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Photograph of Comet Burnham 1959k with the Lowell Observatory 13-inch photo-refractor. Exposure 6 hrs., 48 mins. to 7 hrs., 18 mins., Universal Time on April 29, 1960. Observer H. L. Giclas. Contributed to this magazine by Robert Burnham, Jr., and Paul Knauth. Lowell Observatory photograph.

THE STROLLING ASTRONOMER

Pan American College Observatory

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ANNOUNCEMENTS

Errors in Recent Issues. On page 5 of the January-February, 1960, issue Figure 2 is reproduced with lunar north at the top and lunar west at the left.

On page 38, sixth paragraph, of the March-April, 1960, issue, also Figure 17 on page 39, it is very doubtful that the "Barge of 1959" is the same feature as the great "Barge of 1958." On page 39 of the same issue the caption of Figure 15 errs in identifying the bright area in the STeZ as one of the long-enduring features; and in Figure 18 the bright area in the STeZ near the central meridian is DE, while the bright area preceding the central meridian is not one of the long-enduring features. On page 42 the values given for the mean latitudes of certain belts are incorrect.

On page 66 of the May-June, 1960, issue Dr. James Bartlett should have been credited with 45 drawings, not 5.

An Invitation to Describe Your Telescope. We have received the following information from Mr. S. H. Dennington, 30 A Hill Crescent, Bexley, Kent, England: "I am compiling a book, whose title is 'Some Modern Amateurs' Telescopes,' which will describe about 50 selected telescopes in different parts of the world. Preference is given to instruments with which published observations have been made, or which have special features. Any amateur who wishes his telescope to be considered for inclusion is invited to send me a very brief description of the instrument and its work, with a photograph or two. The last date for finalized entries cannot be later than August 31, 1960. Everything received will be acknowledged, but it may take a little time to provide full replies."

According to the yet unknown date of mailing this issue, it may be necessary to hurry considerably to get a description of your instrument to Mr. Dennington before the deadline set. Among the contributors to his book so far are Patrick Moore, G. A. Hole, John D. Bestwick, V. A. Firsoff, Brian Warner, David P. Barcroft, James Q. Gant, J. Russell Smith, Paul R. Engle (Director of the Pan American College Observatory), Leif J. Robinson, Claude Carpenter, and Alan McClure.

Clyde W. Tombaugh Honored. On May 23, 1960, Mr. Clyde W. Tombaugh was awarded an honorary Doctor of Science Degree by the Arizona State College at Flagstaff. We congratulate Dr. Tombaugh on this distinction, which has been richly earned and is long overdue. We also commend the Arizona State College at Flagstaff on their choice of honoring scientific study in this early stage of the Age of Space, when too often honorary degrees seem to recognize only well-publicized gifts to the college or unusual success in accumulating money. Though probably best known for his discovery of the planet Pluto in 1930, Dr. Tombaugh has been a very active observational and theoretical student of the moon and the planets, especially Mars, for many years. He is now at the Research Center of New Mexico State University, University Park, New Mexico as the head of a group carrying on astrophysical investigations of our Solar System neighbors.

Sixth Convention of the A.L.P.O. The Western Amateur Astronomers are sponsoring a series of meetings extending from Tuesday, August 23 through Saturday, August 27, 1960, at San Jose, California. The San Jose Amateur Astronomers and the Peninsula Astronomical Society are the hosts. The Convention theme is "Astronomy Advances with Amateur Assistance." On August 23 the meetings will begin with the Western Satellite Research Network Convention, observing being planned for the evening. On the morning of Wednesday, August 24, our Association of Lunar and Planetary Observers will meet. The afternoon of the same day will be given to the American Association of Variable Star Observers, and a W.A.A. Business Meeting is planned for the evening. On August 25 the W.A.A. Convention will commence, and in the evening there will be a Field Trip to the Lick Observatory.

W.A.A. sessions for papers will continue on the morning of August 26. The afternoon of that day will feature a Field Trip by chartered bus to the Ames Research Center (N.A.S.A.) and to the Stanford University Radio Research Installation. In the evening there will be a Public Star Party. On August 27 there will be the final sessions for papers and the Final Banquet with an outstanding program that evening, at which time the G. Bruce Blair Award will be presented. The recipient this year is our own A.L.P.O. Secretary, Mr. David P. Barcroft. Mr. Barcroft's personal studies of the moon have received great praise from Dr. Dinsmore Alter and others. Mr. Barcroft's personal library is extensive and contains many old lunar classics long out-of-print. He is one of the most generous and helpful men whom it has been the Editor's good fortune to know; he has repeatedly given freely of his time and effort to help others, and quite without thought of personal gain. It was his generosity, for example, which made possible the publication of the Editor's lengthy "Does Anything Ever Happen on the Moon?" in <u>The Journal of the Royal Astronomical Society of Canada</u> in 1942.

The Saint Claire Hotel in San Jose, San Carlos and Market Sts., is the Convention Headquarters. The Convention Sessions will be in the San Jose Municipal Auditorium, diagonally across the street from the Saint Claire. Walter J. Krumm, 10628 Larry Way, Cupertino, Calif., is the Convention Chairman. The A.L.P.O. Exhibit will be handled by Mr. Jack Borde, 4135 Pickwick Drive, Concord, Calif., with the help of Mr. Jerry Fritche and Mr. Dave Steinmetz, all of the Mount Diablo Astronomical Society. A.L.P.O. members are once more invited to contribute to our Exhibit. The program of papers should be fairly complete when this issue reaches you; but if you still want to submit a paper to the Editor, we shall give it every possible consideration. Everyone interested in astronomy is heartily invited to San Jose for what will surely be an outstanding program.

<u>Seventh Convention of the A.L.P.O.</u> This meeting will be held as part of the National Convention of the Astronomical League at Haverford College, Pennsylvania (near Philadelphia) on September 3-5, 1960. The General Convention Chairman is Mr. Edwin F. Bailey, Franklin Institute, Philadelphia 3, Pennsylvania. Room reservations will be available in the Haverford College Dormitories, two to a room and separate floors for men and women, for five dollars per night. The registration fee of $1.00, or $1.50 after August 15, should be mailed to General Convention Astronomical League, c/o Franklin Institute, Philadelphia 3, Pennsylvania.

On Saturday evening, September 3, there will be open houses at the Haverford Observatory, at the Villanova Observatory a mile away, and at the Flower-Cook Observatory at Malvern, Pennsylvania. On September 4 there will be an excellent bus tour for five or six dollars, the ticket including two meals. The tour will cover the Franklin Institute and the Fels Planetarium, the Edmund Scientific Company (steak dinner), the Spitz Laboratories (buffet supper), and the famous Sproul Observatory of Swarthmore College. The bus route will go through many of the best scenic places near Philadelphia. Incidentally, the Franklin Institute Observatory with its monochromator shows prominences and sunspots every clear day. The A.L.P.O. meeting will be on the forenoon of Monday, September 5. There will also be a Junior Session, a General Session, and an Instrument Session. The final Honor Dinner will be on the evening of September 5. Dr. Louis C. Green, Director of the Strawbridge Memorial Observatory of Haverford College, will be the principal speaker; and his subject will be "Rockets, Satellites, and the New Astronomy."

The A.L.P.O. Exhibit at Haverford will again by handled by Mr. David Meisel, 800 Eighth St., Fairmont, West Virginia. If you haven't done so yet, please send him now your drawings, photographs, and charts.

We hope to see many of you at Haverford for a real astronomical treat!

THE A.L.P.O. MARS PROGRAM FOR 1960-1961

By: Ernst E. Both

The next four apparitions of Mars will be rather unfavorable compared with those of 1954, 1956, and 1958. It is a well-known fact that near-aphelic apparitions are generally not well observed, primarily because of the small apparent diameter of the planet and because they occur during winter months, when uncomfortable temperatures prevailing in northern latitudes make observing quite unpleasant. Consequently our knowledge of the areography and areophysics of the northern hemisphere of our neighboring planet is seriously lacking in detail. Members of the A.L.P.O. could provide valuable observational data if they concentrated on these unfavorable approaches of Mars, and if they followed an observing program similar to that outlined here.

The circumstances of the 1960-1961 apparition of Mars are:

Closest approach: December 25, 1960.
Opposition: December 30, 1960.
Position at opposition: R.A. 6^h 39^m 54^s; Decl. +26° 47' 55".
Apparent diameter at opposition: 15."36.
Stellar magnitude at opposition: -1.3.
Latitude of center of disc at opposition: +2.°24.
Distance from Earth at opposition: 56.5 million miles.

Compared with the 1958 opposition, the apparent diameter will be smaller by 4", with both northern and southern hemispheres of Mars almost equally well presented. Useful observations may be started around September, 1960, when the apparent diameter is about 8", and may be carried through until March, 1961. In the months before and after opposition, adequate results may be expected only from observers equipped with larger instruments (apertures 6 inches and over). The observational program outlined here ought to apply not only to the apparition of 1960-1961, but also to those three following it.

1. Drawings of Mars: Drawings submitted to the Recorder are used for the following purposes: to derive areographic positions; to construct a map of the planet showing the appearance of its surface features during the period covered by the observations; to construct maps showing the distribution of clouds; to determine the extent and behavior of the polar caps; to follow the processes of seasonal change. From this alone it should be obvious that drawings ought to be made with a specific purpose in mind, and that observations should be carefully planned in advance. Little can be gained from spurious and haphazard observations.

We shall concern ourselves here only with drawings used for the derivation of areographic positions. Micrometric measurements of photographic negatives constitute the most accurate method to determine positions of surface features; but because of lack of training and equipment, the amateur can almost never carry out such measurements. However, a simple, yet sufficiently accurate, method which does not require special equipment and training was discussed by K. Graff (1). It involves the construction of an orthographic net of coordinates on a reasonably large scale (diameter of planetary disc: 10 cms. or 4 inches) which is drawn on glass or plastic and is placed over a drawing of the same size. Coordinates can then be scaled off with an accuracy of from ±1° to ±4°. The orthographic net can be constructed with the aid of tables published by Graff and data provided in the American Ephemeris. The drawbacks of this method are: first, a large number of nets has to be constructed for one apparition, since the latitude of the center of the disc changes. Second, ordinary drawings are not suited for the determination of areographic positions because the time required to produce a "finished" drawing lies somewhere in the neighborhood of 30 minutes and more, during which the planet turns through 7° or more of longitude (about 15° in one hour). To show some degree of accuracy, it would seem, therefore, that the drawing must be made within only 8 to 10 minutes. Obviously, such a short period of time suffices only to show the main outlines correctly in size, shape, and position, which is actually all that is needed for the purpose of deriving positions. (It should be mentioned in this connection that a large-scale drawing tends to increase the magnitude of error. A scale of 3 mms. to 1" is recommended by the British Astronomical Association.) The following procedure may be found useful:

Observe the planet for about half an hour or until the eye has familiarized itself with the main features. Check the relative positions of the features carefully in your mind. Then draw the main outlines quickly, starting from the center and working toward the edges of the disc. This done, record the time during which the outline-drawing was made. The drawing may now be completed with regard to finer detail and shading. Specify exactly how long it took you to record the features to be used for positional work, and indicate which features were drawn during that time.

The latitudes derived by Graff's method are reasonably accurate, but the longitudes must be checked by central meridian transit timings. Although J. B. Sidgwick states that "such work, fundamental in the observation of Jupiter, has comparatively little scope as applied to Mars" (2), J. Ashbrook has clearly demonstrated the great value of central meridian transits (3). These may be recorded as follows (4):

Not yet central....................	4^h 30^m	, U.T.
Not yet central....................	4 34	
On C.M.............................	4 37	
On C.M.............................	4 40	
Slightly past C.M..................	4 42	
Slightly past......................	4 44	
Certainly past.....................	4 48	
Transit occurred at................	4^h 38^m	, U.T.

