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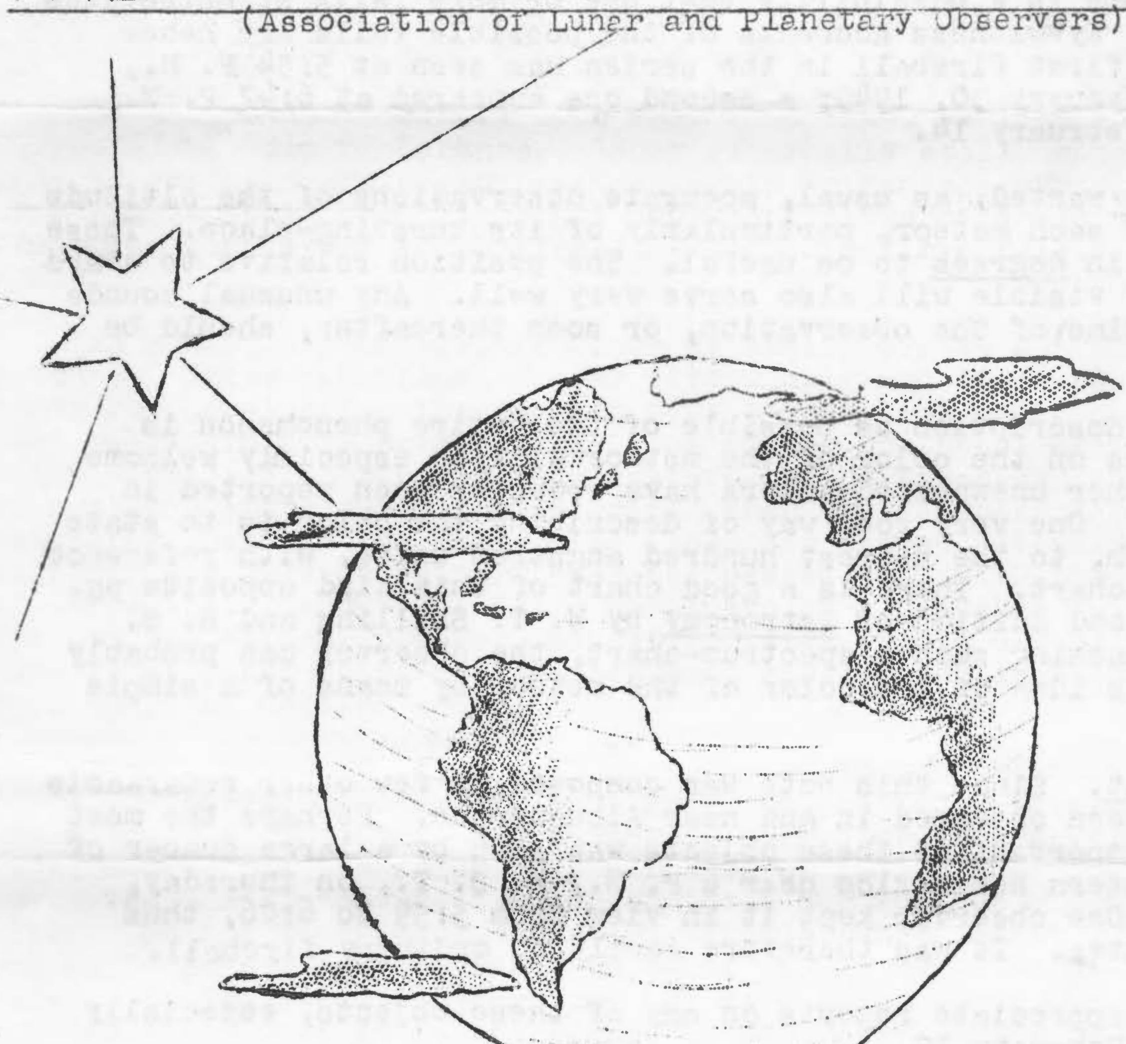
(Association of Lunar and Planetary Observers)



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BRILLIANT METEORS

Information is greatly desired on several fireballs recently observed from Albuquerque and from stations distant as much as 500 miles from the city. It is realized that very few of our subscribers may have seen these meteors. However, some of our readers may have correspondents in the Southwest, unknown to us, who saw these fireballs; and there is a possibility that one or more falls of meteorites are involved. Eyewitness accounts of the possible falls are hence desired. The first fireball in the series was seen at 5:54 P. M., M. S. T., on January 30, 1949; a second one appeared at 6:42 P. M., M. S. T., on February 14.

