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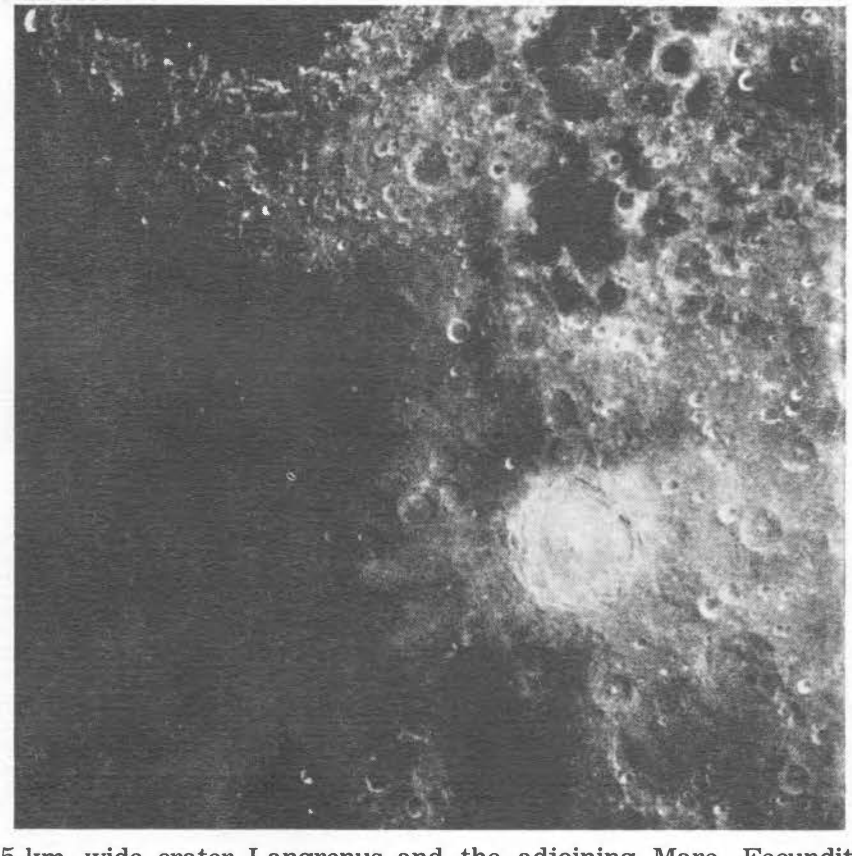

The 135-km. wide crater Langrenus and the adjoining Mare Fecunditatis photographed by the Apollo-8 astronauts in December, 1968. A portion of Mare Crisium shows at the top. Lunar north at top. The sun is to the right at an altitude of 28 degrees over the center of the photograph. This photograph, AS8-18-2881, is one of about 600 in the A.L.P.O. Lunar Photograph Library, which is maintained by Lunar Recorder John E. Westfall.

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PROCEDURES FOR RECORDING CM TRANSITS ON JUPITER AND THEIR REDUCTION

By: Phillip W. Budine, A.L.P.O. Assistant Jupiter Recorder

The visible detail of the Jovian atmospheric surface consists of its extensive, complex, and always changing belts and zones. Each of the many Jovian currents, permanent or temporary, rotates in a sharply bounded, often narrow region of latitude. Visual CM (central meridian) transit observations provide much of what is known now about the rotational characteristics of Jupiter.

An observer of Jupiter soon discovers that rotation periods derived from markings near the equator are about five minutes shorter than those of features located in temperate and polar latitudes. This difference is great enough to render the use of a single zero meridian quite unsuitable as a reference for both classes of objects. Two references are used, System I and System II. System I objects tend to be within ten degrees of latitude, north or south, of the Jovian equator. System I is approximately 9^h50^m for one rotation of the equatorial region of Jupiter, and System II is approximately 9^h55^m for one rotation of the temperate or polar regions of Jupiter.

Both the System I and System II periods are arbitrary and have arbitrary base points for zero longitude. Most features observed on Jupiter conform, though, to these periods with variations on the order of seconds. Features located between the south edge of the NEB and the north edge of the SEB are normally assigned to System I; others, to System II. There is a System I current at the south edge of the NTB, and periods intermediate between System I and II are sometimes noticeable in the SEB Z.

The rotation periods of the two standard meridians are, more exactly:

System I -- $9^h50^m30^s.003$
System II -- $9^h55^m40^s.632$.

If a spot is recorded on the central meridian (where the central meridian is the imaginary line of division midway between the preceding and the following limb normal to the equator), having been moved by the planet's rotation from an initial position within the field of view, then its longitude is equivalent to that of the central meridian. Recording as many of these times for as many spots as one can perceive with one's instrument is of great significance to the A.L.P.O. Jupiter Section.

The method of observation is very simple. Nothing more than a pencil, a notebook, and a reliable timepiece is required in addition to a telescope with some resolving power. (At least three and a half inches is urged for a refractor, and four and a half inches for a reflector.) The timepiece should be accurate to within sixty seconds, but even greater precision is preferable. The rotation of Jupiter is rapid and causes a noticeable displacement near the CM within three minutes, which is equivalent to about two degrees. A mark may seem to be on the CM for as long as two minutes or less, depending on the time of initial observation of the spot. If a first judgement is made in addition to that at which the spot was last noted on the CM, viz., that point at which it is seen to be on the CM after which it ceases to give that impression, then the best estimate is the arithmetical mean given to these two initial values. Owing to error on the part of the observer, the times judged to represent the true central meridian position will be off by one to three minutes. A five minute error is the limit of acceptable error in exceptional circumstances when no better estimate is at hand. An error of this sort spread over a great period of time cannot be too significant. If sufficient observations are available, extreme errors can be corrected.

Every observer must learn how to describe the features he observes on the CM. The general Jovian nomenclature is presented in Figure 1. The observer must become familiar with this arrangement because it is the best approximation to what he will actually observe on Jupiter. Transit features need to be positioned in latitude, roughly, in relation to the belts and zones of Jupiter.

When recording transits on the transit forms one needs some method. Abbreviation will facilitate the process. All Jovian markings can be classified either as bright markings or as dark ones. Therefore, when recording your transit, begin your description with either a "W" for white or a "D" for dark; next place a subscript after this--p. for "preceding end", c. for "center", and f. for "following end"--and then a brief description of the marking's structure.

The special nomenclature recommended for specific markings is presented for white markings in Figure 2 and for dark markings in Figure 3. If the color of the marking tends

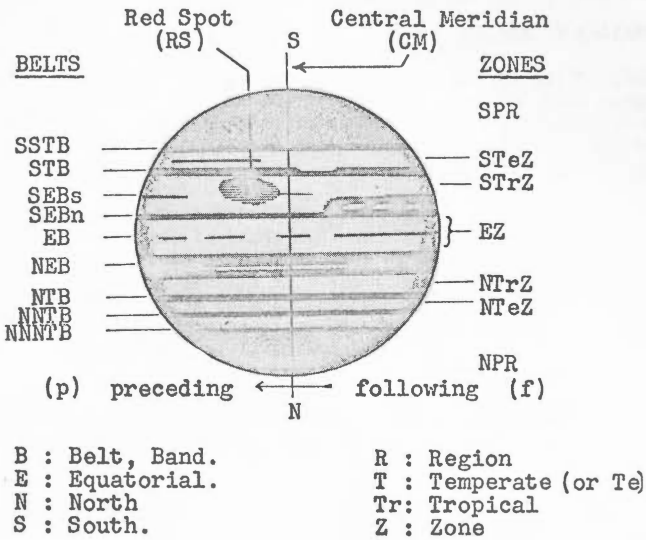

Figure 1. Standard nomenclature of belts and zones on Jupiter, with the abbreviations which are commonly used. In the orientation shown, a simply inverted image with south at the top, the rotation of the planet causes surface markings to move from right to left.

to be distinct from that of the belt or zone in which it is located, this should be specified. Using these suggestions will facilitate analysis by the Jupiter Recorders.

When the transit times have been reduced to longitudes, the results are plotted on graph paper against the dates of observation. A most satisfactory scale is twenty days to one inch, plotting time vertically rather than horizontally. This orientation is valuable because it reminds one of the horizontal orientation of Jovian markings. As the eye runs down the diagram, the history of the positions of the features becomes apparent just as one might have actually observed them consecutively.

Separate charts are used for various regions of Jupiter, and it is a convenience to employ different symbols on the charts for different kinds of features.

The number of observations secured and the tendency for these to be lined up along a straight line, or a curved line, will determine the significance of an individual transit observation, i.e., the extent to which such an isolated observation has been confirmed by others to be a definite feature on Jupiter.

Identification of spots and drawing least squares lines for these is an exacting task for the Recorder. One must be cautious about interpreting graphs where too few marks are available. It is good to have continuity in one's drift charts, and three observations for every six days or less is desirable (assuming random distribution of observations). For an even distribution of observations one needs only seven observations for a thirty-day period. When the Recorder has thus determined from the chart the drift curve, the limiting dates and longitudes are used to determine the change of longitude over thirty days. And this is used to find the rotation period.

These results are then published in a quantitative, rotation-period report. Identification is often checked on disc drawings of reliable observers and on photographs. Strip sketches are rather valuable to the transit recorder who must identify many markings. They are on a larger scale and help to position accurately the various markings. Rough approximations of more delicate features' positions may then be secured as well.

A PROPOSED CONSTITUTION FOR THE A.L.P.O.

By: Richard G. Hodgson

Since its founding in 1947, The Association of Lunar and Planetary Observers has grown and prospered with a minimum of organization. A number of valuable contributions have been made to our knowledge of the Solar System. Much of this progress has been due to the fact that one man--our Director Walter H. Haas--has patiently carried on his shoul-

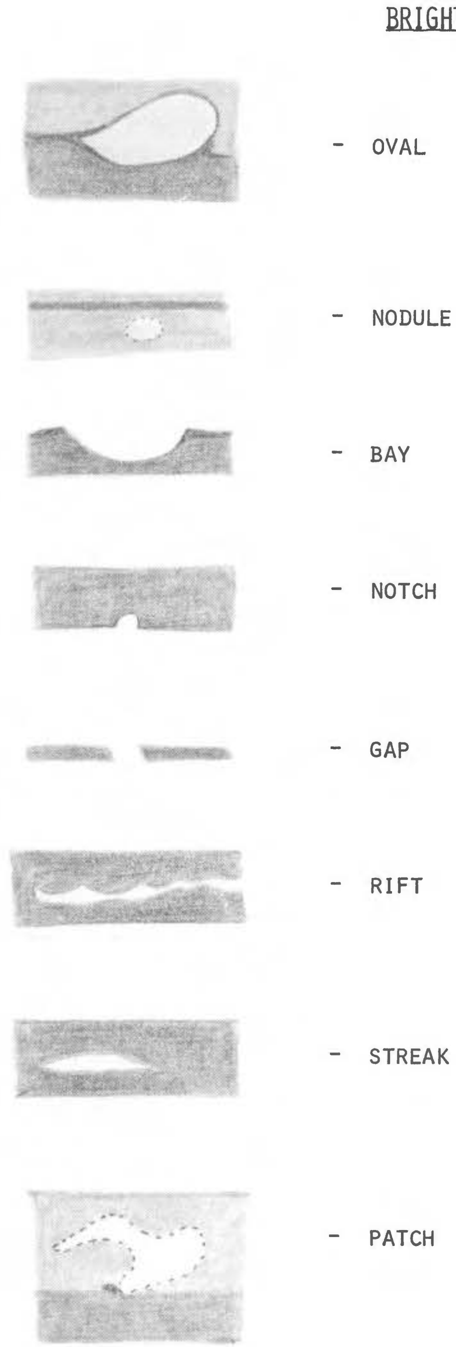

Figure 2. Recommended nomenclature for bright markings at the surface of Jupiter. Prepared and submitted by Phillip W. Budine.

