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SEASON'S GREETINGS

The staff of The Strolling Astronomer extends to all readers wishes for a very merry Christmas and a very happy and successful New Year. We thank all of you for your cooperation during the year now ending. With your continuing assistance we look forward to a more active and scientifically more valuable future for the Association of Lunar and Planetary Observers.

GILBERT BRUCE BLAIR, 1879-1949.

Professor G. Bruce Blair of the University of Nevada died suddenly at his home in Reno, Nevada, of a heart attack on September 19, 1949. His passing is deeply mourned by his many friends, including those of his Church, of the University of Nevada, of the Astronomical Society of Nevada, of the Astronomical Society of the Pacific, and of the Western Conference of Amateur Astronomers. The following biographical information has been kindly supplied by Dr. E. W. Harris of the College of Engineering at the University of Nevada; he was a former student of Professor Blair and a close friend for a number of years.

Professor Blair was born at Blairsburg, Iowa on September 13, 1879. He received his A.B. Degree from Tabor College in 1902 and his M.A. from Washburn College in 1904. He later did graduate study at the Universities of California, Chicago, and Kansas. His principal fields of study were physics, astronomy, and the classics; and at one time he was a fellow at the Lick Observatory. In 1912 he married Miss Rebecca Taliaferro, a college and musical graduate, who survives him. He taught physics and astronomy at Washburn University, Allegheny Observatory, Morningside College, and Oregon State College before he went to the University of Nevada in 1919. Motivated by a deep love for astronomy, he here gave freely of his time and talents during the next 30 years. His professional memberships included:

1. American Association for the Advancement of Science.
2. Astronomical Society of the Pacific.
3. Astronomical Society of Nevada (President).
4. American Meteor Society.
5. Western Conference of Amateur Astronomers.
6. Phi Kappa Phi.
7. Alpha Epsilon Delta.

Professor Blair was probably best known to American amateur astronomers in recent years as the editor of Astronomical Information Sheets. The Sheets were maintained as a service to furnish "Up-to-Date Information for Telescope Using Amateurs" and were sold at a nominal charge. There were subscribers all over the United States and also in a number of foreign countries. Subjects discussed in the Sheets included predictions of occultations, lunar eclipses, bright fireballs, sunspot counts, techniques in telescope-making, and news of amateur astronomy societies, among many other things. The Sheets were thus a most valuable medium for the exchange of ideas and information among active amateurs, and it is unfortunate that there is apparently no one to carry on this phase of Professor Blair's work.

His life work may perhaps be said to have culminated in the first Conference of Western Amateurs at Los Angeles last August. There is a description of this Conference in Sky and Telescope for October, 1949, and a picture of Professor Blair on pg. 309. It is difficult for those of us who knew him there to realize that he is gone. He had long dreamed of such a Conference and was one of those most active in bringing this dream to reality. He would have desired no better memorial than that the Conference should meet again every year and should become a strong group of Western Amateur Astronomers.

The editor knew Professor Blair personally only slightly. Dr. Harris writes that our late friend was "possessed of a strong character, kindly, unassuming, gentle, courtly; unafraid to express his convictions as he saw them, a man who served his God, his Church, his family, and his community well; a lover of humanity; an optimist who took victory and defeat with equal equanimity; a rare soul incapable of the slightest unkindness to his fellow man."

The editor would here like to propose that it would be peculiarly fitting, in his opinion, that any formal Society of Western Amateurs should be named for Professor Blair. The amateur will never have a better, more helpful, and more unselfish friend.

JUPITER REPORT, NO. 5

by Elmer J. Reese

Satellite Markings. A number of very interesting drawings of Ganymede and Callisto have been received during the present apparition. T. R. Cave has contributed six drawings of Ganymede (July 16, 17, Aug. 4, 6, 24, Oct. 3) and two drawings of Callisto (Aug. 6, Oct. 3). He employed powers from 480X to 714X on his excellent 8-inch reflector and on the 12-inch refractor of the Griffith Planetarium. T. Cragg has sent three drawings of Ganymede (July 16, 17, Aug. 1) as seen with 8- and 12-inch reflectors and powers from 336X to 650X. These two observers agree very well on the appearance of detail on Ganymede. Cave shows two dark belts on this satellite; they are similar in general appearance to the belts on Jupiter. A wide, dark belt is located very slightly south of the middle of the disc. This belt is the more prominent of the two and the only one seen by Cragg. The other belt is located about halfway between the center of the disc and the north limb. It seems that this fainter belt is most conspicuous when the satellite is about 30° past inferior conjunction. Cave observed a very dark and extensive hump on the north edge of the southern belt about 15° east of the central meridian on July 17 when the satellite was about 11° past western elongation and again on August 24 when the satellite was about 35° past superior conjunction. Cragg drew a broad and dark hump on the north edge of the southern belt near the central meridian on July 16 when the satellite was 47° past inferior conjunction. Cave, observing almost simultaneously at a different station, confirmed this marking. If E. M. Antoniadi is correct in concluding that the four large satellites of Jupiter always present the same face to their primary (JRASC, vol. 33, no. 7, pg. 281), it is evident that the dark humps observed on these dates were different objects.

