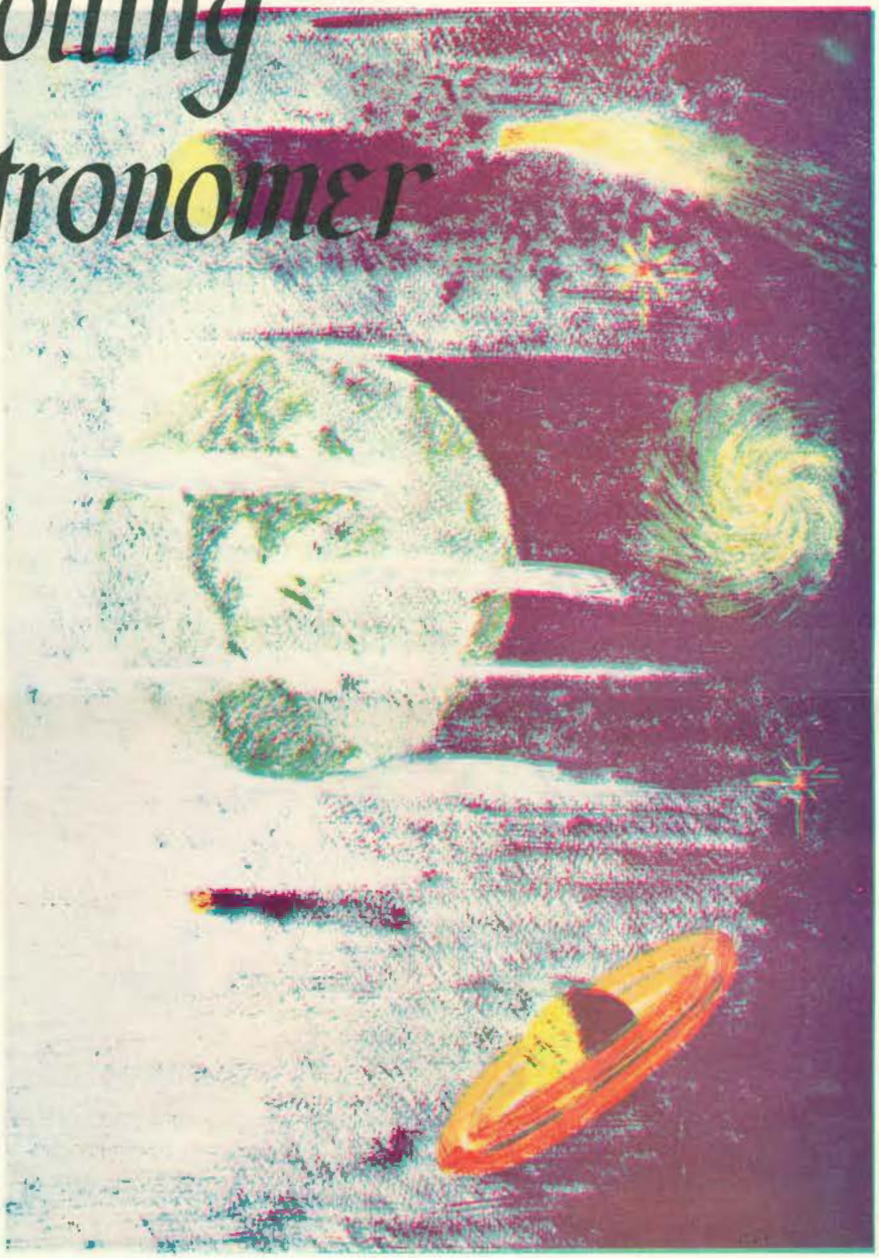
The Strolling Astronomer

Volume 6, Number 6

June 1, 1952

ASSOCIATION OF LUNAR AND PLANETARY OBSERVERS



The Strolling Astronomer
1203 N. Alameda Street
Las Cruces, New Mexico

SUBSCRIPTION RATES

1 Issue (in stock)	$0.35
6 Months	1.75
1 Year	3.00
2 Years	5.00

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NOTICE: In order to facilitate the reproduction of drawings in future issues, readers are requested to exaggerate contrasts on drawings submitted. Extremely faint marks cannot be reproduced. Outlines of planetary discs should be made dark and distinct. It is not feasible to reproduce drawings made in colors. Following these precepts will permit better reproductions.

Figure 1. Photograph of Jupiter on Sept. 30, 1951 by T.E. Howe, 4-inch refl.

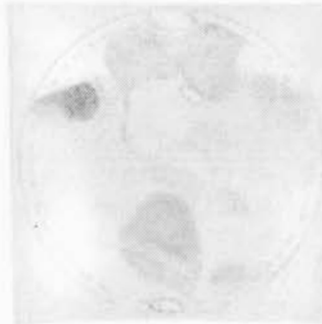
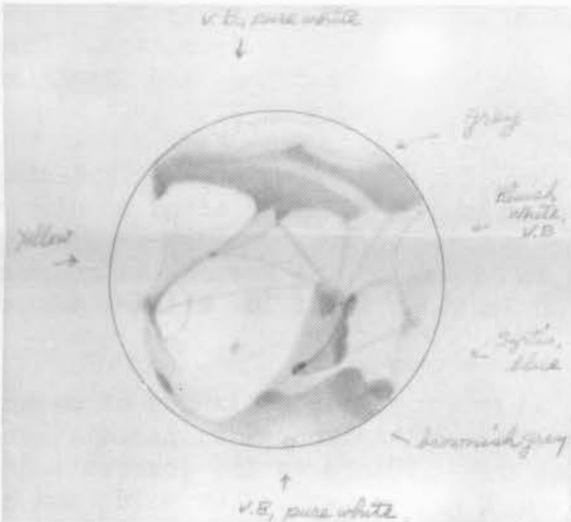


Figure 2. Mars.
C.B. Stephenson.
18.5-inch refr. 400X.
April 20, 1952. 8^h20^m,U.T.
CM = 38°



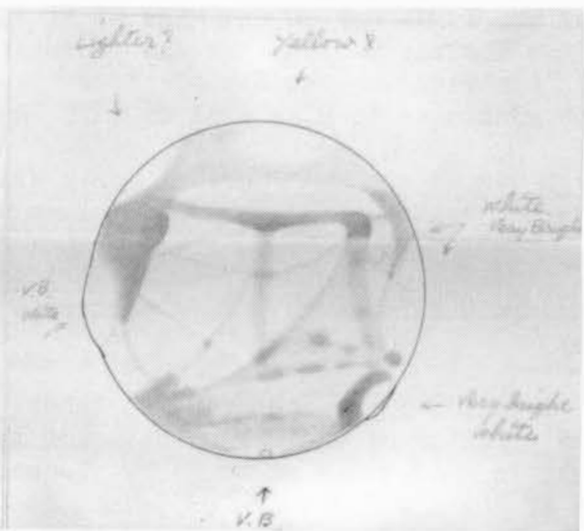


Figure 3. Mars. 8-inch refl. 285X.
T. Saheki. May 12, 1952. $11^h\ 0^m$, U.T.
C.M. = 244°.

