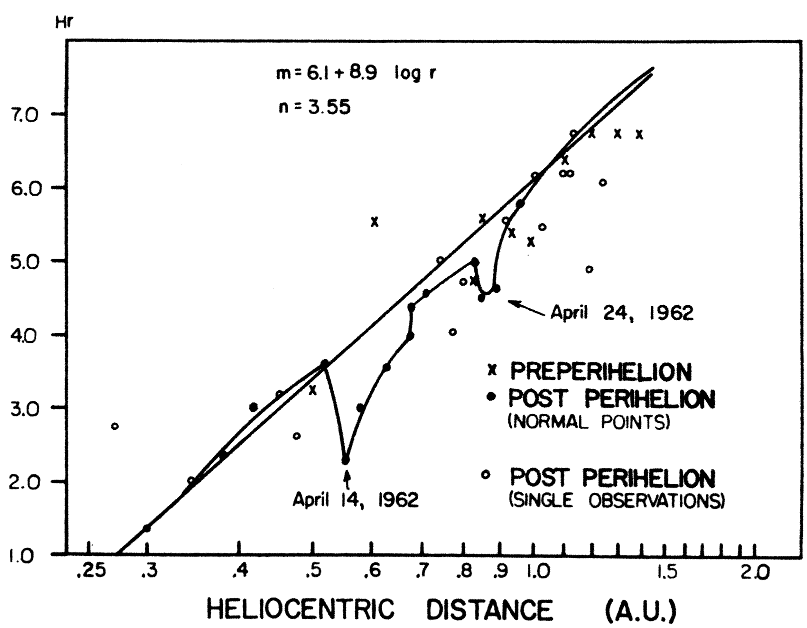

FIGURE 10. Heliocentric visual stellar magnitude of Comet Seki-Lines 1962c plotted against heliocentric distance. See also text.

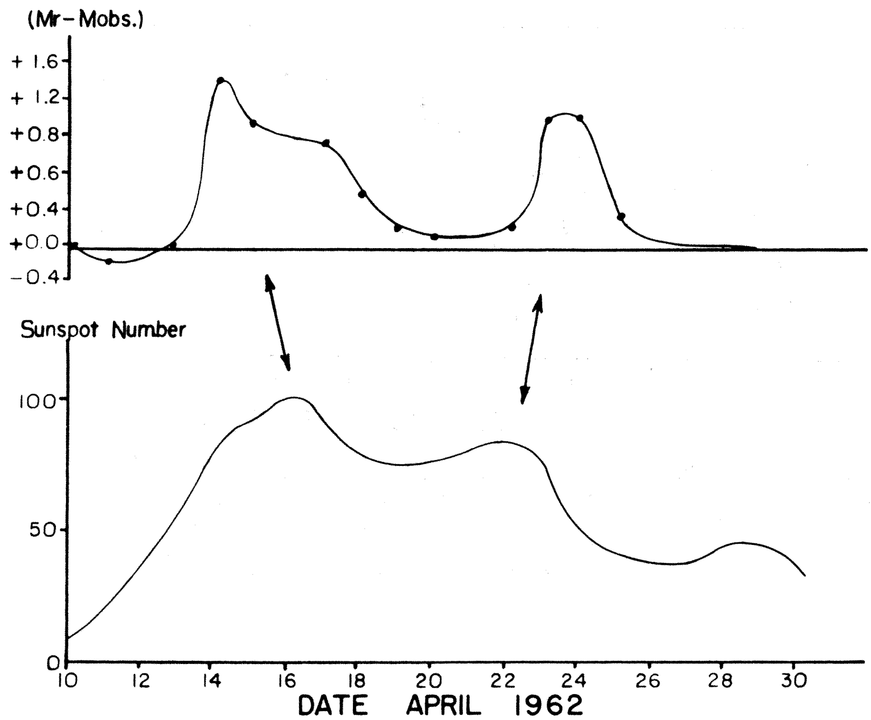

FIGURE 11. Upper curve: magnitude residuals, calculated minus observed, of Comet Seki-Lines 1962c. Lower curve: sunspot number. Note the extremely close agreement in time of two brightness maxima of the comet with two sunspot maxima. See also text.

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that the degree of relative agreement is quite striking. If it is coincidental, then it is quite unlike anything which the author has seen. If it is not coincidental, then one must find an adequate explanation for the behavior. It is not easy to see what correlation would be brought about by something affecting the whole sun. Is this, perhaps, something to do with the corona? We cannot say at this time.