Mr. E. Pfannenschmidt has very kindly sent us four excellent drawings of Ganymede by Dr. W. Sandner (July 4, 5, 12) and Mr. H. Oberndorfer. These observers employed the 11-inch refractor of the University Observatory in Munich. Sandner's drawing of July 12 at $0^h\ 0^m$, U.T., agrees remarkably well with Oberndorfer's drawing of July 4 at $0^h\ 50^m$. Each observer shows a small, bright cap on the southwest limb and makes the southwest half of the disc much darker than the northeast half.

While observing with the 12-inch refractor on August 6 at $12^h\ 18^m$, Cave found the disc of Callisto very diffusely outlined and dull gray in tone except for a whitish cap covering much of the northeast quadrant of the disc. Cave

again found the disc of Callisto surrounded by a hazy band on October 3 at 3^h 40^m while observing with an 8-inch reflector at 665X.

This is indeed an interesting study but one requiring a fairly large telescope capable of excellent definition. Mr. Cave writes: "I feel that any satellite surface detail is very nearly at the limit of visibility of an eight-inch scope; even a 12-inch refractor has little light to spare when dealing with these objects." Further observations are needed. We would like to know whether these markings on Ganymede are permanent surface markings or transient atmospheric features. Can we correlate variations in the observed brightness of the satellites (The Strolling Astronomer, Volume 2, No. 9, pp. 3-7) with variations in the appearance of their surface markings?

Occultation of Jupiter II by Jupiter III. An occultation of satellite II by satellite III was observed on October 16 by W. H. Haas with a 6-inch reflector at 188X. The sky was very clear, and the seeing was poor to fair. We continue with Haas' original notes: "The two bodies were barely resolved at 0^h 56^m. The limbs appeared to be about tangent at 0^h 59^m. There was a single elongated image at 1^h 0^m. Elongation was suspected from 1^h 2^m to 1^h 11^m. Occasional fairly good views from 1^h 12^m to 1^h 46^m showed a single round satellite. Elongation was seen again from 1^h 50^m to 1^h 59^m. The limbs appeared to be nearly in contact from 2^h 0^m to 2^h 5^m. At 2^h 11^m the two satellites were again barely resolved. Mid-occultation was hence at about 1^h 34^m, the mean of the two times when resolution was just possible. The better views at 2^h 15^m and later showed II to have a much brighter surface than III. The position of the line joining the centers of the two satellites both before and after occultation indicated that the occultation was almost central and probably total."

The earth and the sun will lie near the plane of Jupiter's equator in March and April, 1950; consequently, a number of mutual occultations and eclipses of the Jovian satellites should be observable then.

Partial Eclipse of Jupiter II by Jupiter III. E. E. Hare (7-inch reflector, 170X) and E. J. Reese (6-inch reflector, 240X) observed the shadows of satellites II and III partially overlapping each other near 2^h 9^m on September 25. Since their shadows overlapped, satellite II must have been partially eclipsed by III; however, neither observer made a direct observation of the effects of this eclipse on the appearance or brightness of satellite II. Before the shadows merged, each observer estimated that the diameter of the shadow of II was 0.5 or 0.6 that of III. The shadows merged near 1^h 50^m and remained pear-shaped to the end of transit. At 2^h 9^m Reese estimated that the shadow of II was due north of the shadow of III, with the shadow of III covering about one-half of the diameter of the shadow of II.

Red Spot and Hollow. Mr. S. Murayama, a member of the staff of the National Science Museum in Tokoyo, Japan, recently sent two very beautiful drawings of Jupiter to W. H. Haas. Observing with an 8-inch refractor on July 23 at 15^h 35^m, Murayama depicted the Red Spot as a complete oval, very dusky along its edges and much brighter in its interior. The south edge of the SPOT was in contact with the STB. A splendid drawing by F. E. Brinckman on September 19 shows the interior of the Red Spot to be quite bright and colorless except for a dusky, reddish area at the following end. Observations by Reese indicate that a remarkable transition of the Red Spot region occurred during the last week in September and the first three weeks in October. During this interval a fairly dark Red Spot faded and gave way to a bright Hollow bounded on all sides by dark matter as in 1948. A dark column bounding the following end of the Hollow seemed to form within, rather than following, the fading Red Spot. Observations by J. C. Bartlett indicate that the intensity and color of the Red Spot fluctuated very considerably early in October. A detailed drawing by L. T. Johnson

on October 9 shows the Hollow fairly bright and completely surrounded by dusky matter. Johnson could not detect the Red Spot even with a blue filter; however, he did see two thin, dusky streaks within the Hollow. T. Cragg made an interesting observation on October 13 at 4^h0^m with a 12-inch refractor and a blue filter: "The Red Spot had a peculiar shape that night looking quite pointed at both ends. It looked as if gases were being rushed around it with great rapidity. I saw a long, bright protrusion extending from the northwest part of the Hollow." Bartlett, O'Toole, and Reese have also seen a persistent bright streak in the interior of the SEB adjacent to the northwest edge of the Hollow. On October 26 Hare observed dark columns in the STrZ bounding the preceding and following ends of the Hollow - he could see the Red Spot only as a very faint bit of smudge near the middle of the Hollow.