The observer should always state clearly how he defined the central meridian. Most commonly it may be defined as "the line joining the center of the disc and the center of the visible polar cap." In this case, "the observed longitude must be corrected for the eccentric situation of the cap" (5), the correction being necessary only when the south polar cap is used (the eccentric situation of the north polar cap is so small that it can be disregarded).

The following areas, as named on the I.A.U. Map of Mars (6), are suggested for transit observations during the coming apparitions: 1. Trivium Charontis, 2. Thoth, 3. Moeris Lacus, 4. Syrtis Major (northern tip), 5. Ismenius Lacus, 6. Sinus Meridiani (east and west components--northern tip), 7. Oxia Palus, 8. Margaritifer Sinus (northern tip), 9. Niliacus Lacus (eastern and western borders), 10. Juventae Fons, 11. Lunae Lacus, 12. Solis Lacus (eastern and western borders), 13. Phoenicis Lacus, and 14. Mare Sirenum (eastern and western tips). Naturally transit timings should not be confined to these areas, but only well-defined and correctly identified areas should be used. Transits of larger areas should be recorded in terms of preceding end, center, and following end. Since almost any phase-effect tends to minimize the accuracy of transit estimates, such estimates ought to be made close to the date of opposition (perhaps between Dec. 1, 1960 and Jan. 31, 1961). Areas in latitudes higher than 45° are not suited for longitude determination. Finally it is urged that members use the I.A.U. Map of Mars for identification purposes or else state exactly what map was used in making the identification.

2. <u>Atmospheric Phenomena</u>: The study of clouds and their motion in the atmosphere of Mars has justly assumed ever-increasing importance during the last few years. But again our knowledge of cloud behavior during near-aphelic apparitions is severely lacking in detail. Since it is rather costly and for various reasons almost impossible to maintain a continuous photographic patrol of Mars, the amateur's help is of great importance. The value of visual observations can be increased considerably if filters of different colors with known optical characteristics are used. The following list of Eastman Kodak Wratten filters should be helpful:

a. Ground whiteness or white clouds close to the surface: yellow-green no. 57.
b. High altitudes white clouds: deep blue no. 47B.
c. For blue clearing compare the image in yellow/red filters nos. 15, 21, 25, with blue filters nos. 38A, 47B, 48A. Blue clearing is indicated if surface features appear in comparable intensity with both sets of filters (7).

An effort should be made to follow more extensive clouds as long as possible and to watch for possible displacements of cloud systems. An observed displacement immediately indicates the wind velocity. Long enduring cloud systems should be reported to the Recorder by special mail. In addition to clouds, the behavior of the polar caps should be followed closely; the observer should note the extent of the caps with particular care. By using appropriate filters (see above), the observer can determine approximately whether he is observing polar clouds, a cap, or ground whiteness. The exact type of filter used must, of course, always be specified.

3. Visual Photometry: The usual manner of recording intensities of surface markings on a scale of 0 (black) to 10 (very unusually bright), although useful in a very general way (8), is nevertheless not sufficiently accurate for scientific purposes. A more objective method for Mars was described in great detail by G. De Vaucouleurs (9). Fundamentally, his method is not much different from that used by most amateurs; but instead of using an arbitrary scale, De Vaucouleurs uses a standardized one, where:

0 corresponds to the "mean surface brightness of the polar cap,"
2 to the "mean surface brightness of the bright continental areas near the center of the disc," and
10 to the "apparent surface brightness of the night sky background in the immediate vicinity of the planet."

Using this scale, De Vaucouleurs found that the "apparent brightness of the darkest spot on the surface" was generally around 6, in exceptional cases around 7.

Such estimates must be corrected for a variety of factors, "the most important corrections" arising "from variations of atmospheric origin (seeing and sky transparency)" (10). In other words, the following data must always be included with intensity estimates: seeing, transparency, magnification, and telescope. It is further important to use the same eyepiece for all intensity estimates as well as the same telescope. The estimates are meaningless unless repeated frequently to show the photometric behavior of the surface markings with changing heliocentric longitude (change of seasons).

In summary, the A.L.P.O. Mars Section should seek to accomplish the following specific projects during the coming apparitions:

a. Drawings made specifically for the derivation of areographic positions.
b. Central meridian transit timings.
c. Intensity estimates, using the scale described by De Vaucouleurs.
d. A qualitative cloud patrol, using color filters with a variety of different transmission characteristics.

4. Submitting the Observations: All observations should be submitted frequently to the Recorder (Astronomy, Buffalo Museum of Science, Buffalo 11, N.Y.), while general inquiries may be addressed to either the Recorder or to the Assistant Recorder, Mr. Leonard B. Abbey, Jr., (822 S. McDonough St., Decatur, Georgia). The Recorder plans to publish a bulletin at frequent intervals, giving the latest information, preliminary observing results, and general information of interest to the student of Mars. This bulletin is available to any A.L.P.O. member actively interested in Mars and may be obtained from the Recorder after August 1, 1960. The following information should be included with every observation: name of observer, location, instrument, magnification, date, time (U.T.), seeing, transparency, etc. Additional information on observing procedures may be found in the articles mentioned below (11).

References

1. Graff, Kasimir, "Beobachtungen und Zeichnungen des Planeten Mars waehrend der Periheleopposition 1924," Astr. Abh. d. Hamburger Stw. in Bergedorf, Vol. 2, No. 7, 1926, pp. 8-12.

2. Sidgwick, J. B., Observational Astronomy for Amateurs, London: Faber and Faber, Ltd., 1955, p. 126.

3. Ashbrook, Joseph, "A New Determination of the Rotation Period of the Planet Mars," The Astronomical Journal, Vol. 58, August, 1953, pp. 145-155.

4. Lampland, C. O. and E. C. Slipher, "Report of the Committee on Physical Observations of the Planets," Popular Astronomy, Vol. XXXII, June-July, 1924, pp. 349-360.

5. Ashbrook, op. cit., pp. 147-148.

6. Ashbrook, Joseph, "The New IAU Nomenclature of Mars," Sky and Telescope, Vol. XVIII, November, 1958, pp. 23-25.

7. Capen, Charles F., Jr., "Filter Techniques for Planetary Observers," Sky and Telescope, Vol. XVII, August, 1958, pp. 517-520.

8. Avigliano, D. P., "Notes on Observing Mars in 1954," The Strolling Astronomer, Vol. 8, March-April, 1954, p. 27.

9. De Vaucouleurs, Gerard, Physics of the Planet Mars, New York: Macmillan, 1954, pp. 314-325. This account ought to be studied carefully by anyone interested in making intensity estimates.

10. Ibid., p. 318.

11. Abbey, Leonard B., Jr., "Observing Mars in 1958," The Strolling Astronomer, Vol. 12, January-March, 1958, pp. 3-7.

Hartmann, William K., "Lunar and Planetary Observations. Part 1: The Making of Drawings," The Strolling Astronomer, Vol. 14, January-February, 1960, pp. 2-11. See also number 8 above.

THE ASTROPHOTOGRAPHY OF COMETS

By: David D. Meisel, Comets Recorder

As in other areas of astronomy, the camera-telescope combination is an invaluable tool in the study of cometary objects. Many features are revealed photographically that would be otherwise invisible. Almost any size instrument may be used provided that the object is within the brightness range of the aperture employed. This article is merely an introduction to a broad field of research. It is suggested that the observer have a little experience in the art of planetary and stellar photography before attempting comet photography. The reason is simply that the process of recording cometary objects on film contains elements of all phases of celestial photography. Only a brief survey is given here. For a more complete coverage, the reader is referred to the list of texts at the conclusion of this article.

SECTION I. Guiding the Camera and the Choice of Films

Unlike some facets of planetary photography, comet work generally requires quite accurate guiding. In addition to the regular sidereal drive now provided with most instruments, slow motions for both axes and a guide scope are necessary. The most suitable type of guiding eyepiece utilizes a single spike extending radially from the side of the eyepiece with the sharp point directly in the center of the field. (The point of the needle should be very sharp even under high magnification by the eyepiece.) If the object possesses a central condensation of some sort, then guiding should be done using this well-defined point. If, however, a central condensation is not visible in the finder scope, the observer should endeavor to keep the image of the coma surrounding the spike balanced like "an apple on a stick." It seems that guiding is done more accurately if the spike is rotated until it is perpendicular with the point upward in the field. (The observer may find other orientations more "comfortable." Nevertheless guiding along the direction of the needle axis should be avoided.) The needle should be thick enough to be seen against the background sky without additional illumination that might dim the comet image in the finder eyepiece.

As is many times the case, the comet may be too faint to be seen in the small finder telescope. In this instance it is necessary either to transfer the camera-telescope to a larger guide instrument or to compute the amount of correction that has to be made in the sidereal rate of the drive and the declination to follow the comet during exposure. Two alternatives, though more complicated, could be attempted. One is to off-set the axis to compensate for extremely rapid motion in either R. A. or Declination. The other is to use an off-axis image of the camera as a guide image. This latter alternative is especially effective if the prime focus image of a telescope mirror or lens of large size is used. The limitations imposed depend upon the quality of the off-axis image. (Further information on these topics may be found in the references.)

Choice of the film and the choice of instrument are related so they will be discussed as a unit. The type of instrument depends on the comet's angular expanse; wide field cameras are chosen for well-developed objects, narrow fields for small objects with ill-defined comae. The field of the plate should be large enough to include the whole object. (Even if it is artistically proper to center the coma in the middle of the plate, the centering should not be done if part of the comet's tail is then not included. The comet image on the plate should be shifted until that hidden portion of the tail is in the field. The shifting should be done before exposure, of course!). When in doubt reduce the magnification, if possible, and orient the longest dimension of the plate in the direction diametrically opposed to the direction of motion and the apparent line from the comet to the sun. The limiting magnitude for a given instrument and aperture must be determined by experiment with a given film. From previous experience, the observer can determine the type of film that will record the faintest stars with the best images in the shortest exposure time before sky fog blots out the faint images obtained. The so-called reciprocity effect is well covered elsewhere and will not be discussed here. The limiting magnitudes and exposures should be determined for various altitudes and sky conditions. With some experience the observer will be able to guess the appropriate exposures for a given set of conditions. With so many different kinds of film on the market today, it is somewhat difficult to select the type of film most suitable. Certain general parameters may be given here from which the observer, with the aid of a Manufacturer's Technical Film Sheet and previous knowledge of the instrument's performance, may determine for himself the film he wishes to use. These parameters are given in Table 1.

SECTION II. Special Programs

When the observer has gained some experience with the general photographic techniques, he may desire to try some more qualitative work. Just what work can be done depends to a great extent on the instruments available. Each program is here only mentioned and will not be described in detail as they are all covered in other works.

a. Selected Spectral Regions Photography

Observers who possess or have access to cameras of the Schmidt or Maksutov type may be able to secure several photographs of an object within a relatively short time. Observers who do not have these fast cameras could possibly utilize several cameras on one mounting. Guiding should be done as in Section I. Three or more plates in different spectral regions reveal quite different aspects of various features. Red plates show weaker emissions and reflections, especially around the nucleus. Yellow plates show metal emissions and reflections. Blue plates show most detail in the tail, including rays and striations.

b. Polarimetric Photographs

These are obtained for given spectral ranges for the entire comet body or definite portions of the comet in a manner similar to that above. The exposures should be short, taking orientations of the polarization axis at various intervals of angle whose value depends on the number of exposures that can be made.

c. Spectral Photographs

These usually entail rather long exposures and very accurate guiding. Some results have been obtained using short exposures with objective prisms.

d. Sky Searching

Although even less fruitful than visual searching unless using large apertures and fields, photographic comet searching can be done. Since this is covered in other works, only a mention will be made here of the regions of best results. All things considered, the <u>statiscally probable</u> location most suitable for photographic comet discovery is in the circular region that is located 90° from the sun. The other places, though of wider area, are in the low northwest after sunset, the low north, and the low northeast before sunrise. (For the southern hemisphere substitute <u>south</u> for <u>north</u> in the directions.) The big problem in the 90° regions is the rapid proper motion of objects when close to the earth. The observer should keep in mind the fact that if the object moves its own diameter or more during the time of exposure, there is a very good chance that it will not be recorded by the plate. Thus, fast, wide angle shots are desired. It is suggested that any observer who desires to carry out a photographic search program do so in addition to a variable star and/or nova search. Thus some compensation may be had for the hours spent at the telescope in guiding. The guiding for any search should be done at the sidereal rate.