There are wanted, as usual, accurate observations of the altitude and azimuth of each meteor, particularly of its bursting-place. These must be given in degrees to be useful. The position relative to stars simultaneously visible will also serve very well. Any unusual sounds noted at the time of the observation, or soon thereafter, should be reported.

As full a description as possible of the entire phenomenon is desired. Notes on the color of the meteor will be especially welcome since some rather unexpected colors have recently been reported in these objects. One very good way of describing the color is to state the wave-length, to the nearest hundred angstrom units, with reference to a spectrum-chart. There is a good chart of this kind opposite pg. 632 in the Second Edition of *Astronomy* by W. T. Skilling and R. S. Richardson. Lacking such a spectrum-chart, the observer can probably best convey his idea of the color of the meteor by means of a simple painting.

Postscript. Since this note was composed, a few other remarkable meteors have been observed in and near Albuquerque. Perhaps the most puzzling and important of these objects was seen by a large number of persons in western New Mexico near 6 P. M., M. S. T., on Thursday, February 17. One observer kept it in view from 5:59 to 6:06, thus for seven minutes. It was therefore surely no ordinary fireball.

We shall appreciate reports on any of these objects, especially on the one of February 17.

GRIMALDI, A LUNAR ENIGMA

by James C. Bartlett, Jr.

(concluded from February issue)

In addition to the appearance of the Central Streak and the Chevron Pattern, the observer will notice that as the darkening increases a number of small, ill-defined whitish spots appear, mostly in the south. These are always dull and difficult to see, even against the darkness of the floor. One at least, in the extreme northeast, is a crater under the east wall; but most of them cannot be related to anything on the floor seen at sunrise. If a chart is made upon each night of observation some remarkable facts will soon appear. Some of these spots are much "steadier" than others, persisting perhaps for the whole lunation. Others soon fade from view, as if engulfed by the surrounding sea of darkness. More remarkable still, some will vanish only to reappear again--and perhaps again to vanish--during the course of a single lunation. It is not unusual for one of these spots to disappear completely for several lunations, but eventually it shows up again.

As sunset approaches, the floor darkening breaks up into separated patches. These patches disappear irregularly and in no particular order but persist for the longest time immediately under and on the east wall. This is particularly true of the southeast wall, which often appears almost black, the eastern and northeastern portions meanwhile being a much lighter gray. When the darkness has thus retreated again to the walls, the floor has become several degrees lighter, the Chevron Pattern has disappeared, and with the lengthening of the sunset shadows the floor has taken on a blanched appearance. The central streak, however, may still be visible a day or two before sunset; at other times it vanishes much earlier and is then succeeded by a chain of whitish spots.

The question of color is of interest. Though the tone of the floor at sunrise is usually light gray, occasionally faint reddish-brown tones are evident. At sunset, floor-color is generally a yellow-red-brown, about the color of a ferruginous soil. This hue appears to be the basic, "natural" color of the floor surface and does not alter. On the other hand, the dark material which carpets both floor and walls is not only variable in color but is markedly <u>different</u> in color. It is, at full bloom, so very dark as to appear black to the unaided eye. That it is <u>not</u> black, however, can usually be shown by comparison through filters with known shadows. Blue light does not appreciably change it; in green light it is appreciably lighter; but a red filter makes it jet black. It behaves, with respect to color filters, as would a very dark green. Occasionally this green tint is strong enough to be evident to the unaided eye. Just after sunrise a very light green tint is often visible to the unaided eye, but this color rapidly passes to the blackish green of the fully developed darkness. Occasionally the floor becomes so very dark that it appears sensibly black even to filters.

A very remarkable fact about Grimaldi is the apparent operation of some local influence which has power to alter the sequence of events so that these never follow exactly in order lunation after lunation and not infrequently follow very inexactly. Mention has been made of the irregular behavior of the floor spots, some of which may disappear for months and others of which may appear and disappear several times even during the course of a single lunation. An even more inexplicable fact is that occasionally--and rarely--the extension of the darkness from the walls over the floor is markedly inhibited so that the general tone of the floor is much lighter than at other times, only the inner face of the east wall and perhaps a narrow border running along its foot appearing blackish. At other times this inhibiting influence appears to be totally lacking, floor and walls alike merging in an amorphous and equal darkness. But perhaps most remarkable of all is the inability to relate these manifestations to either solar light or heat. Thus, the first break-up of the solid dark area of floor into patches sometimes occurs much earlier than at other times; conversely, the maximum darkness sometimes comes much later than usual. These curious phenomena strongly indicate the existence and work of some purely local agency, which itself it neither systematic nor constant.