Acknowledgments. Mr. Rex Bohannon of Los Angeles has contributed a photograph of Jupiter taken in July with a 12½-inch reflector. Photographs give valuable information about the general aspect of the planet and the Jovigraphic latitudes of the various belt edges. Mr. Paul D. Bevis of Santa Monica, California, has sent us an interesting drawing of Jupiter on October 27 at $4^h\ 0^m$. He depicts three very large projections extending all the way from the south edge of the NEB to the north edge of the SEB. He also shows the SEB to be as conspicuous as the NEB. In recent months we have received several drawings of the Giant Planet from Messrs. E. Pfannenschmidt, O. C. Ranck of Milton, Pa., and W. Howard of Portsmouth, Virginia.

Supplementary Remarks by Editor. In connection with the diffuseness of Callisto observed by Cave on August 6 and October 3, 1949, it is proper to mention that the same diffuse outline has been observed by Dr. Bartlett on a number of occasions and by both Cave and Cragg on June 13, 1948 (The Strolling Astronomer, Volume 2, No. 8, pg. 8, No. 9, pg. 5, and No. 10, pg. 8, 1948). On June 13 the two observers found the other three satellites sharply outlined. The editor would like to underscore Mr. Cave's opinion of the need for large apertures in dealing with detail on the Jovian satellites. On August 24, 1949, Cave, Cragg, Brinckman, and Haas made independent and pleasingly accordant drawings of Ganymede with the Griffith Observatory 12-inch refractor. The same four observers examined Ganymede again with the excellent six-inch Clark refractor on Mount Wilson on August 25. Atmospheric conditions were much better than on the previous night. Nevertheless, the detail on the satellite was far more difficult in the smaller telescope. Although Haas on August 24 with the 12-inch obtained the best view of Ganymede that he has ever enjoyed, on August 25 with the six-inch he felt quite uncertain about details on the disc.

On September 25 Haas also observed the shadows of II and III; he used a 6-inch reflector at 188X. At $1^h\ 45^m$ he remarked that the two shadows were usually seen as a single black oval elongated in a southwest-northeast direction but that the better views showed them as a dumbbell-shaped object. When the two shadows were passing off the disc near $2^h\ 20^m$ he called them "very close" but did not explicitly say whether they overlapped or not. Of course, Haas too failed to examine Jupiter II then in partial eclipse!

Our friends in the British Astronomical Association have sometimes in the past published lists of predictions of the mutual eclipses and occultations of the Jovian satellites. If they do so for coming 1950 events of this kind, we shall try to make the information available to our observers of Jupiter.

VENUS IN OCTOBER

by T. R. Cave, Jr.

Observations of Venus were very numerous during October. The Recorder wishes to welcome three new members to the Venus Section; their names, however, are not new to the A.L.P.O. Dr. James C. Bartlett of Baltimore has forwarded a splendid report, as has Mr. Paul Bevis of Santa Monica, Calif. Mr. L. T. Johnson of Blossom Point, Md., has turned his excellent modified Gregorian on our brilliant evening star.

The observers were:

OBSERVER	STATION	TELESCOPE
J. C. Bartlett, Jr.	Baltimore, Md.	3.5" Refl.
P. D. Bevis	Santa Monica, Calif.	6" Refl.
F. E. Brinckman	Long Beach, Calif.	6" Refl.
T. R. Cave, Jr.	Long Beach, Calif.	8" Refl.
P. O. Chorley	Vallejo, Calif.	3.5" Refl.
T. A. Cragg	Los Angeles, Calif.	6" Refl.
W. H. Haas	Albuquerque, N. M.	6" Refl.
L. T. Johnson	Blossom Point, Md.	10" Refl.
H. Le Vaux	Los Angeles, Calif.	6" Refl.
D. O'Toole	Vallejo, Calif.	6" Refl.
E. J. Reese	Uniontown, Pa.	6" Refl.
E. K. White	Kimberly, B.C. (Canada)	7½" Refl.

The Cusp-Caps: As the waning gibbous phase of Venus drew nearer to dichotomy, the cusp-caps became more difficult objects. This experience was reported by several observers. Haas found the south cusp-cap to be decidedly the more brilliant on Oct. 1, although the north cap was not difficult. Reese found the north cap larger in area than the south and of equal intensity only 23 hours later (possibly a rapid atmospheric change here). On Oct. 4 Le Vaux confirmed Haas' view of Oct. 1, and on Oct. 8 Bartlett noted the cusps to be rather irregular in appearance. Johnson found the north cap possibly slightly more prominent on the same date. Brinckman and Cave on Oct. 9, observing together, saw the north cap definitely projected upon the terminator, while the south cusp was very blunted, the south cap being invisible. One hour later on the same date Le Vaux could see nothing of this apparently very brief appearance, but found the north cap very much the more prominent. On Oct. 10 Bevis noted the dark border of the north cap, although the cap itself was invisible. From about Oct. 15 until near the end of the month the two cusp-caps were of nearly equal size. Haas was

perhaps the first to note this condition, on Oct. 15. White was unable to detect the south cap on Oct. 23. Cragg suspected a temporary dimming of both caps near Oct. 25 and no return to normal brilliancy until Oct. 28. At 0^h on Oct. 28 Chorley found the caps equal. It is interesting to note that O'Toole always recorded a south cusp-cap band but never a similar bordering dark band in the north.

