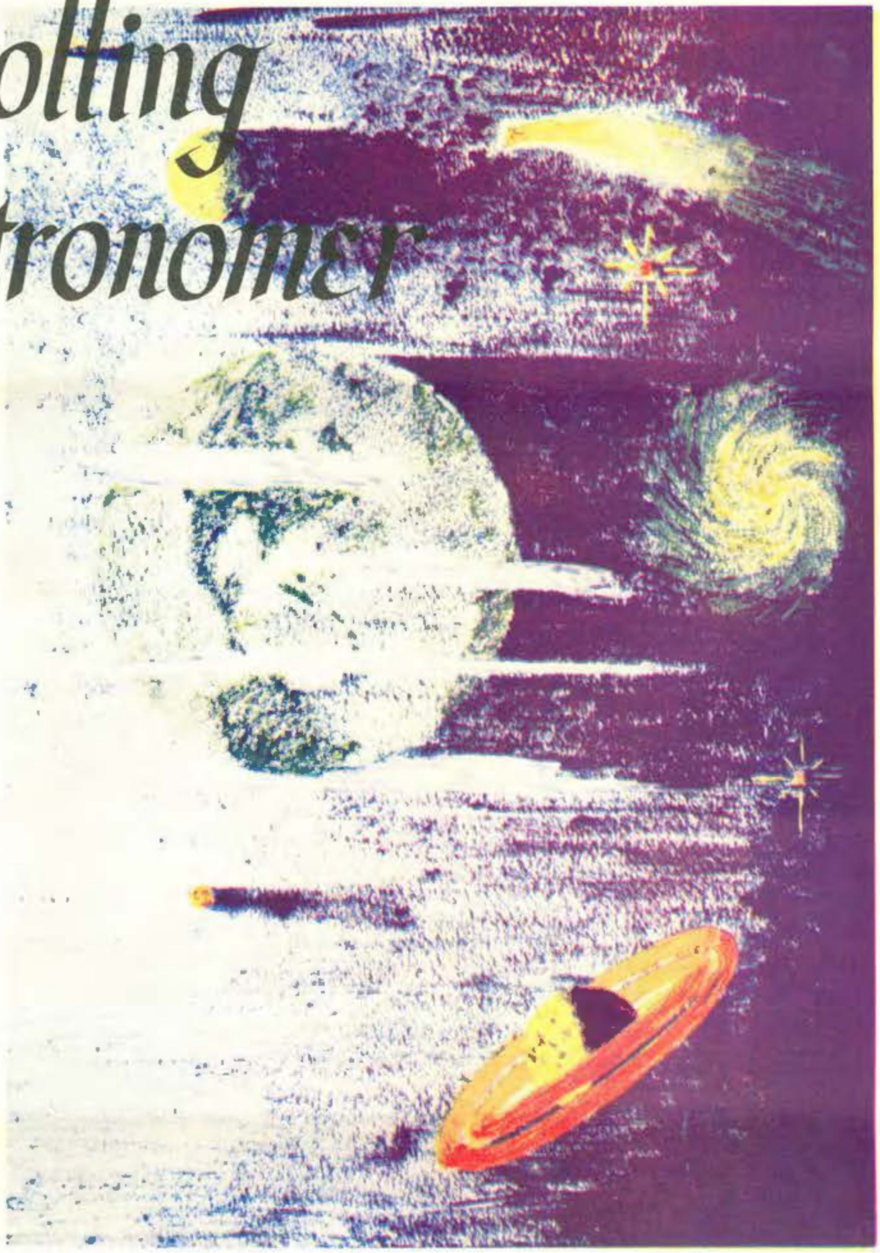
The Strolling Astronomer

Volume 5, Number 4 April 1, 1951

ASSOCIATION OF LUNAR AND PLANETARY OBSERVERS



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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.

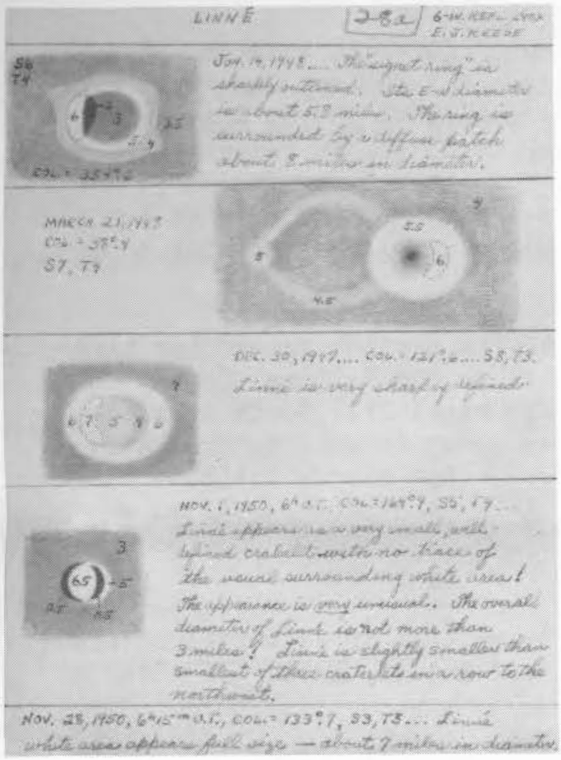


Fig. 1. Observations of Linne by E. J. Reese. 6-inch refl. 240X.

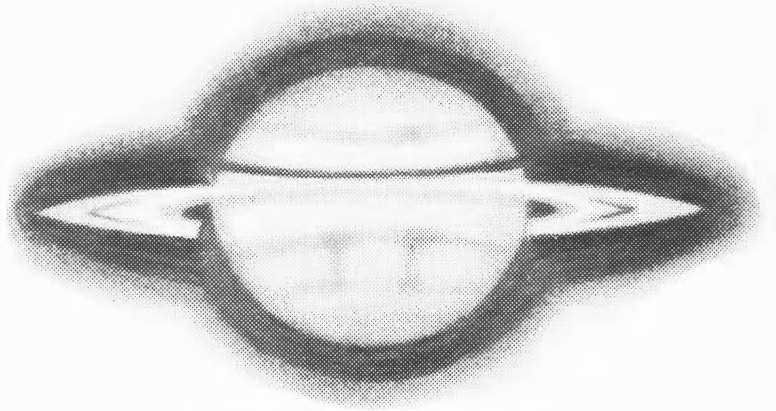


Fig. 2. Saturn. T. Osawa. 6-inch refl. 230X. Dec. 19, 1950. 20^h45^m, U.T.

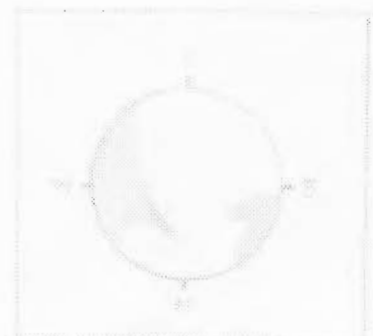


Fig. 3. Uranus. D. O'Toole 6-inch refl. 185X. Dec. 31, 1950. 7^h45^m, U.T.