Figure 4. Mars. T. Saheki
8-inch refl. 222X-400X.
May 6, 1952. $13^h\ 35^m$, U.T.
C.M. = 334°.

Left: E.K. White. 7-inch refl.
250X. Jan. 9, 1948. 6^h5^m, UT.
Right: W. H. Haas. 18-inch refr.
400X. Mar. 12, 1945. 1^h42^m,UT.

Figure 5. Uranus

Figure 6. Uranus

Correction to May, 1952, Issue. On pg. 75, line 18, read "are the same data", not "are the same date".

Astronomical League National Convention. Although the date will be very late indeed when this issue reaches our readers, we should still like to direct attention to the meeting of the Astronomical League at Dallas, Texas on July 3-6, 1952. A full program of papers and exhibits has been prepared. An attractive post-Convention feature for those attending is an optional visit to the McDonald Observatory and to the Carlsbad Caverns. The tentative program and other details may be found on pg. 196 of the June Sky and Telescope. The Convention Manager is Mr. E. M. Brewer, 5218 Morningside Ave., Dallas 6, Texas. All interested persons are most welcome to attend.

Fourth Convention of Western Amateur Astronomers. The Eastbay Astronomical Society will be hosts for this meeting on August 18-20, 1952 at the Leuschner Observatory on the University of California campus at Berkeley. There will be papers, exhibits, and a telescope-party, to all of which amateurs are invited to contribute. Numerous tours to places of scenic or scientific interest are being planned, including ones to the great cyclotron above the Berkeley campus and to the Lick Observatory. More detailed information will be found in a circular released by Mr. W. C. Marion and Miss H. E. Neall, who are respectively the President of the Eastbay Society and the Secretary of the Convention Committee. They urge all amateurs who can attend to do so. All communications and inquiries should be addressed to Miss Neal at 1626 Chestnut St., Berkeley 2, Calif.

New Names on the Moon. Mr. H. Percy Wilkins, 35 Fairlawn Ave., Bexleyheath, Kent, England writes us of these new names which he has recently added to his map:

1. Sirsalis A has been renamed Bertaud in honor of the French astronomer at the Meudon Observatory. This crater is on Section XX of the Wilkins map of the moon.

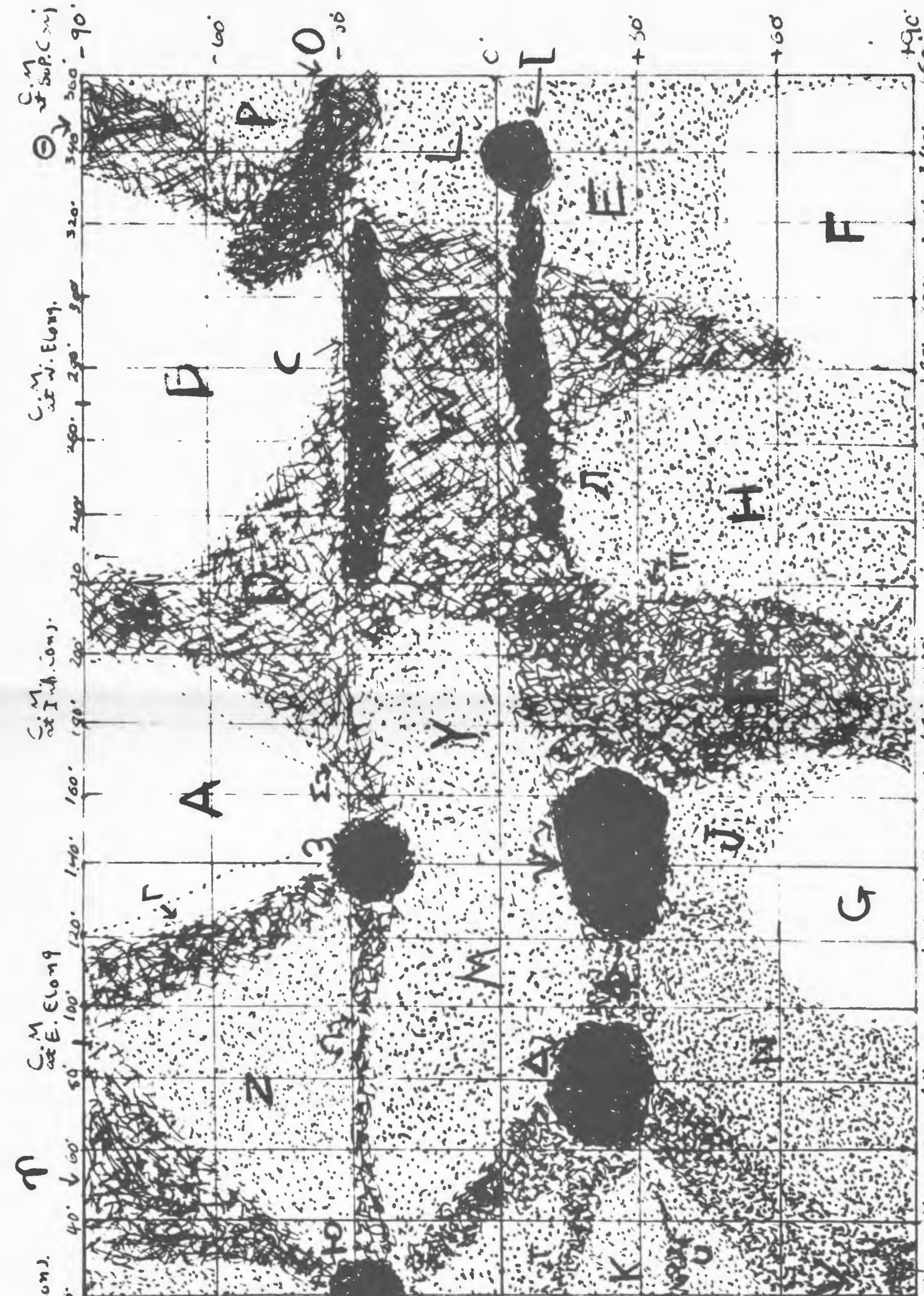
2. Grimaldi B has been renamed Saheki in honor of our colleague at Osaka, Japan, the Director of the Mars Section of the Oriental Astronomical Association. Mr. Saheki is indeed one of the very foremost contributors to the observational programs of the A.L.P.O. Crater Saheki is near the north end of Grimaldi and is easily found on Section XIX of the Wilkins map.

3. Riccioli B has been renamed Ingalls in honor of Mr. Albert Ingalls, the editor of "The Amateur Astronomer" in Scientific American magazine. Mr. Ingalls is, of course, known to every amateur and telescope-maker as a longtime friend and adviser. In 1951 his lengthy services to amateur astronomy were fittingly recognized by the presentation to him of the Astronomical League Award. Crater Ingalls lies just north of Riccioli on Section XIX of the Wilkins map, its floor being largely occupied by another crater.