The Terminator: To nearly all observers the terminator was smoothly convex. O'Toole, Brinckman, and Cave perhaps noted some apparent irregularities in the "equatorial" area (assuming poles near cusps) of a greater degree of convexity than is normal. O'Toole noted this aspect strongly on Oct. 22; Brinckman and Cave, on Oct. 9.

The Limb-Band: This brilliant ash-white band appeared very narrow to Haas on Oct. 1 in a daylight sky. Observing as the sky darkened into twilight, he noted: "Possibly there is a more gradual brightening of the disk for a longer distance up to the limb". Brinckman occasionally found this normally narrow band somewhat wider than usual from Oct. 20 to Oct. 24.

The Dusky Markings: A number of observers were able to detect a considerable amount of detail. Each observer depicted the planet somewhat differently, although there is also a considerable amount of similarity between several of the observers. Bevis and Chorley noted details of a very similar nature on several dates. Haas and LeVaux noted a number of linear-appearing markings which compare very well. Haas wrote on Oct. 1: "The markings are plainer than in September; they are perhaps now of normal intensity". Obviously the most important change occurred in these dusky details. Reese wrote on Sept. 25: "The disk is definitely mottled; however, the exact appearance of the markings is quite uncertain." This appearance was striking to Haas on Oct. 15 and has since been very definitely confirmed by Cragg and with less certainty by several others. In very inadequate views by Cave in late October, under very poor seeing conditions, much the same impression was secured. Haas and LeVaux have both found that the pattern of detail often seems to change from minute to minute. Perhaps this variation is due only to changing seeing conditions; however, it has been frequently noted by several persons in the past. Perhaps the changing appearance over short periods of time is not completely spurious. It will be recalled that some skillful observers of Venus have found very considerable changes in appearance from one day to the next.

The White Areas: Last month Cragg "discovered" a rather permanent white area on the limb somewhat south of the "equator". On Sept. 26 and Oct. 8 Johnson was able to observe what very much appears to be Cragg's marking. LeVaux also perceived it on a number of dates in October. Cragg was able to reobserve this area on Oct. 26 and 27. Other than this one persistent area, it is difficult to follow light areas by comparison of the work of different observers. A few observers have found a rapid apparent shifting of some of these white areas; these shifts may well indicate considerable turbulence, at least at times, in the Venusian atmosphere, particularly in the "equatorial" zone and in high north and south latitudes.

Luminescence of the Dark Side: On Oct. 9 at $22^h\ 38^m$ Bartlett found: "While examining the planet without filters I was much surprised to see the dark side faintly but unmistakably projected against the sky. The appearance was as of a darker surface than the sky, as if of an unilluminated

surface projected against it. On examination in red and green light successively, this projected surface became much more conspicuous, looking black through a red filter. It is possible therefore that it was actually emitting a feeble radiance of a bluish or purplish hue which suffered greater absorption than the blue sky light and so caused the dark side to appear black". Such appearances are very rare, and when seen with certainty as by Bartlett should be carefully examined. Webb in his invaluable Celestial Objects, Fifth Ed., Vol. 1, pp. 64-66 gives considerable attention to "The Phosphorescence of the Dark Side"; however, in these observations the dark side was always seen to be brighter than the background sky. Refer also to The Strolling Astronomer, Vol. 2, No. 8, pp. 4 and 6, 1948, and Vol. 3, No. 7, pp. 8-9, 1949.

Comparison of the Drawings: Drawings by Brinckman and LeVaux on Oct. 9 made slightly less than one hour apart show a striking similarity of detail, the dusky markings and light areas being almost identical. Near 0^h on Oct. 16 Haas and O'Toole observed only 35 minutes apart, and there is a strong resemblance between the two views. Johnson and Haas once observed within two hours of each other and drew very similar details, particularly along the terminator.

Remarks by the Recorder: The Recorder again wishes to congratulate the observers on the excellence of their work. Johnson has occasionally been using an off-axis diaphragm on his 10" reflector; others may thus find an improvement in definition when the seeing is poor. Haas, Cragg, Brinckman, Bartlett, and O'Toole have found filters of considerable help recently. The Recorder finds a blue filter excellent for contrasts between different areas on the disk. White is now making micrometric measurements of Venus, and it is hoped that a full report can be given next month on his results. All data on observed half-phase are desired by the Recorder by the tenth of December.