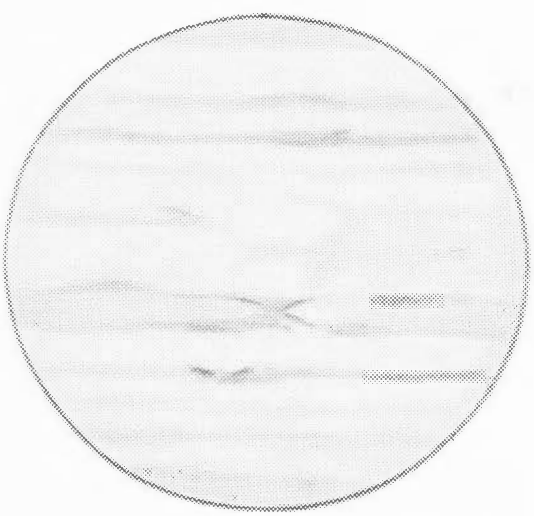


Fig. 4. Jupiter, T.R. Cave, Jr. 12-inch refl. 200X, 380X. Dec. 24, 1950. 0^h 20^m, U.T. $C.M._1 = 215^o$. $C.M._2 = 3^o$.

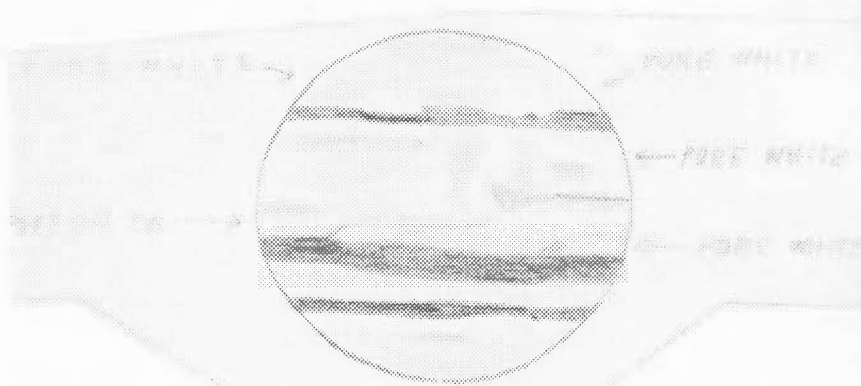


Fig. 5. Jupiter. E. Epstein. 6-inch refl. 100X, 200X. Nov. 25, 1950, 2^h 12^m, U.T. $C.M._1 = 232^o$. $C.M._2 = 247^o$.

ANNOUNCEMENTS

Change of Address. Readers should take note that the address of The Strolling Astronomer and of the Association of Lunar and Planetary Observers has now changed from 167 W. Lucero St., Las Cruces, New Mexico to 133 S. Alameda St., Las Cruces, New Mexico. This new address should be employed in future correspondence. It probably ought to be mentioned that this change in address is due merely to the unsettled condition of the editor's personal affairs and has nothing to do with the policies of this periodical. Certainly it has nothing to do with its expected continuation and improvement.

We hope that many A.L.P.O. members are planning to present papers (or have them presented, if personal attendance is impossible) at the National Convention of the Astronomical League on September 1-3,1951, at Chapel Hill,North Carolina. After all, practically every amateur has a few ideas about telescopes or observing that are novel and that will interest his fellows. The League invites "ten-minute papers on any astronomical subject". Abstracts of papers should be submitted for consideration no later than May 1 to Mr. G. R. Wright, 830 Hemlock Court, N.W., Washington 12, D. C. Time is already growing short.

We have unofficial information that the Third Convention of Western Amateurs will definitely be held in southern California in mid-August, 1951. We plan to announce further details as they become available.

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

We have recently received from Mr. H. P. Wilkins, the Lunar Director of the British Astronomical Association, a new Section of his map of the moon. It shows upon a stereographic projection the averted hemisphere of the moon, in so far as it is known. The map was drawn by Mr. Wilkins on the basis of observations by himself and Mr. P.A. Moore, who is an active member of the B.A.A. Lunar Section. The projection selected shows the libratory regions as an annulus or ring and impresses the editor as a good choice for the purpose. It is our hope to include this New Section later in our serial reproduction of the Wilkins map.

The energetic Mr. Wilkins is also bringing out a new and improved edition of his map. We can perhaps give no better description than to quote part of a letter from him dated January 22, 1951:

"Please note that a new Edition is now coming out; and the opportunity has been taken of revising some of the Sections, incorporating a large number of new measures of positions. A Catalogue of these is being prepared. It is believed that the new Edition will be perfectly accurate; where necessary, Sections have been redrawn. A réseau of one-inch squares has been introduced to enable the coordinates to be ascertained. In most cases the alterations are very small, fractions of an inch; but their introduction means that all known errors have been removed. Much fresh detail has also been added. If the map is used for ascertaining positions,please use this new Edition in preference to the earlier. A copy of Section IX is enclosed...The price of this Edition will be two pounds, five shillings." This price is somewhat more than six dollars in American money, but it will be best to determine the exact rate of exchange from your bank or post office when ready to order. Obviously, all specialists in lunar matters will wish to obtain from Mr. Wilkins this latest, most detailed, and most accurate edition of his excellent map. His address is 35 Fairlawn Avenue,

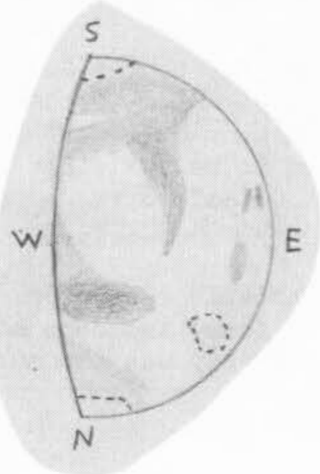


Fig. 1. T. Cragg
6" reflector
October 2, 1950
13:21 UT

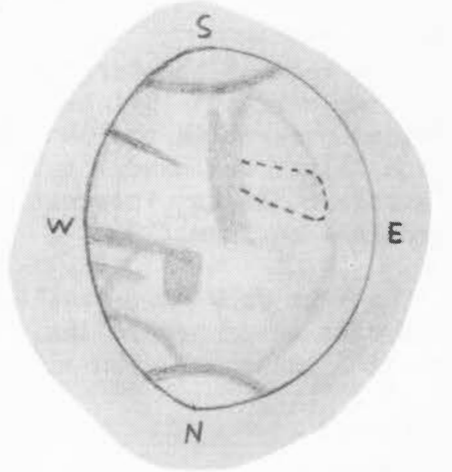


Fig. 2. D. O'Toole
6" reflector
October 9, 1950
14:00 UT

Bexleyheath, Kent, England. For those whose astronomical interests are more general the older edition now appearing in <u>The Strolling Astronomer</u> will still constitute a very useful map of the moon and one much superior to all its predecessors.