JUPITER'S SATELLITE GANYMEDE IN 1951-52

by Ernst E. Both

The appearance of Elmer Reese's map of Ganymede (The Strolling Astronomer, Vol. 5, No. 7, pg. 1, 1951) marked a milestone in our knowledge of this Jovian satellite. Now, another milestone has been reached in the form of a composite map by T. E. Howe, 7226 Bennett Ave., Chicago 49, Illinois (see pg. 79). Mr. Howe's composite map was constructed from the following sources:



COMPOSITE MAP OF GANYMEDE BY T. E. HOWE

1. Map by Danjon in L' Astronomie, 1944, pg. 33.

2. Map by Lyot in L'Astronomie, 1943, pg. 58.

3. Map by Reese, mentioned above.

4. Map by Howe, not published, 1951.

5. Drawings by Barnard and Antoniadi, no dates given.

In constructing a map of Ganymede it is assumed that the satellite always keeps the same face toward Jupiter (see The Strolling Astronomer, Vol. 5, No. 7, pp. 9-10, 1951); and a provisional system of longitudes is set up in which the central meridian is 0° or 360° at superior conjunction, 90° at east elongation, 180° at inferior conjunction, and 270° at west elongation (see also The Strolling Astronomer, Vol. 5, No. 3, pp. 8-10, 1951, E. Hare's "Jupiter 1950 Report No. 4"). We have seen that Howe's map was constructed from various sources. In constructing a composite map we should always keep in mind that since we took the material from different sources (from different observations made at different times), we are assuming that we are dealing with a fairly stable surface and that we chart only the unchangeable markings on that surface. Since our knowledge of the surface markings of Ganymede is relatively new, serious observations having been chiefly limited to the last few decades, we must be very careful to accept only markings seen by at least two observers, especially if the observations were made a considerable space of time apart.

In evaluating Howe's Composite Map we compared it to maps of Ganymede by Lyot (1943), Reese (1949), Howe (1951), and Both (1951 and based upon drawings by Saheki and Both) and also to drawings by Both, Cave, Howe, Saheki, and Others. All maps used agree upon one feature: a broad, horizontal, dark band through the equator of the satellite. [In locating the equator of Ganymede we assume that the axis of rotation is perpendicular to the plane of the orbit.] This object is probably the only general agreement found on all maps and most of the drawings. On Howe's Composite Map this equatorial band is split in two and dissolved into details, which extend along both sides of the equator. Otherwise, only Lyot's map shows such an arrangement. The two Syrtis Major-like structures on Howe's Composite Map, the one at longitude 160° to 220°, latitude 0° to 70° N. and the second at longitude 260° to 320°, latitude 0° to 60° N., are found on Reese's map, the first at longitude 210° to 240°, latitude 0° to 20° N. and the second at longitude 270° to 320°, latitude 0° to 20° N., and on Both's map, the first at longitude 200° to 240°, latitude 0° to 40° N. and the second at longitude 270° to 320°, latitude 0° to 65° N. They are, however, absent from Lyot's 1943 map and from Howe's 1951 map. Even so, we can be fairly sure of the actual existence of these two markings. The details south of the equator on Howe's Composite Map are completely absent from Reese's map and are only vaguely shown on Both's map. Only the dark gap between longitude 200° and 220°, latitude 0° to 90° S. is confirmed with certainty on Both's map. Nevertheless, these markings south of the equator appear to be fairly well represented on the other maps.

In conclusion, we may say that it is probably too early to construct an adequate map of the surface markings of Ganymede and that it will take a rather long time before we shall be able to construct maps like the ones we use in the study of the surface of Mars. At the present there is still too much disagreement among the different observers as far as general detail is concerned (not to mention anything about the finer detail!) to permit definite conclusions. Nevertheless, Howe's Composite Map should be regarded as a very creditable achievement and should serve us as an example of what can be done.

Observations of Ganymede in 1951-52. Observations of Ganymede were received from the following observers: E. E. Both (8-inch refr.), T. E. Howe (4-inch refl.), E. J. Reese, 241 S. Mount Vernon Ave., Uniontown, Penna. (6-inch refl.), and T. Saheki, No. 29 Shi-Jūtaki, Uriono-cho II-24, Sumiyoshi-ku, Osaka, Japan (8-inch refl.). All observers agree upon a dark equatorial band. Howe draws a small polar cap-like structure on the south limb (no date given). Saheki's drawing on August 11, when the central meridian of longitude was 60°, looks much like the Syrtis Major on Mars. Saheki writes that the markings are rather faint most of the time but are clearly visible. Both had somewhat the same experience; in fact he never could observe a really distinct, dark-and-bright contrast in the markings. Although Howe records dark, round spots south of the equatorial band, Saheki finds dark spots only to the north of that band.

Reese writes of a very interesting observation, which we quote in full: "I was pleasantly surprised on October 3 [1951], near 3^h25^m, U.T. distinctly to see a thin dark belt crossing the disc of Ganymede. Ganymede was approaching Jupiter's South Polar Region. The belt was inclined about 21° to the belts of Jupiter. At mid-transit (6^h U.T.) the dusky belt was all that could be seen of the satellite - the appearance was similar to that depicted by W. H. Steavenson on Feb. 18, 1932 at 8^h 49^m (Memoirs B.A.A., Vol. 34, part 2, plate XII) except that the belt was thicker at its southeast end rather than at its northwest end. The inclination is the same".

Postscript by Editor. The mapping of Ganymede demands a fairly large and optically excellent telescope, at least 8 inches in aperture and preferably more, and good seeing. (The results obtained by Reese and Howe with smaller apertures are certainly not typical.) Even the fortunate possessor of a 12-inch telescope of very good quality may find only three or four nights a year which are suitable for this exacting study. Obviously, our knowledge of the detail on the surface of Ganymede will grow but slowly. However, the equipped amateur has here a definite opportunity. The Editor would recommend rather high powers of 300X and more and would further urge careful study of the sky-brightness most favorable to seeing the markings on this satellite clearly. For example, it is very important in studying the markings of Mercury to observe the planet when it is not too pale on a full daylight sky but also when it is not too glaring on a late twilight sky, the period for best views perhaps lasting as little as 5-10 minutes. Similar considerations may well apply to Ganymede.

CONSIDERATIONS OF ADAPTATIONS FOR THE WILKINS MAP OF THE MOON

by F. A. Keysor

Many of us who are interested in selenology have purchased the Wilkins map from Mr. Haas. It contains a large amount of detail and will be of invaluable service to selenologists, both amateur and professional. By themselves the Sections of the Wilkins map are rather hard to use, especially when working directly at the eyepiece. Even when one is working on indoor research, the individual features are often difficult to locate. This condition is not the fault of the map because its purpose is to show the moon in great detail. I have found, however, that three separate steps can be taken to make the map easier to use. These are:

1. To secure a location list of lunar features.
2. To make a set of small finder charts.
3. To secure a set of photographs showing the visible lunar surface.