<u>Postscript to Budine Article by Editor</u>. We highly recommend the C.M. transit observations described above to all observers of Jupiter. The article above is similar to a chapter in a new A.L.P.O. Jupiter Handbook on which work is in progress. Mr. Paul Mackal, our Jupiter Recorder, is editing the coming Handbook; and several leading A.L.P.O. Jupiter observers are contributors. We tentatively plan to publish other articles on different facets of our Jupiter program. More extensive member participation in these observational studies would add to their value; in addition, they can become most enjoyable in themselves.

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ders the enormous responsibility for keeping the A.L.P.O. going. His ability in discharging his many tasks and his uncomplaining nature have enabled the A.L.P.O. to develop without much formal organization. There never has been a constitution. Although there have been business meetings from time to time, there never have been elections or elected officers. Nor have members been burdened with financial statements to read. There have been none, and there has been rather limited discussion of finances at business meetings. We tend to suppose that Walter is magically endowed to make everything come out right.

The time has come to ease some of the burdens of our beloved Director/Editor/Treasurer/Chief Correspondent. The A.L.P.O. should have a constitution, and at least a minimum of organization. This need was generally felt by those members who attended The Southwestern Astronomical Conference in Las Cruces, New Mexico, in August, 1968. As a result

DARK MARKINGS (D)

- DARKER SECTION OF BELT (SECT.)

- CONDENSATION (COND.)

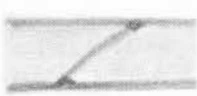
- ELONG. COND.

- ROD

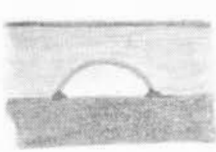
- PROJECTION (PROJ.)
  LOW

- TALL

- VEIL (OR SHADING)

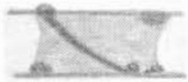


- FESTOON (FEST.)



- LOOP FEST.

- COLUMN (COL.)



- DISTURBANCE (DIST.)

Figure 3. Recommended nomenclature for dark markings at the surface of Jupiter. Prepared and submitted by Phillip W. Budine.

of that discussion, a committee was established to draw up a constitution for consideration by the members of the A.L.P.O. Ken Thomson, Richard Wend, and I (serving as chairman) constituted this committee. Their suggestions, and those of many others, have gone into the making of this proposed Constitution and are much appreciated.

Thus a proposed Constitution is now here presented for the careful consideration of A.L.P.O. members. We have tried to keep this document as simple as possible, and to keep organization at a minimum. We hope that it is not so narrow or restrictive as to bind the future course of the A.L.P.O., but nevertheless clear enough to provide procedures for a wide variety of circumstances. Since the region primarily served by the A.L.P.O. is quite large--North America--and many members therefore cannot and do not attend business meetings, we have tried to maximize participation of all members in the nomination and election procedures by the use of mail ballots. This is cumbersome but necessary. We have felt, however, in the case of tie votes that the tie should be broken in some other way than by repeated mail ballots, and have made provision for this.

It is not appropriate here to analyze this Constitution part by part. Give it careful consideration. If you have criticism to offer, I would appreciate your comment.

Article I - Name, Purpose and Membership Requirements

1. The Association of Lunar and Planetary Observers (hereinafter abbreviated as "A.L.P.O.") is an association of astronomical observers who desire to aid the advancement of scientific knowledge through study of the objects which comprise the Solar System.

2. The purpose of the A.L.P.O. is three-fold: (1) To encourage persons who own or have access to astronomical instruments to undertake disciplined and systematic observations of objects in the Solar System suitable for their equipment; (2) To circulate the results of such observations, and report other current information on the Solar System through publication of a Journal published at frequent intervals; (3) To encourage popular interest in the astronomy of the Solar System.

3. Two types of membership are offered in A.L.P.O. (1) Individual membership is open to all persons who are interested in astronomy, and is attained and retained by subscribing to the Journal published by the A.L.P.O. (2) Group or Institutional membership is available to astronomical societies, schools, and libraries. Such members are entitled to one vote per subscription fee paid. Group and institutional subscribers may waive membership if they so desire.

Article II - Methods and Meetings

1. To advance its scientific and educational work the A.L.P.O. encourages its members to affiliate themselves with one or more of its Observing Sections, and carry out their observations under the direction of an experienced Recorder. The Recorder (aided in the larger Sections by one or more Assistant Recorders) has oversight of a particular Section, and prepares reports of observations at regular intervals.

2. General oversight of the A.L.P.O. is exercised by its Director with the advice of an Executive Council in accordance with the provisions of Article III of this Constitution.

3. The A.L.P.O. publishes a Journal at frequent intervals containing reports of meetings, reports of its Observing Sections, papers by members, and current news regarding the Solar System.

4. The A.L.P.O. normally holds an Astronomical Convention annually, usually in the summer, at which papers on the Solar System are read and discussed. All members and the interested public are invited to attend this Convention.

5. The Annual Business Meeting of the A.L.P.O. is normally held in conjunction with the Annual Convention. All members whose subscriptions (and other fees, if any) are paid are free to take part, and each member has one vote. This Annual Business Meeting has authority to act on all business concerning the A.L.P.O. subject to provisions of this Constitution.

6. Special Business Meetings may be called at other times either (1) at the call of the Director, or (2) at the request of three-fifths of the members of the Executive Council, provided that notice of the meeting's place, date, time, and purpose is sent to all members at least forty-five days in advance.

7. The quorum for all Business Meetings is twelve members.

Article III - Elected Officers

Section 1. The elective officers of the A.L.P.O. are (1) a Director, (2) eight members constituting, with the Director, the Executive Council, and (3) three Tellers to count and report the election of the Director and of the Executive Council.

Section 2. The Director.

1. Duties and Powers. The Director has general oversight of the affairs of the A.L.P.O. He normally moderates all Business Meetings, and the meetings of the Executive Council, of which he is a member ex officio. With the advice and consent of a majority of the other members of the Executive Council, the Director appoints qualified A.L.P.O. members to the various appointive offices and assistantships as circumstances may require. He also has power to remove persons from appointive office at any time for non-fulfillment of duties, and can fill vacant appointive offices on an interim basis until the next meeting of the Executive Council. Any person removed from appointive office by the Director has the right to petition the Executive Council for reinstatement within forty-five days of his removal; until the Executive Council takes action on such a petition the office can only be filled on an interim basis.

2. Nomination and Election. The Director is elected for a term of four years, and may serve an indefinite number of terms. Nominations for the office of Director may be made (1) at the Annual Business Meeting in the year in which the Director's term expires, or at a Special Business Meeting if for any reason the office becomes vacant, or (2) by filing a nominating petition or letter with any of the Tellers signed by five or more members not more than ninety days, nor less than fifteen days prior to the Business Meeting at which nominations are expected to be made. After this Business Meeting the newly elected Tellers send out ballots to all members whose subscriptions (and fees, if any) are paid on which the names of those nominated by letter or by the Business Meeting are listed. All ballots returned in sixty days or less are then counted by the Tellers, and the person securing the highest number of votes is elected Director, and assumes the office without delay. In the event of a tie vote for Director, the Executive Council chooses between those persons who have tied.

Section 3. The Executive Council.

1. Duties and Powers. The Executive Council assists the Director in his work, and has the following duties and powers. (1) Appointments made by the Director to appointive office must be made with the advice and consent of a majority of the Executive Council. (2) Creation of an Observing Section, or of an appointive office, must be made either by the Executive Council or by an Annual or Special Business Meeting; elimination or consolidation of an Observing Section or of an appointive office is the prerogative of an Annual or Special Business Meeting. (3) In the event of a tie vote, the Executive Council chooses the Director from among those who have tied. (4) Subscription fees to the **Journal**, and other dues, if any, are determined by the Executive Council in the light of the costs involved, and are set no higher than to cover those costs in a prudent manner. In connection with this responsibility the Executive Council reviews the financial affairs of the A.L.P.O. at least annually. (5) The Executive Council may from time to time grant awards to members of the A.L.P.O. for distinguished contributions to astronomy.

2. Election of the Executive Council. The Executive Council consists of (1) the Director who normally moderates, and who is a member ex officio, and (2) eight members elected by mail ballot in accordance with the nomination and election procedures applicable to the office of Director, except that the Meeting at which nominations are made may nominate no more than twice as many persons as vacancies, not including names entered by letter petition. In the event that the mail ballot results in a tie vote, the expiring Executive Council chooses between those persons who have tied.

3. Term of Office. The eight elected members of the Executive Council are elected for a term of two years, normally in two classes, so that four persons are normally elected each year. They may serve no more than two consecutive terms.

Section 4. Tellers. The Annual Business Meeting elects three A.L.P.O. members who are not nominees for any elective office to serve as Tellers to oversee the elctions of a Director and of the Executive Council by mail, as provided in this Constitution. These three should be chosen, if possible, with a view to their geographical proximity to each other in order that they may readily meet to conduct their business. The Tellers serve a term of one year, or until their successors are chosen, and may serve an indefinite number of terms.

In order that the provisions of this Constitution may be well known to A.L.P.O. members, this Constitution, after ratification, shall be published, together with any amendments in force, either (1) in a separate booklet, one copy of which shall be given to every present A.L.P.O. member, and to new members when they join, or (2) in the first issue of every odd-numbered volume of the A.L.P.O. Journal commencing on page 1.

Article V - Ratification and Amendments

1. Ratification. This Constitution shall be deemed ratified and in force provided it is approved by (1) a two-thirds majority of members present and voting at an Annual Business Meeting, and (2) a two-thirds majority of members not present at this Meeting who return ballots by mail to the present Director within sixty days of their distribution.

2. Amendments. Amendments to this Constitution may be proposed by any Annual Business Meeting, or by a Special Business Meeting convened for that purpose, provided that it is supported by two-thirds of those present and voting at such a meeting, and is subsequently approved by two-thirds of those members returning ballots to the Tellers within sixty days of their distribution.

Postscript by Editor. As Mr. Hodgson has described above, it was decided at the 1968 Business Meeting of the A.L.P.O. to appoint a committee to draft a proposed Constitution for the consideration of the membership. This committee reported at the 1969 Business Meeting, where Mr. Ken Thomson read the proposed Constitution. After some discussion, it was moved by Daniel Vukobratovich that the Constitution and a resumé of the planning behind it be published in The Strolling Astronomer and be submitted for publication by December 15, 1969. The motion passed unanimously, and its provisions have now been carried out.

The work of the committee and the publication of the proposed Constitution will be useful, of course, only in so far as A.L.P.O. members read and study its text. Criticisms, opinions, and suggestions for changes are most cordially invited. They should be sent either to Reverend Richard G. Hodgson, Dordt College, Sioux Center, Iowa 51250 or to the Editor. May we hope to hear from you?

THE SAN DIEGO BUSINESS MEETING OF THE A.L.P.O.

This meeting was held on August 23, 1969 as part of the W.A.A.-A.L.P.O. Convention at San Diego, California. Twenty members attended. The Director of the A.L.P.O. acted as Chairman, and minutes were kept by Dr. John Westfall.

The A.L.P.O. Observing Manual was discussed at some length, although the absence of the two co-Editors, Mr. Clark Chapman and Dr. Dale Cruikshank, was a handicap. It was moved, seconded, and passed to make a complete second copy of the entire Manual (now done). Various possible methods of publication were suggested. (The Editor's latest knowledge is that efforts to find a regular publisher are continuing and that they have not yet been successful.) Mr. C. Capen raised the question of needed updating of some of the Manual chapters since they were written several years ago.

The selection of a site for the 1970 Convention was discussed for some time. The results have already been reported in Str. A., Vol. 21, Nos. 11-12, pp. 215-216. We shall meet with the W.A.A. at Sacramento next August.