SECTION III. Choice of Filters

Of course, the ideal filter is that one whose dominant region or whose curve of transmission closely corresponds to the desired spectral sensitivity. However, few filters manufactured meet this requirement and are still both easy to use and stable. Thus if a red spectral sensitivity is called for, the observer must consult a table giving a resumé of the physical characteristics and select the filter that fulfills the requirements. Then a film is selected whose maximum sensitivity is near that of the chosen filter. (It would be indeed foolish to choose a film having a maximum sensitivity in the red when the filter has a blue dominant wavelength.) If two filters have nearly the same spectral characteristics, the one with the greater transmission coefficient should be selected, other things being equal. Thus as with the choice of film the selection of a suitable filter is left to the observer. One other factor which must be taken into account is the color correction of the instrument. So far the considerations have been for a color corrected system that is nearly perfect. Those who wish to convert visual instruments to photographic use may find a combination of filter and emulsion that is satisfactory. (This selection is discussed in books on advanced telescope making and photography.) However, the usual blue corrected photographic mirror systems and objectives are very satisfactory without change. When spectroscopic emulsions are used, the filters recommended by the manufacturer or their equivalent should be employed, making an allowance in the exposure time for the absorption of the filter.

SECTION IV. Development and Final Preparation

Unless otherwise directed by the manufacturer, the fine grain hydroquinone developers will give the best results. (Kodak D-11, D-19, Ansco 30, or 90. Kodak DK-20 may be useful in some instances.) Development times vary over a wide latitude. The directions with the developers should be followed until some experience allows the observer to vary the time to obtain certain effects. When the negatives or plates are dried, they should be carefully examined (for comet images, or novae if search plates). Care should be taken to keep scratching to a minimum. Any imperfections should be noted on the data card. Printing and enlargement can be carried out on an experimental basis until the best combination of paper and paper developer are found. It is possible that the observer has already determined this information from previous astronomical work.

It may seem as if this paper is an extremely rapid excursion through this aspect of celestial photography; however, many of the techniques described here are still in the developmental stage. Two last notes: When searching for new comets always expose two plates of a given sky region either later on the same evening or on the following night. Be sure always to record the necessary photographic data and exposure, filters, seeing conditions, etc. Comments upon, or corrections to, this paper are welcomed. Corrections will be made as experience dictates.

TABLE 1.A - For Small Extent Objects

Object Distance from Sun (A.U.'s)	(Angular)	Regions (Features)	Instr.	Plate Scale	Speed*	Sensitivity[1] (Spectral)
>1	$>20^\circ$	Central	TC	L	F	y to b
>1	$>20^\circ$	Tail-Outer	WFC	S	mF-vF	b
<1	$>20^\circ$	Central	PFT	S-L	S-vS	g to r
<1	$>20^\circ$	Tail-Outer	WFC	S-L	S-mF	UV to IR

TALBE 1.B - For Large Extent Objects

Object Distance from Sun (A.U.'s)	(Angular)	Regions (Features)	Instr.	Plate Scale	Speed*	Sensitivity (Spectral)
<1	$>18^\circ$	Central	TC	S	S-mF	y to b
<1	$>18^\circ$	Tail-Outer	WFC	L	S	UV to IR
>1	$>18^\circ$	Central	WFC	S	mF-F	UV to IR
>1	$>18^\circ$	Tail-Outer	WFC-CM	L	S-F	UV to r
<0.5	---	Tail-Outer (Central)	TC-WFC	-	(2)	UV -- IR(2)
~ 1.1	$\sim 180^\circ$	Central	TC	S	mF	UV -- IR
~ 1.1	$\sim 180^\circ$	Outer	vWFC	vL		
---	$< 25^\circ$	Inner	TC-WFC	?	(3)	(4)

Note: TC indicates camera telescope, PFT prime focus telescope, WFC wide field camera, vWFC very wide field, CM convex mirror all sky system, L is large numerical plate scale per inch, S is small numerical plate scale per inch (before enlargement), F is fast, mF is medium fast, vF is very fast, S is slow, vS very slow, y is yellow, b is blue, g is green, r is red, UV is ultraviolet, and IR is infra-red.

Footnotes to Table 1

(1). Blue sensitive emulsions with or without filters, moderately fast and fine grain, seem to be the best all purpose film in spite of what is quoted here. (See Section II, Selected Spectral Regions Photography). If the color index of the object is known, this should be used to determine the plate sensitivity.

*The film and instrument should be as fast as is compatible with grain requirements, i.e. the grain of the emulsion should be reduced as much as possible, yet not to the point that the exposure is excessively long. Some kind of median between speed and grain seems the most desirable.

(2). Objects must be favorably placed. Blue to red, depending on sky conditions. Choice of speed also depends on observing conditions.

(3). The film and instrument should be as fast as possible, yet making allowance for sky fogging.

(4). All spectral regions may be attempted, but again blue sensitive plates will probably give the best general results.

The criteria are very general and are subject to revision as experience or personal research dictates. Guiding should be done as indicated in Section I, first part.

References

1. A.L.P.O. Comets Section Handbook--To be published.

2. Ingalls, A. G., Amateur Telescope Making, Books I, II, III.

3. King, E. S., A Manual of Celestial Photography.

4. Selwyn, E. W. H., Photography in Astronomy.

5. Merton, Gerald, Photography and the Amateur Astronomer. (J.B.A.A., Vol. 63, page 7.)

6. Rackham, Thomas, Astronomical Photography at the Telescope.

7. Sidgwick, J. B., Amateur Astronomer's Handbook.

8. Sidgwick, J. B., Observational Astronomy for Amateurs.

9. Texereau, Jean, How to Make a Telescope.

10. Mayall & Mayall, Skyshooting.

11. Mayall, Wyckoff, Polgreen, The Sky Observer's Guide.

A.L.P.O. COMETS SECTION REPORT NO. 3

By: David D. Meisel

Because of the rapid growth and increased responsibilities of the Comets Section, the Recorder has instituted six different special divisions to take care of the various administrative problems that have resulted. These divisions are as follows:

1) The Observational Division - Will handle the correspondence necessary for the distribution of observational material to interested groups and persons.

2) The Information Division - Will handle the distribution of information through all channels of communication used by the Comets Section. This division is also responsible for all special Comets Section Publications.

3) The Confirmation Division - Will coordinate all amateur efforts of collation and confirmation of newly discovered objects, especially those objects reported by amateurs themselves.

4) The Computation Division - Will handle all special mathematical problems of the Section, including orbit calculation and observation reduction.

5) The Instrumentation Division - Will design and originate by research and experimentation new observational methods and instruments especially adapted for use on cometary objects.

6) Research Division - Will carry out long range studies of various problems connected with cometary and meteoritic bodies.

The chairmen of the various divisions will be announced at a later date. All correspondence should still be addressed to the Recorder in care of the specific division to which the inquiry is directed. The material received will then be forwarded to the appropriate division for action. It is hoped that this "division of labor" will enable the Section to function more effectively and efficiently. A special mimeographed brochure explaining the services and policies of the Section will be available shortly for those who are interested. Inquiries for the brochure should be made to the Information Division.

Publications Received

Mention will be made from time to time of significant papers and other publications that have been contributed to the Comets Section. Those who wish to contribute manuscripts to the Section are encouraged to do so. Copies of each manuscript of special interest will be made on microfilm and will be on file with the A.L.P.O. Librarian. Copies of translations of foreign manuscripts will be on file with the Foreign Language Coordinator. Applications for loans of these copies should be made directly to the above. The Section also has limited funds for the purchase of important and hard-to-get publications. Those having books or other publications for sale on all phases of cometary astronomy are invited to write to the Recorder giving detailed information concerning the condition and price of the manuscript or volume. Terms will then be arranged if the Section decides to accept the offer of sale. Those who wish to keep the originals of publications submitted to the Section are asked to state for what length of time the Section may keep the manuscript on loan. Unless otherwise directed, the Recorder will keep all manuscripts on file at Section headquarters. If the manuscript is not exceptionally long, contributors of all manuscripts will receive copies of their contributions that are kept for Section files. Translations will be included where possible. All communications concerning publications should be directed to the Information Division.

DETERMINATION OF A COMETARY ORBIT, by Guy B. Petter, Memoirs of the B.A.A., Volume XXI, 1920, contributed by Ernst E. Both, Foreign Language Coordinator.

Abstract. A demonstration of Leuschner's method in its simplest form is presented. Elementary considerations are given in detail.

POLARISATION de la COMETE Mrkos 1957d, Note of Mme. Marie-Therese Martel, presented by M. Andre Danjon, Publications of the Haute-Provence Observatory, Vol. 4, No. 19. Contributed by William Shawcross of Sky and Telescope magazine.

Abstract. The polarization of the nucleus decreased as a function of the phase angle. Accordingly the rates of polarization of the tail varied according to the measured areas, the highest ones reaching 32, 28, 24, 22, and 19 % as observed on the 22, 25, 26, 27, and 28 respectively of August, 1957.

This paper was translated by Mrs. L. D. Meisel and David D. Meisel.

BEOBACHTUNGEN DER SCHWEIFENTWICHLUNG DES KOMETEN 1956h Arend-Roland, by K. Wenske from the Communications of the Hamburg Observatory in Bergedorf, Number 108. Paper contributed by William Shawcross; translated by D. Meisel.

Abstract. The changes in the direction and form of the comet's tail shown by several series of photographs in two spectral regions are described. The formation of the counter tail as well as the form difference in the blue and red spectral regions were investigated by means of isophot representations. A series of photographs on the night of April 27-28, 1957, permitted the determination of material velocities in one of the tail rays.

Physische Beobachtungen von Kometen, by Max Beyer, Communications of the Hamburg Observatory in Bergedorf. Paper contributed by William Shawcross; translated by D. Meisel.

Abstract. An extensive description and analysis of the visual observations of nine comets appearing between Oct. 6, 1953, and July 9, 1955. These observations are a continuation of nine previous reports dealing with visual observations of comets with a 10½-inch refractor and other smaller instruments at Bergedorf. Since 1932 nearly 67 objects have been observed. Indications are given throughout that at large solar distances the tail direction deviated greatly from the direction of the solar radiation pressure. References are made to previous papers but do not detract from the continuity of the present work.

The Recorder would like to thank Mr. Both and Mr. Shawcross for their contributions.

COMET ALCOCK 1959e

G.E.D. Alcock, on the evening of Aug. 25, 1959, discovered a new comet while sweeping for comet P/Giacobini-Zinner. This was Alcock's 560th night of comet sweeping at which he has spent 646 hours. Mr. Alcock is to be commended for his perseverance and consequent success. The first A.L.P.O. sighting of this object was at the Nationwide Amateur Astronomers Convention in Denver on August 31, 1959, just after evening twilight. Bill Kunkel located the object using F. Ohmer's 12½-inch reflector on the grounds of Chamberlain Observatory. Position values were obtained by D. Meisel with the same 12½-inch reflector and were transmitted to Harvard Observatory. The following observers have submitted reports both positive and negative. (No significance to order.)

Ronald Bales, Salem, Oregon, 10" Reflector.
Dennis Milon, Houston, Texas, 6" Refractor.
William Kunkel, Los Angeles, California.
Alan McClure, Los Angeles, California, 5.5" F5 Zeiss Camera.
David D. Meisel, Fairmont, West Virginia, 8" Reflector.
Robert Farmer, Jewett, Texas, 8" Reflector.
Tim Fitzgerald, Jewett, Texas, 8" Reflector.
Mark Zillman, Danville, Illinois, 4" F5 Zeiss Camera.
Craig Johnson, Boulder, Colorado, 4" Reflector.
Ned Onstott, Pueblo, Colorado, 12" Reflector.
Ronald Schorn, Urbana, Illinois, 7 x 50 Binoculars.