How is the location list prepared? A large index of all named features is included with the Third Edition of the Wilkins map. This index tells on what Section each named feature lies. However, the location of the feature on the Section is not shown. On the Third Edition of the Wilkins map there is a gridwork of horizontal and vertical lines intersecting at right angles. These are to indicate the rectangular coordinates Xi and Eta, as explained upon pg. 62 of the May, 1952 Strolling Astronomer. We may designate the strips between these lines by letters and numbers so that any feature can be located accurately and quickly. For example, assume that we are seeking the location of the crater Tycho. Our location list indicates that this particular crater is situated at designation XXIII 17 P. Thus Section XXIII of the map is the one to use. We next find number 17 on the horizontal designation and then the letter P on the vertical designation. Where these strips converge, we find the crater Tycho. Each Section having its own letters and numbers should be considered an individual unit. With this system features can be located immediately. [One might also employ on a location list the rectangular coordinates Xi and Eta themselves, a procedure having the further advantage that Xi and Eta are readily converted to lunar latitude and longitude. - Editor.]

The second step which can be taken to simplify the use of the Wilkins map is to prepare a set of special finder charts. I have purchased a set of blueprint charts from the Northwood Observatory, 4102 Westview Road, Baltimore 18, Maryland. They show progressive lunar phases and are most useful in finding the correct Sections for use along the terminator. The finder charts have a complete index of their named features. The boundaries and numbers of the Sections of the Wilkins map can be inscribed with white or yellow pencil on the blueprints. For example, if we wish to locate a small crater near Petavius, we first look up Petavius in the index of the finder charts. We thus learn the phase at which the crater is located on the terminator and what Section of the Wilkins map to use, and we then employ the location list to find it upon its Section. This procedure is ideal because it puts the correct Section at our fingertips for observation and research.

A set of photographs of the moon is helpful because it gives a graphic view of the mapped lunar surface. These photographs will probably be in several sections. In order to integrate the use of the charts with these photographs we can make a template with the diameter of the template equal to the diameter of the moon on the finder charts. Then the divisions of the photographs can be inscribed on the template. When this template is placed over the finder charts the finders will show which photographs can be used with the various Sections of the Wilkins map. In the same way any named feature on the finder charts can be located on the photographs. The Wilkins map, the finder charts, and the photographs can be used in different combinations depending on the objective of the selenologist.

In addition to the above steps, an index of all material on all important lunar features is badly needed by selenologists. Such an index would greatly facilitate all our research work. All members who have large lunar libraries and are interested in compiling an index are requested to contact F. A. Keysor, 415 N. Ashland Avenue, La Grange Park, Illinois. The author will welcome correspondence.

Postscript by Editor. We express our thanks to Mr. Keysor for the article above and its helpful ideas upon the more effective use of the H. P. Wilkins map of the moon. An index of the kind envisioned by Mr. Keysor would naturally be of great advantage to selenology. If it is to be as complete as possible and as useful as possible, its compilation will be a tremendous piece of work.

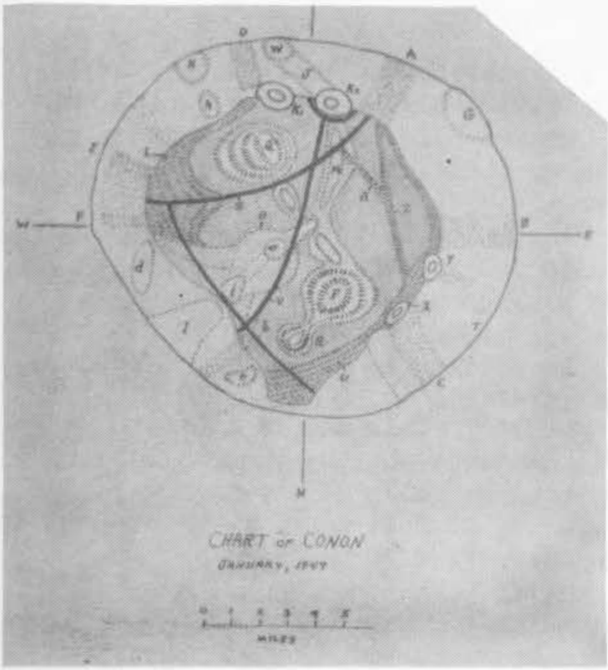


Fig. 1. Key Chart by E. J. Reese

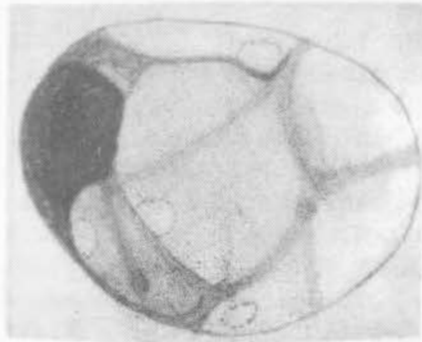


Fig. 2. C. C. Post
March 6. 4^h 15^m, U.T.
6-inch and 8-inch refls.
180X-400X.
Colongitude 26°.6

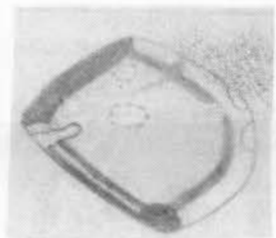


Fig. 3. W. H. Haas
March 7. 1^h 48^m, UT
6-inch refl. 188X,298X
Colongitude 37°.5

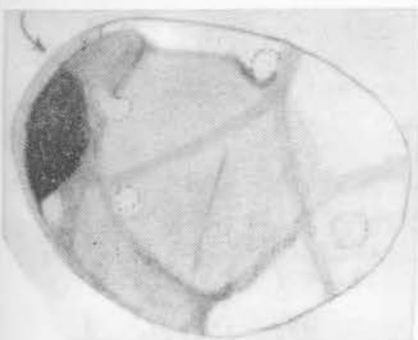


Fig. 4. C. C. Post
March 7. 5^h 45^m, UT
6-inch and 8-inch refls.
200X - 400X
Colongitude 39°.5

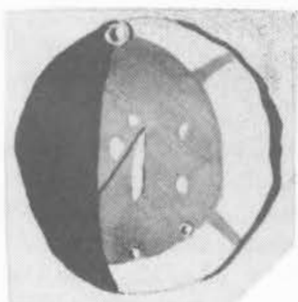


Fig. 5. H.P. Wilkins
April 3. 21^h, U.T.
33-inch refr. 320X.
Colongitude 16°.2

Fig. 6. T. A. Cragg
April 4. 2^h 45^m, U.T.
12-inch refl. 420X.
Colongitude 19°.1

SOME OBSERVATIONS OF CONON IN MARCH AND APRIL, 1952

by Walter H. Haas

The lunar crater Conon, about 13 miles in diameter and located in the lunar Apennines, has been the subject of an intensive study on the part of a number of A.L.P.O. members; and we have to date secured more than 300 drawings, almost 200 of them by E. J. Reese. Some results secured in March and April, 1952, are so interesting that we shall describe them in some detail here. The participating observers are as follows: T. A. Cragg (12-inch refl.), W. H. Haas (6-inch refl.), G. Persson, 16 Mandholmen, Copenhagen, Valby, Denmark (6-inch refl.), C. C. Post, 621 S. Melendres, Las Cruces, N. Mex. (6-inch refl. and 8-inch refl.), and H. P. Wilkins, 35 Fairlawn Ave. Bexleyheath, Kent, England (Meudon Observatory 33-inch refractor). Figure 1 on pg. 83 is a key map of Conon giving the nomenclature which will be used here; it was prepared by E. J. Reese, 241 S. Mount Vernon Ave., Uniontown, Penna. in January, 1949. This map is a preliminary one only. The term colongitude used here is a measure of the solar illumination of a lunar region. It is the lunar eastern longitude of the sunrise terminator and is about 0° at first quarter, about 90° at full moon. The observations will now be described in chronological order.