The Constitution Committee report, as described above on this page, was given.

It was suggested by Mr. Harold Kaiser that we occasionally publish in Str. A. a discovery observation form.

It was suggested that we publish each year a pamphlet on Section observing projects.

The Director reported briefly on membership and finances.

ADDITIONAL A.L.P.O. 1967 MARS DRAWINGS

The following drawings of Mars by A.L.P.O. members during its 1967 apparition may be regarded as a supplement to Mr. Klaus Brasch's Report on pp. 29-35 of Str. A., Vol. 22, Nos. 1-2. They were selected by Mr. Brasch and were intended by him to take the place of the usual apparitional map of Mars. Readers may wish to compare these drawings with the close-up photographs of Mars obtained in 1969 by Mariner VI and Mariner VII.

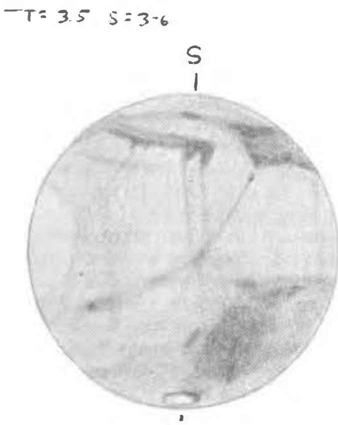


Figure 4. Drawing of Mars by L. M. Carlino on April 30, 1967 at 1^h0^m, U.T. 6-inch refr., 170X and 285X. Seeing 3-6. Transparency 3.5. C.M. = 10°. Original drawing in natural colors. All Mars drawings in this group are simply inverted views with south at the top.

Figure 5. Drawing of Mars by C. Capen on May 1, 1967. 82-inch refl., 1000X. C.M. = 15°. View in orange and red light. Martian Date July 27.

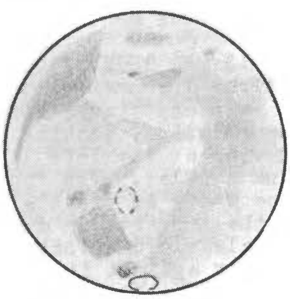


Figure 6. Drawing of Mars by Bruce Salmon on April 28, 1967 at 4^h0^m, U.T. 10-inch refl., 400X. Seeing 7. Transparency 4. C.M. = 72°.

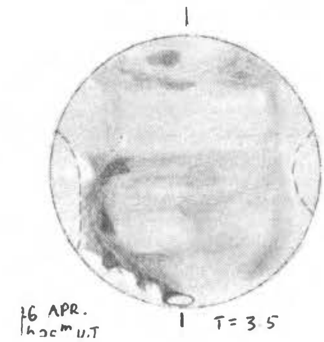


Figure 7. Drawing of Mars by L. M. Carlino on April 26, 1967 at 4^h25^m, U.T. 6-inch refr., 170X, 285X. Seeing 2-4. Transparency 3.5. C.M. = 95°.

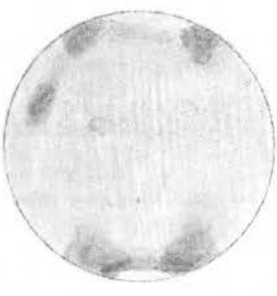


Figure 8. Drawing of Mars by Kenneth J. Delano on June 1, 1967 at 3^h15^m, U.T. 12.5-inch refl., 300X. Seeing 6. Transparency 5. C.M. = 116°. Original drawing in natural colors.

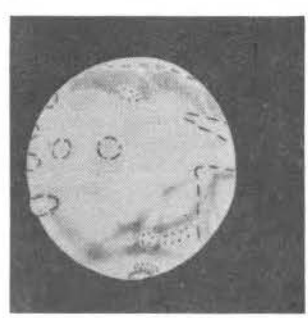


Figure 9. Drawing of Mars by C. Capen on May 24, 1967. 82-inch reflector. C.M. = 158°. Martian Date August 8.

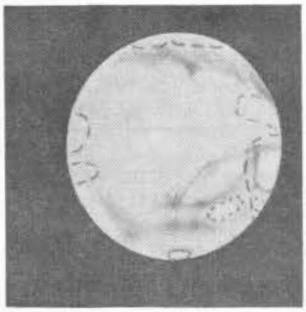


Figure 10. Drawing of Mars by C. Capen on May 23, 1967. 82-inch reflector, 1000X. C.M. = 165°. Clouds present on this date.

Figure 11. Drawing of Mars by C. Capen on May 30, 1967. 82-inch refl. C.M. = 190°. Red, yellow, and green light. Martian Date August 11.

Figure 12. Drawing of Mars by Wayne Wooten on April 11, 1967 at 3^h30^m, U.T. 8-inch refractor, 450X. Seeing 3-4. Transparency 4. C.M. = 213°.

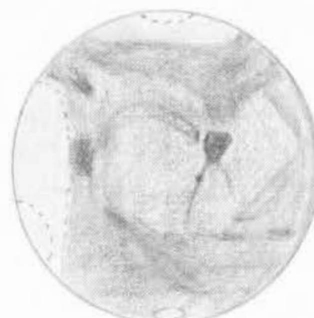


Figure 13. Drawing of Mars by L. M. Carlino on May 13, 1967 at $3^h 0^m$, U.T. 6-inch refractor, 200X-285X. Seeing 3-6. Transparency 3.5. C.M. = 285°. Original drawing in natural colors.

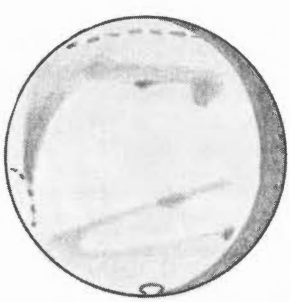


Figure 14. Drawing of Mars by Bruce Salmon on June 14, 1967 at 2^h15^m, U.T. 10-inch refl., 500X. Seeing 8. Twilight sky. C.M. = 340°.

Figure 15* Drawing of Mars by Walter H. Haas on May 15, 1967 at 3^h20^m, U.T. 12.5-inch refl., 303X. Seeing 3-5. Transparency 6. C.M. = 271°. South polar cap mottled in appearance. North part Syrtis Major dark bluish gray.

*This drawing was not among those selected by Mr. Brasch but was immodestly added by the Editor to fill an empty corner.

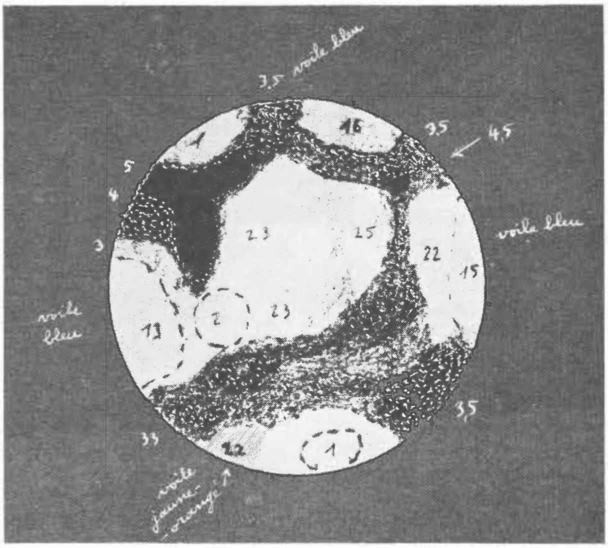


Figure 16. Drawing of Mars by R. de Terwangne on April 27, 1967 at 20^h15^m, U.T. 110-mm. refractor, 145X. Seeing 2-5. Transparency good. C.M. = 318°. Green filter part of time. Note a yellow-orange veil and several blue veils on limb of Mars.

<u>THE A.L.P.O. LUNAR SECTION ARISTARCHUS-HERODOTUS MAPPING PROJECT: FINAL REPORT</u>

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

(concluded from <u>Str. A.</u>, Vol. 21, Nos. 11-12, pp. 181-201, and Vol. 22, Nos. 1-2, pp. 13-24)

<u>C. Tones.</u>

Because the Aristarchus-Herodotus Region Project was primarily a relief study, the tonal characteristics of the area were observed only incidentally. Because of observed tonal variations in the AHR, such as a tonal study really requires a research project of its own. Hopefully, such a project could use the AHR map as a base and could identify many of the various light and dark zones of the region with the relief features shown on the AHR map (Vol. 21, Nos. 11-12, pp. 198-199).

Figure 15 on pg. 16 of Vol. 22, Nos. 1-2 shows the coarser tonal features of the AHR, plotted on a reduced version of the AHR relief map. Many tones vary in this area, both during a lunation and between different lunations. For example, the dark bands on the inner walls of Aristarchus change, and only their "typical" positions and tones are shown here. All tones in Figure 15 are those observed under a high sun. Due to the low solar altitude at the time of the Orbiter photographs, they were of little help in ascertaining minute tonal detail.

Under a high sun, the entire AHR stands out as a bright area; and Aristarchus, with its central peak, is the brightest feature on the Moon's nearside. Nevill (Neison) was the first English-language selenographer to classify the tonal variations of this region on the now-familiar 10° scale (i.e., from 0°, black, to 10°, "dazzling white"). Table 11 lists his tonal estimates for the AHR, together with estimates made for the same, and some other, features by some A.L.P.O. observers.

<u>Table 11. Tonal Estimates for Selected Features in the AHR.</u>

Feature	Brightness According To: Nevill	A.L.P.O. Observers[a,b]
Aristarchus:		
General	9½°	-----
East Wall	6-8°	6° (R), 9° (S)
South Wall	8°	9° (S), 8° (W)
West Wall	9°	10° (S), 8° (W), 10° (Ri)
North Wall	9½°	9° (S), 8° (W)

Table 11. Tonal Estimates for Selected Features in the AHR. (cont.)

Feature	Brightness According To: Nevill	A.L.P.O. Observers[a,b]
Aristarchus (cont.):		
Interior	9½°	6° (R), 8° (W)
Central Peak	10°	10° (R), 10° (W)
Peak S of Central Peak	9½°	-----
Herodotus:		
Peak Alpha (E Wall)	7°	8° (W)
Peak Beta (N of Alpha)	3°	-----
Oceanus Procellarum	2-2½° (General)	(AHR): 5° (S), 5° (W), 5° (Ri)

Features not Classified by Nevill:

Aristarchus glacis (general)	6-7° (W), 7° (Ri)
Aristarchus--feature 4	7-8° (R)
Craterlet SE of feature 4	7.5-9° (R)
Aristarchus--feature 5	9° (R), 9° (W)
Aristarchus-Band A	3.5° (R), 4° (S)
Aristarchus-Band C	4°.5 (S)
Aristarchus-Band E	5° (S)
Aristarchus-Band F	5° (S)
Aristarchus-Band I	5° (S), 6° (W)
Aristarchus-Band on Floor Margin	4°.5 (S)
Aristarchus-Light Patches on N Floor	7-8° (R)
Aristarchus-Light Streak on S Floor	6.5-7° (R)
Herodotus-West Wall	7° (W), 7°.5 (Ri)
Herodotus N	6° (H), 7° (W), 7°.8 (Ri)
Herodotus-Floor	2° (H), 5° (W), 3°.5 (Ri)
Herodotus-Light Patch on S Floor	5° (H)
Herodotus-Condensation in above	6°.5 (H)
Scarp SW of Aristarchus (running to Herodotus)	7-9° (S), 7° (W), 7.8-8° (Ri)
Dark Patches N of Aristarchus	4° (W)
Schröter's Valley-Floor	6° (W), 6°.0 (Ri)

[a]H = Hartmann (1957), "The Herodotus Puzzle," p. 451.
R = Reese (1956), "Aristarchus from Sunrise to Sunset," pp. 36-37. Values are given for colongitudes near 140° (local noon).
Ri = Ricker; S = Snyder; W = Westfall.