A strongly suggestive fact is that not every area of Grimaldi is subject to these changes. True, most of the surface is so affected; but in the far north there existr what appears to be a "barren" area. This area always appears sensibly the same, lunation after lunation, dull, grayish-brown, featureless save for some craterlets, streaks, and the like. In its northward advance the darkness always stops at the edge of this area as if completely inhibited; it never penetrates beyond this point. Whatever the nature of this floor-darkening may be, the conditions necessary to its development apparently are altogether lacking in this one small area.

Lack of space prevents a detailed description of many other curious appearances not even mentioned here. Grimaldi is not only definitely one of the moon's variable areas, but it is perhaps the most irregularly variable area of all. The writer has studied these changes for many years, with instruments ranging from 2 to 5 inches in aperture and including both mirrors and lenses; all have agreed on the essential appearances related above, though naturally differing as to availability of small detail. If any observer with at least a good 3-inch objective will watch this formation closely (sporadic observationsare absolutely worthless for the purpose), and if he will keep a chart of the floor details as seen night after night, the train of events outlined above will soon become apparent--though if they follow exactly the same sequence no one will be more surprised than the author.

Serious observers, unfamiliar with the technique of lunar observing, can do no better than consult Mr. Haas' fine monograph "Does Anything Ever Happen on the Moon?" for clear and concise instructions.

Comments by Editor. We thank Dr. Bartlett for his very interesting presentation of one phase of his lunar studies. Since his observations have been made with apertures of five inches and less, they should be verifiable with the instruments available to almost any one of our readers. After all, the angular area of the floor of Grimaldi, in spite of its position near the moon's limb, does exceed that of any planet. Hence, a glass good enough to show any detail whatever on Jupiter or Mars should suffice to reveal markings in Grimaldi. We urge lunarians to examine this walled plain.

A number of reprints of the editor's "Does Anything Ever Happen on the Moon?" are still available, and he will be glad to supply a copy to anyone writing for one. This monogram is a lengthy discussion of periodically changing lunar areas, which some students have interpreted as representing physical agencies (e.g., vegetation, hoarfrost, volcanoes, etc.) still active on a small scale on the moon's surface.

Among the drawings of Grimaldi which Dr. Bartlett has kindly sent to us is one at $23^h 15^m$ on December 25, 1947, by Universal Time deserving special mention. (The corresponding E. S. T. is 6:15 P. M. on December 25.) It shows a large black area in the southeast part of the floor. This area was even darker than the interior shadow of the west wall of Grimaldi, presumably because this shadow was lightened by sunlight reflected into it. If the southeastern area was shadow, it is curious that it has apparently not been observed at all at the same solar lighting in many other lunations. At the time of the curious observation the eastern longitude of the sunrise terminator--a quantity also called colongitude--was 69°.7. Observational errors are out of the question with a black area so large and so prominent. If this mark was not shadow, its nature is difficult to imagine. We earnestly request our readers to search their notebooks for observations near $23^h 15^m$ on December 25, 1947, and also near colongitude 69°.7 in other lunations as they relate to the presence or absence of this black area.

As Dr. Bartlett himself has written in personal correspondence, a fundamental question in interpreting the changes in Grimaldi is whether the floor does actually grow darker as the sun rises higher above it. This question is of more general lunar interest, in fact; the floor of Plato has often been reported to be darkest near its lunar noon, and such dark marks as the ones prominently present near full moon in Eratosthenes and Alphonsus have been accused of the same behavior. Nevertheless, it is difficult to be sure that such apparent darkenings are actual; one must fear that they may represent only increased contrast between the areas and their environs, which are brightest near noon. Hence, exact photometry of high-sun dark areas is desired.