1952, March 5. $2^h\ 18^m$, U.T. Colongitude 13°.4. Post. With Conon almost half full of shadow the drawing shows well Streaks S, Z, and U, Wall Bands Band A, and Bright Area O. There is a darker spot in U just north of the base of Wall Band B. Mr. Reese invites close attention to this spot and thinks that it may vary greatly in appearance in different lunations. Post's drawing shows nothing of Cleft V, which must have been very close to the edge of the shadow of the west wall. Two white spots on the south inner wall may well be Craterlets K_1 and K_2, though their crateriform nature was not noticed. A small white spot was drawn on the north inner wall.

March 6. $3^h\ 0^m$ to $5^h\ 30^m$. Colongitude 25°.9 to 27°.2. Post. Figure 2 on pg. 83. Streaks U, S, and Z, Fault B, and Wall Bands A, B, and C were all seen well. Again there was a darker spot in U. Post drew a bright spot on the south inner wall(K_1?) and a smaller bright spot on the north inner wall. He saw two bright areas, one O and the other probably hill R, adjacent to Fault B. Reese comments: "I have thus seen area 'O' [very close to Fault B] many times (example: February, 1948 lunation); and yet on many other occasions near the same colongitudes (example: October, 1947 lunation), I have seen 'O' much nearer the center of the floor at a considerable distance from the fault. This bright area certainly behaves more like a cloud than a permanent topographical feature." Post was impressed by the lessened darkness of the south part of the shadow on the southwest inner wall - an aspect rarely shown on the drawings in our files but drawn by E. E. Hare on December 30, 1949, at colongitude 30°.7 (Figure 3 on pg. 5 of The Strolling Astronomer for January, 1952). As is apparent on Figure 2 on pg. 83, Post saw several markings on the west inner wall, including Bright Area I.

March 6. $5^h\ 56^m$. Colongitude 27°.4. Haas. This observation may be compared with the almost simultaneous one by Mr. Post. Haas recorded, in order of decreasing conspicuousness, Fault B, Band U, and Streak S. "Fault" B appeared rather clearly to be the shadow of a ridge on the northwest inner wall; and Streak S was broad, diffuse, and very inconspicuous. Cleft V was invisible. Haas further perceived Wall Bands A, B, and C, Hill R, and Bright Areas O and Q. Unlike Post, he drew Wall Band A to terminate below the rim of Conon.

March 6. $21^h\ 55^m$. Colongitude 35°.5. Persson. Our Danish colleague found the floor ash-gray, the inner walls, brightt yellow. The shadow on the southwest inner wall looked blue-black near the illuminated floor. A drawing by Mr. Persson apparently shows Streak S, Fault B, and Band U, the last-named as an oval gray spot.

March 7. $1^h 48^m$. Colongitude 37°.5. Haas. Figure 3 on pg. 83. The observer depicted Fault B, Band U, a very difficult Streak S, a Wall Band A again stopping below the rim of Conon, Bright Area Q, a faint white area near the center of the floor, and a very dark spot at the north end of Conon. Haas was very surprised to find a diffuse, hazy, whitish band crossing Fault B near its southwest end and concealing the "fault" there (Figure 3). He was forcibly reminded of such an aspect present on many of E. J. Reese's 1946-8 drawings but rarely or never depicted by A.L.P.O. members in 1949-51. The observations recorded upon this band are strongly suggestive of a lunar atmospheric obscuration varying in behavior from year to year and even from month to month.

At $4^h 38^m$ Haas observed Conon again and confirmed his drawing; he emphasized that certainly a bright band interrupted the course of Fault B.

March 7. $4^h 30^m$ to $7^h 0^m$. Colongitude 38°.8 to 40°.1. Post. Figure 4 on pg. 83. This observation may be compared to the one by Haas on the same date. It will be noted that Post's drawing closely resembles the one he made on March 6 (Figure 2). He did now see in addition the north half of Cleft V as a thin dark streak. At the position on the rim to which the arrow on Figure 4 points he suspected a flashing bright point (a peak?). Mr. Reese comments: "Mr. Post depicts no bright area on the northwest inner wall at or near area 'I' on March 7 at colongitude 39°. I was unable to see the slightest trace of a bright area at 'I' on January 8, 1952 at 41°, and yet on September 26, 1942 at 43° a solid white mass was clearly seen extending from area 'O' all the way to the northwest rim of the crater. The white haze seemed to obscure the entire southwestern half of Fault B". On March 7 Post apparently saw nothing of the whitish band across the southwest end of Fault B recorded by Haas on this date - unless this band was resolved by Post in a better view into two bright spots, the one an Area O close to Fault B and the other on the west inner wall (Figure 4).

March 7. $22^h 0^m$. Colongitude 47°.7. Persson. Hampered by a strong wind and bad seeing, the observer could only tell that the floor was bright and that there were some dusky spots and streaks on the walls.

April 3. $21^h 0^m$. Colongitude 16°.2. Wilkins. Figure 5 on pg. 83. Surely everyone who has ever observed Conon will be greatly interested in what this famous observer saw with the great Meudon refractor! There was a short ridge near the center of the floor. There has been much argument about whether or not Conon possesses a central elevation, and this observation would appear to settle the matter in the affirmative. A cleft near the center of the floor ran in to the shadow. Perhaps it is part of Cleft V; but if so, its direction differs badly from what several American observers have drawn. Wilkins recorded a craterlet on the south rim, probably K, or K_2. He drew two minute pits at the foot of the northeast inner wall; these are largely or wholly lacking from A.L.P.O. drawings with ordinary telescopes, though the southern one may be Craterlet X on Reese's map. Mr. Wilkins further saw four white spots on the floor (Figure 5) and Wall Bands A and C. He stresses that there was no other detail whatever in an excellent view.

April 4. $2^h 45^m$. Colongitude 19°.1. Cragg. Figure 6 on pg. 83. Cleft V was very prominent, and Mr. Cragg felt confident that it really is a crack in the lunar surface. A dark streak roughly perpendicular to V was perhaps Streak

S. Near its north end Cleft V passed between Bright Areas O and P. Band Z was seen well, but Band U was very weak. Usually U is much more easily seen than is Z. Cragg recorded Wall Bands A and B, the former being far weaker than in most recent observations, and Craterlet K_2 as a bright spot. Cragg drew the shadow in the western part of Conon to be less dark near or at the position of the white band drawn by Haas on March 7 (Figures 3 and 6).