[b]Aristarchus Band designations are after: Reese, loc. cit.; and Robinson (1962), "Contributions to Selenography, Part I. Aristarchus, 1957-1960," p. 33.

The agreement between tonal estimates for some of the objects is encouraging, but a number of features have been estimated by only one observer so that their reliability can not be gauged. Also, there are innumerable features (e.g., Aristarchus Z and Herodotus G) whose tones have not been estimated at all. Sometimes, too, different estimates for the same object will disagree (e.g., Herodotus N); and it is not clear whether the discrepancy is due to (i) observer error, (ii) changing solar lighting, or (iii) actual (nongeometric) changes of the Lunar Transient Phenomena variety. Clearly, a lengthy and comprehensive series of tonal estimates is needed for the AHR, along the lines of Reese's[59] and Bartlett's[60] programs, but much expanded.

Because of their debatable nature and appearance, the bands of Aristarchus have received considerable attention from observers and, due to their variable nature, present a special cartographic problem. (Due to the scarcity of estimates outside Aristarchus, but within the AHR, there may be other similar variable areas there as well.) Figure 15 in Str. A., Vol. 22, Nos. 1-2, shows a typical appearance for these features, derived largely from Reese's and Robinson's maps and Bartlett's drawings (the Bartlett drawings consulted were restricted to those near colongitude 137°--local noon). Using Robinson's nomenclature, Figure 15 shows bands A, B_1, B_2, C, D, E, G, H, I, and J_1--in this writer's opinion, bands B_3, F_1, F_2, F_3, and J_2 are visible only occasionally and are thus not shown on the map. As several observers have remarked, particularly those using large apertures under excellent seeing conditions, the bands probably show fine radial structure, perhaps associated with radial fracture or landslip patterns like those shown on Orbiter-V frame H-198 (Figure 10 in Str. A., Vol. 21, Nos. 11-12).[60]

Future tonal studies of the AHR should include studies of colors as well, for which some useful preliminary work has already been done. Early in this century, R. W. Wood noted that a large area which overlaps the western margins of the AHR (in subprovince 2. d. as defined earlier in this article) appeared unusually dark in ultraviolet, possibly indicating the presence of sulphur.[61] Certainly, his studies in this area could be extended with more modern techniques. Observing at visual wavelengths and using color filters, Avigliano noted three zones of subtle coloration within the AHR.[62] The *mare* (S, E, and NE of Aristarchus) was seen as yellowish-grey, while the surface SW of Aristarchus and south of Herodotus appeared brownish-yellow. The third zone, west of Aristarchus and north of Herodotus, appeared yellowish-brown. Again, these results should be extended by more intensive studies in the future.

D. Selenology of the AHR.

Although not a selenological (i.e., lunar geological) study in itself, it is hoped that the AHR map can be used for selenological interpretation. Only a few pertinent notes will be given here. For a detailed selenological mapping study of this region, the reader is referred to H. J. Moore's excellent map.[63] Table 12 correlates the physiographic provinces already described (above, Section VI.A.) with Moore's geological units.

Table 12. Correlation of Physiographic Provinces with Geologic Units of H. J. Moore.

Physio. Prov. or Subprov.	Geologic Unit	Period/Epoch/Group (System/Series/Group)
1.	Ipm (*Mare* material) Icr (Crater rim material)[a]	Imbrian/Archimedian/Procellarum Imbrian/Archimedian/---
2.a.	Ccr (Crater rim material)[b]	Copernican/---/---
2.b.	Icr (Crater rim material)[c] Cs (Slope material)[d] Ipm (*Mare* material)[e]	Imbrian/Archimedian/--- Copernican/---/--- Imbrian/Archimedian/Procellarum
2.c.	Cs (Slope Material)[f] Csr (Sinuous Rille material)[g]	Copernican/---/--- Copernican/---/---
2.d.	Ch (Cobra Head Formation)[h] CEv (Vallis Schröteri Formation)[i]	Copernican/---/--- Eratosthenian or Copernican/---/---
2.e.	If (Fra Mauro Formation)[j]	Imbrian/Apenninian/---
2.f.	CEv (Vallis Schröteri Formation)[k] rc (Rille and chain-crater material)[l] If (Fra Mauro Formation)[m]	Eratosthenian or Copernican/---/--- ---/---/--- Imbrian/Apenninian/---
3.	Ccr (Crater rim material-high albedo)[n] Ccrd (Crater rim material-low albedo)[o] Cs (Slope material)[p] Ccf (Crater floor material)[q] Ccp (Central peak material)[r]	Copernican/---/--- Copernican/---/--- Copernican/---/--- Copernican/---/--- Copernican/---/---

Table 12.--Continued:

[a]Rim of Aristarchus F.
[b]Uppermost layers only; overlies older series.
[c]Herodotus glacis.
[d]Herodotus inner wall.
[e]Herodotus floor; Ipm is often overlain by material of Copernican age.
[f]Vallis Schröteri wall.
[g]Vallis Schröteri floor.
[h]Near Cobra Head.
[i]Remainder of 2.d.
[j]Excepting Aristarchus Z.
[k]West of 48°.7 W.
[l]Rima Aristarchus I; date probably Archimedian or later.
[m]Remainder of 2.f.
[n]Aristarchus glacis on W, S, and E.
[o]Aristarchus glacis on N.
[p]Aristarchus inner wall.
[q]Aristarchus floor.
[r]Aristarchus central peak.

Descriptions of the telescopic characteristics, and gelogical interpretations, for the geologic units are given with Moore's map, which also contains a cross section traversing the AHR. The chronological sequence assumed by Moore is as follows (most recent on top):

COPERNICAN

ERATOSTHENIAN

IMBRIAN { ARCHIMEDIAN { Procellarum
IMBRIAN { APENNINIAN

PRE-IMBRIAN

As an aid to selenological interpretation, three profiles (cross sections) have been constructed through the Aristarchus-Herodotus Region. The plan (surface) projections of these profiles are shown in Figure 16 on pg. 17 of Vol. 22, Nos. 1-2. (The end points of these three profiles are A-B, C-D, and E-F.) The three profiles are shown in Figure 17 on pg. 51. Each profile is at a horizontal scale of 1/1,000,000 and a vertical scale of 1/400,000 so that the vertical exaggeration is 2.5 times.

The topmost profile (A-B) cuts through the following physiographic subprovinces and provinces (left to right): 2.d., 2.b., 2.a., 3., and 1. This section brings out the relative shallowness of Herodotus (2.b.), its flat floor, and the fact that its east wall depth exceeds its west. The elevated Aristarchus plateau (2.a.) is shown at the center. Note that Aristarchus' west wall is higher than its east and that both walls show several terraces.

The central profile (C-D) includes four subprovinces (left to right): 2.d., 2.c., 2.f., and 2.e. The undulating nature of the plain 2.d. is shown on the left. Vallis Schröteri's (2.c.) east wall is higher than its west, and the surface to the east (2.f.) is also slightly higher than that to the west (2.d.). The mountain block (2.e.), containing Aristarchus Z, is on the right.

The final profile (E-F) runs NNW-SSE through (left to right) 2.e., 2.f., 2.a., 3., and 1. The mountain block (2.e.) descends more gradually on its south flank than on its west (section C-D). The landslips on the north and south walls of Aristarchus (3.) are obvious, as is the asymmetric location of its floor. South of Aristarchus, its ejecta give Oceanus Procellarum (1.) a gently undulating profile, broken by the shallow ring of Aristarchus F.

E. Lunar Transient Phenomena (LTP's)

The phrase "Lunar Transient Phenomenon" (LTP) is used loosely to mean an observable physical change on or above the Moon's surface (which actually could be a permanent rather than a "transient" change). Examples might be landslides, meteoritic impacts, gaseous outbursts, lava flows, fluorescence, and the like.

LTP's of various types have been reported in the AHR many times for a long period. The first known such observation was by Hevelius in 1650, who recorded a "red hill."[64] A well-known early report was Herschel's of March 4, 1783, when he observed a red spot in the vicinity of Aristarchus.[65] In spite of these observations, and many similar reported cases during the succeeding 180 years, most professional astronomers considered the moon a "dead world" and discounted reports of LTP's in the AHR and elsewhere.[66]

It has been only in the last decade that the pendulum of opinion has swung back; and the scientific community has acknowledged the existence of LTP's and, by implication, the validity of at least some of the numerous amateur and professional observations of them. This change of attitude began with Kozyrev's visual and spectrographic observation of a reddish glow followed by a gas emission on the central peak of Alphonsus (November 3, 1958).[67] Soon, reliable observers reported similar effects in Aristarchus and its vicinity. Grainger and Ring twice (May 30-31 and June 27-28, 1961) made a photographic record of an enhancement of Aristarchus' spectrum in the ultraviolet.[68] Three times in 1961 (November 26 and 28 and December 3) Kozyrev photographed anomalous spectra in the red and blue in the AHR, also noting red glows.[69] The most famous such observation, though, was that of Greenacre and Barr (October 30, 1963, followed by a similar observation on November 28, 1963), who observed reddish glows in three AHR areas with the 24-inch refractor of Lowell Observatory.[70] These three areas are shown in Figure 14 on pg. 15 of Vol. 22, Nos. 1-2: (1) the SW rim of the Cobra Head, (2) the scarp SW of Aristarchus Z, and (3) the SW rim of Aristarchus. After this time, reports of "red glows" and other phenomena in the AHR have been frequent. In August, 1964, "Operation Moon Blink" began; and numerous AHR LTP's were reported.[71] Meanwhile, amateur observers such as James C. Bartlett continued observing LTP's in the AHR, just as they had been doing for many years before Kozyrev's or Greenacre's observations.

An exhaustive catalog published in 1968 listed some 579 reported LTP's from November 26, 1540 through October 19, 1967.[72] Of these, 243, or 42 per cent, were located within the AHR! Clearly, there is some observer bias; more observers observe, and hence report, LTP's in an area known to be rich in them. Nonetheless, this is probably the most "active" area on the moon, and events of several types have been reported in a number of sites within the area. Table 13 summarizes these observations by type of phenomenon and by location.

Table 13. Summary of LTP Observations in the AHR.

A. Color Phenomena--Type I. (Violet, blue-violet, or blue glows or flares.)

1. Aristarchus--walls. Especially:

    i. South wall bright spot.
    ii. East wall bright spot.
    iii. East and NE wall.
    iv. Rim.
    v. West wall base.

2. Aristarchus--floor and central peak.
3. Aristarchus--nimbus (dark violet).
4. Area N and NE of Aristarchus.
5. Plateau bounded by Aristarchus, Herodotus, and the Cobra Head.
6. The Cobra Head.

B. Color Phenomena--Type II. (Red or pink glows or patches.)

1. Aristarchus--south portion (especially craterlet and "trough" on SW wall).
2. Aristarchus--floor and central peak.
3. Cobra Head. Especially:

    i. SW rim.
    ii. SE rim.

4. Scarp west of Aristarchus Z.
5. Herodotus--SE wall.
6. Entire area between central and south Aristarchus to east Herodotus (occasionally).