MERCURY IN THE SECOND HALF OF 1950

by Donald O'Toole

Several observers contributed material on Mercury for the apparitions that fell during the latter part of 1950, and these observations will be considered under their respective months.

August 1950

Howard Le Vaux, using a 6" reflector, and Donald O'Toole, also using a 6" reflector, observed on a total of 12 dates during this evening elongation, the majority of these observations having been secured by Le Vaux.

Theoretical half-phase occurred on August 22.5; and O'Toole, while not having observed before or at this time, found a somewhat concave terminator on August 25 at $i = 95^{\circ}$. However, Le Vaux recorded half-phase on August 14 at $i = 76^{\circ}$, or 8.5 days before greatest elongation. This is a very large value for this discrepancy, which is usually less and is sometimes nonexistent.

Le Vaux has instigated an interesting plan with regard to Mercury, which involves observations on the same evening with and without a red filter. Drawings thus secured reveal several interesting things, the most significant of which this Recorder feels to be in regard to the Criophori-Aphrodites region. On three out of four evenings (July 29, August 13 and 14) when a red filter was used, Le Vaux found, without a filter, two dark markings roughly forming a fork, with the apex at the terminator. With a red filter, he found the southern of these two markings (Criophori) to be invisible, while the northern (Aphrodites) remained present in the same recognizable form. On August 11, the other day when a filter was used, both markings seemed to be invisible with a filter. In this regard it is interesting to note that O'Toole drew a forked Criophori-Aphrodites on August 26.

Le Vaux drew two small and extremely variable cusp-caps on many drawings, these caps never projecting. O'Toole always found two caps of near-equal size, but which projected. On all dates the northern cap was the more conspicuous.

October 1950

Thomas Cragg, D. O'Toole, and H. Le Vaux obtained a total of six drawings of Mercury during this apparition, the first two using 6" reflectors and the last a 10" reflector.

Theoretical dichotomy was due on October 3.3. O'Toole found the terminator straight on October 3.6. However, Cragg and Le Vaux both recorded a convex terminator on October 2 and 3 respectively, which shows that the terminator must have been straight for both of them around October 1, if not before. Since actual dichotomy often occurs after predicted dichotomy in western elongations, it is puzzling that these two observers found an evident about-face in their results. The Recorder is unaware of any previous similar findings in agreement on this singularity.

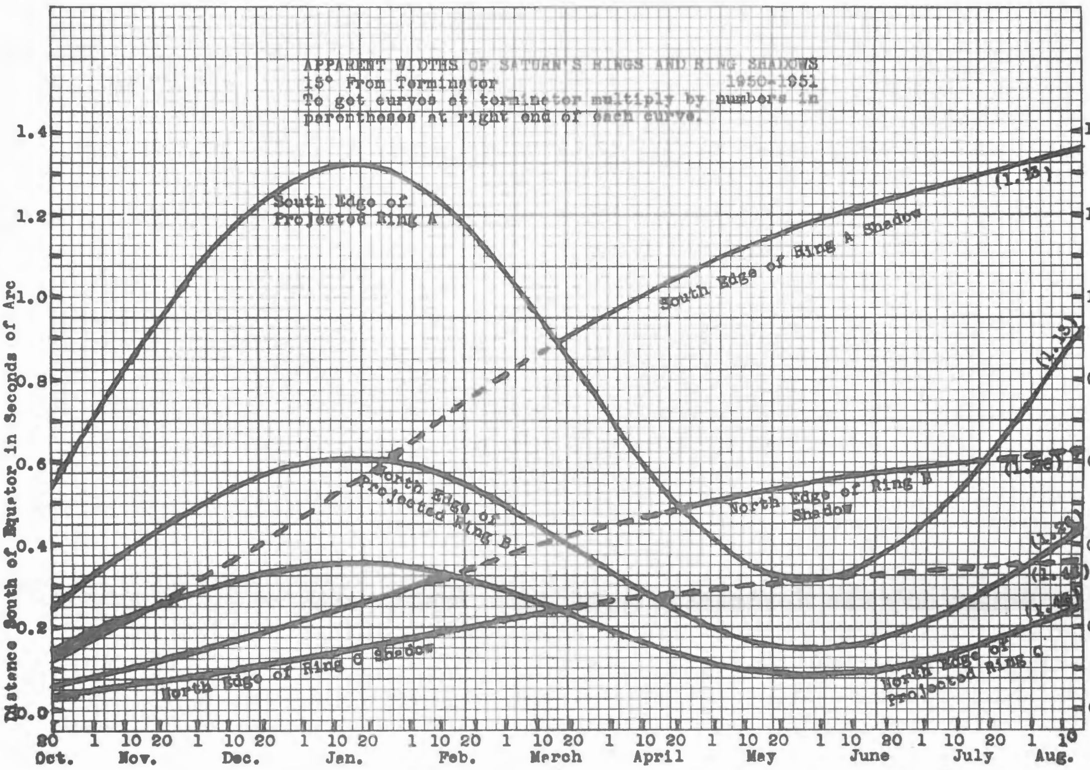
Cragg on the 2nd and O'Toole on the 9th made separate drawings which are in rather complementary agreement, as drawings of Mercury go. These sketches are shown in the illustration on pg. 3. The two primary dark areas are evidently Iovis-Horarum vallis (upper) and Lycaonis (coming in from terminator). Other points for comparison will reveal themselves to the interested viewer.