It will be noted that Cragg depicted a number of features not visible to Wilkins only six hours earlier in a much larger telescope. Is the visibility of the markings, then, improving rapidly with progressively higher lighting near colongitude 18^{o}? However, Post on March 5 drew Bands U and Z, Streak S, Bright Area O, and Wall Band B, all of which were quite invisible to Wilkins under somewhat <u>higher</u> lighting on April 3. The mystery deepens!

April 5. 4^h 1^m. Colongitude 32°0. Haas. The observer was greatly interested to record again a dull, diffuse, whitish band across the southwest end of Fault B, much as on March 7 (Figure 3). On April 5 he also saw this band well in a clearer view at 2^h 0^m. Curiously, Fault B itself could not be seen at the foot of the dark northwest inner wall of Conon. Band U was conspicuous; Streak S, very difficult. Haas further depicted Wall Bands A, B, and C, Bright Area Q, and a small white spot near the center of the floor. Perhaps the last-named was Mr. Wilkins' ridge. There was again a very dark spot at the north end of Conon.

April 6. 8^h 18^m. Colongitude 46°3. Haas. The hazy band was still present. Surprisingly, Fault B was invisible. Band U was seen well; Streak S was diffuse and difficult. Haas further recorded Wall Bands A and B and Bright Area Q.

We hope that this discussion will inspire at least a few of our readers to make regular and careful observations of the lunar crater Conon. Such a study can become most fascinating, and such an intensive examination of a small lunar region may well lead to significant results.

OBSERVATIONS AND COMMENTS

Figure 1 on pg. 77 may be of interest in connection with Mr. T. E. Howe's article "Lunar and Planetary Photography with Small Telescopes" on pg. 36 of our March, 1952, issue. Several readers have written of their interest in Mr. Howe's ideas. Figure 1 is reproduced from an enlargement of a photographic print secured on September 30, 1951, at 4^h, U.T., when the central meridian of longitude was 95^{o} in System I and 273^{o} in System II. Mr. Howe used a 4-inch reflector and projected the image two inches through a one-inch eyepiece, thus obtaining an image of Jupiter one mm. in diameter. The exposure was 1/5 of a second. He used Super Pan Press Film and developed for 30 minutes in Ansco 17, to which Hydram and Para-Phenylene diamene had been added. Printing was on number 4 and 5 paper. The amount of enlarging done for Figure 1 is probably too great for best results; but one readily recognizes the North Equatorial Belt a little below (north of) the center of the image, the bright South Tropical Zone in the upper half of the disc, and the shaded North and South Polar Regions. Something of the North Tropical Zone is also recorded just below the N.E.B. These results are creditable for an aperture of only 4 inches.

Soon before 2^h 45^m, U.T., on April 4, 1952 T. A. Cragg examined the floor of Plato with a 12-inch reflector at 420X, the seeing being fairly good and the transparency being fair. The colongitude was near 19^{o}. He was amazed to see absolutely <u>nothing</u> on the floor, not even the near-central crater-pit. Mr. Cragg's negative observation derives added importance from the fact that he immediately afterwards made a fairly detailed drawing of the crater Conon; his drawing is reproduced on pg. 83 and shows very plainly Cleft V. There is abundant visual and photographic evidence that Cleft V is often much more difficult than the Plato floor craterlets at this lighting. Cragg's experience is forcibly reminiscent of the apparent "obscurations" of detail in Plato under low lighting attested to by many skilled lunar observers; Goodacre gives a number of examples on pp. 245-6 of his Moon.

W. H. Haas examined Plato briefly on March 6 at colongitude 25°.3 and on March 9 at colongitude 64°.6. He saw in decreasing conspicuousness these spots on the floor, using the nomenclature of Figure 1 on pg. 5 of our January, 1952 issue: A, B (as a splotch), D (twin craterlets merged into one), and C (tiny). He employed a 6-inch reflector in fair seeing.

On pg. 6 of our November, 1951 issue we described how Patrick A. Moore, Glencathara, Worsted Lane, East Grinstead, Sussex, England on August 20, 1951 observed what he considered to be a very abnormal bright spot on the south wall of the crater W. H. Pickering, the companion of Messier. W. H. Haas, however, thinks that he himself drew this spot on two occasions in the past. In a letter dated April 17 Mr. Moore remarks: "I had a recent look at the Messier pair under conditions of illumination similar to those prevailing when I observed the bright spot, and they looked eminently normal; I am actually pretty sure that the appearance that night [August 20, 1951] was abnormal, but am open to conviction!"

J. C. Bartlett has contributed an instructive discussion in correspondence about the paths of two clouds on Mars observed in Japan in the autumn of 1951. In Volume 6, Number 3 of The Strolling Astronomer the paths of these clouds are shown on Figures 1 and 2 on pg. 31; their behavior is described on pp. 40-41. Assuming the general circulation of the atmosphere of Mars to resemble that of the earth, Dr. Bartlett points out that high-level winds in low northern latitudes blow toward the northeast, in low southern latitudes, toward the southeast. Now the clouds recorded by Saheki and Osawa in Japan moved south and somewhat east from middle northern latitudes into the Martian tropics and then moved south and somewhat west across the equator and into low southern latitudes. Here east and west are referred to the direction of rotation of Mars and thus have reversed meanings from their ordinary usage as directions in the terrestrial sky. If they were high-level objects, these Martian clouds moved against winds blowing from the equator in the northern hemisphere and at a considerable angle to winds blowing from the equator in the southern hemisphere. The surface winds on the earth in low latitudes (the trade winds) blow toward the southwest north of the equator, toward the northwest south of the equator. Again, the motion of these Martian clouds differs greatly from such an expected pattern. Dr. Bartlett points out that these two clouds give little evidence that the general atmospheric circulation of the two planets is similar. Nevertheless, as he says, it is hard to see how basic effects produced by the rotation of a planet and by its greater heating near the equator should not be present on Mars. We might note that the latitude of the sub-sun point on Mars was 18° N. to 20° N. when these clouds were observed. It may ve bery significant that both clouds changed their direction of motion near this latitude.