MOON, MARS, AND SATURN

All readers interested in lunar photography will wish to know of results secured last month by E. K. White with a 7-inch reflector. He used Superpan Press Film and employed an orthoscopic ocular of equivalent focal length 0.5 inches for magnification. The focal length of his mirror is 100 inches. An enlargement of a photograph of Aristarchus and vicinity at $5^h\ 30^m$ on November 5 (U.T. here and later), the colongitude being 83°9, shows two of the much-discussed dusky bands on the east inner wall. One of Plato at $6^h\ 0^m$ on November 5 shows three white spots on the floor; these are the central craterlet; the southeast craterlet, and the north central pair as a single spot. On this date White had a clear sky and somewhat poor to fairly good seeing. Visually he was able to see very clearly five or six dark bands on the Aristarchus wall and a number of spots on the Plato floor. He thinks that his photographs are about as good as those in W. H. Pickering's Photographic Atlas of the Moon; Pickering's plates were taken with a 6-inch refractor in 1901. The editor here agrees with Mr. White. Our colleague suggests that a good 12- or 15-inch mirror has great possibilities for lunar photography.

White drew the floor of Plato on November 6 at colongitude 96°2 and found these eight spots in order of decreasing conspicuousness: near-central craterlet, southeast craterlet, eastern of north central pair, western of same pair, east central splotch, a tiny spot some miles south of the

near-central one (and frequently seen by Reese and Haas in the past), a tiny spot about five miles northwest of the southeast craterlet (thus at or very near the position of the "new" craterlet found by Reese on September 10 at 120°.8 and mentioned on pg. 8 of our November issue), and a tiny spot perhaps 10 miles north-northwest of the near-central craterlet. On every night from November 2 to November 6 White searched for tiny bright spots on the floor in fairly good seeing and never saw others besides the eight listed above. On every night the twins were clearly divided, and always the eastern one was a little the larger and more conspicuous. The view was so distinct that Mrs. White, who seldom observes, independently confirmed the difference in size on one date. In good seeing through an opening in clouds on October 8 at colongitude 103°.0 White also found the twin craterlets clearly divided and the eastern one the larger and more conspicuous.

On October 1 at colongitude 15°.4 Reese in rather poor seeing saw the central craterlet very easily and glimpsed shadow in it. He further easily saw the east central splotch and glimpsed the southeast craterlet. While still at the telescope, he felt absolutely confident that the central craterlet and the east central splotch could not have been missed on March 9, 1949, at 20°.9 (The Strolling Astronomer, Vol. 3, No. 5, pp. 9-10, 1949) "had they been anyway nearly as bright and conspicuous as they were on this night". Reese goes on to wonder: "Observational errors are indeed tricky things, but how many seemingly good observations can we discard as erroneous and still consider ourselves unbiased in regard to lunar changes?"

A few drawings of Plato were made in August-November by T. Cragg (12-inch refractor), D. O'Toole (6-inch reflector), and W. H. Haas (6-inch reflector). Cragg on August 6 at colongitude 54°.9 recorded a peak near the foot of the west wall; it is perhaps identical with a hill seen by Haas on October 1 at 17°.3 near the southwest wall and also previously remarked by E. K. White and F. R. Vaughn (each with a 7-inch reflector) under low lighting. Cragg, O'Toole, and Haas saw on the floor under high lighting these spots in order of decreasing conspicuousness: near-central craterlet, east central splotch, north central pair (single except to Cragg), and southeast craterlet. Haas has also seen with difficulty the tiny spot about five miles south of the central craterlet and at $6^h\ 28^m$ on November 4 found it more easily visible than the southeast craterlet. In fact, Haas has frequently thought this southeast craterlet definitely smaller and more brilliant than in 1942-5, when he was unfortunately (for this comparison) using a different telescope than now. That the southeast craterlet may sometimes change rapidly in brightness is suggested by the fact that Haas found it under near-identical conditions distinctly dimmer near $11^h\ 29^m$ on November 8 than near $6^h\ 4^m$ on November 7. Reese's "new" craterlet was not noticed by O'Toole on the "discovery" date of September 10 at 121°.9, nor could Haas later see it on November 7 at 108°.5 or on November 8 at 123°.3; but this negative evidence probably merely means that it is useless to look for the "new" object unless the twins are clearly divided. When Plato was near the sunset terminator on November 13 at 183°.9 Haas found that a ridge apparently occupied the position of one of the numerous bright streaks visible under higher lighting. Do we here have a clue to their nature?

About a year ago we summarized the results of systematic searches for possible lunar meteoritic phenomena up to that time (The Strolling Astronomer, Vol. 2, No. 10, pp. 4-5, 1948). Probably the most regular watcher for

these objects recently has been Mr. Millard Williams with an 8-inch reflector in West Los Angeles, California. From October, 1947, to November, 1949 he spent about 48 hours in such searches. Results have been negative except that on November 2 at about $7^h\ 5^m$ "what appeared to be a thin hair-like bright line appeared momentarily at right angles to the terminator and extended into the [night hemisphere] for 75 to 100 miles. It appeared about at Schiaparelli. The bright line or streak lasted for seemingly less than a second, but it appeared to be a real phenomenon. It was too short in duration to determine anything as to its nature. Such a streak has not been observed before during this series of observations." Mr. Williams was watching the terminator-region near Schiaparelli when the streak was seen. His description suggests to the editor that we have here still one more moving lunar bright speck, or possible lunar meteor.