December 1950

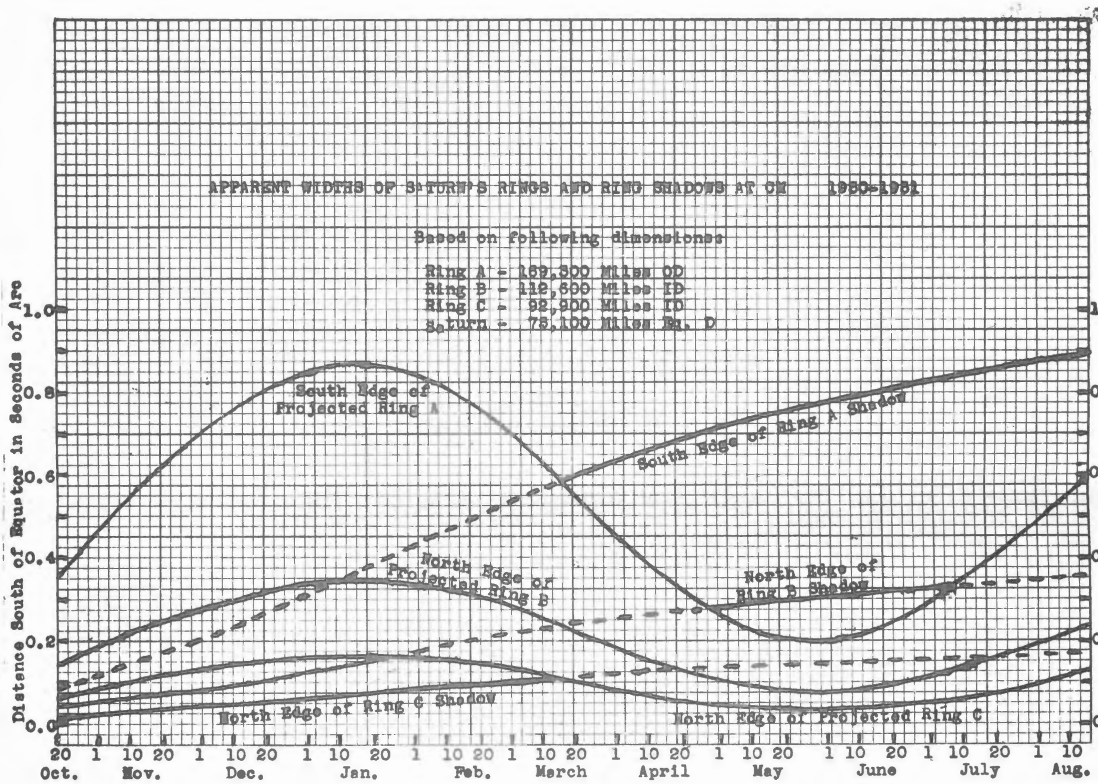
H. Le Vaux with a 10" reflector was probably the only observer following the planet during this apparition. He secured three drawings, the last of which on December 13 shows a convex but almost straight terminator. Dichotomy was predicted for December 19. These values indicate true half-phase may have occurred somewhat before predicted time.

Le Vaux's three drawings reveal some markings of rather thin appearance. On one occasion he compared the details on Mercury, about 6" in diameter, and those on nearby Mars, about 4.7" in diameter, and thought the detail on Mercury more prominent than that on Mars, even though the latter was observed under better seeing conditions. This result may be checked with other comparisons of these two planets that have been made in the past, some of which will be found on pages 4 and 5 of The Strolling Astronomer for October, 1949. All the evidence seems to point to the fact that Mercury does exhibit markings that are usually about as prominent as those on Mars, but the actual appearance and nature of which are virtually unknown.

Postscript by Editor. Mr. Donald O'Toole, 114 Claremont Ave., Vallejo, Calif., is the Mercury Recorder of the A.L.P.O. Members should submit all observations of Mercury that they secure to Mr. O'Toole, who is also always glad to correspond with members interested in studying Mercury. Detail on this



APPARENT WIDTHS OF SATURN'S RINGS AND RING SHADOWS
15° From Terminator 1950-1951
To get curves at terminator multiply by numbers in parentheses at right end of each curve.
South Edge of Projected Ring A
South Edge of Ring A Shadow
North Edge of Projected Ring B
North Edge of Ring B Shadow
North Edge of Ring C Shadow
North Edge of Projected Ring C
(1.15)
Distance South of Equator in Seconds of Arc
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10
Oct. Nov. Dec. Jan. Feb. March April May June July Aug.



APPARENT WIDTHS OF SATURN'S RINGS AND RING SHADOWS AT CM 1950-1951
Based on following dimensions:
Ring A - 169,300 Miles OD
Ring B - 112,600 Miles ID
Ring C - 92,900 Miles ID
Saturn - 75,100 Miles Eq. D
South Edge of Projected Ring A
South Edge of Ring A Shadow
North Edge of Projected Ring B
North Edge of Ring B Shadow
North Edge of Ring C Shadow
North Edge of Projected Ring C
Distance South of Equator in Seconds of Arc
1.0
0.8
0.6
0.4
0.2
0.0
20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10 20 1 10
Oct. Nov. Dec. Jan. Feb. March April May June July Aug.

planet is seldom seen easily, but the planet is a challenging object for that very reason. In the editor's opinion, small telescopes do almost as well on Mercurian features as large telescopes, which circumstance should be encouraging to the average amateur with his modest equipment.

The editor thinks that it must be very difficult to tell whether the bright cusp-caps of Mercury are actually projecting or whether one is dealing merely with irradiative errors.

EXPERIMENTS ON THE NAKED EYE VISIBILITY OF ARTIFICIAL DOUBLE STARS AND SMALL PLANETARY DETAILS

By David W. Rosebrugh

These experiments were undertaken at the suggestion of Mr. Walter H. Haas, Editor, *The Strolling Astronomer*; and the writer wishes to express his appreciation of the broad grasp which Mr. Haas has of planetary problems, as evidenced by his pointing out the desirability of such tests.

The experiments were designed to answer two questions: (a) Can the human eye separate two round spots of planetary marking when they are closer together than Dawes' limit? Dawes' limit, of course, applies to bright stars against a black background of sky; and it may not necessarily apply to, say, 2 dark green objects on a buff colored background. (b) Can the human eye detect the presence of planetary details which are smaller in size than Dawes' limit?

As the experiments were convenient for this purpose a third test (c) was made to determine the smallest size disc whose color could be determined.

Description of Tests

Twelve sheets of paper were secured, 2 each of white, buff, blue, brown, green, and black. From one of each pair 15 paper discs were punched with an ordinary paper punch. Measurements indicated that these were all 0.192 inches in diameter. Fifteen of these artificial stars (or planetary details) were pasted on each of the unmarred sheets in such a way that each sheet had 5 single and 5 double stars on it, of the colors other than itself. For instance, on the blue sheet there were single stars of white, buff, brown, green, and black, and double stars consisting of 2 white, 2 buff, 2 brown, 2 green, and 2 black discs.

The intention was to paste the double stars so that their spacing would be 0.384 inches center to center. There would thus be 0.192 inches of clear spacing between them. However, my fallibility was such that the double stars actually averaged only 0.348 inches from center to center, with a maximum variation either way of 6%; hence, each double star was measured, center to center, and allowance was made for the exact actual spacing.

The 6 sheets with their 5 double and 5 single stars apiece were fastened to the side of a box which was placed in direct sunlight. The distances at which I was able to see the double and single stars and identify the colors of the single stars were measured with a surveyor's 100 ft. chain. All estimates were made by moving towards the artificial stars; that is, the point where the phenomenon first became visible was that measured. All estimates were made with the left eye closed, using the right eye only. The tests took from 9:30 a.m. to 2:30 p.m., E.S.T., on Sept. 4, 1950. The sheets were set up facing in the direction of the sun at 9:30 a.m. and were shifted to face the sun's direction again at 12:30 p.m.

The tests first made at 9:30 a.m. were repeated at 2:30 p.m. to see whether any systematic error had crept in, but the results were consistent. The seeing was good to excellent as shown by solar observations. All observations were made at least twice. Some were made for check purposes, as above, 4 times.