In our April, 1952 issue we told of a temporary brilliant spot on Mars observed by Mr. Tsuneo Saheki on December 8, 1951 (Figure 1 on pg. 46 and text on pp. 48-49). Several readers have offered comments on this spot. Mr. Lonzo Dove, Broadway, Virginia regards it as an artificial phenomenon; he thinks that the "flying saucers" of recent years are visitors from Mars and has gone so far as to predict future dates of their appearance. Perhaps Mr. Dove's ideas will seem somewhat the more credible to those who read the article "Have We Visitors from

Space?" in Life magazine for April 7, 1952. Mr. Frederick Benario, 151-10 State St., Flushing 54, New York directs attention to a somewhat similar observation which he made upon Jupiter with a 3.5-inch reflector at 90X in the later summer of 1951. Favored by a clear sky and good seeing, he suddenly saw on the north limb of Jupiter "a flash of the same albedo and light as the planet itself". The flash surpassed the moons of Jupiter in size and brightness. Mr. Benario at first thought that he had been deceived by an illusion, but he now thinks that the object was real and that it may have been an asteroid or giant meteorite falling into the atmosphere of Jupiter. If the object were near Jupiter, its apparent size must have been greatly enhanced by irradiation; for the largest known asteroid is far smaller than the Galilean moons of Jupiter. It is also well to bear in mind that a luminous object is fully 33 stellar magnitudes dimmer at the oppositional distance of Jupiter than at a distance of 100 miles. Therefore, if Mr. Benario's object were a meteoritic impact-flash at the visible surface of Jupiter, its brilliance at a distance of 100 miles would have surpassed that of the sun in our sky! Also, it would seem that the flash of a meteorite penetrating the gaseous surface of Jupiter must be dimmed by the overlying clouds. If the object were at the surface of Jupiter, it should have been witnessed at the moment of its appearance in all telescopes then directed to Jupiter; such additional observations are not known to us, though naturally we cannot be positive that anyone else was looking. Perhaps the most conservative explanation of this object would be that it was a stationary terrestial meteor which was projected against Jupiter only for observers very near Mr. Benario's station of observation. Mr. John J. O'Neill, 209 N. Long Beach Ave., Freeport, Long Island, New York proposes that the phenomenon observed by Mr. Saheki was produced by a stream of ions entering the Martian atmosphere. In the same fashion a terrestrial auroral display might be seen as a small brilliant spot by an observer on another planet. Mr. O'Neill suggests that the incoming ions transferred their kinetic energy to gases in the Martian atmosphere and in this way dissociated atoms; later, recombination occurred with the emission of photons, the median of the wavelengths being within the visible range. The estimated speed of diffusion of 1200 miles per hour (pg. 51 of April issue) is thus readily explained. In his Science Column in the New York Herald Tribune on May 11, 1952 Mr. O'Neill drew attention to some discoveries reported at the recent annual meeting of the American Geophysical Union by Dr. H. A. Wiley of the Air Force Cambridge Research Center, Cambridge, Mass. By means of experiments performed with high-altitude rockets at the White Sands Proving Ground Dr. Wiley and his associates found that the Rayleigh atmospheric scattering of light vanishes at an altitude of about 18 miles and that the air is self-luminous from an altitude of 22 miles up to at least 80 miles. This glowing of the air is thought to have the same cause as the well-known permanent auroral illumination of the night sky. The daytime glow is 10,000 times greater than the nighttime glow but is insignificant compared to the light of the sun. Mr. O'Neill urges that we should pay much more attention to phenomena of the upper planetary atmospheres in our studies. The Editor suggests that it might be instructive to compute the stellar magnitude of terrestial auroral displays as seen from Mars or Venus. He thinks it very doubtful that many Martian upper atmospheric luminous phenomena can appear brilliant against the sunlit surface of the planet, upon which Saheki observed his December 8 spot.

We have received observations of Mars in February-April, 1952 from the following persons: J. C. Bartlett, Jr. (3.5-inch refl), J. T. Carle, 2734 N. Sixth St., Fresno, Calif. (8-inch refl.), T. A. Cragg (12-inch refl.), S. Ebisawa, 612 Tanashi-machi, Kitatama-gun, Tokyo, Japan (8-inch refl. and 8-inch refr. at the National Science Museum in Tokyo and 6-inch refl.), W. H. Haas (6-inch refl.), P. A. Moore, Glencathara, Worsted Lane, East Grinstead, Sussex, England (12-inch refl.), S. Murayama, 10 Nishikata-machi, Bunkyo-ku, Tokyo, Japan (8-inch refr. at the National Science Museum), O. C. Ranck, P. O. Box 161, Milton, Penna. (4-inch refr.), T. Saheki, No. 29 Shi-Jūtaku, Uriono-cho II-24, Sumiyoshi-ku, Osaka, Japan (8-inch refl.), C. B. Stephenson, Dearborn Observatory, Evanston, Ill. (18.5-inch Dearborn refractor), D. Strayhorn, 527 S. Front St., Wilmington, North Carolina (4-inch refr.), and I. Tasaka, whose address is known to Saheki (13-inch refl.). We thus have a pleasing total of 12 different observers; and four of these are members of the Oriental Astronomical Association in Japan, to whom we are much indebted for their cooperation. Particular praise must go to their Director, Mr. Tsuneo Saheki, who on April 30 made his <u>one hundred and first</u> drawing of the 1951-2 apparition! If this total is perhaps not a record for the pre-opposition half of an apparition, it is certainly a feat worthy of the very highest praise. Mars was approaching the earth during the period covered by these observations, the angular diameter increasing from $7''.6$ on February 1 through $11''.4$ on March 15 to $16''.6$ on April 30. Quantity $\odot$, the heliocentric longitude of the planet measured so as to be 0° at the vernal equinox of the northern hemisphere, increased from 91° on February 1 to 132° on April 30. Thus the season was the first half of summer in the northern hemisphere and the first half of winter in the southern hemisphere. The north pole of Mars was tipped toward the earth by 13 to 18 degrees in February-April.