We mention here a project that we hope to describe more fully in the future. Over a year ago E. J. Reese constructed a simple but effective photometer in which a flashlight was the source of an artificial star of controllable brightness. This "star" could be made equal in lustre to stars of known brightness and could be dimmed to invisibility projected against lunar regions. Mr. Reese soon determined that a star of magnitude 3.5 was just visible against an average portion of the full moon in his 6-inch reflector at 60x. The extinction-brightness was about 2.5 and 4.5 against the brightest and darkest features on the full moon respectively. A few months ago the editor asked Mr. Reese to investigate the intensity-changes of one or two high-sun dark areas. He kindly did so and soon had enough measures to allow tentative conclusions. It appeared clear, he reported, that the floor of Plato was brightest under highest illumination and did not darken from early morning to noon. The same behavior was apparently true of the dark spots in Alphonsus. It is reasonable to infer that this result applies to other high-sun dark areas. If so, the high-sun darkening argument for lunar vegetation must be regarded as disposed of by Reese's laudable piece of work--one must now suppose that the plants, if real, cover the surface so scantily (most of the lunar rocks or ground being bare) that they little affect the intensity-changes of the region whereon they lie.

However, it seems completely out of the question to explain all the changes that Dr. Bartlett has described in Grimaldi as due to changing lighting. Perhaps others will send us their observations and interpretations.

JOVIANA

On pp. 1-3 of our January issue we discussed the intensity of the Red Spot Hollow in 1948 when well off the central meridian of Jupiter. We now have these additional observations by T. Cragg:

Date (U. T.)	C. M. (II)	Telescope	Observation
1948, June 30	259°	6-inch refr.	Hollow about same brightness as adjacent zones.
July 22	281	6-inch refl.	Same as June 30.
August 24	192	6-inch refl.	Hollow definitely quite difficult, somewhat fainter than nearby zones.

These observations and ones quoted earlier evidence that the Hollow was often much duller when well off the C. M. than when on it and that its intensity off the C. M. was widely variable.

A letter from Mr. H. M. Johnson on December 29, 1948, deals largely with the same general subject and Dr. Bartlett's interpretation of it as caused by vertical oscillations of the Hollow (January issue). We quote in part:

"I have rapidly read through all the B. A. A. Jupiter Reports Nos. 1-29 (1890-1933) with a special view to possible references to clues on relative heights of surface marks.

"One of the first things I found was an observation and hypothesis anticipating the Stephenson-Bartlett idea for ascertaining relative heights aroused by the variation in the Red Spot intensity relative to its background near the limb and near the C. M. I quote it from Memoirs, vol. 1, part 5, pg. 80, 1891.

" 'During the night of the 4th October [1891] some observations were made, which, perhaps, furnish some indication relative to the altitude of the streak in the atmosphere of Jupiter with respect to other objects. At 11^h30^m [presumably Greenwich Mean Time here and later] the streak was seen close to the following limb of the planet's disc. It was then fainter than the South Equatorial Belt in the same longitude as the streak. At 11^h35^m the preceding end was about as dark as the belt in the same longitude. Whilst at 11^h39^m the preceding half of the streak was considerably darker than the South Equatorial Belt. [The streak was moving on to the disc with Jupiter's rotation.] When in mid transit the streak was, of course, much darker than the belt. These observations suggest that the streak was rather more deeply immersed in the atmosphere of Jupiter than the South Equatorial Belt; or else that the cloud envelope was denser above the former than above the latter.'

"The quotation is from A. S. Williams. The streak in question was an unusually dark red one in the north edge of the South Temperate Belt, which from the descriptions and drawings impresses me as a grosser example of the peculiar streak in the same latitude observed in 1940, for which Peek found a dampened harmonic oscillation in longitude. Since Williams gives a series of transits for the 1891 object, I plotted them and found a rough indication of longitudinal oscillation for it, too; but unfortunately not certainly of constant period, the transits of the first two months being too few to decide.

"Re the changes in relative intensity near the limb, it is noteworthy that they are so rapid as to be detectable in 5 minutes. Near the limb this would indeed be a small linear shift relative to the planet's radius. It is in accordance with the rapid changes in contrast with [Jupiter's] surface of the satellites soon after beginning transit on the disc, or soon before ending.

"On Sept. 15 [1891] P. H. Kempthorne [8½-inch mirror] reported that 'the streak on the following side ran right up to the limb.' And 'Mr. Hy. Corder, in a drawing dated Sept. 8, 10^h40^m, shows the streak very distinctly up [to?] the limb.' He used a 6½-inch mirror. Such observations as these seem to be in some conflict with rapidly increasing intensity inside the limb as per Williams, except that according to Williams' notes on intensities at C. M. transits the streak may have been absolutely fainter Oct. 4 than in Sept. 8—15."