If the choice had been left to the human eye the sheets of paper would have been arranged in the following order of brightness: white, buff, brown, blue, green, and black; but a G. E. photographic exposure meter was used, which placed them in the order: white, buff, blue, brown, green, and black, which is the order shown.

Three sets of observations are shown. Table I shows the distances at which twin spots could be seen as separate spots. Making these observations presented no difficulties. Certain facts are at once apparent. White and buff present little contrast and hence are less visible when used together. This is true also, but to a lesser extent, of buff and brown, blue and green, and even blue and brown. Table II shows the angular diameters for which the presence of single spots could just be detected. At these distances, which ranged up to 119 feet for white and buff spots against a black background, neither color nor shape could be seen. The spot was just "there". Table III shows the distance at which the colors of the spots were detectable. The measurements in this case were fraught with extreme difficulty, as with increasing distances buff soon appeared like white, blue like green, and even brown like blue. White and black seemed to maintain their individuality to the greatest distances, but eventually at the limit of vision all spots lost their colors and became merely shades of lighter or darker grey against their backgrounds. To decide whether blue, for instance, appeared "blue" or merely a shade of grey was a difficult task.

Referring to Table I the question naturally arises as to how the results obtained with paper disc stars can be tied in with, or calibrated to, the results one would secure with real stars against a black sky. It is my opinion that the results shown in the last column for light colored discs on a black background, when illuminated by sunshine, as these were, are practically what my naked eye could achieve with double stars if there were any suitable double stars available in the sky, and hence that all the results in Table I are approximately what one would secure using a telescope with a power of 1x. If instead of 1x the power is 300x, the upper useful power for a 6-inch telescope under the most favorable conditions of seeing, the results in Table I can be divided by 300.

The proof, or perhaps we should say the impression, that this is so takes three steps. First step. I made an artificial star out of a flashlight, whose lens was covered with a piece of tin, punched with two round holes, each 0.26 inches in diameter, on centers of 0.48 inches. The lens was also covered with two thicknesses of tissue paper so as to give a diffused glow back of each "star". I used this for tests on the evening of Sept. 23, 1950, a night of nearly full moon; but I operated in the shade of a building. At a distance of 46.8 feet the total brightness of this artificial star was nearly as great as that of the full moon so that I found it necessary to reduce the brightness to something less than Jupiter, but greater than Arcturus, by placing a pinhole before my eye. At the distance of 46.8 feet the two stars were clearly separable. They subtended an arc of 174 seconds, which is closely comparable with the results in Column 7 of Table I. Second step: I repeated this test using a 6x30 monocular and found that I could separate the stars at 267.3 feet. At this distance the components submitted an arc of 30.5 seconds, center to center.

Multiplying by 6 gives 183 seconds, closely comparable to the 174 seconds above. Third step: With my eye and a power of 300x on my former 6" Clark refractor I was able to separate a double star of 0.6 seconds. Three hundred x 0.6 seconds equals 180 seconds. Other observers report separating 2.2" with a 6" reflector at 105x and 2.4" with a 9.4" reflector at 90x. One hundred and five times 2.2" equals 231 seconds; and 90 x 2.4" equals 216 seconds, which values are in close agreement with my own results of around 180 seconds.

While the above chain of reasoning is perhaps a little tenuous, it is my distinct impression that my eye is capable of separating two objects, whether they are stars in the sky viewed through a telescope, an artificial star made from a flashlight, or an artificial star made of paper discs, if the two objects present an apparent separation at my eye of about 180-190 seconds. It would be nice if I could confirm this with Epsilon Lyrae, separation some 200 seconds; but, alas, I cannot do so. This star is so faint to my myopic vision that I cannot do more than detect its presence (as in the tests reported in Table II) and cannot even do this except intermittently on the best nights.

As one looks over the figures on Table I, especially the averages at the bottom, one derives a slight suggestion that planetary details, as represented by the first five columns of figures, are perhaps less separable than double stars, as represented by the last column. This answers our Query (a) in the negative. One cannot <u>separate</u> two round spots of planetary markings when they are closer together than Dawes' limit. However, I am somewhat impressed by the constancy of the figures shown at the bottom of Table I and prefer to draw the tentative conclusion that within reasonable limits of contrast the power of any one eye to separate close objects is a constant, be they stars in the black sky or minute planetary details.

As one compares Table II with the corresponding figures in Table I it is apparent that spots can be <u>detected</u> at distances of from 3 to 6 times the distance at which two round equal-sized planetary details can be separated from each other. This answers our Query (b) in the introduction above, in the affirmative.

Comparing the figures in Table III with the corresponding in Table I it appears that in a general sort of way one can detect the colors of planetary details if their apparent size is ½ the angle at which 2 spots would have to be to be separable. This gives us the answer to problem (c) above.

TABLE I

Seconds of arc which various artificial double stars had to subtend (center to center) before being clearly separable to the naked eye.

Spot Color	Background Color: White	Buff	Blue	Brown	Green	Black	
White	x	310	212*	191*	207*	191*	
Buff	297	x	212*	191*	207*	191*	
Blue	216*	195	x	231	248	191*	
Brown	216*	223	282	x	207*	191*	
Green	216*	203*	221	212	x	191*	
Black	216*	203*	212*	191*	207*	x	
Average all items	232	227	226	201	215	191	215
Average of contrasting items	216	203	212	191	207	191	203

*Good Contrast between stars and background.

TABLE II

Seconds of arc which various round discs of paper (planetary detail) had to subtend to be visible to the naked eye.

Spot Color	White	Buff	Background Color Blue	Brown	Green	Black	
White	x	117	47*	46*	36*	28*	
Buff	146	x	51*	49*	40*	28*	
Blue	61*	56	x	96	129	33.5*	
Brown	55*	73	98	x	49*	28.7*	
Green	52*	46*	80	64	x	33.8*	
Black	39*	39*	40*	45*	39*	x	
Average of all items	71	66	63	60	59	30	58
Average of contrasting items	52	42	46	47	41	30	43

*Good contrast between stars and background.

TABLE III

Seconds of arc which various round discs of paper (planetary detail) had to subtend for their colors to be distinguished.

Spot Color	White	Buff	Background Color Blue	Brown	Green	Black	
White	x	125	56*	50*	36.6*	37.7*	
Buff	170	x	157*	131*	131*	99*	
Blue	166*	130	x	122	133	79*	
Brown	168*	134	100	x	110*	79*	
Green	168*	126*	151	111	x	76*	
Black	39*	46*	57.5*	43*	43*	x	
Average of all items	142	112	104.3	91	91	74	102

*Good contrast between stars and background.

Postscript by Editor. Mr. David W. Rosebrugh, 70 Waterville St. Waterbury 10, Conn. has been a regular contributor to *The Strolling Astronomer* from its beginning. He is perhaps best known as an active student of variable stars and is a former President of the A.A.V.S.O.