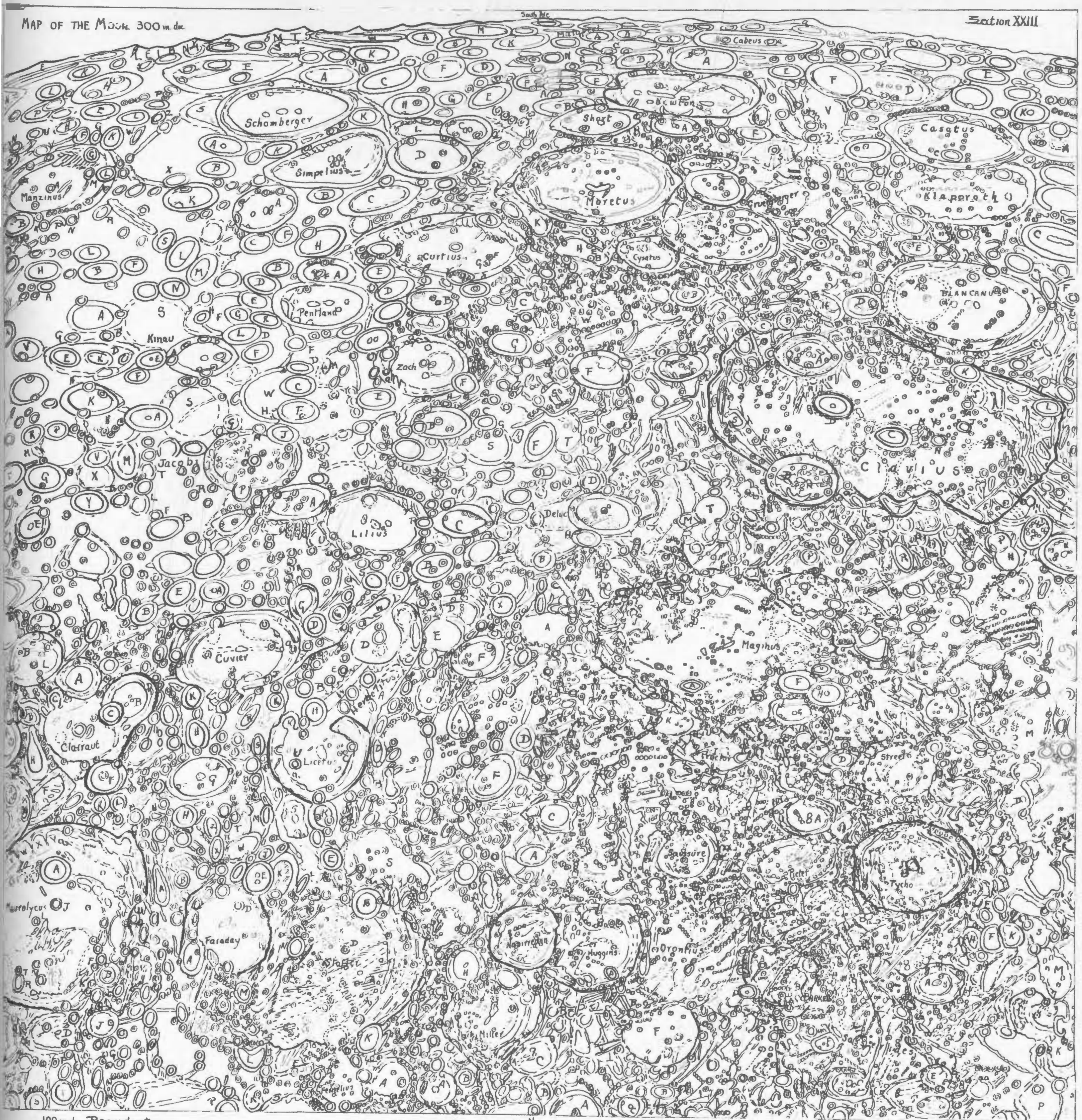
The north cap was small and brilliant, so small that it was difficult to be sure of its true appearance with ordinary instruments and average conditions. The cap was at times comparatively dull, as if covered by mists or clouds; and between March 20 and the end of April Murayama and Saheki sometimes saw the tiny remanant of the surface cap to be surrounded by a whitish polar haze. None of the observers, except Ebisawa, saw any bordering dark fringe to the north cap, not even Stephenson with an 18.5-inch refractor in rather poor seeing. (However, there is reason to think that a thin and rather faint fringe still existed at the end of April.) Saheki continued to measure the diameter of the north cap, and the table which follows is a continuation of the ones on pg. 41 of our March issue and on pg. 57 of our April issue. The true diameter includes a correction for the tilt of the axis of Mars.

<u>Interval</u>	<u>$\odot$</u>	No. <u>Observations</u>	Angular <u>Diameter</u>	Corrected True <u>Diameter</u>
1952, Feb. 22	100°	2	12°	710 kms.
March 14-16	110°-111°	5	13	700
March 21-28	113°-116°	8	9	530
April 1 - 5	118°-120°	9	8	420
April 16-18	125°-126°	5	6	320
April 21-30	128°-132°	8	5	260

Two other observers determined the angular diameter of the north cap as follows: Stephenson, 15° on April 7 and 12° on April 20, and Ebisawa, 7° to 8° on April 16. The cap was evidently still melting at $\odot 132^\circ$ on April 30.

The south polar cap was unquestionably always a cloud-cap in February-April. Its changes in size and brightness, its dullness and diffuseness as compared to the north cap, and its irregular visibility permit no other interpretation. The south cap was much more conspicuous to some observers than to others, as was also true in 1950 at the same Martian season. Some southern bright areas, particularly Hellas and Argyre II, at times simulated a bright cap on the south limb. Stephenson found the south cap extremely small on April 7 and 17° in angular diameter on April 20. To Saheki its color at times contained some yellow. Under very excellent conditions on May 1 at C.M. 247° Bartlett suspected that the south cap projected very slightly above the limb.

Clouds were observed in considerable numbers, as one might expect in the northern summer. Most of them were seen in low latitudes on the sunrise limb or the sunset terminator. A number of them were even drawn to project on the limb or the terminator. However, it is likely that many of these apparent cloud-projections did not truly project but only appeared to do so because of the effects of irradiation on very bright areas on the limb or the terminator. Other clouds were not observed directly but revealed their presence by obscuring surface detail, especially near the limb or the terminator. We shall mention some of the more interesting clouds. Bartlett on April 3 at C.M. 167° recorded a yellow cloud on the sunrise limb near latitude 36° S. On April 4 at C.M. 143° he remarked a much larger white cloud at about the same position. Cragg on April 4 at C.M. 161° detected a number of yellow clouds scattered over the equatorial regions, but northern detail around Propontis was unobscured. Mr. Cragg's drawing on this occasion has been published as Figure 6 on pg. 61 of our May issue. Both Cragg and Bartlett used color filters to confirm that their clouds were yellow. On April 6 at C.M. 170° Haas found widespread obscurations apparently extending from Mare Sirenum to the north cap; there were only the vaguest shadings and half-tones in the equatorial and northern deserts, and Propontis was diffusely outlined. Haas quite failed to see certain features visible to him in these longitudes earlier in the apparition and visible to Cragg on April 4. Moore remarked a cloud in Aeria on April 14. Aeria had looked whitish to Japanese observers on April 5. Bartlett on April 30 at C.M. 256° with perfect conditions (seeing 10 and transparency 5!) found an obscuring haze over much of the disc; it was mottled with diffuse, gray, vague shadings, even Syrtis Major being rather light. A number of yellow clouds were also noted. By May 1 at C.M. 247° the markings were more definite, though still fainter than usual. On April 20 at C.M. 357° Bartlett saw a curious sabre-shaped white streak lying on or close to the central meridian of longitude and extending over about 45 degrees of latitude in the northern hemisphere. A white cloud over Thymiamata was recorded by Saheki on April 1 and 5, by Bartlett on April 18, and by Bartlett and Stephenson on April 20. On April 16 Saheki drew on the sunset terminator a small white cloud fully as brilliant as the north cap normally was in April, the cloud appearing to project slightly. It remained visible from $13^h 15^m$ to $14^h 55^m$, U.T., C.M. = 145° to 169°, near latitude 20° N. On April 17 at C.M. 180° and 193° Saheki drew this cloud again; but it did not appear to project, perhaps being of less height in the longitudes now observed. On April 18 the cloud was absent. C.M. = 183° to 204°. On April 21, however, C.M. = 134° to 159°, Saheki again recorded a small, very brilliant, slightly projecting cloud on the sunset terminator, which cloud may have been slightly farther south than on April 16. Thus we see that portions of the cloud endured for at least five days and that it may at one time have covered fully 60 degrees of Martian longitude (C.M. 134° to 193°). Its position changed little or not at all. There is a possibility that Haas previously saw this very same cloud on the sunset terminator on April 6 at C.M. 170°. In it he remarked a tiny brilliant core, which may have projected at C.M. 173°.



SECTION XX111

of

H.P. WILKINS 300-INCH MAP OF THE MOON

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