Table I presents the basic observational data gleaned from these reports. Bracketed values are given for the photographic data as these represent provisional approximations subject to revision at a later date. The magnitude values are corrected for aperture effects according to the methods outlined by Bobrovnikoff (Popular Astronomy, Vol. 49, page 467, 1941.) Further photometric reductions will be made, the results of which will be published later. The object seemed to fade much more rapidly than expected. Thus it would seem that the object's illumination was governed roughly by an inverse 5th or 6th power law.

The Recorder would like to thank the A.L.P.O. observers for their contributions.

NOTE ON FUTURE OBSERVATIONAL REPORTS: Reports on comets will be divided into two parts. The first part will present only the preliminary reduced observational data. The second part will contain further data reductions and the data evaluations. The first parts will be published as soon after the appearance of an object as possible. The second parts generally will follow the first parts by six months or less.

TABLE I.

DATE 1959	TIME U.T.	UNCORRECTED MAGNITUDE	CORRECTED VISUAL MAGNITUDE	DEGREE OF CONDEN-SATION	COMA DIAMETER	MEANS OF OBSER-VATION	NOTES
Aug. 31	0.1805^d	~11.0	+ 9.4	~4	2.5'	Visual	No. 1
Sept. 2	5^h	~11.0	+ 9.8	~3	$2\frac{1}{2}$'	Visual	No. 2
3	$5^h\ 15^m$	~12.0	+10.4	--	~2'	Visual	No. 3
	$\left.\begin{matrix}1^h\ 45^m\\2^h\ 33^m\end{matrix}\right\}$	[10.1]	-----	4(?)	[2']	Photo-graphic	No. 4
4	0.1250^d	11.2±0.1	+10.3	7	2' inner, 3' outer	Visual	No. 5
	$\left.\begin{matrix}1^h\ 50^m\\3^h\ 25^m\end{matrix}\right\}$	[10.0]	-----	5(?)	[3']	Photo-graphic	Exposure ~30mins.
	(?)	(?)	-----	----	2'	Photo-graphic	No. 6
5	$\left.\begin{matrix}1^h\ 45^m\\4^h\ 00^m\end{matrix}\right\}$	[10.5]	-----	4(?)	[3']	Photo-graphic	Exposure ~30mins.
6	$4^h\ 00^m$	11.5	+10.6	8(?)	6' (?)	Visual	No. 7
	$5^h\ 58^m$	(?)	-----	----	3'	Photo-graphic	No. 8
7	5^h	11.5	+10.6	8(?)	5'	Visual	No. 9
	5^h	11.5	+10.9	----	5'	Visual	
21	0.042^d	(Fainter than 13.5 mag.)	>12.6	----	--	Visual	No. 10

Notes

1. Also seen by numerous others at N.A.A.C.
2. No nucleus, no tail.:.slightly elongated coma along 90^o-270^o P.A., central condensation seen east of center of comet.
3. Coma spherical, diffuse.
4. No details concerning emulsion, etc. Star images are generally very good. Sidereal rate. This and the other prints contributed by Mr. Zillman will be evaluated in a special report to be prepared at a later time.
5. No nucleus, slight, faint tail visible for 6'. Central condensation +13 magnitude. Partially obscured star brightened as comet moved away from it. $\Delta m = \frac{1}{4}$ magnitude in $\frac{1}{2}$ hr.
6. Exposure ~15 mins. No magnitude reported. Plates evaluated by observer.
7. Possible elliptical shape to coma. 290^oP.A. major axis, rather well condensed.
8. Exposure 40 mins. Coma diffuse. No magnitude reported.
9. Central condensation ~+12 mag.
10. Predicted position was examined rather carefully under good observing conditions. Object brighter than 13.5 magnitude could have been detected.

A report of the results of the photographic and data analysis will be published later.

Correction

In the Comets Recorder's article on Comet Burnham (Str. A., Jan.-Feb., 1960, pages 12-13), it was reported the I.A.U. had adopted the procedure of reporting two magnitude predictions in an ephemeris. Dr. Elizabeth Roemer of the Flagstaff Station of the Naval Observatory has pointed out that the I.A.U. has not adopted or recommended such a measure. It seems that the "fad" was started by B. G. Marsden of Yale Observatory. However, since many experienced observers consider such values misleading, the procedure of quoting two magnitudes will not be continued. The Recorder apologizes for this misinterpretation of I.A.U. policy. In addition, Dr. Roemer points out that only in a very remote way do the magnitude values computed in this manner correspond to actual magnitude values as observed. Until such a time that the Comets Section can make definite recommendations to A.L.P.O. members about making magnitude predictions, inverse 4th and 6th power brightness values will be used.

Supplement by Editor

On January 19, 1960, Frances W. Wright of the Harvard College Observatory wrote David Meisel as follows: "I have shown your letter of December 28 to Dr. Whipple and he states that we shall welcome any of the responsibilities which you and your group can assume in regard to amateur announcements of Comets.

"We authorize you to re-transmit to amateurs any of the telegraphic messages sent by our Observatory to you. Dr. Whipple is only fearful that your Comets Section may not obtain the necessary financial grants. It would be wonderful if the necessary funds could be obtained."

The photograph of Comet 1959k on the front cover of this issue and also those reproduced as Figures 1 and 2 were given by Mr. Robert Burnham, Jr., of the Lowell Observatory to Paul Knauth of Houston, Texas. Mr. Knauth has been a student at the Summer Institute in the Astro-Sciences at Pan American College from June 7 to July 16, 1960, and kindly offered the photographs to the Editor for publication.

H. P. WILKINS: AN APPRECIATION

By: Patrick Moore

By the death of Dr. H. P. Wilkins, in January, 1960, Britain loses her most distinguished selenographer; and his many colleagues all over the world lose a valued friend.

Wilkins became an amateur astronomer when very young, and remained an amateur to the end of his life. Though competent in all fields of astronomy, he laid no claim to eminence as a mathematician or as a general theorist; and he undertook no astrophysical research. He made useful planetary observations from time to time, but not consistently; and though skilled at mirror-making he was not particularly outstanding. It was in his own special study of the Moon that he excelled.

He spent a lifetime in lunar research. His knowledge of our satellite was encyclopaedic, and in spite of his amateur status he was regarded --and rightly so--as the leading authority. The completion of his great map of the Moon occupied him for half a century, which is not surprising in view of the amount of detail shown. Many of the features were discovered by himself, either with the 15½-inch telescope in his private observatory, or with giant telescopes at professional establishments. When the skies were clear and the Moon visible, it was seldom that he was not hard at work. His patience was matched only by his enthusiasm.

His work was acclaimed by the many honors bestowed on him, including an honorary Doctorate of Philosophy. He also served on the Lunar and Planetary Commission of the International Astronomical Union, and directed the Lunar Section of the British Astronomical Association for ten years, during which time he transformed it from an almost non-existent body into a large and efficient organization. He was also the founder of the International Lunar Society, and served as its first President.

In addition to his actual research, Wilkins was also a first-class lecturer and broadcaster who did much to popularize astronomy. Those who came to him for help and advice were never disappointed, and there are many who owe him a debt of gratitude. He went to many countries, including the United States, and proved himself to be an ideal astronomical ambassador. One proof of this is that he made friends wherever he went, and new acquaintances who had known him only by repute were often surprised to find that he had an extremely strong sense of humor.

A fair summary of Wilkins' astronomical career is to say that he was an amateur in the great tradition, and that his lunar work will be of lasting value. His position was unique, and cannot be filled. His death is an irreparable loss not only to his friends, but also to Science.

FIGURE 1. Photograph of Comet Burnham 1959k with a 13-inch photo-refractor on April 27, 1960. Exposure $8^h\ 30^m$–$8^h\ 45^m$, Universal Time. Observer Robert Burnham, Jr. 103 a0. Contributed by Robert Burnham, Jr. and Paul Knauth. Lowell Observatory Photograph.

IN MEMORIAM: CARL P. RICHARDS AND ED L. FORSYTH

By: Walter H. Haas

We have learned with much regret of the deaths last spring of Mr. Carl P. Richards of Salem, Oregon, and of Mr. Ed L. Forsyth of Fallbrook, California. Both men had lived long and full lives. Neither was in any sense a professional astronomer; but they earned the affection and the respect of those who knew them, and astronomy will be much poorer when it ceases to attract such devotees. Both had been members of the A.L.P.O. from its very early days, Mr. Richards being in fact a charter member. Both were personally known to the Editor, and he has considered it a privilege to know them as well as he did.

Carl Price Richards was born at Sheffield, England, on July 11, 1881, and came to the United States as a young man. He was a civil engineer by profession and worked for the Oregon State Highway Commission in

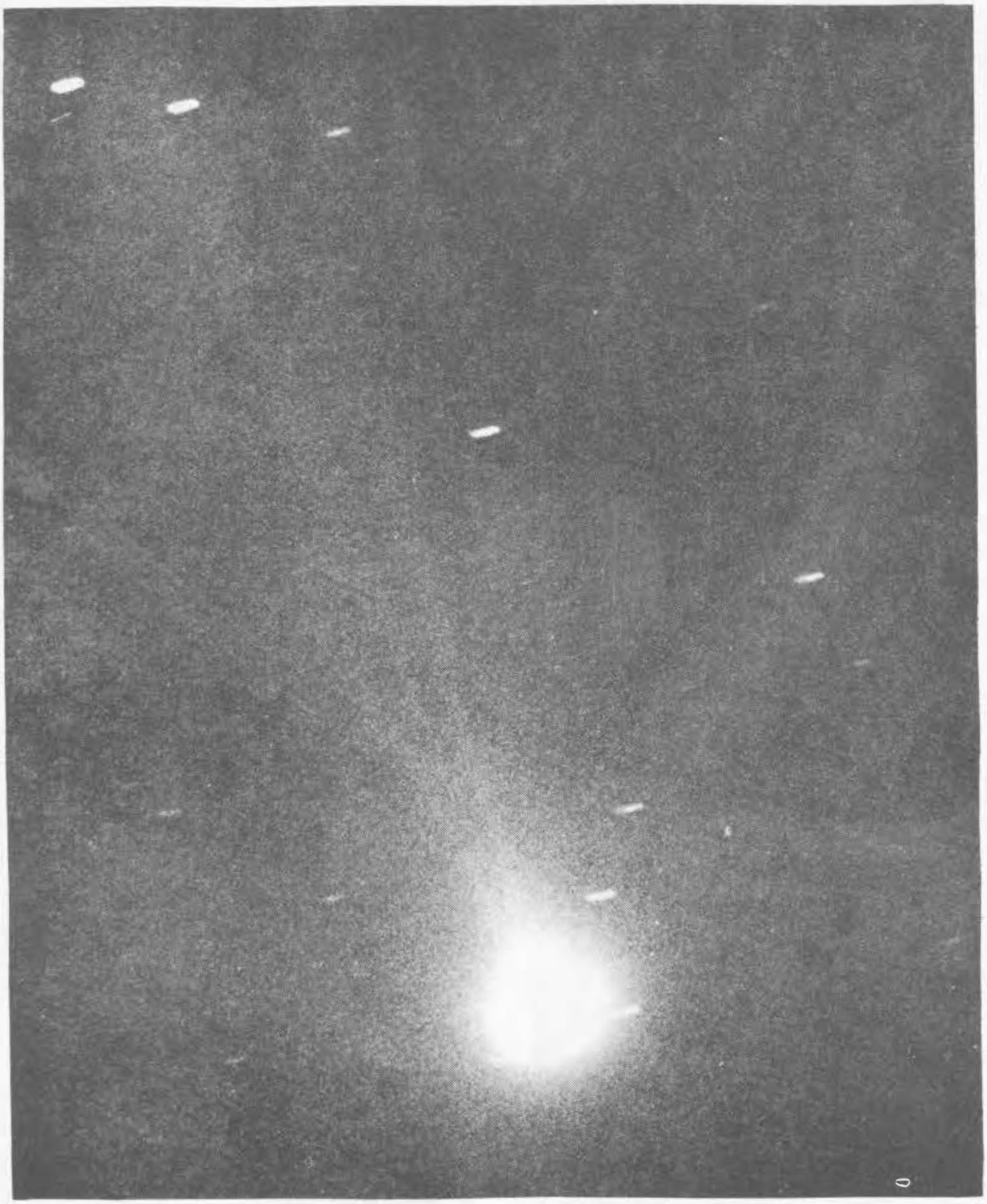

FIGURE 2. Photograph of Comet Burnham 1959k with the U. S. Naval Observatory 40-inch reflector at Flagstaff, Arizona. Exposure 8 minutes at about 11^h, Universal Time, on April 8, 1960. Observer Dr. Elizabeth Roemer. Contributed by Robert Burnham, Jr., and Paul Knauth. Official U. S. Navy Photograph.

the bridge department from 1920 to 1923 and again from 1939 until his retirement. He was fond of calling himself an "armchair astronomer," though he did some observing with a small refractor and also travelled to Canada to watch and photograph at least one total eclipse of the sun. He was, moreover, actively interested in geology. In 1955 he received the annual Astronomical League Award in recognition of his outstanding services to amateur astronomy. He served several terms as a national officer of the Astronomical League and attended almost all of its National Conventions, most of them at considerable distances from Oregon. He was the author of several informal but informative articles in The Strolling Astronomer and other periodicals. It is very typical of Carl Richards that he gave his complete file of back issues of The Strolling Astronomer, many of them now scarce and hard to get, to the New Mexico State University Library.