The editor congratulates and thanks Mr. Rosebrugh for this report on his experiments with artificial discs. More work on these fundamental problems in lunar and planetary observational astronomy is badly needed.

OBSERVATIONS AND COMMENTS

We acknowledge with thanks the arrival of observations of Saturn in December, 1950, and January, 1951, from T. A. Cragg (6-inch reflector, 12-inch reflector), S. Murayama (18-inch reflector), and T. Osawa (6-inch reflector). The instrument used by Mr. Murayama is at the Tanakami Observatory, Japan. One of Mr. Cragg's drawings was reproduced as Figure 2 on pg. 1 of our March issue, and one of Mr. Osawa's is Figure 2 on pg. 1 of this issue. In addition, Mr. Clyde W. Tombaugh has informed the editor orally of some observations of Saturn in recent months made with his 9-inch reflector.

The observers agree in finding the two most conspicuous cloud-belts to lie in low latitudes on opposite sides of the equator. To be consistent with terminology used during the 1948-9 and 1949-50 apparitions, we shall call these the North Temperate Belt and the South Equatorial Belt; actually, however, their difference in latitude scarcely justifies the distinction between "equatorial" and "temperate". The observers further agree that the N.T.B. was more conspicuous than the S.E.B. in December and January. The N.T.B. was resolved into two components by Cragg with his 12-inch telescope and by Murayama with an 18-inch, the former commenting upon the duskiness of the space between the components. On January 24 Cragg observed the S.E.B. to have a darker center with a less dark "wing" on each side, as can be seen on Figure 2 on pg. 1 of the March issue. A North North Temperate Belt was remarked in middle northern latitudes by Osawa and Cragg, and Cragg observed several very thin and faint belts in high southern latitudes. Osawa commented upon a vagueness of southern hemisphere detail. There were rather large dusky polar shadings. Osawa depicted a few darker condensations in the N.T.B. and S.E.B. and some dark columns across the bright zones. All four observers perceived Cassini's Division in the rings near the ansae; the rings were but little opened, for the Saturnicentric latitude of the earth was only four degrees. Mr. Osawa, nevertheless, drew Ring C plainly; and Mr. Cragg glimpsed the brighter outer portion of Ring B. The shadow of the rings was black and prominent just south of the projected rings themselves, and Osawa on December 19 and 26 cleanly divided the rings from their shadow near both limbs of the planet (Figure 2 on pg. 1).

The rings of Saturn are now closing, and the numerical Saturnicentric latitude of the earth will reach a minimum value of 1°0 in late May, after which it will increase. To speak with proper scientific caution, we do not expect that 4-inch telescopes will show more than five or six divisions in the rings in May! We look forward to receiving reports from our readers of their observations of the two Saturnian shadows (that of the ball on the rings and that of the rings on the ball) when these shadows will have been small in March and April. A letter from Mr. G. D. Roth on February 6, 1951, conveyed the information that he is Acting Saturn Recorder of the Bund der Sternfreunde in Germany. Mr. Roth expresses his wish for close and profitable cooperation between the Bund der Sternfreunde and the A.L.P.O. in studies of Saturn. We share this wish. Perhaps some of our members would like to correspond with our German colleague, who reads and writes English well. Hiss address is G. D. Roth, Privatsternwarte, Muenchen 9, Pengmoosstrasse 6, U. S. Zone, Germany.

Mr. Donald O'Toole has submitted a drawing of Uranus made with only 6 inches of aperture on December 31, 1950; this drawing is reproduced as Figure 3 on pg. 1. Commenting on the usual difficulty of Uranian detail, the observer still thought that the markings in the northwest quadrant of the disc were rather definite. Just after making the drawing, O'Toole noted a faint point of light far west of the disc and another one a little to its northeast. These positions correspond to those of satellites Oberon and Ariel respectively. We suggest that other A.L.P.O. members search for the satellites of Uranus. Large apertures can scarcely fail to score here, and it is highly creditable to perceive any satellites with only a 6-inch.

Recognizing that markings on Uranus are difficult at best, the editor would like to urge the following plan upon A.L.P.O. members. When the seeing is unusually good, examine the disc, preferably with a power of 30 or more per inch of aperture. If any detail can be glimpsed, make a careful drawings. One to three hours later make a second independent drawing. If possible, make a third after another interval. Compare the drawings, and see whether the same markings are present on the different drawings. Uranus, of course, has been rotating while these observations have been in progress. It would be most excellent confirmation of the objective reality of the detail depicted to be able to demonstrate that it has shared in this rotation of the planet - something not yet achieved with Uranus, to the editor's knowledge. It would also be excellent to have visual confirmation of the period of rotation, which rests upon photometric data, and perhaps eventually to obtain a visual determination of the period. Obviously, the program here outlined will require rather lengthy periods of good seeing.

E. J. Reese has contributed several drawings and observations of Linné, made with his 6-inch reflector at 240X in 1947-50 and reproduced as Figure 1 on pg. 1. As is well known, this object is seen as a white area most of the time; the small craterlet enclosed within the white area is visible only under low lighting and is a difficult test of optical quality for telescopes less than roughly 12 inches in aperture. Reese estimates the diameter of the Linné crater to be three miles or less and the diameter of the surrounding white area to be seven or eight miles, as his notes show. Readers should also note on Figure 1 on pg. 1 that on November 1, 1950, at colongitude 164°9, and thus about seven hours before sunset on Linné, Reese was very surprised to find the craterlet well-defined and to see no trace of the surrounding white area. His drawing on March 21, 1948, at 38°4 (Figure 1) suggests to the editor the presence of a "ruined" or "submerged" carter-ring just west of Linné and somewhat larger than it - say ten or twelve miles in diameter.

We have been pleased to receive about a dozen inquiries from readers relating to the program of observations of the brightness of Uranus outlined in our February issue. The Montreal Centre of the Royal Astronomical Society of Canada plans to make a group-project of this program; surely other astronomical societies could profitably follow this example. Mr. Charles Tarwater of Long Beach, Calif. is the first to submit observations of Uranus. Using a 2-inch, 8 power monocular, he estimated the brightness of the planet on 8 dates from February 13 to March 12 (U.T.). We would be glad to see a still much greater response to this program. After all, it requires nothing but binoculars or field-glasses and some interest, and the data secured in the project are of value to professional astronomers. As mentioned before, report-blanks will be furnished free of charge to all who write for them. Also as mentioned before, a very similar program of estimates of the brightness of Neptune can be carried out, which subject we plan to discuss further in our May issue.