There is some evidence for particle action on the comet. On April 10 a photograph by Alan McClure here shown as Figure 12 (and similar ones by others) revealed the peculiar parallel ray structure that was observed in comet 1957d (Mrkos). Figure 13 shows a set of sketches based on McClure's photograph. It should be noted that the tail assumed an angle intermediate between the anti-solar point and the radius vector of the motion. Before analyzing such a photograph, one must be aware of perspective. The comet was at the time going away from the earth, trailing its huge tail in an arc behind it. The small anti-tails labelled J and K are actually in the plane of the comet's orbit with the long axis pointing toward the plane of the ecliptic. The features in and near the nucleus appear normal. Then at a point several degrees away from the nucleus along the curved main tail, the ray structure is deflected as if encountering drag! The faint amorphous structure of the rest of the curved tail seems not to be even affected. It is not clear at this time just what the situation really was. Careful analysis will show, however, that rays C, D, E, and F (Figure 13) are along great circles which intersect near the sun rather than near the head of the comet. A more rigorous study of the situation is necessary before the relative orientation will become clear. It would be interesting to see how near these rays lie to the lines of magnetic force theorized as being associated with the "solar wind".

FIGURE 12. Photograph of Comet Seki-Lines 1962c by Alan McClure with a 5.5-inch F:5 Zeiss Triplet. U.T. April 10, 1962, 3^h 42^m - 3^h 52^m. Panchro emulsion, filter transmitting from 3800 to 6300 angstroms. Some moonlight. Frazier Mountain, California, 7300 feet.

Since we have postulated solar activity as being responsible for the photometric maxima observed on April 14 and April 22, 1962, is there any effect observed in the photographs? In the June, 1962 issue of <u>Sky and Telescope</u> on page 307 there are two photographs taken on the nights in