Mr. Richards underwent surgery on April 15, 1960, to correct the tremor which had severely afflicted his hands in recent years. Pneumonia and other complications caused his decease on April 26. Interment is at Mt. Crest Abbey in Salem, Oregon. He is survived by his wife, Mrs. Florence Richards, and two sons, Howard J. and Bernard B. We offer our deep sympathies to his family and friends.

Mr. E. L. Forsyth died of pneumonia on April 24, 1960. He had lived for many years in retirement on his citrus ranch at Fallbrook, California, within sight of Palomar Mountain. While his health permitted, he used a 6-inch reflector by Mellish. In his earlier years he was an engineer for the Santa Fe Railroad Company. He then made his home at Needles, California, and carried on many observations of variable stars with a 3-inch Brashear refractor. In 1947 he was awarded a life membership in the Los Angeles Astronomical Society. As long as he was able, he regularly attended their monthly meetings. He was also present at the first Conventions of the Western Amateur Astronomers. He studied comets and meteors with much diligence and sometimes travelled to the southern California deserts to see the stars more clearly.

However, those who visited the Forsyths at Fallbrook will perhaps think of them chiefly as an example of gracious living in a world often too hurried to know such pleasures. They will long remember the view of the town and valleys from Sunny Brae Observatory, the pepper tree behind the house, the records with the popular tunes from early in this century, and the well-kept Model A Ford which Ed long drove. They will hope that he may now be closer to the stars which he loved so long and so well.

He is survived by his wife, Mrs. Eunice Forsyth, and by a daughter in Pasadena, California. Their loss is our loss too.

LUNAR AND PLANETARY OBSERVATIONS.

PART 2: SUBMITTING OBSERVATIONS TO THE A.L.P.O.

By: William K. Hartmann

In a preceding article in the Jan.-Feb., 1960, Str. A. we discussed the making of observations at the telescope. However, A.L.P.O. observers should not be content to stop with a completed observation. Isn't a major purpose of the A.L.P.O. to help advance our knowledge of certain phases of Solar System astronomy through voluntary work? If so, then the observer, if he hopes to make a contribution to our knowledge, should submit his data to the appropriate A.L.P.O. Recorder so that, along with many other bits of information submitted by others, it may be analyzed to produce the comprehensive but detailed lunar and planetary studies for which the A.L.P.O. works. The purpose of this article will be to discuss how one goes about submitting his observations in a manner most suited to our Recorders and to try to give some tips to the prospective contributor.

Consider the task of a Recorder who may receive from a number of A.L.P.O. members observations on various sizes and shapes of paper, with comments and data presented in different ways. It is the Recorder's job to piece all this material together into a single coherent Section Report. The reader will thus agree that if all observers could adopt some standardized methods of submitting observations, the Recorder's job would be made simpler, and his results more accurate. In fact, the reader will probably ask if such standardization hasn't been or isn't being accomplished. The answer is that steps are being taken in this direction among the various Sections. Notice that we are now talking about methods of submitting finished observations rather than a possible standardization of observing procedures in the Sections.

1. General discussion of preparing observations

At this point we will consider some general points concerning preparation of observational material for study by A.L.P.O. Recorders. All records must be preserved in some form by each observer. I have found a loose leaf observing notebook to be a convenient form for keeping observations. As described in the earlier paper in the Jan.-Feb., 1960, issue, I record my observations on single form sheets. These are used at the telescope with a clip board, and then finished observations can be transferred into the appropriate notebook. Loose leaf binding also permits freedom of order. Thus, while I usually file drawings chronologically for each separate celestial object, during an apparition of Mars, for example, I can file by central meridian to allow easy checking for progressive changes. Another type of filing system involves making drawings on index cards, and filing them in card file boxes.

When the time comes to submit observations, they must be copied with maximum care. Since the originals will probably not be suitable for publication due to low contrast, and since copied data can be put in forms suitable to the Recorder, the originals are usually kept by the observer, while the copies will be kept by the Recorder. However, some may want to submit originals and keep the copies. (Opinions of the Recorders vary on this topic.) This reproducing of the drawing involves the same steps as making the original at the telescope. If smudging was used to get an initially uniform background for the original, do this first for the copy, too. Then start with the major features and work down toward minor ones, just as at the telescope. Tracing the drawing by holding it up at the window is probably the easiest way to get the outlines of the major details accurately positioned; and once these are in, the drawing can be taken to a desk where the major outlines will provide a framework for copying the details and filling in contrasts. [Photographic copying may also sometimes be employed.--Editor.]

Perhaps this is a good place to include a reminder about planetary disk size. There is lack of agreement on how large planetary disks should be drawn. One school of thought supports variable size to show the change in apparent diameter of the disk. Another group favors constant size so that comparisons and searches for changing detail are easier. Even the best constant diamter is not agreed on. Many favor two inches, but there is a trend toward a larger size. The observer of a planet will want to know ahead of time what size the particular Section favors so that he can copy his drawings without trouble. The Jupiter Section has recently adopted a 2 and 7/16 inch equatorial diameter disk in the standard report forms it sends out.

It seems that the main enemy of the copied drawing is lack of contrast. Readers of The Strolling Astronomer will recall Prof. Haas's occasional pleas for more contrast and the notices to the same effect found on the inside back cover. Clearly in presenting a drawing with shadows (such as a lunar or Saturn drawing) or one with very dark spots (such as Jupiter), we need a black that will really look black in order to be able to show other dusky tones in an intermediate shade. For drawings of inherently low contrast objects (for example Mercury, Venus, or lunar maria), the contrast simply must be extremely exaggerated. In drawing such an object at the telescope, it is necessary to exaggerate contrast, just in order to show anything at all; however, contrast may have been kept fairly low in the original drawing to portray the appearance of the object more accurately. In copying the drawing for possible publication, exaggeration must be extreme if any detail is to be visible in the magazine version.

Now, how do we get this contrast? I am not sure I can answer this question definitely since I am not sure what materials have given the best results in the past for Strolling Astronomer illustrations. Perhaps the Editor can add some comments on this subject. [Drawings should be made on a good grade of white, unlined paper. Line drawings and stipple drawings, of course, pose no problems. The linear dimensions of a drawing are reduced about 20% in reproduction. It is best to avoid all colors except black and white, nor is ink usually a flexible medium here.--Editor.] I would like to try an experiment to help clear up this problem. Figure 3 shows a set of squares filled in by various methods as lableled. As I write this, I don't know just what conclusions will be drawn from Figure 3, but it should be a guide for the reader in making his drawings for publication. Reference to Figure 3 may show what materials can give a good black when reproduced in The Strolling Astronomer and whether white tempera paint helps make a whiter white.

Recently, I have been using black and white tempera paint to provide extremes of black and white in some of my submitted drawings. As a further experiment in this business of contrast, Figure 4 shows two copies of the same drawing, both made on the same kind of white paper. Figure 4a is made using only a no. 2 pencil. In Figure 4b white tempera paint was used to make whiter whites (sunlit crater wall, ridges, mountain peaks), black tempera for the extensive black shadows, Skrip #32 jet black ink for fine shadows, and the same no. 2 pencil for intermediate shades. A similar comparison may be made for planetary drawings between Figures 5a with no. 2 pencil, and 5b with white tempera for the NTrZ and bright ovals, the Skrip black ink for the condensations, and the no. 2 pencil for the other markings. (For planetary drawings with their fine details, I find pen and ink more useful than tempera for the darkest markings, but for broad lunar shadow areas the paint seems to give better results.) The reader may judge whether this procedure seems to help increase contrast. Tempera paint has the advantages of being cheap, easily washable, and easy to apply. A brush is not necessary; I find it is easy to spread the paint around with a pencil point or stick. A soft pencil may be used to get fairly dark blacks, but the danger of smearing is thus increased; however, perhaps a protective spray such as mentioned in the preceding article may help solve this problem. My present inclination (before seeing the above comparisons in print) would be to recommend black tempera paint for large black areas such as the shadows in Figure 4b, and black ink (which is easier to handle for fine work) for small details such as the spots in Figure 5b; but, as I say, the reader may judge by the results when these drawings are compared in print.

Recorders prefer that each drawing be on a separate sheet in general. Other data obtained at the time of a drawing, such as intensities, conspicuousnesses, and color estimates, should generally be put on the same sheet as the accompanying drawing. Intensities can be conveniently and clearly shown in a subsidiary outline sketch submitted along with the main drawing, as in Figure 6. This extra outline drawing eliminates the need for putting distracting and perhaps misleading numbers on the main drawing itself, yet presents the intensities in a clear way. In the preceding article, I described a quicker method for recording intensities at the telescope; but as I mentioned there, this method shown in Figure 6 seems more suitable for submitting drawings since it presents the material in a more direct way. Central meridian transit observations are usually submitted separately from the other data.

Descriptive notes to accompany the drawing should go right along with it on the same sheet. They should be detailed enough to explain anything that is not clear from the drawing but should be concise. Separate general notes on a planetary apparition or impressions of the observer over a period of observing should also be kept reasonably concise. Such general notes can be helpful to Recorders but should not tend to drag out with many details which are described already in the individual drawings.

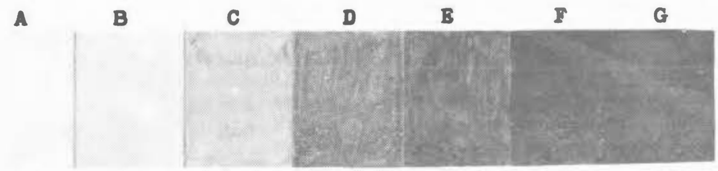

FIGURE 3. Intensities of Various Materials.
A - White Tempera Paint B - Plain White Paper Surface
C - No. 2 Pencil--Medium Pressure D - No. 2 Pencil--High Pressure
E - Skrip No. 32--Permanent Jet Black F - Black Tempera Paint
G - India Ink

FIGURE 4a. Copied with #2 Pencil.

FIGURE 4b. Copied with Black and White Tempera Paint, Black Ink, and #2 Pencil.

Sinus Iridum.

Sept. 8, 1958. $9^h\ 18^m$-$9^h\ 35^m$-$9^h\ 56^m$ U.T. 8-inch Reflector.
B 250X (250X with use of Barlow Lens)
S = 8. T = 5. William K. Hartmann. New Kensington, Pa.
Colong. 209°.8 at $9^h\ 35^m$.