Bearing upon the problem of the relative sizes of the twin craterlets in the north central part of the floor of Plato, which craterlets are numbers 3 and 4 on Figure 5 on pg. 1 of our March issue, Mr. E. J. Reese has submitted freehand sketches of the appearance of these two craterlets on two Lick Observatory photographs of the moon. These are M4a, taken on October 21, 1937, near colongitude 129°, and M6, taken on October 26, 1937, near colongitude 175°, both with the 36-inch refractor. The low-sun view on October 26 shows the true craterlets well; they are externally tangent and have only slight outer walls. The northeast craterlet is fully as large as the southwest one. The high-sun photograph on October 21 shows two bright spots apparently much smaller than the true craterlets. The northeastern spot is clearly the brighter of the two. The exact relation of the high-sun bright spots to the low-sun craterlets is not evident on these photographs and might well change with changing lighting.

We apologize for our failure to inform our readers of the occultation of Venus by the moon on February 7-8, 1951. However, the conditions of visibility were discussed for the entire nation in <u>Sky and Telescope</u> for January and for the Far West in <u>Astronomical Information Sheets</u>. (The latter periodical is issued at Sacramento Junior College, Sacramento 18, Calif. and is intended for the telescope-using amateur.) At Dallas, Texas, E. M. Brewer and others observed with two 6-inch reflectors and one 10-inch reflector; but there was only a very close approach of the moon and Venus at this station. At Madera, Calif., D. P. Barcroft and C. Landquist were hampered by clouds and only located the moon and Venus after emersion. R. R. Lee at the Milwaukee Astronomical Society Observatory was more successful. Braving a temperature of 1° F. and a 30 m.p.h. wind, he observed with a 5-inch, 20 power terrestrial telescope and a 4-inch refractor at 50X to 150X. At immersion near $22^h\ 46^m$, U.T. (sunset at $23^h\ 12^m$) Lee saw nothing noteworthy, but "there was little time to note any effects on the wiggling image." At emersion near $23^h\ 42^m$ the planet was not perceived until it was two of its own diameters distant from the limb of the moon. Mr. Lee concludes: "The thin sliver of a moon seemed to pierce Venus and was apparently holding it out for display like a brilliant diamond on a stickpin. For fully an hour the view that caught the eye in the western sky was remarkable with Venus, the moon, Jupiter, and Mars all close together. It was a sight that will live long in an astronomer's memory."

On February 7 Mr. P. A. Moore in England wrote that Mr. R. M. Baum, an active member of the B.A.A. Lunar Section, has reobserved Maedler's reddish tint near the crater Lichtenberg. D. P. Barcroft saw apparently the same phenomenon about ten years ago. W. H. Haas had made many observations during the last decade of the color of a dark area just west of Lichtenberg, chiefly with a 6-inch reflector. He finds the hue sometimes reddish but also sometimes bluish or purplish. It is his tentative opinion that changes in color independent of the solar lighting occur.

On February 1 T. R. Cave, Jr., wrote that it is his impression that the craterlet within the Linné white area (Figure 1 on pg. 1) is several times larger in his 12.5-inch reflector than he found it to be with his 10-inch reflector in 1941. The tininess of the object, the interval of 10 years between the observations, and the use of different telescopes make the editor feel dubious that any change occurred.

On pg. 5 we reproduce two graphs kindly contributed by Mr. Lyle T. Johnson; they allow quick determinations of the approximate apparent angular widths of

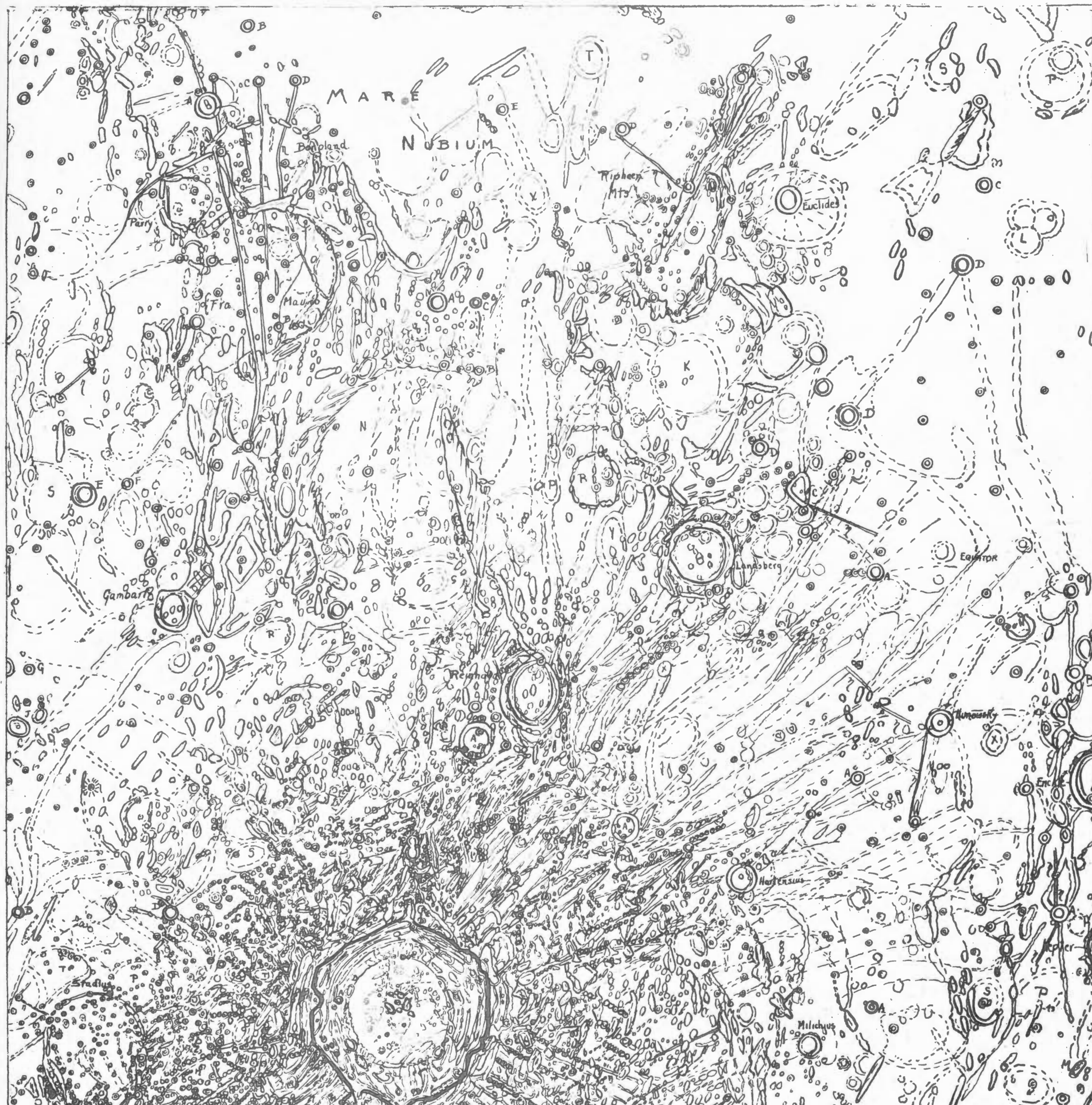
Saturn's rings and their shadows during the 1950-51 apparition. The one graph is for the central meridian (CM); and the other is for a position 15° from the sunrise or sunset terminator, it being felt that this position will correspond better with observations than the actual terminator or the actual limb. Mr. Johnson necessarily assumed certain dimensions for the planet and its rings, which values he has indicated. The use of the graphs should be fairly obvious, but we shall give a few examples. First, let us determine the width of the projection of Rings A and B at the C.M. on December 10, 1950. On this date, as we find from the C.M. graph, the south edge of the Ring A projection lay 0".75 south of the equator, while the north edge of the Ring B projection lay 0".30 south of the equator. Therefore, the width of the projection of Rings A and B was 0".75-0".30 or 0".45. As a second example, let us find the width of the observable portion of the shadow of the rings on the ball at the C.M. on April 1, 1951. Again using the C.M. graph, we note that the south edge of the shadow of Ring A lay 0".63 south of the equator on April 1 and that the south edge of the Ring A projection then lay 0".45 south of the equator. Therefore, the breadth of the shadow was 0".18. It should be noted that this shadow was on the south side of the projection of the rings on April 1; however, it was on their north side prior to March 16. On March 16 itself the Saturnicentric latitudes of the earth and the sun were equal; and the shadow of the rings was then quite invisible, being concealed by the rings themselves. As a final example, let us determine the width of the gap between the projected rings and their shadow on December 18, 1950, at a distance of 15 degrees from the terminator; T. Osawa and L. T. Johnson saw this gap near this date. In the computation we shall suppose that shadows can be seen through Ring C, the Crape Ring. On December 18 at a distance of 15° from the terminator the north edge of the Ring B projection lay 0".56 south of the equator of Saturn; the south edge of the shadow of Ring A lay 0".39 south of the equator. Therefore, the gap between the rings and their shadow here had a breadth of 0".17 (this gap being, as mentioned above, seen through Ring C). It might be noted that the same gap had a breadth of only 0".05 at the C.M. on December 18, a value apparently too small to be observable.