C. Tonal Variations. (Changes in intensity, location, and visibility of light or dark areas.)

1. Aristarchus--Bands. Including:

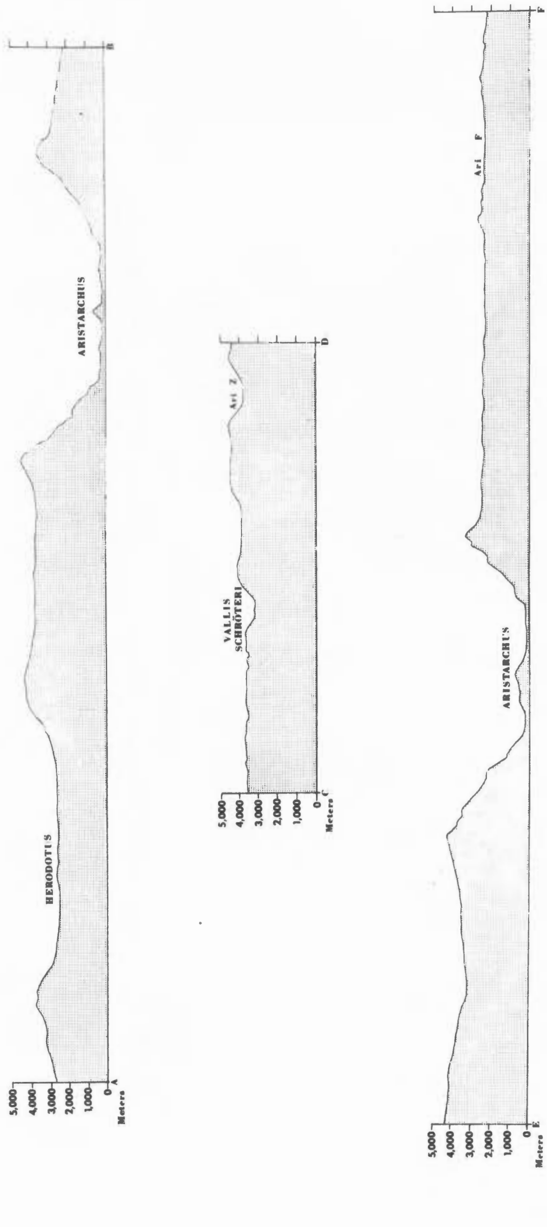


Figure 17. Three vertical profiles of the topography of the Aristarchus-Herodotus Region of the Moon. Locations of these profile lines are shown in Figure 16 and 17 of Str. A., Vol. 22, Nos. 1-2. The horizontal scale of these profiles is 1/1,000,000 (the same as Figure 16), and the vertical scale is 1/400,000, giving a vertical exaggeration of 2.5X. The effect of lunar surface curvature has been removed. See also text of article by Dr. John E. Westfall.

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Table 13. Summary of LTP Observations in the AHR. (Cont.)

i. Floor margin (concentric band).
ii. Inner wall (radial bands).
iii. Plateau west of Aristarchus (radial bands).

2. Aristarchus--Bright Spots. Including locations on:

i. West wall.

Table 13. Summary of LTP Observations in the AHR. (Cont.)

ii. South wall.
iii. SW wall.
iv. NW wall.

D. Other LTP's.

1. Brightening of entire AHR (sunlit and earthlit, various wavelengths).
2. Local, small, bright spots or points (e.g., Bartlett's "peak" in Herodotus).[73]
3. Obscurations (various areas):

   i. Whitish, mist or fog-like.
   ii. Brown patches.

It is difficult to detect any pattern from Table 13. No portion of the AHR, excepting possibly Oceanus Procellarum, seems free of phenomena. There appear to be two areas of concentration, though, the rim and inner walls of Aristarchus and the Cobra Head, with Herodotus a possible third. Hopefully, at least some of these LTP areas can be correlated with relief features shown on the AHR map.

References

[1]Westfall (1962), "Prospects for the A.L.P.O. Lunar Section."

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[3]Greenacre and Hall (1963), "A Recent Observation of Lunar Color Phenomena."

[4]Kuiper, ed. (1960), Photographic Lunar Atlas.

[5]McIntosh, op. cit.

[6]Kopal, ed. (1965), Photographic Atlas of the Moon. Plates LXXXI, LXXXVIII, CLI, CLXXVIa, CLXXVIb, and CXC.

[7]Kuiper, op. cit. Plates E3a, E3b, F3a, F3b, F3c, F3d, F3e(i), and F3f.

[8]Miyamoto and Matsui, eds. (1960), Photographic Atlas of the Moon. Plates 93-104 and 114.

[9]Lick Observatory, unpublished photographs ECD-38 and ECD-68.

[10]Table Mountain Observatory, unpublished photographs 1689, 1751, 2305a, 2305c, and 2455d.

[11]Unpublished photographs H-150 and H-151.

[12]Unpublished photographs H-198, H-204, M-197, M-198, M-202, and M-203.

[13]Meyer and Ruffin (1965), Coördinates of Lunar Features. Group I and II Solutions, p. 94.

[14]The references, designations, and ξ - and η - coordinates were taken from: Arthur (1962), "Consolidated Catalog of Selenographic Positions." Pp. 72-74.

[15]Meyer and Ruffin, loc. cit.

[16]E.g., Hopman (1965). Die Genauigheit des Angaben von relativen Höhen auf dem Monde, p. 72.

[17]Westfall (1962). "A Relief Map of Eratosthenes."

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[19]Hackman and Mason (1961). Engineer Special Study of the Surface of the Moon, sheet 3.

[20]Crater diameters in this section, when given to 0.1 kms., are derived from: Arthur

et al. (1964), "The System of Lunar Craters. Quadrant II."

[21]Wilkins (1954). Our Moon, plate on p. 78.

[22]English Mechanic, 15 (1872), 406.

[23]Nevill (1876). The Moon, Sect. VIII. Schmidt (1878). Charte der Gebirge des Mondes, Sect. XVIII. Elger (1885, observation of March 8, 1884). "Aristarchus and the W Wall of Herodotus."

[24]Wilkins (1952, observation of April 7, 1952 with Meudon 33-inch refractor). Str. A., 6, 96.

[25]"Observations and Comments," Str. A., 7 (1953), 38.

[26]Str. A., 6 (1952), 96.

[27]Str. A.: 4, No. 9 (1950), p. 1; 5, No. 3 (1951), p. 1; 7 (1953), pp. 106-07; 10 (1956), pp. 35-37.

[28]Str. A., 6, No. 1 (1952), p. 5.

[29]Wilkins (1954). Our Moon, p. 78.

[30]Wilkins and Moore (1955). The Moon, p. 256.

[31]Ibid., p. 263.

[32]English Mechanic, 15 (1872), 406.

[33]Pickering (1903). The Moon, Plate 13 (f. p. 42).

[34]Fauth (1964). Mondatlas, plate 18. Wilkins and Moore, op. cit., p. 256.

[35]Reproduced in: Goodacre (1931). The Moon, p. 264.

[36]Str. A., 18 (1964), 76-78.

[37]Fauth, op. cit., Plate 18.

[38]Observation of February 12, 1957, 6-in. reflector. Reproduced on front cover: Str. A., 11, Nos. 7-10 (1957).

[39]Wilkins and Moore, op. cit., p. 259.

[40]Ibid., pp. 256, 259-60.

[41]Ibid., p. 263.

[42]Cooke (1956), "Schröter's Valley," pp. 322-24.

[43]Reproduced on front cover: Str. A., 11, Nos. 7-10 (1957).

[44]Wilkins and Moore, op. cit., p. 257.

[45]Str. A., 5, (1951), No. 3, p. 1, Fig. 4.

[46]English Mechanic, 15 (1872), 406.

[47]Wilkins and Moore, op. cit., pp. 256-57.

[48]Str. A., 6 (1952), 96.

[49]Str. A., 6 (1952), 71, based on 52 observations with a 4-in. reflector.

[50]Str. A., 3 (1949), No. 9.

[51]Str. A., 5, No. 3 (1951), p. 1.

[52]Str. A., 4, No. 10 (1950), p. 1.

[53]Str. A., 10 (1956), 35-37.

[54]Schmidt, loc. cit.

[55]Observation of March 30, 1950. Reproduced in: Moore (1953), Guide to the Moon, Plate VII.

[56]Observation of April 7, 1952, 33-in. Meudon refractor. Str. A., 6 (1952), 96.

[57]Observation of November 3, 1949, Str. A., 3 (1949), No. 9; Str. A., 4, No. 10 (1950), p. 1; Str. A., 6, No. 1 (1952), p. 5.

[58]Str. A., 10 (1956), 35-37.

[59]Reese (1956), "Aristarchus from Sunrise to Sunset."

[60]Bartlett's material consists of a very large collection of (unfortunately) largely unpublished drawings over a period of many years. He, along with Reese, has concentrated on Aristarchus and its environs.

[61]Wood (1910), "The Moon in Ultra-Violet Light: Spectro-Selenography." Wood (1912), "Selective Absorption of Light on the Moon's Surface and Lunar Petrography."

[62]Avigliano (1954), "Lunar Colors," p. 65.

[63]Moore, H. J. (1965), Geological Map of the Aristarchus Region of the Moon. U. S. Dept. of the Interior, Geological Survey, Map I-465 (LAC-39). Scale = 1/1,000,000.

[64]B.A.A. Lunar Section Circular 1967, 2, No. 8.

[65]Herschel, W. (1912). Collected Scientific Papers. Herschel also noted bright points in the AHR in 1783. Schröter, Bode, and von Brühl also noted LTP's in this area in the period 1784-1792.

[66]Some of these AHR LTP's were reported by well-known observers, however--e.g., Struve (1822), Argelánder (1825), Smyth (1832, 1835), Flammarion (1867), and Pickering (1891, 1897, and 1898), for example. Undoubtedly, many reports were spurious, though; the image of Aristarchus, due to its unusual brightness and, hence, contrast with its surroundings, often has a pronounced color fringe in refractors, and in any instrument when the moon is at a low altitude.

[67]Kozyrev (1959), Priroda, 3, 84. Dinsmore Alter had earlier (October 26, 1956) photographed a suspected obscuration on the floor of this crater: Alter (1956), Pub. A.S.P., 69, 158.

[68]Grainger and Ring (1963), M.N.R.A.S., 125, 101.

[69]Kozyrev (1963), Nature, 198, 979.

[70]Greenacre (1963), "A Recent Observation of Lunar Color Phenomena." Budine and Farrell confirmed the October 30, and Fisher the November 28, observations.

[71]Cameron and Gilheany (1967), "Operation Moon Blink and Report of Observations of Lunar Transient Phenomena." A "Moon Blink" uses a rotating filter wheel (red and blue filters) and an electronic image tube to detect lunar color variations; some British observers have had success using a purely visual version of the "Moon Blink."

[72]Middlehurst et al. (1968). Chronological Catalog of Reported Lunar Events. Another, earlier but useful, catalog is: Haas (1942), "Does Anything Ever Happen on the Moon?"

[73]Bartlett (1964), "Herodotus, A Light that Failed."

APPENDIX A. PROJECTION X- AND Y- COÖRDINATES (1/250,000 SCALE) OF MERIDIAN-PARALLEL INTERCEPTS IN OR NEAR THE AHR.

Long.(°W)/Lat.(°N)	X (cm.)	Y (cm.)	Long.(°W)/Lat.(°N)	X (cm.)	Y (cm.)
45/22	498.02	1538.46	48/23	526.04	1516.26

APPENDIX A. (Continued)

Long.(°W)/Lat.(°N)	X (cm.)	Y (cm.)	Long.(°W)/Lat.(°N)	X(cm.)	Y(cm.)
45/23	494.28	1526.91	48/24	522.06	1504.79
45/24	490.54	1515.36	48/25	518.09	1493.33
			48/26	514.11	1481.86
46/21	512.53	1546.47			
46/22	508.71	1534.96	49/22	540.64	1524.01
46/23	504.90	1523.44	49/23	536.58	1512.57
46/24	501.07	1511.91	49/24	532.52	1501.12
46/25	497.26	1500.40	49/25	528.46	1489.69
			49/26	524.40	1478.25
47/21	523.28	1542.87			
47/22	519.38	1531.38	50/22	551.23	1520.21
47/23	515.48	1519.89	50/23	547.09	1508.80
47/24	511.58	1508.38	50/24	542.95	1497.38
47/25	507.69	1496.90	50/25	538.82	1485.98
47/26	503.78	1485.40	50/26	534.67	1474.56
48/21	534.00	1539.19	51/23	557.57	1504.96
48/22	530.02	1527.73	51/24	553.35	1493.57

APPENDIX B. BIBLIOGRAPHY.