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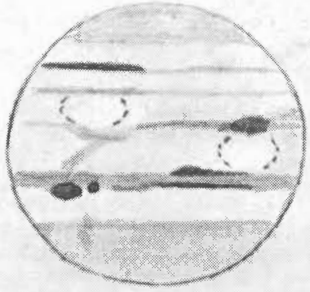
2. Remarks on submitting material to the individual Sections

We have discussed some general instructions about submitting drawings. In trying to cover more details, we run into the problem of differences among the Sections. I dare not try to speak for the individual Section Recorders since a mistaken word here might conflict with recent decisions of a Recorder concerning his Section's policies. (I want to be able to go to future A.L.P.O. Conventions without fear of reprisal from wronged Recorders!) However, I have been in touch with a number of Recorders, and in late 1958 I sent out questionnaires to each one concerning



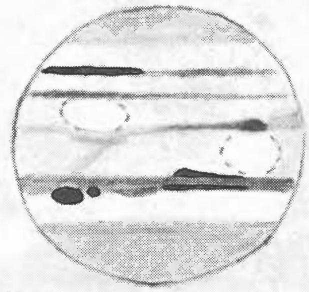


FIGURE 5a. Copied with #2 Pencil.

FIGURE 5b. Copied with White Tempera Paint, Black Ink, and #2 Pencil.

Jupiter.

June 29, 1958. $2^h\ 32^m$–$2^h\ 36^m$–$2^h\ 43^m$ U.T. 8-inch Reflector.
B 250X (250X with use of Barlow Lens) S = 5-6. T = 5.
William K. Hartmann, New Kensington, Pa.
$C.M._1 = 111^\circ$ $C.M._2 = 209^\circ$

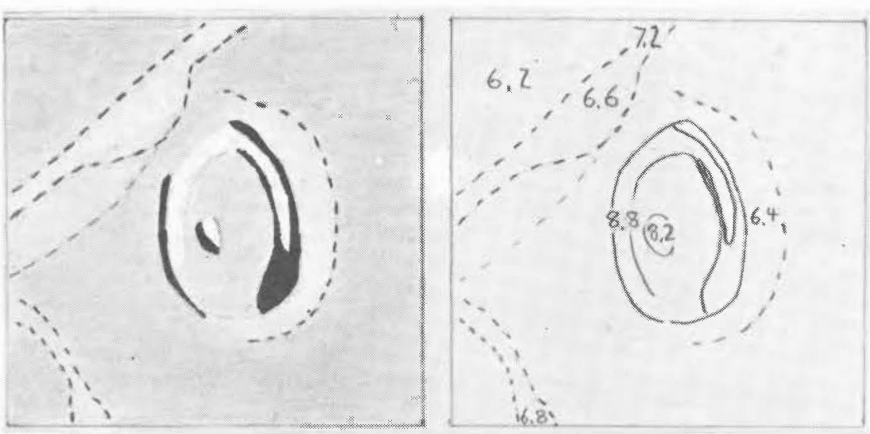


FIGURE 6. Method For Presenting Intensities.

Compare with Figure 3 in part one, Str. A., Jan.-Feb., 1960, which shows same drawing (Schiaparelli) with a method of recording intensities.

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policies in their different Sections. Thus, with this information as a guide (in fact, some of the preceding statements were generalizations based on this information), perhaps if I am cautious I can safely make some helpful statements.

First of all, as mentioned before, there is a noticeable trend among the Sections toward standardization of submitting material. A number of our Sections now have or plan to have standard forms which will be sent to observers and which the observers can use to copy their data. This makes the observer's job easier (for example, the Jupiter Section forms have a properly shaped blank disk for Jupiter). This also leads to more efficient analysis by Recorders since the form in which the data is reported is constant. (As pointed out in the preceding part of this paper, we wish to eliminate uncontrolled variables in scientific work.) Thus, the problem of just how the submitting should be done will be at least partially solved. Observers should plan to get a supply of whatever forms may be available for submitting their work to each particular Section.

The best detailed instructions for doing work in each Section come, of course, from the Section Recorders. Therefore, I have included an appendix listing articles on observing and submitting material for each Section. Planetary observers can check this list for more information on the particular planet of interest. Such articles on planets are frequent in appearance, often coming (not just by coincidence) just before an approaching apparition.

Our Lunar Section presents a unique case since the moon cannot be treated one apparition at a time. It seems to be best to submit surface studies formation by formation. That is, an observer may work up a report based on several observations of one area. Prof. Haas writes: "Our Lunar Section should, I think, always accept single lunar drawings of individual craters. However, charts of selected lunar areas, made from a number of drawings, are actually more valuable. ...each contributing observer will do well to draw and study only a limited number of lunar objects."

Other lunar programs of the A.L.P.O. include the Lunar Meteor Search, which, by massing observations, is attempting to establish the relative frequency or infrequency of visible lunar meteoritic phenomena, and the Lunar Missile Survey, which is concerned with observing manmade space probes in the vicinity of, or impacting upon, the moon. Forms and information on these specialized programs are available from Robert Adams (Meteor Search) and Prof. Haas (Missile Survey).

Our Comets Section also has unique problems of recording data. The abundant material published in <u>The Strolling Astronomer</u> and sent out to interested observers by our Comets Recorder, David Meisel, provides detailed instruction and forms for submitting cometary work.

Besides checking articles such as those listed in the appendix to get further information on these A.L.P.O. activities, observers are encouraged to communicate with the Recorders about problems of gathering and submitting data and in order to get observing forms when they are available.

It is difficult to say much more than this about the various Sections due to their individual natures. As already noted, there is a tendency toward production of forms for submitting observations. Also, Sections are requesting work in special fields so that we may be seeing more specific projects organized for research by a whole Section. In any case, the observer will want to try to plan ahead of time what sort of observing he will do, and how it may fit in with what is desired by the Section Recorder. He will also want to know how the Section Recorder wants this work reported. In Part 1 of this article we have discussed how the most common form of record, the drawing, is made and have mentioned some of the other sorts of observations that are conveniently made along with drawings. In the present Part 2 we have discussed the problem of submitting these observations. With this information as background the observer can proceed to check the articles by Recorders and to map out observing programs consistent with personal interest and the aims of the Sections. Good observing!

APPENDIX

There follows here a list of some articles from The Strolling Astronomer on observing, dating back to 1956. These are listed by Sections. Section observational Reports as such are not listed unless they are also the means of giving instructions for observing. The more recent articles are favored for giving up to date information. Such articles are valuable in planning observing programs.

MERCURY SECTION

Ranck, Owen C., "Report of the A.L.P.O. Mercury Section," Jan.-Apr., 1959, pp. 20-22. (Work in 1957 and 1958.)

VENUS SECTION

Bartlett, James C., Jr., "Venus--the Unknown Planet," Jan.-June, 1957, pp. 38-42. (Goals and research.)

MARS SECTION

Cave, Thomas R., "The Amateur Mars Observer and Some Notes on the 1958-59 Apparition," Nov.-Dec., 1959, pp. 128-135. (Notes on observing, research.)

Cave, Thomas R., "Your Telescope and Mars," July-Sept., 1958, pp. 75-76. (Use of the telescope.)

Abbey, Leonard B., Jr., "Observing Mars in 1958," Jan.-March, 1958, pp. 3-7. (Comments on observing.)

Haas, Walter H., "Mars in 1956," March-April, 1956, pp. 44-48. (Observing programs and techniques.)

Vaughn, Frank, "Mars--1956," Jan.-Feb., 1956, pp. 3-7. (Observing programs and techniques.)

JUPITER SECTION

Budine, Phillip W., "Valuable Amateur Studies of Jupiter," Jan.-Feb., 1960, pp. 13-18. (Transit observations and studies of Disturbances.)

Budine, Phillip W., and Reese, Elmer J., "Jovian Nomenclature and Transit Observations," Jan.-Feb., 1960, pp. 18-21.

Budine, Phillip W., "Some Suggestions for Observing Jupiter," Jan.-Apr., 1959, pp. 1-3. (Observing programs.)

Budine, Phillip W., "Central Meridian Transit Observations on Jupiter," Jan.-April, 1959, pp. 3-6. (Instructions and tables for calculating.)

Squyres, Henry P., "Some Suggestions about what can be done on Jupiter during the 1957 Apparition," Sept.-Oct., 1956, pp. 108-110. (Observing programs.)

SATURN SECTION

Cragg, Thomas, "The A.L.P.O. and Saturn," Jan.-June, 1957, pp. 42-43. (Goals and research.)

URANUS - NEPTUNE SECTION

Abbey, Leonard B., Jr., "A Progress Report on Uranus and the A.L.P.O.," Nov.-Dec., 1957, pp. 145-147. (Goals and research.)

Abbey, Leonard B., Jr., "The Uranus - Neptune Section Report No. 1: Plans for 1957," May-June, 1956, pp. 54-59. (Goals and research.)

LUNAR SECTION

Haas, Walter H., "Some Suggested Observations of the Total Lunar Eclipse on March 13, 1960," Jan.-Feb., 1960, pp. 28-32. (Eclipse observing programs.)

"A Method of Detecting Lunar Swan Emission Bands," Sept.-Oct., 1959, p. 124. (Filter usage.)

"Some Comments on a Lunar Research Project," May-Aug., 1959, pp. 95-96. (Comments on Westfall's paper; see below.)

Westfall, John E., "A Suggested Program of Lunar Research," Jan.-Apr., 1959, pp. 6-8. (Proposed studies of specific areas.)

Both, Ernst E., "Introduction to Selenomorphology," Oct.-Dec., 1958, pp. 114-119. (Morphological study.)

Haas, Walter H. "Lunar Colongitude: Why, What, How, and When," July-Sept., 1958, pp. 80-82. (Calculation and use of colongitude.)

Moore, Patrick, "Some Suggestions Regarding Lunar Domes," July-Sept., 1958, pp. 83-85. (Studies of domes.)

Wilkins, H. Percy, "The Night Side of the Moon," July-Oct., 1957, pp. 99-102. (Studies of the night side.)

Wilkins, H. Percy, "Modern Selenography," Sept.-Oct., 1956, pp. 106-108. (Observing prgorams.)

LUNAR METEOR SEARCH

Adams, Robert M., "Progress Report of the A.L.P.O. Lunar Meteor Search Project in 1958-59," Jan.-Feb., 1960, pp. 21-26. (Recent work.)

Thompson, Steadman, "On the Prospects for Success of the A.L.P.O. Lunar Meteor Search," May-June, 1956, pp. 62-63. (Probability of confirming lunar meteors.)

LUNAR MISSILE SURVEY

"The Lunar Missile Survey: Possible Changing Objectives," Sept.-Oct., 1959, pp. 123-124. (Goals.)

Haas, Walter H., "Artificial Planet One and the A.L.P.O. Lunar Missile Survey," Oct.-Dec., 1958, pp. 152-154. (Observations and notes on research.)

Haas, Walter H., "The A.L.P.O. Lunar Missile Survey: A Status Report," July-Sept., 1958, pp. 103-107. (Organization and research.)

COMETS SECTION

Meisel, David D., "New Comet Burnham," Jan.-Feb., 1960, pp. 12-13. (Observing programs and forms.)

Meisel, David D., "The Art of Comet Searching," Jan.-Apr., 1959, pp. 8-12. (Observing techniques.)

Meisel, David D., "The A.L.P.O. Comets Section," Nov.-Dec., 1957, pp. 134-136. (Organization and research projects.)

Meisel, David D., "A Visual Cometary Photometer," Nov.-Dec., 1957, pp. 136-138. (Construction of photometer.)

Meisel, David D., "Visual Observations of Comet Arend-Roland 1956h and Others," Sept.-Oct., 1956, pp. 116-122. (Work on Arend-Roland and notes on observing.)

MISCELLANEOUS

Glenn, William H., "Observing the October Eclipse," May-Aug., 1959, pp. 50-58. (Solar eclipse observing programs.)