Writing on February 6, Mr. G. D. Roth at Munich, Germany, offers some remarks about colors on Mars and the differences between different observers in recording them. He says in part: "In my opinion there are two factors: 1. The instrument *must be* a reflector (coated with aluminum, *not* silvered), and the eyepiece should be monocentric (achromatic). 2. The conditions of the air and the observer himself *must be the best* (not to be hungry or tired). In parts of your country larger apertures may be used with more success than here in Central Europe. In any case experience brings results to us, even when using small apertures of three to six inches. My results are on the one side green and on the other brown, besides black, gray, and orange. In this matter I am supposing the following: red and green mixed give a brownish color; red and green are 'Komplementaerfarben' too. The surface of Mars is generally reddish-orange with darker sections. Would it not be possible that there is a connection and that the different results are of optical or physical origin? The use of color filters may be very helpful in this matter!"

F. E. Brinckman, Jr., of Long Beach, Calif., in a letter on February 20 offered some comments on Dr. Joseph Ashbrook's article "The Meteorology of Other Planets", in *Scientific Monthly*, Vol. LXIX, No. 4, October, 1949. The article describes Dr. W. Becker's discovery of slow year-to-year changes in brightness of all the outer planets. Brinckman writes that he concurs (from previous personal observations?) that the general disc of Jupiter is brightest when the Equatorial Zone is dusky and red and is dimmest when the E.Z. is bright and white. (A. S. Williams found variations of 12-year period in the E. Z. and its two bordering Equatorial Belts. However, these variations have not been maintained during the last 15 years or more - at least in the editor's opinion.) Brinckman goes on to propose long-range colorimetric and photometric studies of latitudinal sections of the disc of Jupiter. The method should presemably be photography, and careful control of all conditions affecting the results would be necessary. Perhaps a similar program could be undertaken with Saturn, but here the large changes in the Saturnicentric latitude of the earth would be a serious complication. Brinckman also wonders whether colorimetric and photometric variations in the rings of Saturn may not appreciably influence the observed color and brightness of Saturn as a whole. He directs attention to A.L.P.O. observations during the 1949-50 apparition of differences in the color of the east and west ring-arms (The Strolling Astronomer, Vol. 4, No. 1, pg. 11, No. 2, pg. 13, No. 4, pg. 10, No. 6, pp. 9-10, and No. 8, pp. 14-15, 1950). Finally, Brinckman expresses his surprise that the variations in brightness of Mars, Jupiter, Saturn, Uranus, and Neptune, as reported by Ashbrook, should all be about 0.3 stellar magnitudes. Coincidence or some unknown law of nature?

On February 26 Mr. Brinckman wrote of his work on the lunar walled plain Grimaldi; and his remarks may be compared with Dr. J. C. Bartlett's opinions, as given on pg. 14 of our January issue. Brinckman remarks that on his 25 or so drawings of Grimaldi in 1944-51 there are surprising differences in appearance near the same solar illumination in different lunations. He suspects that his own work differs considerably from Dr. Bartlett's. Brinckman urges careful studies of Grimaldi with color filters and the making of sketches in quick succession on the same night with different color filters. He has himself carried out some preliminary work of this kind. Any filters used, of course, should be commercial filters of known transmissivities at different wave lengths.

The energetic Mr. Brinckman has also made an extensive study of the lunar crater Cassini and especially of Cassini A, the largest crater on the floor of Cassini. He cordially invites other A.L.P.O. members to join him in observing Cassini and A. He has so far concentrated upon a careful topographical survey. Brinckman confirms the existence of a central peak (mentioned by Goodacre), or rather ridge, in Cassini A and has suspected a minute craterlet atop this ridge. Dusky bands develop on the east and northeast walls of A between colongitudes 18° and 50°; first three, and then two, are seen with difficulty. Possibly their visibility is not consistent from lunation to lunation. Brinckman notes that a cleft on the inner glacis of the south and southeast walls of A is sometimes discontinuous or broken. There is apparently a resemblance to "Fault B" in the crater Conon, which E. J. Reese and others have found sometimes continuous and sometimes broken (The Strolling Astronomer, Vol. 4, No. 2, pg. 15, 1950). Is it just possible that lunar atmospheric obscurations are involved with both craters? Brinckman is rather puzzled by the fact that a craterlet about a mile in diameter between Cassini A and the north wall of Cassini, a craterlet shown by Goodacre, Wilkins, and others, has not been seen by him in more than 150 observations with 3- to 8-inch telescopes in 1944-51. D. O'Toole also failed to find it in a superlative view with a 6-inch reflector. Indeed, it appears to be absent from a photograph in the Lick Observatory series. Brinckman also mentions occasional views of two streaks, perhaps rills, in the south central part of the floor of Cassini under low morning illumination.



300 in. MAP OF THE MOON Section VI

Drawn by H. Percy Wilkins. 1939.

Section VI

SECTION VI

OF

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

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