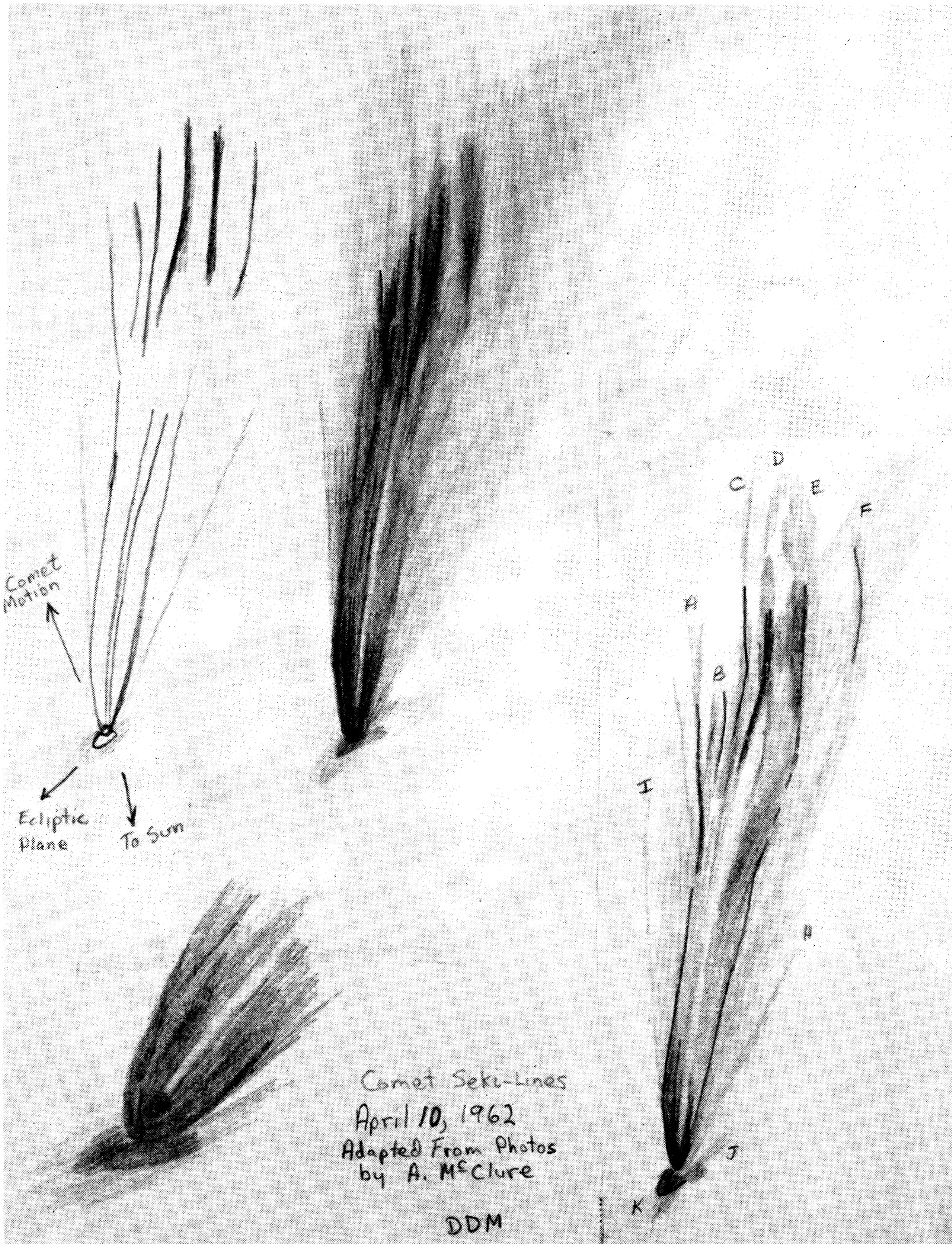

FIGURE 13. Sketches by David Meisel of tail structure of Comet Seki- Lines 1962c adapted from photograph by Alan McClure on April 10,1962. See text.

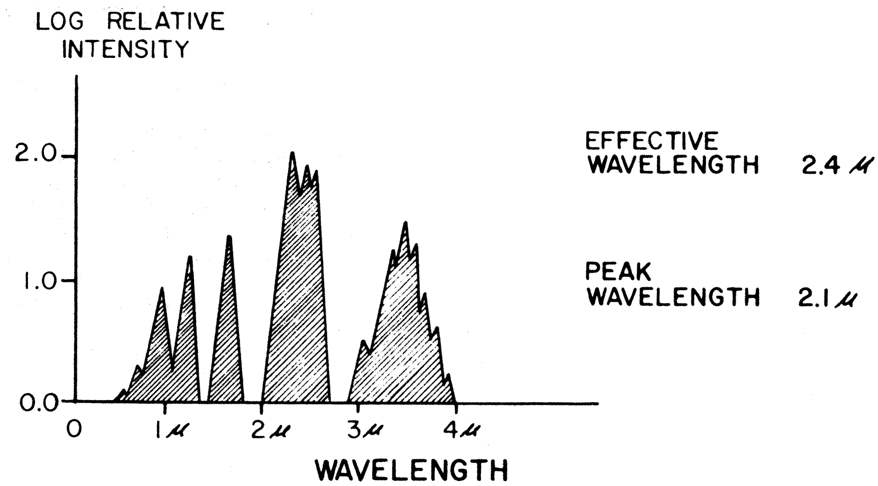

FIGURE 14. Transmission characteristics of E3 infrared detector + atmosphere, no filters. This system used in making the tracings presented in Figure 15. See also text. Prepared for publication by Mr. Ray Montes.

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question, each shows a double tail pattern. One of these tails points in the anti-solar direction. The other, apparently what was left of the long curved tail, is somewhat askew at a 30° angle to the north. Since no photographs appear to be available for the period between April 14 and 22, it cannot be said what affects can be directly attributed to solar activity.

One final set of observations should be mentioned. At the request of the Comets Recorder, Mr. P. Barnhart attempted infrared observations of Comet Seki-Lines. These observations have been made available to the Recorder by Dr. Walter E. Mitchell, Jr. of the Perkins Observatory in Delaware, Ohio. The instrument used was the 32-inch telescope of the Perkins Observatory. The IR photometer was equipped with an "E3" detector with effective transmission properties as given in Figure 14. Four traces were made of the comet, sweeping in declination (Figure 15). The visual aspect of the comet is shown for comparison. Attention is drawn to the presence of the two tail rays in the IR tracing. A rough calibration was made using an F5 star with the result that m (IR) of Comet Seki-Lines = $4^{m}.0$. Comparing with the visual magnitude, m_v = $3^{m}.7$ on the same date. The comet was apparently about normal in visual magnitude. Just what is the interpretation of the IR magnitude is not known at this time. It is presented here to show a possible direction for future research with large telescopes. The observation may represent an astronomical first even if it does not have any intrinsic accuracy.

In most of the areas studied we have found the situation to be normal, that is, we have posed more questions than we have answered. However, let us not end on a note of despair. One thing was demonstrated by the observations. In certain instances, magnitude estimates made by amateur observers under different conditions and with different instruments can be made to agree. Correction to a common photographic system as advocated by Bobrovnikoff appears to be necessary, however. It is often stated that visual star observations can be made to agree to within 0.1 magnitudes by systematic corrections. Here we have found that the average error of visual observation is about $\pm 0^{m}.4$. Bobrovnikoff found that for very experienced observers accuracies of $\pm 0^{m}.2$ in individual observations might be expected. However, the Recorder would be very happy if <u>all</u> the magnitude estimates could be trusted to be within $\pm 0^{m}.4$. There is still room for improvement, but the results are encouraging.