Haas, Walter H., "Some Remarks upon the Tombaugh-Smith Seeing Scale," Oct.-Dec., 1958, pp. 144-145. (Improved seeing scale.)

THE DOLLFUSS WHITE SPOT: A PRELIMINARY REPORT

By: Thomas A. Cragg

A great white spot was found on the planet Saturn by Dollfuss at Pic du Midi in late April and was confirmed on May 2, 1960. The latitude of the new spot was about +60°, and it had a preliminary period of about $10^h\ 40^m$. This information was quickly communicated to various groups interested in planetary news so that the spot could be followed up by other observers. Those who have observed the spot so far, to the author's knowledge, are Mr. Thomas R. Cave, Mr. Thomas A. Cragg, Mr. Joe S. Miller, and Mr. Leif J. Robinson. When first observed on May 6, 1960, (U.T.) by the above mentioned group, it was a white spot slightly smaller than the large oval clouds common to the E.Z. It gradually grew smaller and less evident as the bright polar zone developed. The last transit observed by the above group was on May 26, 1960. On May 30, the next good transit time date, nothing was found in the zone distinct enough to allow a good C.M. transit to be obtained. Figure 7 shows the spot as seen by Cragg on May 22 (U.T.), four days before the last obtainable transit, and of course after the spot had largely subsided.

From immediately available transits it seems that this spot exhibited a period of $10^h\ 39^m.8$, which is fully 20 minutes shorter than the spectroscopic rate for that latitude.

Mr. Botham of South Africa observed a spot on Saturn in late March and early April, 1960; but from the information supplied by a BAA Circular, it appears that this could not be the Dollfuss Spot as the longitudes don't check. Mr. Clyde Tombaugh, it is understood, has also seen a spot on Saturn. No information on his spot is in the hands of the author at this writing.

All this points to the strong probability that Saturn is having a very active apparition this year and should be ardently followed.

GENERAL NOMENCLATURE OF SATURN

By: Thomas A. Cragg

Ball

EZ = Equatorial Zone.
EB = Equatorial Band.
NEB_s = North Equatorial Belt, south component.
NEB_n = North Equatorial Belt, north component.

NTrB = North Tropical Belt.
NTB = North Temperate Belt.
NPR = North Polar Region.

Rings

A = Outer bright ring, outside the Cassini Division.
B = Middle bright ring.
C = Inner dusky ring or Crape Ring.
D = Outer dusky ring outside of Ring A.

Ring Divisions

C5 = Division in the middle of the Crape Ring.
B0 = Division between the Crape Ring and the bright middle ring.
B3 = Division 0.3 of the way out in Ring B.
B5 = Division 0.5 of the way out in Ring B.
B7 = Division 0.7 of the way out in Ring B.
Cassini = Division separating Ring A from Ring B.
Encke (A5) = Division 0.5 of the way out in Ring A.

Frequently minor divisions in the rings are obscured by being adjacent to abrupt changes in ring intensity. This is especially true with the divisions in Ring B, which frequently divide the three major shadings normally found in this ring.

This general nomenclature sketch (Figure 8) was purposely made without shadows. Prior to opposition the shadow of the ball on the rings is always west of the ball, or on the left in the simply inverted view. After opposition the shadow is to the east or right in the simply inverted view. The shadow of the rings on the ball depends entirely upon the relative Saturnicentric latitudes of the Sun and the Earth, which don't necessarily change over at opposition. Figure 8 shows the rings at their maximum tilt exposing the northern surface. Although not exactly correct, it will suffice for a general description covering the 1958, 1959, and 1960 apparitions.

Those familiar with previous general nomenclature discussions will recognize a new feature added this time, i.e. the NTrB. This belt made its appearance early in the 1958 apparition and has continued to be seen since then.

SATURN IN 1958

By: Thomas A. Cragg

The apparition was not too well observed despite the rather impressive number of contributors. In general, it appeared to be a normal apparition without much of the kind of detail that requires much continuous observation. Those contributing to this report are listed below:

Mr. Lynwood G. Aubrecht, 16128 South Drexel, South Holland, Illinois, 60 mm. refr.
Dr. James C. Bartlett, Jr., 300 North Eutaw Street, Baltimore 1, Maryland, 5" refl., 4½" refl., 3" refl.
Mr. Stephen P. Bieda, 29 Clareview Avenue, San Jose, California, 4½" refr.
Mr. Enian Buchanon.
Mr. Phillip W. Budine, 102 Trafford Road, Binghamton, New York, 4" refr.
Mr. Thomas A. Cragg, 246 West Beach Avenue, Inglewood 3, California, 6" refr., 12" refl., 12" refr.
Mr. Hugh D. Curtis, 2511 Montrose Avenue, Montrose, California, 8" refl.
Mr. Sheldon Friedman, 6448 South Halsted, Chicago 40, Illinois.
Mr. D. Del Grande, 2.4" refr.
Mr. Walter H. Haas, 1835 Evans Place, Las Cruces, New Mexico, 12½" refl., 6" refl.

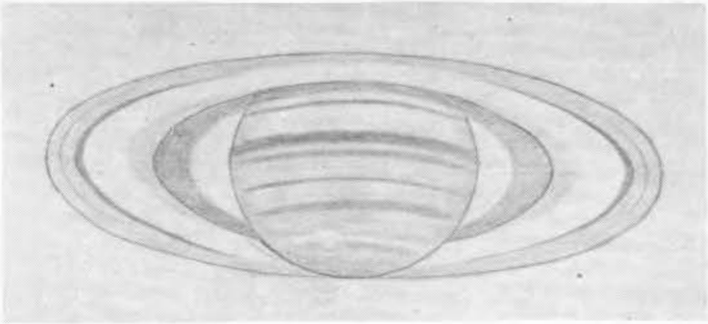

FIGURE 7. Drawing of Saturn by Thomas A. Cragg on May 22, 1960, at $11^h\ 7^m$, U.T., 12-inch refl. at 240X. Seeing 3-4, transparency 4. "Dollfuss white spot," in zone just south of NPR, observed to transit at $11^h\ 13^m$, U.T. Division B5 suspected twice.

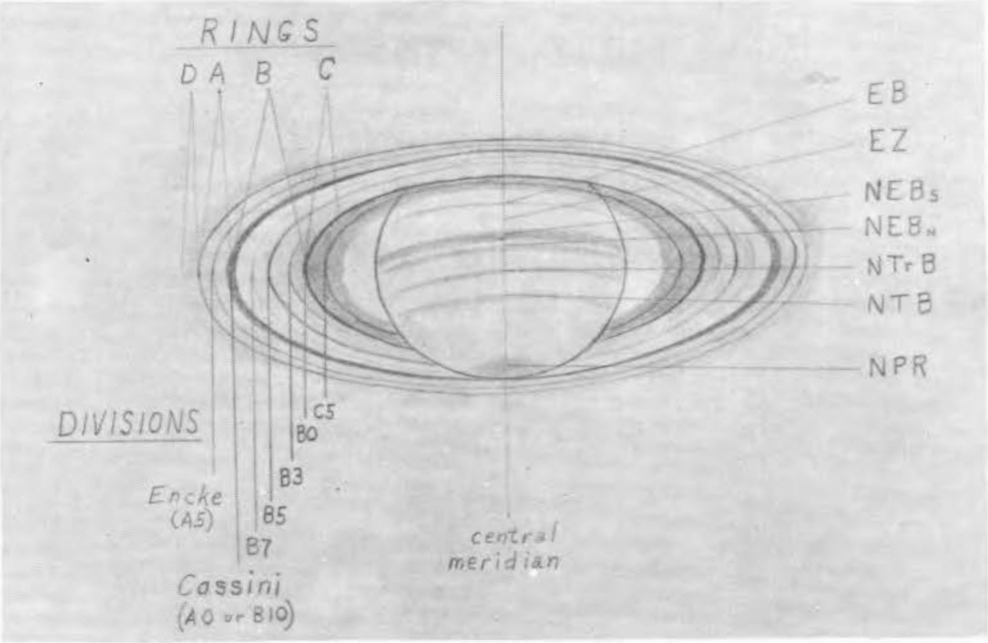

FIGURE 8. Nomenclature of Saturn employed by the A.L.P.O. See also article "General Nomenclature of Saturn" in this issue. Contributed by Thomas A. Cragg.

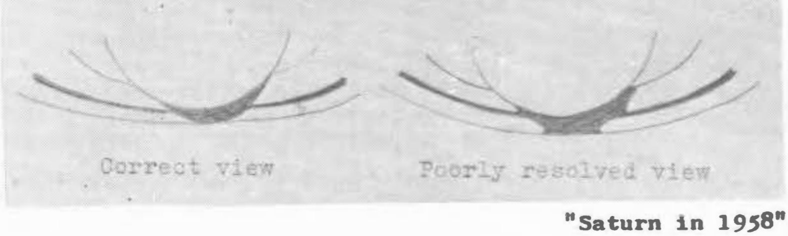

FIGURE 9. A suggestion by Owen C. Ranck relating to observed anomalous shapes of shadow of ball of Saturn on rings. See also article "Saturn in 1958" in this issue.

Mr. Carlos M. Jensen, 1432 West 4th Street, Salt Lake City, Utah, $3\frac{1}{4}$" refr.
Mr. Craig L. Johnson, 765 South 46th Street, Boulder, Colorado, 4" refl.
Mr. Owen C. Ranck, 112 Broadway, Milton, Pennsylvania, 4" refr.
Mr. T. J. Richards, 14 Donald Crescent, Wellington, W3, New Zealand, 6" refl.
Mr. Frank R. Vaughn, 5801 Hammersley Road, Madison, Wisconsin, 10" refl.
Mr. Gary Wegner, 9309 N.E. 191st Street, Bothell, Washington, 10" refl.

The Ball

EZ: The Equatorial Zone in 1958 was always the brightest part of the ball, being fainter than the outer part of Ring B early in the apparition, essentially equal to it in mid-apparition, and generally brighter than the outer part of Ring B in the latter part of the apparition. The number of bright oval clouds, generally rather frequent in this zone, was conspicuously less. Also, fewer equatorial festoons were observed.

EB: Fully half of the observers perceived this belt more than once during the 1958 apparition. There appears to be little doubt that this belt is slowly getting stronger. When seen, it was usually quite narrow and rather faint. W. H. Haas observed the following part of a darker section in this belt on May 22 and 25, 1958, (U.T.), yielding an uncorrected period of $10^h\ 14^m.7$. The light-time change would be very small over such a short time interval, so the $10^h\ 14^m.7$ period is probably good. However, this value is a little long for this latitude, $10^h\ 14^m.0$ being more like the normal rate.

NEB: This was clearly the most obvious belt during the entire apparition, and was seen by all observers. During nearly all the apparition, both components were visible, the southern component always being the stronger. During the last half of the apparition Bartlett, Jensen, and Johnson occasionally saw it single. The occasional short-lived dark spots, wavy southern edge, and festoons normally associated with this belt were again seen, but less in number. Bartlett led the field in checking rotation-rates of these very transitory phenomena, but none lasted long enough to improve the basic $10^h\ 15^m$ period for this region. Bartlett found two spots nearly a month apart, which according to the $10^h\ 15^m$ period looked as if they were the same. However, if the original spot's period was off by only 0.5 minutes, in one month the accumulated error would amount to $\frac{1}{2}$ hour difference in the predicted central meridian transit time! Bartlett and Haas observed the color of this belt to be reddish-brown, which is normal for the NEB.

NTrB: This is a new belt and was seen in May, 1958, as soon as the planet came under observation. Bartlett and Johnson saw it off and on during the apparition, but they were apparently not the only ones who saw it. When seen, it appeared mostly as a rather narrow belt roughly half way between the NEBn and the NTB. A brightish zone between it and the NEBn (a NTrZ?) containing brightish oval clouds and festoons was reported by Bartlett in June.