The references below represent a fairly exhaustive search of the English-, French-, and German-language literature through about mid-1968, with some later additions. Naturally, new references applying to the AHR are appearing constantly.

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________. "American Astronomers Report. Lunar Riverbeds." Sky and Telescope, 37 (1969), 91-93.

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________. "Concerning Mars, Saturn, and the Moon." Str. A., 4, No. 9 (1950), pp. 1, 12-13.

________. "An Extraordinary Green Light Seen North of the Rings Aristarchus and Herodotus." Vega, 2 (1956), 32.

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THE TRANSIT OF MERCURY ON 1970 MAY 9

By: Richard G. Hodgson, A.L.P.O. Mercury Recorder

On 1970, May 9 a transit of the planet Mercury across the disc of the Sun will take place. The ideal location for observing both ingress and egress of the planet from the solar disc is in the vicinity of 50 or 60 degrees longitude east of Greenwich, preferably in the northern hemisphere. Thus this transit will be best observed from the countries of the Middle East; good views of the entire transit may also be obtained from Greece and other countries in eastern Europe. North American observers living east of the Rocky Mountains will be able (weather permitting!) to observe transit egress shortly after sunrise on May 9. Since this is a Saturday morning many persons may be free from their regular work and able to observe.

Transits of Mercury are of limited scientific value, but are well worth observing. Their relative rarity, coming as they do at intervals of 3, 10, or 13 years, gives to them a certain value. Mercury is too far away from the Earth to be useful for determination of the Astronomical Unit (the Earth-Sun distance), but precise timings of ingress (exterior and interior contact with the solar limb) and/or egress (interior contact followed by exterior contact) would be of interest. A stopwatch and radio time signals are needed, and prior experience in timing lunar occultations would be helpful. All observers who can do so are urged to submit a report of results to the writer.

Another useful project for any readers with access to large apertures and suitable solar observing equipment would be to examine the region around Mercury with fairly high magnification in search of any possible satellites of the planet. This writer doubts very much that there are any, but our present knowledge is only sufficient to exclude satellites of the ninth magnitude or brighter. A small satellite in transit of the solar disc might reveal itself that under other circumstances would go undetected. The region around Mercury within 30 diameters of the planet ought, therefore, to be carefully examined.

Observers should be alert to any unusual circumstances. While the evidence is abundant that Mercury does not possess a significant atmosphere, one should be alert to note any additional evidence for or against the existence of a tenuous atmosphere around the planet. Such evidence must be carefully considered, and one must beware of instrumental and other spurious effects.

This writer recalls his first view of the planet Mercury -- the first six minutes of the last transit of Mercury which occurred on 1960, November 7. It was an exciting occasion never to be forgotten, with Mercury beating a heavy bank of clouds in a frantic race in the sky above Cape Ann, Massachusetts. Perhaps this time many A.L.P.O. members may secure a much longer view.

In undertaking transit observations extreme caution must be exercised in order that the observer is not blinded by the Sun. The mere use of a Sun filter is not adequate, for the solar heat has not infrequently caused them to crack, and serious and permanent damage can be done to the observer's vision before he is aware of it. The use of a projection screen is completely safe, and is recommended for general viewing. The use of a Herschel solar wedge together with a Sun filter is also a safe approach, and may permit a better view.

For those who wish more particulars regarding this transit of Mercury study of The American Ephemeris and Nautical Almanac for 1970, pp. 304-307 is recommended. For those wishing more background information on the transits of interior planets, the appropriate chapters in Werner Sandner, The Planet Mercury, and Patrick Moore, The Planet Venus may be consulted.

Let us hope that many A.L.P.O. members may be able to observe this event. Reports of observations should be sent to the Mercury Recorder without delay for analysis and a general publication of results.

CRISIS IN THE LUNAR SECTION: A PROGRAM FOR THE 1970'S

By: Harry D. Jamieson and John E. Westfall, Clark R. Chapman, Charles L. Ricker, Kenneth J. Delano, and H. W. Kelsey, A.L.P.O. Lunar Recorders.

Your Lunar Section is presently at a crossroads. Since the beginnings of serious professional interest in the Moon, and most especially since the recent use of manned and unmanned probes, the general level of participation in lunar studies by amateurs has dropped steadily. Never before has the A.L.P.O. Lunar Section been faced with such lack of participation in its programs.

And yet, is this a lack of interest? We prefer to hope otherwise. We think, rather, that the reason for the sharp decline in observations during the past few years is simply a general feeling that - because of recent advances in space hardware - no more is left for the amateur to do. This is a mistake.

Even though the Orbiters have produced outstanding views, it should be remembered that high resolution photography has left many problems still unanswered. Such photographs (though highly detailed) represent only a very limited view of an area in space and time. It is now, and will continue to be for some time, impossible to secure a complete high resolution photographic record under all conditions of lighting. How important is, when one considers the special lighting problems connected with domes, rays, light and dark markings, ridges, saucers (or "soft craters"), ghost craters, and, in some cases, vertical profile work, should be obvious to all. Until such time as the Moon is under continuous observation from orbit, and there are enough professional astronomers available to handle all of the possible phases of lunar research, the role of the amateur will not only remain pertinent, but important. There is still a great deal left to be done.

And so, after much discussion, the Recorders of the Lunar Section have decided to meet the challenge by taking the following steps:

1. The expansion of our present programs to include the study of a wider range of related problems. The Dome Survey, for instance, will be enlarged to study the various aspects of such other low-light features as ghost craters, "mesas", and "saucers", in addition to domes. The Selected Areas Program will add a number of additional formations.

2. Publication in The Strolling Astronomer of a regular feature known as "Lunar Notes" in order to keep the membership informed of current events and special items of interest happening in the Section (to be edited by John E. Westfall).

3. The formation of more joint programs with the Lunar Sections of other societies, both to avoid duplication of effort, and to stimulate greater interest in lunar research.

4. The addition of a number of new programs, to include the following:

    a. A program to study the vertical dimensions of previously ignored features, such as ridges, faults, sinuous rilles, and some mountains.

    b. A program to study and chart bright craters. Some craters become bright at local noon, while others are invisible. Why this difference? Other high-light features to be studied at the same time by this program will include banded craters, and perhaps light and dark areas.

5. The A.L.P.O. Lunar Observer's Manual is now available from Mr. Charles L. Ricker, whose address may be found on the back inside cover of this issue. This thirty-page book is a gold mine of information, chapters having been written by each of the Recorders. Price to A.L.P.O. members is 25¢.

6. The Lunar Training Program, under the direction of Mr. Clark R. Chapman, continues to instruct members in lunar observing. The new program is now a Section unto itself, and instructs observers through a series of guided observations. All new members, and also those who have not been active observers for a number of years, are urged to write to Mr. Chapman. The benefits to yourself and your Association will be manifold.

7. The Lunar Photograph Library now has a very fine selection of Orbiter, Ranger,

Surveyor, Apollo, and Earth-based photographs which are available from John E. Westfall. These are very useful tools to anyone wishing to do serious research work, and interested persons will find Dr. Westfall most willing to help with selection. Photographs are normally loaned for six weeks, and return postage is appreciated.

Though only a few programs are listed above, the Section may soon initiate others if membership interest warrants, and of course anyone wishing to embark on something of his own will certainly receive encouragement from the writers. The whole field of lunar research is still wide open and is really hardly even touched. The main thing that we are interested in, of course, is in promoting such studies.

In closing, we invite the comments and constructive criticisms of interested members. This is your Lunar Section. Should other programs in addition to those above be added? Should different programs be interchanged with those above? How can the Lunar Section best serve you, the reader. . . . ?

Your Lunar Section is at a crossroads. The direction it takes, and therefore its future, depends entirely upon your interest.

BOOK REVIEWS

Der Sternenhimmel 1970, by Robert A. Naef, 1969, Verlag Sauerländer, Aarau, Switzerland, 180 pages. (Written in German.) Available from Albert J. Phiebig, Box 352, White Plains, New York 10602, at $3.95 per copy, postpaid.

Reviewed by J. Russell Smith

This excellent handbook, now in its 30th year, is prepared under the auspices of the Swiss Astronomical Association. If you can read elementary German, you'll find this to be one of the most complete handbooks available anywhere. Many amateurs have wished for a similar detailed handbook written in English.

Although this volume is a paperback, Mr. William E. Shawcross, of Sky and Telescope, has made a useful hint: reinforce the spine with cloth tape, and then one can use it at the telescope.

There are 9½ pages, with detailed maps, on the solar eclipse of March 7, 1970. Mr. Naef states in a letter to Prof. Haas that he plans to be in Florida for that special event.

If you are interested in this book, I suggest that you place your order now with Mr. Phiebig for the 1971 edition. This will insure your having the volume for the events in Jan., 1971 as well as for the rest of that year.

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1970 Celestial Calendar & Handbook, by Charles F. Johnson, Jr., published by same at Watertown, Conn., 1969. 38 pages, price $1.50.

Reviewed by Gene Lonak

This concise spiral-bound book is a must for owners of optical instruments ranging in size from small binoculars to telescopes of up to six-inches of aperture. Everything needed to understand the primary observations of the intermediate and beginning amateur is offered in a logical and easy-to-read manner, presented to be used both in the field and indoors.

Beginning with a rough lunar map, preface, and explanatory notes, the author follows with a calendar of events of planetary and related phenomena for each month which also includes sidereal times for selected instants and information to calculate the Julian date. Next, the positions of the satellites of Jupiter and times of their geocentric phenomena are included to aid the observer of this planet. In addition, the positions of Uranus and Neptune are plotted on star fields for the entire year along with brief outlines of the aspects and physical characteristics of all the planets. The observer should have no trouble in locating any member of the Solar System and its interesting phenomena for 1970.

For amateurs interested in other astronomical phenomena, eclipses, principal meteor showers, and the brightest stars with positions, magnitudes, spectral classes, and distances are given next. Times of the phases of the moon, occultations, and a page and a half of the most easily observed variable stars follow and extend to double and multiple stars.

Ending with the basic constellations and their times of visibility in northern latitudes, the suthor then offers helpful hints for observing with binoculars and small telescopes. For someone in a quandary as to "what to observe", he lists seventeen worthwhile projects ranging from the moon to deep sky objects with positions and information regarding easily observed star clusters, galactic nebulae, and external galaxies. Mr. Johnson terminates this handbook with positions of the "Big Four" asteroids for selected dates and a diagram of Jupiter to assist in identifying its zones and belts. Finally, general references for further reading are listed for observers wishing more detailed guides.

The Celestial Handbook should be in the possession of all observers who seriously wish to begin to do worthwhile projects for their own pleasure and to initiate more detailed studies of the sky.

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Exploration of the Universe. Second Edition. By George Abell. New York: Holt, Rinehart, and Winston, March 1969. 722 pages. Price $12.95.

Reviewed by Richard G. Hodgson

This book is an excellent, up to date, college-level text in descriptive astronomy. Having examined most of the basic college texts on the market with a view to teaching from them, and having taught from this text at the University of Vermont and at Dordt College, I believe this book stands head and shoulders over all others I have seen, and is highly recommended to all who want a basic survey of astronomy.

Exploration of the Universe is essentially descriptive and non-mathematical. Where necessary, mathematical discussion is placed in footnotes, or in specially marked sections of chapters, to be studied or omitted depending upon the reader's mathematical background.