We thank Mr. Johnson for directing attention to this interesting extract from the important and voluminous B. A. A. work on Jupiter. It is clear that <u>near-limb dullings relative to another mark at the</u>

same longitude were observed in 1891 and perhaps were variable then too. The editor would be disposed to think that any Jovian feature visible right up to the limb must lie at a most remarkably high level in the planet's atmosphere since he has never seen such an appearance--though he has not particularly looked for it.

In The Strolling Astronomer, Volume 2, Number 9, pp. 3-7, we carried an article by J. C. Bartlett in which he described rapid changes in the colors and brightnesses of the four large satellites of Jupiter as observed by him. W. H. Haas observed these bodies for color and brightness on three dates in 1948 with a 6-inch reflector. He made the following step-estimates of relative brightness. The step, or unit, is probably about 0.1 magnitudes.

August 3	3^h15^m, U. T.	III 7 I = II 12 IV
August 8	3^h15^m	III 5 I = II 10 IV
August 8	3^h53^m-4^h18^m	III 2 I = II
August 8	5^h17^m	III 2 I 1 II 7 IV
August 10	3^h30^m-3^h40^m	III 6 I 1 II 1 IV

As E. E. Hare has pointed out, the observed brightness of a satellite will vary considerably with its distance from Jupiter; even so, Jupiter III must have dimmed appreciably between 3^h15^m and 3^h53^m on August 8 to cause the change observed. At least it is more reasonable to suppose that III dimmed than to suppose that all the others brightened. Haas was unable to see much color to the satellites; J. III was somewhat orangeish, and the others were nearly white--to be sure, I was a trifle oranger than II, or else II was bluer than I.

E. J. Reese with a 6-inch reflector at 240x made 12 comparisons of the relative brightnesses of the four large Jovian satellites from September 1 to October 11, 1948. Most of these observations were twilight views. On all occasions J. III was the brightest of the four. On all but one occasion J. I came second. The exception occurred at 0^h40^m on September 27, when II ranked second and I (near its primary) came third. In all other views J. II was third when visible. J. IV ranked fourth nine times and tied for third two times. At 0^h0^m on October 10 IV was almost as bright as I.

It has long been known that the south edge of the North Equatorial Belt of Jupiter rotates in System I, the north edge, in System II. One might expect an intermediate period for features centrally placed in the belt, but few observers have ever succeeded in following marks there. Nevertheless, E. J. Reese established eights drifts for markings at the middle of the N. E. B. in 1948. The marks fell into two groups, the larger with a period of $9^h53^m30^s$ and the smaller with a period near $9^h54^m10^s$. The mean period for all was $9^h53^m42^s$. One of the marks was "a small, well-defined, brilliant oval" in the middle of the belt near the preceding end of the "remarkable" dark streak on the south edge of the N. E. B. Here "remarkable" refers to its extraordinary motion in increasing longitude (I); see our Volume 2, No. 8, pg. 8, and No. 10, pg. 9, 1948. Reese eventually concluded that the period of the prec. end of the streak was $9^h53^m39^s$ from June 24 to

August 3 and that the period of the brilliant oval was $9^h53^m42^s$ from June 29 to August 13. He notes: "It may be significant that six normal drifts on S. edge N. E. B. were little affected by being crossed by the drift of the dark streak."

OBSERVATIONS AND COMMENTS

Note. Readers are reminded that all dates and times in this publication are given by Universal Time unless some other system is explicitly mentioned.

L. T. Johnson has submitted a sketch of Uranus made with a 10-inch reflector at 480x near 3^h55^m on February 2. A narrow dark belt crosses the disc in a W.-N. W. to E.-S. E. direction. Two fainter belts parallel to it mark the edges of dusky "polar shadings." The east and west limbs are also shaded. E. Otto with an 8-inch reflector and 120x at Eilenburg, Germany, drew the planet at 20h on December 3, 1948. His sketch shows a rather strong dark band near the south limb. W. H. Haas observed and drew Uranus several times in February with a 6-inch reflector at 141x and 188x. His various views show some internal differences, which the observer thinks may mean actual changes in the appearance of the planet. Perhaps his sketch near 6^h16^m on February 23 may be described as typical. The darkest belt lies near the northwest limb. A parallel belt near the southeast limb and one near the southwest limb are lighter and are about equally dark. Still fainter is a belt near the northeast limb. The northwest limb is dusky and is thus dimmer than the rest of the disc (apart from the belts).