NTB: This belt was always the second most conspicuous belt on the planet, being seen consistently by nearly all the observers. Its general nature was more that of a widish diffuse belt rather than of a thin narrow belt like the EB. Spots in this belt were quite rare, though one was picked up but died out before it could be confirmed.

NPR: Apparently either some very rapid changes or else too little attention being paid to this normally dormant region made it appear that the whole dark cap would disappear for short intervals. Clearly, sufficient observations are not at hand to determine which is the case. If these are real changes, they represent the greatest change in a small interval of time witnessed on Saturn in recent years. It is hoped that in the future more attention will be given this area to see whether these changes are real.

The Rings

The outer portion of Ring B was always the brightest part of the ring system, even brighter than the EZ during the first part of the apparition. Ring C, the Crape Ring, was seen in front of the ball by all observers, and in the ansae by 3/4 of them. A peculiar "jaggedness" of the inner edge of Ring C was observed by Richards but went totally unconfirmed by others. Here is something to look for when viewing Ring C in the future.

Ring B continued the appearance of three sharply defined shaded regions, the inner third always being the darkest and the outer third always being the brightest.

The dark radial rifts in the inner part of Ring A seen at the ansae in the past largely by Chet Smith were observed by Richards, with the possible confirmation of Wegner. A brighter section immediately adjacent to Cassini's Division was seen occasionally by W. H. Haas.

Ring D was seen by Craig Johnson on July 29 and 30 under very superlative conditions.

Ring Divisions

Cassini--Seen by all observers on every occasion. More than half of the observers saw it all the way around the rings.

Encke's--Seen by nearly all the observers on most occasions. W. H. Haas felt that this division was more nearly 0.6 of the way out in Ring A.

C5--Not reported by any of the observers.

B0--Observed by Craig Johnson, W. H. Haas, and T. Cragg. Cragg felt this division was easier than Encke's when the Crape ring was well seen in the ansae.

B3--Reported during this apparition by W. H. Haas, who saw it on several occasions, but unconfirmed by others.

B5--Cragg reported this division several times but was unconfirmed by others.

B7--Unreported by any of the observers.

Satellites

Bartlett noted changes in the color of Titan as a function of orbital position. To the Recorder's knowledge this is the first attempt of anyone in this direction. It would seem a little surprising if a great color change were found. However, there is little question of the variation of total light with orbital position of most of Saturn's satellites, especially Iapetus.

Bi-Colored Aspect

This is an effect making one ring-arm of Ring A appear redder than the other, the effect being confirmed with filters. Dr. Bartlett, our chief observer of planetary colors, has continued his study of this effect. On July 2 the effect was quite remarkable so Bartlett observed with three different telescopes and different eyepieces, confirming the aspect with <u>all</u> combinations. Dr. Bartlett's wife observed the effect also <u>without</u> previous knowledge.

Certainly we're dealing here with an illusion of some kind, but no readily available explanation is at hand. Such obvious things as atmospheric refraction, chromatic aberration, and possible unique difficulties with a single telescope or eyepiece have been unsuccessfully suggested.

General Notes

Toward the end of the apparition the higher latitude belts appeared to be fading, but one wonders how much of this fading was due to Saturn's increasing distance.

Mr. Ranck brought up an interesting suggestion regarding the way different observers depict the shadow of the ball on the rings. Especially during large inclination angles, the edge of the ball's shadow crosses the Cassini Division at a very small angle. These small angle intersections generate very narrow cusps--like the horns of a crescent moon--which tax the resolving power of our instruments. Mr. Ranck's suggestion is that we would probably see these "horns" more rounded due to our lack of resolving power (Fig. 9). If we go one step farther, we would probably "straighten out the curves" in the poorly resolved view if seeing were also rather imperfect. How effective irradiation would be in this problem is also worth questioning. At any rate, it seems that it would be wise to think seriously about Mr. Ranck's suggestions whenever any careful considerations of critical shadow shapes are made.

SOUTHWEST REGION CONVENTION OF THE ASTRONOMICAL LEAGUE

By: Ray M. Camp, Jr.

Sixty-five delegates of nine amateur astronomical societies from three states, Louisiana, Texas, and New Mexico, attended the biennial convention of the Southwest Region of the Astronomical League in Fort Worth, Texas, on June 10 and 11, 1960. The convention was held at the Fort Worth Children's Museum and at the observatory area of Convair Recreation Association in Fort Worth. Many features of the two-day program, the results of hard work on the part of many society members in preparation, provided a thoroughly enjoyable convention consisting of exhibits, amateur papers, films, special demonstrations and social activities. Host societies were Fort Worth Astronomical Society, Fort Worth Junior Astronomical Society, Texas Astronomical Society (of Dallas), and Convair Recreation Association Astronomy Society (Fort Worth). The last-named group has only recently become a member of the Astronomical League. This group has, in the last three years, constructed a 19" reflecting telescope, an observatory, and other astronomical instruments, and has contributed much of time and scientific instruction to amateur astronomers of the entire Southwestern area.

New officers of the Southwest Region of the Astronomical League were elected at the business session on Saturday, June 11, 1960, to serve for the period 1960-1962: E. M. Brewer (Texas Astronomical Society, Dallas), regional representative; Arthur E. Gilligan (Convair Recreation Association Astronomy Society, Fort Worth), chairman; Ray M. Camp, Jr. (Fort Worth Astronomical Society), vice-chairman; Charles Frazier (Texas Astronomical Society, Dallas), secretary-treasurer. Mr. Brewer, as regional representative, retains the office he has filled so ably during the past two years. The other new officers succeed the excellent leadership of retiring officers Ted F. Gangl (Dallas), chairman; Clifford O. Weyland (Henderson, Texas), vice-chairman; and James M. McMillen (Fort Worth), secretary-treasurer.

Gathering at 3:00 p.m., Friday, June 10, 1960, delegates registered in the modern rotunda of the Fort Worth Children's Museum, exchanging greetings over cold punch provided by ladies of the Fort Worth Astronomical Society and Convair Recreation Association Astronomical Society. This friendly, informal spirit lasted throughout both days of the convention. Hard work on the part of members on the program paid off with most enjoyable and informative sessions of the convention. The quality of individual research papers presented by members was high; their ability to reach the audience was exceptional. The close attention and response of the audience indicated the group's genuine interest.

The Friday afternoon session was launched at 4:30 p.m. by a talk by Mr. Ted F. Gangl, chairman of the region for 1958-60, in which he presented ideas concerning "Astronomy as Related to Industry," with other coordinating factors of science and our daily lives. Following this excellent setting of a theme, Norman Cole, Curator of the Planetarium of Fort Worth Children's Museum, presented a fine analysis and method of procedure for the construction of "Maksutov Telescopes."

Previous to the convention and during registration, many delegates set up exhibits in the rear of the auditorium of the Museum. There were telescopes belonging to members of the Fort Worth Junior Astronomical Society and Convair Recreation Association Astronomy Society. Mr. Walter H. Haas of the Pan American College Observatory displayed original observation notes, drawings, and photographs secured in planetary study. Dr. Herman C. Sehested of Fort Worth displayed a graphic series of Moonwatch materials, including several telescopes now in use, an actual ephemerical chart of an artificial satellite for the days of the convention, and merit awards received by the Fort Worth Moonwatch team for its work during the past three years.

Following the dinner recess on Friday, guests gathered in the Charlie Mary Noble Planetarium of the Museum and were treated to a "Trip to the Moon" by Curator Norman Cole. Receding terrestrial and lunar horizons and distant, fast approaches to the satellite and the planet by the spectators from their seats in the imaginary space ship were the most impressive features of this stimulating and good-humored expedition. Dramatic climaxes were obtained by sound effects of rockets, communications between "crew members," and the explosive moments when the "ship" reversed direction to decelerate for landing.

Delegates then immediately stepped from the planetarium to the roof of the Museum for a Moonwatch demonstration by Dr. Herman C. Sehested. He was assisted at the telescopes by several regular members of the Fort Worth Moonwatch team. High clouds concealed the passage of the expected satellite. Nevertheless, the routine use of star-charts, time signals, stop-watches, and tape-recorded procedures presented an authentic scene of action. Informal discussion and visiting followed until nearly 10:00 p.m., when the Friday's session of the convention was considered adjourned.

Saturday's session began with registration of additional delegates and an official welcome by Ted F. Gangl, regional chairman, and James E. Harper, president of the Fort Worth Astronomical Society. The program was turned over to Miss Kay Gross, Junior Program Chairman, who introduced three outstanding young men and one young lady in a scientific series of talks during the morning. Miss Sara Worley of the Shreveport Junior Astronomical Society, Shreveport, Louisiana, vivaciously reported the formation of the society during the past year. Charles Miller of the Junior Texas Astronomical Society of Dallas surveyed astronomical spectroscopy. Slides were used graphically by Harry Crawford of Fort Worth Junior Astronomical Society to show his own camera mounting as used for astrophotography, and by Tommy May of Arlington, Texas, to show stages of his construction of his own observatory and telescope. Excellent audience-contact and wit were obtained by the young speakers throughout the junior program.

At 11:00 a.m. on Saturday Mr. Walter H. Haas of Pan American College Observatory, Edinburg, Texas, presented a very educational review of "Suggested Amateur Observation of Jupiter and Saturn." These planets will be in vantage positions for summer observation in 1960, and Mr. Haas pointed out that strict use of procedures in setting up charts and in drawing of details exactly as observed, as well as simple description of colors, would obtain for the observer accurate results which can be depended upon for scientific research.

During the lunch recess, delegates talked, looked at the exhibits, saw the large collection of meteorites set up by Oscar Monnig of Fort Worth and the Museum, and were photographed as a group in the Museum rotunda. The program was resumed, and very interesting subjects were covered by the following speakers: Charles Frazier of Dallas presented some general "Problems of Cosmology." Tommy May of Arlington, Texas, reviewed "Gravitation," with blackboard solution of formulas. Marvin Fox, of Convair Recreation Association Astronomy Society, Fort Worth, used beautiful black-and-white slides with his "Milky Way" talk. George Craig, also of the Convair Society, presented some interesting drawings of space vehicles and planetary environments with relation to "Colonies in Space." Oscar Monnig, nationally-known authority on meteorites, of Fort Worth, presented this time a series of color slides of star trails and other celestial objects in "Amateur Celestial Color Photography."

At 5:00 p.m. Saturday Dr. W. A. Orr, senior aerophysics group engineer of Convair Division, General Dynamics Corporation, Fort Worth, a special guest speaker, presented a very interesting lecture concerning "Some Interesting Aspects of Space Flight," which included color slides indicating orbital patterns, possible interplanetary flight plans, and various present and future possible means of propulsion, together with problems which may be encountered by manned space flight. After the dinner recess, the delegates traveled to the Convair Recreation Association area in suburban Fort Worth to see the recently-constructed 19" reflecting telescope and the observatory of the Convair Recreation Association Astronomy Society.

FIGURE 10. Delegates who enjoyed the many exhibits, educational lectures, demonstrations, and social activities at the biennial convention of the Southwest Region of the Astronomical League, held at the Fort Worth Children's Museum, Fort Worth, Texas, on June 10 & 11, 1960. Photograph by Lee Angle Photography, Fort Worth, Texas.

Jaromir J. Becan
Ronny Bolton
Basil Boyd
Bobby Brown
W. M. Calhoun
Ed Calvert
Ray M. Camp, Jr.
Norman Cole
Jimmy D. Cox
Harry Crawford
Marvin Fox
Charles Frazier
Ted F. Gangl
Thomas L. Gibson
Mr. & Mrs. Arthur E. Gilligan
Joel Gregory
Miss Kay Gross
Mr. & Mrs. James E. Harper
John Harper
Ralph Hopkins
James M. McMillen
Tommy May
Charles Miller
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Wayne Pound
Dewen Schwartzenburg
Lee Shepherd
Floyd L. Shirey
Uel Stephens
David Thomas
John Walker
Randy Wills
J. W. Worley
Sara Worley
(six people apparently unidentified)

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