H. P. Wilkins has communicated an unusual observation made by J. W. Fisher at Brussels (Belgium?) on February 2, 1949 with a 4-inch refractor. At $18^h\ 20^m$ Mr. Fisher remarked a whitish glow on the earthlit hemisphere in the region of Kepler and Encke. The glow began to fade at $18^h\ 50^m$ and disappeared at $19^h\ 15^m$. The moon was about four and one-half days past new. If the fading was not due merely to the moon's diminishing altitude, what is the explanation?

A drawing of Aristarchus in fairly good seeing by E. J. Reese on November 3 at colongitude 58°0 is noteworthy as showing two low ridges crossing the floor from north to south. The central peak and a hill in the north part of the floor lay on the course of the eastern and larger ridge. The other ridge, which bordered the shadow of the west wall, contained a higher point near its middle. It is curious that the drawing shows nothing of two crater-pits often observed at this lighting at the foot of the east inner wall and portrays very little difference in tone between the east inner wall and the eastern half of the floor.

L. T. Johnson made a drawing of Conon on September 3 at colongitude 34°5, using his 10-inch reflector at 300X. The much-discussed "fault b" was probably seen at its southwestern end; the northeastern end was less definite. E. E. Hare writes that he has found "cleft v" in Conon to be unmistakably shown on a Yerkes Observatory photograph taken in 1909! This cleft runs approximately north-south and almost passes through the center of the floor. The photograph was taken under afternoon illumination, the colongitude probably being near 148°. We are asking Mr. Hare for an exact reference to this photograph.

Dr. J. C. Bartlett has sent us an excellent and detailed discussion of his observations of Grimaldi from August to November; a summary must be deferred to a future issue because of lack of space. D. O'Toole made a drawing of Grimaldi on August 17 at $17^h\ 30^m$, the colongitude being 194°3. The corresponding P.S.T. is 9:30 A.M. so that he was observing in full sunshine! He employed a 6-inch reflector and 47X. Bartlett's Chevron Pattern is apparently depicted, and the Central Bright Streak was very slightly sharper on its east edge than on its west. O'Toole drew Grimaldi at night on September 10 at 121°9. In seeing almost perfect he resolved the Central Streak into a number of separate parts which "in turn seemed to have other parts to them." O'Toole saw several dark splotches on the floor and a larger and darker area near the southeast edge. T. Cragg on August 16 made an experiment which other lunarians might well imitate. Using a 12-inch

reflector at 168X with fairly good seeing and a clear sky, he successively drew Grimaldi with several different color filters. One may hope in this fashion to establish the color of different features in this walled plain.

During the last month we have received observations of Mars from F. E. Brinckman (6-inch reflector), T. R. Cave (8-inch and 6-inch reflectors), W. H. Haas (6-inch reflector), E. E. Hare (7-inch reflector), D. O'Toole (6-inch reflector), the Schwaebische Sternwarte observers (8-inch refractor), and E. K. White (7-inch reflector). On December 15 the angular diameter of Mars will be 6".8. The north pole will be tipped toward the earth by 23 degrees. The quantity ⊙, the areocentric longitude of the sun measured so as to be 0° at the vernal equinox of the northern hemisphere, will be 51°.

Perhaps the first observation of the current apparition was secured by our Schwaebische Sternwarte colleagues at $3^h\ 30^m$ on July 3. They had seeing 10 and transparency 5, conditions which the editor had always previously supposed existed only in the dreams of frustrated planetarians! A drawing made with 433X at C.M. 61° shows a north cap (⊙332°) and a bordering dark band but no south cap. It is rather difficult to identify much else, though an enlarged Margaritifer may very well be present. We learn from E. Pfannenschmidt's Mitteilunger fuer Planetenbeobachter that the Schwaebische observers think that the transparency of the Martian atmosphere deteriorated after July. They report a conspicuous north cap without a dark border, some southern maria, and a "certainly atmospheric" south cap reaching to latitude 40 degrees south. "Everything else appears to lie under a yellowish haze." It should be noted that the July 3 drawing was made when the angular diameter of Mars was only 4".0. By comparison the diameter of Uranus will be 3".8 at its opposition on December 25. The poor agreement of the drawing with maps leads the editor to think that on such small discs features are badly misplaced and are drawn with grossly distorted shapes, even under very favorable conditions.

All observers agree that the north cap was brilliant and conspicuous in October and November. E. K. White with his homemade filar micrometer measured the angular diameter of the north cap to be 38 degrees on October 21 and 37 degrees on November 6. Haas obtained 41 degrees as the average of measures of his eight original drawings from September 18 to November 20. Neither observer corrected for the phase of the planet. Rather curiously, Haas' measures fail to show the presumed spring melting of the north cap, though ⊙ had reached 40° on November 20. The dark "melt-band" around the north cap was prominent in October and November. White described it as broad but by no means outstandingly dark. Haas alone recorded a very narrow, black, north edge to this band. A contrast-effect? The south cap was diffuse and was usually smaller and dimmer than the north cap, being undoubtedly atmospheric.