Jupiter was observable under poor conditions in February, at a low altitude on a dawn sky. W. H. Haas on a number of different dates found the South Equatorial Belt (or perhaps really its north component) to be the easiest belt. The North Equatorial Belt was second; it sometimes almost equalled the S. E. B. in conspicuousness and sometimes was well behind it. Haas found the South Temperate Belt to rank third and also saw the Equatorial Band and the North Temperate Belt. On February 23 T. Cragg saw the N. E. B. and the S. E. B. as "solid bands across the entire disc" and suspected the N. T. B. and the S. T. B. The S. T. B. was suspected of being sinuous. On February 18 and 23 Haas observed the Red Spot Hollow as a large white oval a little brighter than adjacent parts of the South Tropical Zone, which was apparently the brightest zone. The Hollow depressed the south edge of the S. E. B. in the usual way, and a dark band outlined its following shoulder (as in 1948). On February 18 a C. M. transit by Haas put the following end of the Hollow at longitude (II) 245°. The Hollow has changed little or not at all in appearance and position since last autumn.

It is planned to describe in our next issue observations of the two Saturnian shadows while they were very narrow recently and observations of the Crape Band between February 14 and 24, inclusive. We hence omit these matters now.

M. B. B. Heath has measured the width of the Crape Band on original drawings made with his 10-inch reflector. The deduced angular widths below rest upon E. E. Hare's computed values of the width of the shadow of the rings.

Date		Estimate	Angular Width Crape Band
1948,	November 6	1/2 shadow rings	0".26
	November 7	1/2 " "	0.26
	December 26	1/3 " "	0.17
	December 30	1/4 " "	0.12
1949,	January 2	1/5 " "	0.09
	January 3	1/4 " "	0.12
	January 8	1/5 " "	0.09

These estimates rather clearly indicate that the Crape Band was decreasing in breadth in November-January. W. H. Haas, however, who had been unable to see the Band at all in December and January, first suspected it on February 1 and saw it regularly from February 7 on. Numerical estimates by him on February 7, 9, 10, and 11 make the width of the Crape Band at the central meridian about 0.5 (or 0".30), where the unit is the width of Cassini's at the ansae. Other numerical estimates are 0.2 to 0.3 by T. Cragg on January 30 with a 12-inch refractor, 0.5 by E. J. Reese on February 8 with a 6-inch reflector, and 0.67 by E. E. Hare on February 11 with a 7-inch reflector. C. W. Tombaugh observed with an 11-inch reflector on February 22 what is presumably generally true: the Crape Band widened from the C. M. to either limb.

Recent observers of Ring C at the ansae include E. E. Hare(7-inch reflector), E. J. Reese (6-inch reflector), L. T. Johnson (10-inch reflector), and T. Cragg (12-inch refractor). Cragg's notes about Ring C on January 30 should much interest planetarians having first-class instruments: "Near Ring B it was considerably brighter (maybe 1½ to 2 steps) than in its inner part. As one progressed from the outer to the inner edge, it was less and less brilliant. In fact, it was a little difficult to see the inner edge! (It was not sharp.)" We have these observations of the portion of the distance that Ring C extends from the inner edge of Ring B to the globe: L. T. Johnson on January 25 estimated less than ½, Johnson on February 1 obtained about 3/10, Johnson in good seeing on February 2 estimated about 4/10, E. J. Reese on February 8 found about 0.43, and Reese on February 18 estimated 0.45. Reese's view of Saturn on February 18 was truly excellent, and he writes that he saw Ring C in the ansae perhaps more distinctly than ever before. The color of C in the ansae to Reese was pale blue --almost white.