Although the book is rather expensive, its double column format and 722 pages add up to much more material than is found in most astronomy texts. There are also many illustrations, a number of them in superb color. The book is also remarkably up to date, recording in its pages information which had appeared in learned journals only three or four months prior to its publication.

Considering its length, Exploration of the Universe is remarkably free from typographical and factual errors. Some of the more important ones may be mentioned:

1. Stonehenge is not of Druid origin as stated on p. 6. Indeed, some discussion of the astronomical use of Stonehenge would strengthen the historical discussion in the book. Cf. Gerald S. Hawkins, Stonehenge Decoded.
2. The largest of the lunar maria is not Mare Imbrium (p. 282), but Oceanus Procellarum.
3. Mercury rotates on its axis in 58.65 days, not 58.56 days (p. 297).
4. In describing the Red Spot on Jupiter as a possible Taylor column (p. 312) one could wish that mention were made of the history of the longitudinal drifting of the Red Spot, which in this reviewer's opinion considerably weakens the Taylor column hypothesis.
5. In mentioning the ghost planet Vulcan (thought in the 19th century to exist between Mercury and the Sun) Abell describes it as "reported as having been observed once" (p. 322). It was reported more than once, i.e., by Lescarbault, Lummis, and Watson; and an observation by Stark was also considered as evidence.
6. On p. 626, column 1 some garbled sentences occur.
7. In the table of constellations (p. 706) Horologium is not "The Cloak" but "The Clock."

One other improvement should be made in any subsequent edition -- the use of metric measures (perhaps with English equivalents in parentheses). Abell slides back and forth between the two systems too readily. Thus on p. 299 we read "Venus has a radius of 6056 kms., only about 200 miles less than the earth's." Most readers do not have the conversion tables memorized well enough to understand this sort of statement.

In spite of these blemishes, George Abell's Exploration of the Universe is an excellent piece of work, and is highly recommended to all interested in astronomy.

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Messier's Nebulae and Star Clusters, by Kenneth Glyn Jones. New York: American Elsevier Publishing Company, Inc., 1969. 480 pp. Price $22.50.

Reviewed by Richard G. Hodgson

On a clear dark night most of us enjoy taking some time from our lunar and planetary observing to hunt for some of the famous deep sky wonders of Charles Messier's well-known list. Indeed, I suspect that many of us hope in time to observe the entire list, and are wondering as we do so how these objects have appeared to others with various size instruments. Here at last is an ample-size book describing in detail each of the Messier objects for us, quoting at length the impressions and supplying some of the drawings of early observers -- William and John Herschel, Admiral Smyth, T. W. Webb, and Lord Rosse, among others, and of course Messier himself.

Kenneth Glyn Jones' book is very expensive -- the price of a good eyepiece -- but if one considers it as a reference work to be used over many years it is worth the cost.

The heart of the book is a detailed discussion of the individual Messier objects, occupying 240 pages. This portion of the book is well done indeed.

While some of the introductory chapters have merit (especially on the missing objects and on the classification of the Messier objects), much of this material is elementary and inaccurately stated, and therefore unnecessary and even undesirable in my view. The people who buy this book for $22.50 are not (perhaps with rare exceptions) beginners in astronomy, and are not buying it for their coffee tables. They are intermediate to advanced amateur astronomers who know much about observing equipment and methods, and probably already have better presentations of these subjects in other books in their libraries. The discussion of limiting magnitudes, the telescope, and accessories is oversimplified, for example, and cannot hold a candle to that in J. B. Sidgwick's The Amateur Astronomer's Handbook. It would be better to condense this introductory part and lower the price of the book.

Much the same criticism can be made of the latter portions of the book. A lengthy section gives biographical sketches of many early observers which are hardly necessary to the book, and might better be put in a history of astronomy rather than here. Some of the tables near the end are useful, but redundant. The undistinguished glossary given is hardly necessary, considering the astronomical background of probable buyers.

In spite of these criticisms, the heart of the book -- 240 pages on the individual Messier objects -- makes good reading, and compensates for other weaknesses. One could wish that some valuable information on this subject appearing in articles by the author in Sky and Telescope (March, 1967) and recent issues of The Journal of the British Astronomical Association might also have been included. Perhaps a second edition can make these improvements and, by eliminating redundant and unnecessary material, allow the price to be lowered to about $12 to $15, where many more could afford to buy it. Then more of us might be happy.

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Star Atlas and Workbook of the Heavens. Edited by Walter Scott Houston. Published by American Education Publications, 55 High Street, Middletown, Conn. 06457, Copyright 1967. Price 30¢ per copy (minimum order: 10 copies). 32 pages, including covers.

Reviewed by Rodger W. Gordon

The dean of deep-sky observers has edited an inexpensive combination atlas-workbook. It is primarily intended to introduce the night skies to elementary and secondary school children at a level comprehensible to everyone (which unfortunately many introductions to astronomy intended for the same audience fail to do). The essential part of the text consists of 5 star maps with a sixth north circumpolar map, together with a list of objects in various constellations for both naked eye and telescopic enjoyment. A plus feature of the star maps is that the yellow grid lines used on the chart disappear if a red flashlight is used so that the maps then resemble the actual night sky -- therefore, less confusion. Prefacing the star maps are directions on how to use easily recognizable stars and constellations to find other constellations. This section should be studied first before proceeding to the regular maps.

Houston has managed to convey a bit of almost every conceivable astronomical topic for the novice and in just the right amount -- enough to whet the appetite to dig deeper, but not enough to cause confusion, or worse boredom. We find information on meteor observing, variable star observing, astro-photography, and other endeavors most likely to fascinate a budding amateur. A logbook is included where the student goes out and finds the object(s) and then writes down his sighting of it. A list of organizations, books, and magazines is given for those whose interests merit further exploring.

At 30¢ a copy, the student can mark his own observations on the charts freely without worrying about it. There is plenty of room on the charts to do so.

The covers are very interesting -- an actual reproduction of the first American star map from Burritt's Geography of The Heavens - 1832, complete with the mythological figures one never sees on "modern" star maps.

One error was noted on the list of objects for chart 5 (page 21). The physical description for M52 is incorrect. M52 is an open cluster. The description given actually refers to M57 in Lyra (Ring Nebula), although the numerical data for M52 are correct. Hopefully, future editions will have this error corrected.

This book is so valuable that perhaps Mr. Houston could be persuaded to enlarge it for a wider audience in the future and to bring out an enlarged version under a separate offering. As it stands, it's easily the best introduction of astronomy to school age children presently available. The Editor is to be congratulated for such a worthwhile effort. Even an "old-timer" like myself finds the elementary approach a refreshing experience.

THE B.A.A. BLINK DEVICE - A DESCRIPTION

By: H. W. Kelsey, ALPO Lunar Recorder

(Paper read at the A.L.P.O. Convention at San Diego, California, August 21-23, 1969.)

It is acknowledged that when the reflected light from an object is viewed in rapid sequence through two filters of widely separated wave length sensitivity, an apparent blink will be generated, providing the light involved is similar or equal in wave length to one or the other of the selected filters. Furthermore, this rapid sequential viewing of an object eliminates the effect of short visual memory, thus improving the reliability of relative color intensity estimates concerning the object under study.

The final configuration of a blink device is limited only by the ingenuity of the individual assembling it. V. A. Firsoff described his device as a mounting of a comprehensive set of filters on a swivel beyond the eyepiece. P. K. Sartory introduced a rotating filter wheel consisting of Wratten 25 and 80B 120-degree filter segments. The remaining 120-degree segment is left open for the transmission of integrated light. This device, as a unit, incorporates an ocular holder and mating extension for the focusing mount. It is customary to operate this device manually; however, a motor-driven design has been developed by K. J. Kilburn.

Sartory has also suggested a simplified device in which the red and blue filter segments are mounted between two pieces (2" x 2") of slide cover glass and are manually passed through the optical beam between the ocular and the observer's eye. Obviously, adequate eye relief is required with this system; therefore, an ocular of not less than 12.5 mms. focal length is recommended, and the addition of an achromatic Barlow will provide the necessary magnification flexibility.

Since the simplified blink device has been accepted by the A.L.P.O. Lunar Section, it is appropriate that its deficiencies be considered. They are as follows:

1. The inherent color that is introduced by the glass.
2. Refraction, resulting from the four glass surfaces.
3. Attenuation, or light loss, in the glass itself.
4. The fragility of the device.

The aberrations introduced by items one through three will remain constant and are probably negligible. Item four can be surmounted by appropriate caution and a modicum of good luck. However, when evaluating the error that can be introduced, we must consider the most important factor involved. This is concerned with the after image that is formed in the eye after prolonged staring at a fixed color. In this application, the after images that will be formed are yellow following blue exposure, and the blue-green that follows red. This unavoidable phenomenon dictates that the preferable sequence of rapid viewing be from the blue to the red. As an additional safety factor, it is recommended that a viewing sequence of no filter, blue, and then red be adopted. By this method the periodic viewing through the no filter area tends to overcome the after image. In addition, to avoid the after image effect, the observer is cautioned not to prolong his viewing through either of the filters.

It is impossible to specify a repetition rate for the motion of the filter segments;

however, practice by the individual observer will soon establish an acceptable procedure.

Fabrication of the blink device is very simple. The red and blue filter segments are inserted between the two sheets of slide cover glass, and are positioned at the edge that will be adjacent to the observer's nose. Sartory recommends a slight lap joint between the filter segments in preference to an attempted butt joint which may leave an open slit that can be most distracting. As to the size of the filter segments, this can be determined individually with 3/8" x 3/4" horizontal strips suggested.

Before placing the blink device in operation, let us consider what constitutes a visual blink. From present experience we can assume that a blink will, in most instances, be a very subtle presentation in which an area will appear brighter in one of the filter segments. Incidentally, at this time a Lunar Blink is considered valid when it exhibits a finite life, usually of a few minutes duration. Likewise, it is of importance to note that a blink can be produced by the enhancement of a feature or area in either the red or the blue.

For those who are utilizing filters in individual mounts, the frustration of relying on recall for relative color intensity estimates will be alleviated, and the accuracy of their estimates will be improved.

It is probably obvious by now that the Wratten Filters 25 (red) and 80B (blue) that have been selected for lunar studies can also be used in planetary studies; and if this configuration is not desired, it is a simple operation to replace them with another pair.

In conclusion, we extend our congratulations to the members of the British Astronomical Association for devising, testing, and introducing this device that is contributing to the reliability and enjoyment of amateur observations.

ANNOUNCEMENTS

Sponsors and Sustaining Members. There follows a listing of our Sustaining Members (who pay $10 per year) and Sponsors (who pay $25 per year) as of March 4, 1970. We are greatly indebted to these colleagues for their generous and valuable financial support of the A.L.P.O. Their assistance has been most important in the work we are trying to do in astronomy.

Sponsors. William O. Roberts, Grace A. Fox, David P. Barcroft, Philip and Virginia Glaser, Dr. John E. Westfall, Dr. James Q. Gant, Jr., Ken Thomson, Reverend Kenneth J. Delano, Richard E. Wend, Reverend Richard G. Hodgson, William Kunkel, A. B. Clyde Marshall, Alan McClure, and Walter Scott Houston.

Sustaining Members. Sky Publishing Corporation, Charles F. Capen, Charles L. Ricker, Elmer J. Reese, Carl A. Anderson, Gordon D. Hall, Michael McCants, Dr. William K. Hartmann, Ralph Scott, A. W. Mount, Charles B. Owens, Joseph P. Vitous, John E. Wilder, Clark R. Chapman, A. K. Parizek, B. Traucki, Frederick W. Jaeger, P. K. Sartory, Nicholas Waitkus, Patrick S. McIntosh, Lyle T. Johnson, the Chicago Astronomical Society, H. W. Kelsey, Phillip Wyman, Harry Grimsley, Daniel W. Harris, the Junior Texas Astronomical Society, Dr. David Meisel, Daniel Vukobratovich, John Bally-Urban, W. King Monroe, Warner T. Crocker, James W. Young, Phillip W. Budine, Klaus R. Brasch, Inez N. Beck, Jimmy G. Snyder, Dr. George W. Rippen, the Polaris Astronomical Soceity, Dr. Joel W. Goodman, William B. Chapman, and Harry D. Jamieson.