Acidalium, Propontis, and Casius have been seen with their bases on the north polar band. Haas thought Propontis much less conspicuous on October 22 than on September 18. The planet is now close enough that the general contours of the tropical maria can usually be recognized on drawings. Oases recorded are Charontis, Lunae (very ill-defined to Brinckman on November 6), and Ascraeus. Canals drawn are Tartarus, Cerberus, Titan, Triton, Uranius, Jamuna (possibly Nilokeras-Ganges), and Gehon (planet not

observed in all longitudes). Uranius was "quite prominent" to Brinckman on November 6 and was drawn plainly by Haas near the limb on November 8. Jamuna (?) was less conspicuous to Haas on November 8 than on November 6 or 13.

A drawing by Haas at C.M. 282° on November 20 is puzzling because almost nothing can be identified; even Syrtis Major is absent! Conditions were the same as on other dates when drawings compare well with maps. Further, Syrtis Major was seen on November 17 and also on October 13 when Mars was more remote than in November. The editor thinks that we must conclude that there was widespread Martian atmospheric obscuration of this region on November 20. This interpretation is favored by the facts that Syrtis Major was less conspicuous than Casius on November 17 (surely because less dark since Syrtis is larger) and that there were two large, dull, whitish areas (presumably clouds) on the terminator on November 20. We eagerly await receiving more observations of this portion of Mars near November 20.

Saturn was observed in October and November by Brinckman, Cave, Haas, Hare, Missert, O'Toole, Reese, and White. Cave used an 8-inch reflector; Missert, a 6-inch reflector; the other telescopes are as given elsewhere in this issue. In November there were these belts in decreasing conspicuousness: North Temperate, South Equatorial, South Polar, and North Polar. In addition, Hare glimpsed an Equatorial Band on November 12. The intense N.T.B. is far darker than the S.E.B., though much narrower. The S.E.B. has been resolved into two components only with difficulty. The Polar Bands are diffuse and might show much structure in excellent seeing. The Equatorial Zone, south of the projected rings, is again the brightest part of the ball; and Haas has found its north part brighter than its south part, as in 1948-9. The narrow North Tropical Zone between the N.T.B. and the shadow of the rings is the second brightest zone. Several observers agree that the ball is more dusky south of the S.E.B. than north of the N.T.B. In mid-November it was still barely possible to see sky between the narrow rings and the ball. Rather surprisingly under these conditions, White on October 30 wrote of seeing Ring C at the ansae and of finding Ring B brightest in its outer third (as in recent years). The small shadow of the ball on the rings is inconspicuous, but Haas has found that the puzzling white spot beside it (usually considered a contrast-effect) is still visible. This observer found Cassini's Division at the ansae still easily visible on November 17.

On November 14, 17, and 20 the editor was surprised to find a difference in the brightness of the east and west arms of the rings with some color-filters but not with others. He would prefer to give no more details here but to ask observers to compare the brightness of the two arms with filters ranging from dark red to dark blue.

We have these central meridian transits of the preceding end of a darker section of the North Temperate Belt:

Date	Observer	U.T. Central	Conditions
1949, November 3	Haas	$11^h\ 41^m$	fairly good
November 6	Haas	11 18	poor
November 9	Haas	10 43	poor
November 9	Reese	10 55	very bad
November 12	Reese	10 34	poor
November 12	Cave	10 20	poor
November 14	Haas	12 44	fair
November 17	Haas	11 45	fair
November 20	Haas	10 24	poor

The editor's tentative interpretation is that this feature had a rotation-period of about 10 hrs., 14 mins. on November 3 and that the period shortened rapidly with the passing of time, being only about 10 hrs.,6 mins. by November 20. If this remarkable motion is at all correct, it is most important that everyone able to observe Saturn should secure as many transits of this object as possible. The average period from 40 rotations between the November 3 and 20 observations is 10 hrs., 10.1 mins.; but this period is worthless for predicting the intermediate transits. Haas has suspected a bend in the North Temperate Belt at the position of this feature, but other observers do not so far confirm its presence. Reese on November 12 found the preceding end of a brighter section of the North Tropical Zone to coincide in longitude with this preceding end of a darker section of the belt, and Haas confirmed such a brightening of the zone on November 17 and 20.

Satellite Titan will transit the disc of Saturn between $9^h\ 20^m$ and $14^h\ 7^m$ on December 14, will be occulted by its primary at $13^h\ 32^m$ on December 22, and will transit again between $8^h\ 12^m$ and $13^h\ 3^m$ on December 30. These phenomena should be worth looking for. The transits will occur roughly midway between the shadow of the rings and the north limb.

ABOUT UNUSUAL KINDS OF METEORS

The description of "Streak-Meteors and Flash-Meteors" on pp. 11-12 of the November issue brought forth a very interesting letter from Mr. Roy R. Lee, Vice President of the Milwaukee Astronomical Society. Mr. Lee has apparently observed these objects (whether streak-meteors or flash-meteors or both appears uncertain) from the Observatory of the Milwaukee Astronomical Society, located about 15 miles west of Lake Michigan and well away from city lights. The objects are always very faint so that Mr. Lee is not completely certain of their actuality. Mr. William Albrecht, who sometimes works with Mr. Lee, has also seen these "flashes". The two observers have never seen the same flash simultaneously but have not particularly looked for them; they have instead noticed these objects accidentally during meteor counts or in general views of the sky while awaiting their turn at the Society's telescope. It would, of course, be of great value in this problem if two observers at the same place independently saw the same

"flash" at the same time and at the same position in the sky; for one can scarcely credit that illusions having only a physiological and/or psychological basis would be that much alike for two different persons. Lee thinks that the apparent meteors last less than half a second, are usually elongated, and cover a patch of sky half a degree wide and somewhat longer than that. They do not occur in any particular direction or region of the sky.