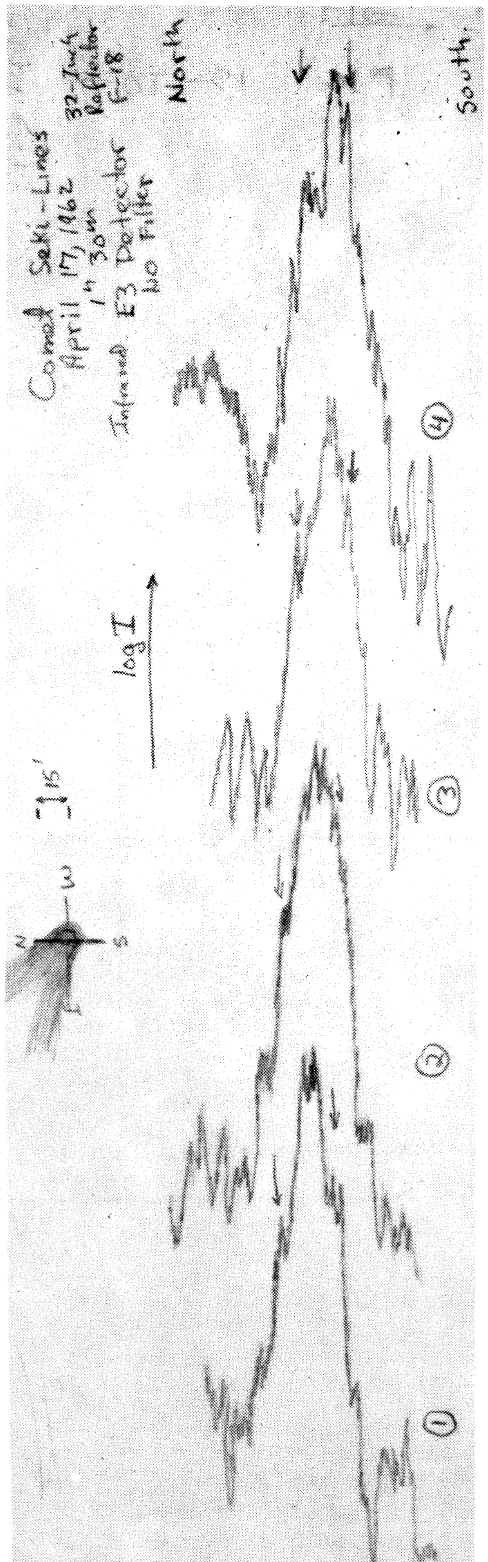

FIGURE 15. Infrared tracings of Comet Seki-Lines 1962c on April 17, 1962 at 1^h 30^m, U.T. Perkins Observatory 32-inch reflector. E3 detector and no filter. See also text on page 61.

A.L.P.O. LUNAR PHOTOGRAPH LIBRARY

By: John E. Westfall, A.L.P.O. Lunar Recorder

Recently Mr. C. F. Capen, of the Jet Propulsion Laboratory's Table Mountain Observatory, has generously furnished the A.L.P.O. with a number of lunar photographs taken with the Table Mountain's Observatory's 16-inch Cassegrain reflector. These photographs are of excellent quality, and (for earthbound telescopes!) show lunar detail only exceeded by photographs taken with the largest professional instruments. The photographs furnished are in the form of 5 X 7 and 8 X 10-inch enlargements. The Table Mountain lunar photographs are entirely suitable for selenographic and selenologic research.

Two examples of the Table Mountain photographs are published in this issue, in order to show the high quality of the series. These are number 1689, of the Wargentin area, and number 1418, of the Eastern (IAU) Mare Nubium (Figures 16 and 17).

Enlargements of these photographs are available, on loan, to interested A.L.P.O. members for use on specific research programs. In order to distribute the photographs, the following procedure is to be followed (which may be modified in the future, depending on the number of requests received):

1. Requests are to be mailed to:

   John E. Westfall
   A.L.P.O. Lunar Recorder
   3104 Varnum Street
   Mount Rainier, Md. 20822

2. The request letter should include:

   a. Either a list of the photographs wished <u>or</u> a description of the area for which coverage is wished. Also list the colongitude range preferred, if any.

   b. A brief description of the use to which the photographs are to be put.

   c. Fifteen cents in stamps to cover postage.

3. The date the photographs should be mailed back to the author will be the <u>last</u> date on the back of the photograph (normally six weeks from the date the photographs are mailed to the user). All photographs are to be returned on or