Staff Changes. Mr. Richard E. Wend has resigned from the staff of the Jupiter Section of the A.L.P.O. We accept his resignation with much regret. He served the Association very ably for a number of years as Jupiter Recorder and has been a valued contributing observer for even longer. We hope that he can so continue and thank him very much for his considerable help in the work and goals of the A.L.P.O.

We are appointing as a new Lunar Recorder: Harry D. Jamieson
3707 Archwood Ave.
Cleveland, Ohio 44109

Mr. Jamieson was on the Lunar Section staff in the past and initiated our Lunar Dome Survey. We heartily welcome him on his return. Our whole Lunar Section staff are considering possible new observing programs and changes in their division of work; it is intended to inform readers in our next issue what projects Mr. Jamieson and the other Recorders will be in charge of.

Apollo 11 Research Findings. Pergamon Press in coöperation with the Geochemical Society and the Meteoritical Society is publishing a 3-volume Proceedings of the Apollo 11 Lunar Science Conference on April 30, 1970. The set features papers written by the principal investigators in the three-month examination of sample lunar rocks and dust brought back from the moon by the Apollo 11 crew. Their findings were given at the Apollo 11 Lunar Science Conference in Houston on January 5-8, 1970. The monograph contains 2000 pages and is highlighted by color plates and halftones of the lunar samples. The entire set sells for $30.00 and may be ordered from Pergamon Press, Maxwell House, Fairview Park, Elmsford, New York 10523.

In Memoriam: Frank Kettlewell. All who knew him learned with deep regret of the death of Frank Kettlewell on June 11, 1969 at the age of 79. He was chief of the Art Department of The Oakland Tribune at that time and for many years had been one of the Bay Area's leading editorial cartoonists. Though astronomy was only one of his many hobbies, he designed and built several telescopes and served on the Board of Directors of the Eastbay Astronomical Society for more than 25 years. Many of us had the good fortune to meet him at various Conventions of the Western Amateur Astronomers. He was a versatile craftsman of considerable skill and employed the newspaper technique of etching to fabricate a number of the recent G. Bruce Blair Medals given by the Western Amateur Astronomers. It is typical that he taught himself the necessary processes in order to do so and that he took up the project after others had tried other methods without success. He had a singular genius for knowing when something needed to be done and for making things easy and pleasant for those in whose company he was. Perhaps the finest tribute was given by our Secretary, Dave Barcroft, when he wrote: "When Frank died, I'll bet there were a thousand fellows who said, 'I've lost my best friend'."

The Diameter of Mercury during Solar Transits. One project sometimes carried out during transits of Mercury across the face of the sun is measuring the angular diameter of the planet, which is difficult to determine by direct measures at other times because Mercury is so poorly placed for observation. Richard G. Hodgson, the Mercury Recorder, adds the following notes to his article about the May 9, 1970 transit of Mercury on pages 63-64: "Regarding the transit of Mercury, I think some mention might be made of measures of the planet's diameter at such a time under the 'Announcements' column of Str. A. It would be a worthwhile project provided one has access to the necessary equipment. I did not mention it in the article because I felt that this sort of determination is more a matter for the larger professional observatories. If any A.L.P.O. members do try this determination, however, I should like to learn of their results. Cf. de Vaucouleurs, Icarus, 3, 187-235, and especially Camichel et al., Icarus, 3, 410-422 on the 1960 transit."

Observing after Surgery for Eye Cataracts. A portion of a letter from Joseph P. Vitous on January 3, 1970 contains encouraging news for those who have had surgery for eye cataracts, or who may face the prospect of such surgery. Mr. Vitous is a long-time member of the A.L.P.O. and a regular contributor. He wrote: "While they [6 slides of Jupiter in natural colors] are not perfect, it must be recalled that focusing is done with eyes from which cataracts have been removed. I wear well-fitted contact lenses that replace the natural eye lenses removed in surgery. It should be an encouragement to all old timers, who may be affected with cataracts, to have a competent surgeon do the job of removal and fitting of proper eye lenses. A cataract definitely does not mean the end to a person's observing efforts. A little delay, perhaps, but such a person can be back at the telescope in a comparatively short time."

Convention at Sacramento. The Western Amateur Astronomers and the Association of Lunar and Planetary Observers will hold their 1970 Convention jointly at Sacramento, Calif. on August 20, 21, and 22, 1970. The Headquarters for the meeting will be the Mansion Inn at 16th and H Streets, near the State Capitol. Every effort is being made to keep prices down, and motels within walking distance of the Mansion Inn have rates in the range of $6-$18. Activities are planned for the ladies and non-astronomers.

An important feature of meetings of this kind is the paper sessions. It is planned to devote one big session exclusively to the total solar eclipse of March 7, 1970. Even those not caring to give formal papers about the eclipse might like to show slides of their instrumental set-up and results. Papers intended for the Proceedings must reach one of the two following Paper Chairmen no later than July 20, 1970:

1. Clifford Holmes (for the W.A.A.)
   8642 Wells Ave.
   Riverside, Calif. 92503

2. Walter H. Haas (for the A.L.P.O.)
   Box 3AZ -- University Park, N. Mex. 88001

The copy sent to the Chairman must be "camera ready"; and all illustrations for publication must be contrasty, glossy photographs. If you miss the July 20 deadline, your paper is likely to miss the Proceedings; but please send the proper Chairman your title and a brief résumé. The presentation time of most papers must be limited to 15 minutes.

Floor space is available for commercial and individual or group displays. Those wishing to bring an exhibit should determine their needs and space requirements as soon as they can so that the committees can plan the room layout.

All inquiries about the Convention should be sent to the following address:

S.V.A.S.
6218 28th Ave.
Sacramento, Calif. 95820

The host is the Sacramento Valley Astronomical Society. More details on this coming meeting will be carried in future issues of this journal. Those writing to the S.V.A.S. at the address above can obtain the first publicity release, with a map of Sacramento, a list of motels and prices, and further details on several subjects outlined above.

In Memoriam: Charles A. Haas. The father of the Editor passed away on July 9, 1969 at the age of 90. He was born in Germany and spent most of his boyhood in Amish sections of Ohio. He taught school during most of his active life, at first in several of the one-room country schoolhouses of the past. For a time he had a small farm near the village of New Waterford, Ohio. After his retirement and after the death of his wife in 1948, Charles Haas lived with Walter Haas in New Mexico and Texas.

While he was still active enough, his interests in astronomy centered around the mechanical construction of telescopes; and much of the work on the Editor's personal 12.5-inch telescope, which some visiting A.L.P.O. members have seen, was his. He maintained a general interest in science and in the world around him and reviewed several books in this journal in the 1950's. He was extremely helpful with the work of mailing out this periodical in ways that will be best understood by those who have produced similar non-profit magazines. He attended a few of the early W.A.A. Conventions.

The Editor and his family thank the many friends who have expressed their sympathy.

Riverside Telescope Makers Conference. This meeting will be held at the Riverside City College in Riverside, Calif. on April 18 and 19, 1970. Many well-known speakers have been engaged, including Bob Cox, Sky and Telescope's A.T.M. Editor. Prizes will be given for mechanical and optical excellence in telescopes. A previous meeting of the same general type at Riverside in the spring of 1969 was highly successful. Interested persons wanting more information should write to Clifford Holmes, 8642 Wells, Riverside, Calif. 92503.

OBSERVATIONS AND COMMENTS

Ephemeris of Comet Tago-Sato-Kosaka 1969g. Mr. Dennis Milon has furnished an ephemeris of this comet which was computed by Mr. Michael McCants at the University of Texas. He used the elements given by Dr. Brian Marsden on IAUC 2189. A portion of the ephermis is reproduced here. As usual, Δ is the distance from the earth in astronomical units; r, that from the sun. The predicted stellar magnitude is here 5.8+ 5 log Δ + 10 log r. The "tail" column gives the value in millions of miles of one degree of length of tail, which is naturally assumed to be directed away from the sun. The positions are for 0 hrs., Ephemeris Time, on each date.

Date	Right Ascension	Declination	Δ	r	Magnitude	Tail
1970, March 25	$4^h35^m.61$	49° 0'.0	1.943	1.909	10.1	6.3
March 30	4 46.47	49 37.4	2.078	1.985	10.4	7.1
April 4	4 57.10	50 9.6	2.211	2.059	10.7	8.0
April 9	5 7.78	50 37.7	2.342	2.133	11.0	8.9
April 14	5 18.28	51 2.3	2.470	2.206	11.2	9.9
April 19	5 28.70	51 23.9	2.596	2.279	11.5	11.0
April 24	5 39.04	51 42.8	2.719	2.350	11.7	12.1
April 29	5 49.31	51 59.5	2.840	2.420	11.9	13.4

Mr. John Bortle notes that magnitude estimates of Comet Tago-Sato-Kosaka can be greatly assisted between April 10 and April 20, approximately, by the AAVSO b and d charts of the variable star R Aurigae 050953. Send 15¢ for this chart to the AAVSO, 187 Concord

Ave., Cambridge, Mass. 02138; please enclose a stamped envelope.

Ephemeris of Comet Bennett 1969i. Readers with modest telescopes or none at all can enjoy a bright comet in the spring morning sky. The ephemeris here is part of one given by IAU Circular 2203, Jan. 29, 1970; the magnitudes are from 5.0 + 5 log Δ + 10 log r.

Date	Right Ascension (1950)	Declination (1950)	Δ	r	Magnitude
1970, March 25	$22^h 6^m.06$	-2° 50'.0	0.690	0.552	1.6
March 30	22 14.61	+12 36.7			
April 4	22 28.91	+26 27.9	0.752	0.639	2.4
April 9	22 47.66	+37 25.7			
April 14	23 09.44	+45 34.7	0.948	0.777	3.8
April 19	23 33.00	+51 31.7			
April 24	23 57.36	+55 53.0	1.186	0.936	5.1
April 29	0 21.74	+59 06.7			

Comet Kohoutek 1969b. The following comet will require a fair-sized telescope for its observation. The ephemeris given is part of one published by Dr. Marsden on IAU Circular 2199, January 14, 1970.

Date	Right Ascension (1950)	Declination (1950)	Δ	r	Magnitude
1970, March 27	$2^h 25^m 14$	+68° 13'.9	1.798	1.720	11.1
March 29	2 46.00	67 34.5			
March 31	3 05.52	66 47.7	1.825	1.723	11.2
April 2	3 23.63	65 54.5			
April 4	3 40.36	64 56.1	1.858	1.728	11.2
April 6	3 55.76	63 53.5			
April 8	4 09.91	62 47.6	1.897	1.734	11.3

Miscellaneous Notes from the A.L.P.O. Comets Recorder. The following items are extracted from various recent mailings by Mr. Dennis Milon. Persons wishing to be part of the Comets Section announcement service should send Mr. Milon stamped and addressed cards and envelopes; his address is on the back inside cover. Comet report forms are available at a cost of $2 for 50 forms. Observers who do not use these forms are requested to put each day's observations of a comet on a separate sheet of paper. Actually, the Editor is sure that the form will be far more convenient. Comet observing techniques were described in *The Strolling Astronomer*, Vol. 20, Nos. 11-12; reprints of this helpful article are available from the A.L.P.O. Comets Recorder. Readers wishing to begin to study comets scientifically will do well to study this article first. Visual observers are reminded to look for detail in the coma of comets since the coma is usually overexposed on photographs.

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