The doubled South Equatorial Belt is still the most conspicuous belt; at times in February it was really outstanding, probably fully as conspicuous as in 1947-8. Reese and Haas agree that its south edge is sometimes diffuse and indefinite, its north edge, often very dark and irregular. Though very dark, the South Polar Band is a poor second in conspicuousness. Third place is held usually by the North Temperate

Belt but sometimes by the Equatorial Band. The N. T. B. is the darker, but the E. B. has the advantage of being seen against a much brighter background. Hare and Haas found the N. T. B. fainter in February than in December and January. Cragg on January 30 again saw the N. T. B. to have a very dark center and fainter "wings" on both the north and south edges. Good views have shown the E. B. to lie south of the middle of the bright Equatorial Zone, which is brighter north of the belt than south of it. Hare and Reese have seen darker spots in the E. B. The North North Temperate Belt was recorded in February and late January by Cragg, Reese, and Haas but is definitely more difficult than in the last months of 1948. Cragg sees it as the darker edge of a dusky North Polar Region. The South South Temperate Belt, about midway between the S. E. B. and the S. P. B., has been seen by W. Sandner, L. T. Johnson, E. E. Hare, E. J. Reese, T. Cragg, and W. H. Haas. It is, nevertheless, thin and elusive. Reese draws two rather narrow, slightly brighter zones near the S. S. T. B., one to its north and one to its south. Cragg's drawings appear to show at least one of these zones. Reese depicts stationary white spots on the limbs where these zones touch them, which spots Haas has apparently seen. A number of observers find shaded Polar Regions, of which the south one is more conspicuous than the north one. Reese on February 8 and Cragg on January 30 and February 18 perceived a small whitish cap on the extreme south limb. A similar north cap was occasionally observed by Cragg and Haas. During February the North Tropical Zone between the North Temperate Belt and the projected rings differed little in tone from the ball north of the N. T. B. The Equatorial Zone continues to be the brightest part of the Saturnian system. Brighter clouds have been seen here by Reese, and a mottled appearance has been suspected by L. T. Johnson. Duller regions in the E. Z. were observed by Cragg on February 3 and 18.

Students of divisions in the rings (using this term to denote <u>concentric shadings</u>, which may or may not be actual black gaps) have been given material for study by Cragg's view on January 30 with the Griffith Observatory 12-inch refractor! Readers might like to compare the following account with "Detail in the Rings of Saturn" in this pamphlet, Volume 2, No. 5, pp. 4-5, 1948. Cragg on January 30 saw, or at least glimpsed, fully <u>six</u> divisions, as follows: 1. Cassini's. 2. Encke's in Ring A, glimpsed twice. 3. The Third Division near the inner edge of Ring B, seen definitely. 4. The Fourth Division in the outer half of Ring B, glimpsed three times. 5. The Fifth Division between Rings B and C, glimpsed twice. 6. A Sixth Division near the middle of Ring C, glimpsed three or four times. Other observations of these divisions will be summarized. Encke's was glimpsed outside the middle of Ring A by Reese on February 8 and 18, was glimpsed by Johnson on February 2, was <u>suspected</u> by Hare on February 6, and was suspected by Cragg on February 10 (6-inch reflector). The Third Division is perhaps really second after Cassini's in conspicuousness; for it was definitely present to Cragg on February 10 and was suspected by him on February 18. The Third was occasionally glimpsed by Johnson in good seeing on February 2, was drawn by Haas on February 15, and was shown clearly by Reese in a beautiful drawing on February 18. The

Fourth Division was suspected by Cragg on February 10. The Sixth Division is intriguing because previously unreported in our Association's work--and because surely difficult! Mr. Cragg writes that Mr. T. R. Cave of Long Beach, Calif., independently "discovered" the Sixth several days before he did but that they only learned of this very pleasing accordance when they met about a week afterwards. Mr. Cragg further writes that "a drawing of Saturn made with the [Lick] 36-inch refractor some years ago revealed this division." One could wish that the rings were widely opened for a proper study of these divisions!

Some remarks by C. W. Tombaugh about Encke's Division are worth reporting. First stating that in "smaller apertures," including his own 12-inch reflector, this division is seen as a faint gray streak, he goes on to say: "However, with the Lowell 24-inch refractor, I have seen the Encke Division double on three occasions when the seeing was exceptionally good, and during years when the ring system was well open. It is approximately in the middle of Ring A. The components of the Encke Division are only about 1/7 or 1/8 the width of A apart. The components themselves are about 1/4 or 1/5 the width of the distance separating them." Mr. Tombaugh's figures would make the width of each component 1/28 to 1/40 the width of Ring A--truly Lowellian thinness. This same doubled aspect of Encke's Division is shown on a drawing by P. Lowell at the 1914-5 opposition of Saturn, published in <u>Popular Astronomy</u>, Volume 24, pg. 419, 1916.

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S T A F F

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<u>Postscript</u>. The editor regrets the belated mailing of this issue of <u>The Strolling Astronomer</u>. It is caused by his being ill recently.