Lee has wondered whether auroral flashes can be the explanation. However, the "flashes" have never been seen on a night when an aurora was observed directly, although there are several aurorae a month in Milwaukee. He has also considered airport beacons flashing on small clouds, but lack of repetition and lack of seeing the clouds otherwise make this possibility unlikely. He and Albrecht consider some form of meteor the most plausible explanation.

No other member of the A.L.P.O. has reported in correspondence that he has seen meteors of the sort described by Mr. Barnes in Pakistan. It would naturally be unwise to conclude that such observations have actually never been made by our other readers; still, these must be rare phenomena even for persons who observe ordinary meteors fairly often. We understand that at least one streak-meteor of the sort published upon by Professor Mohd. A.R. Khan (Popular Astronomy, Vol. 56, pg. 498, 1948) has been observed in the United States and hope to supply details in a future issue.

An excellent article about possible lunar meteors was published by Mr. G. de Vaucouleurs under the title of "Recherche de Météores Lunaires" in L' Astronomie for September, 1947. It should be carefully studied by everyone interested in the problem of lunar meteors and able to read the French language. Mr. de Vaucouleurs goes so far as to discuss the possibility of photographing lunar meteors and of detecting their parallactic displacement as observed from stations far apart on the earth's surface.

PRINCIPLES OF ENVIRONMENTAL ADAPTATION AS APPLIED TO POSSIBLE LUNAR PLANTS.

by James C. Bartlett, Jr.

From the romantic days of Galileo, whose magic "Optik Tube" was confidently expected to show the white sails of lunar argosies ploughing the waves of quite literal lunar maria, the possibility of life on the moon has occupied a respectable share of astronomical thinking - and it has led to arguments as acrimonious as they were ill-founded.

Signor Galilei's miniature earth eventually dissolved into a post-Renaissance dream as improvements in the telescope brought lunar details into sharper focus. But the dream was hard in dying, and as late as the 18th century Gruithuisen had no difficulty in recognizing lunar fortresses and even a kind of State Roads system; and the world was passingly amazed by Schroeter's discovery of a large lunar city a little north of the equator and near to Marius. Even Fraunhofer (1787-1826) contributed another fortress and a few more roads.

The appearance of Der Mond, in 1837, struck a sour note in this lunar fantasia. To Beer and Maedler the moon was an arid, airless, lifeless desert. Not only were there no lunar metropolises, but there had never

been any. Yet it is worthy of note that the immortal pair were a little cagey when it came to pronouncing the lunar surface to be absolutely devoid of life of any kind. In fact, their own observations of certain formations made them grudgingly admit the probability of some kind of vegetative processes at work there.

The significance of such an admission, from observers so markedly prejudiced the other way, failed to receive the attention it deserved. Unfortunately the negative aspect of their views was stated with such an impressive air of finality that astronomers in general speedily lost all further interest in close studies of the lunar surface and thus in the one mode of study which alone offers any hope of demonstrating life processes at work upon the moon. Had it not been for the devotion of a small number of energetic lunar observers, our knowledge of lunar minutiae might well be no further advanced than it was in Beer and Maedler's day.

Whatever may be the ultimate truth about the lunar environment, Molesworth's work on Plato and Pickering's studies of Eratosthenes reveal a common denominator. One is forcibly struck by the fact that not even one such observation of the kind they recorded could have been made on the sort of moon pictured by Beer and Maedler. Yet we have on record not one but literally scores of such observations and by observers at least as competent as those who today, without even troubling to study the moon in detail, pronounce ex cathedra against the evidence.

The burden of this paper is that observational evidence indicates the probable existence of lunar vegetation. The corollary is that there is something wrong with current theories of lunar conditions - which would not be surprising - or that Nature has adapted lunar organisms to the postulated conditions - which would not be impossible.

In speaking of lunar "vegetation" nothing more is to be understood than the concept of living organisms in fixed positions. A "plant" as applied to the moon, therefore, means only an organism of unknown constitution fixed to the soil. What, then, is the nature of the evidence which must be sought to demonstrate the existence of lunar plants?

It is not, as is often implied, surface color. Mere surface color is quite insufficient as evidence since such color can just as plausibly be ascribed to soils and minerals and their oxidation products. Moreover, we have many examples among terrestrial plants of color adaptations whereby the plants blend so perfectly with their backgrounds as to become completely invisible at a distance of only a few feet. Of such I will mention only Astrophytum myriostigma, the curious, bladder-like cactus and the singular tribe of lithops. These organisms so closely mimic the stones among which they live that it is often difficult to find them. It should be obvious that if the entire surface of a lunar mare was thickly strewn with such or similar vegetation, we should be none the wiser.

(To be continued)

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