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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 - Sasagase Meteorite, Japan.

Fig. 2 - Kuga Meteorite, Japan. About three times actual size.

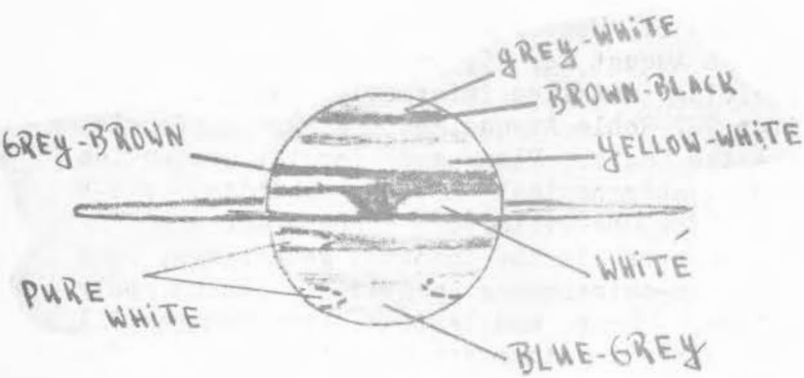

Fig. 3 - Saturn
G. D. Roth-4-in. refl.
June 2, 1950. 20^h20^m.
160X.

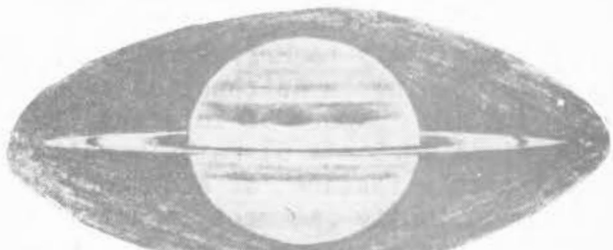

Fig. 4 - Saturn.
S. Ebisawa-7-in. refl.
April 11, 1950. 11^h9^m.
160X.

Fig. 5. - Mars.
E. E.Hare-12-in. refl.
April 7, 1950. 6^h0^m.
375X, 525X.
C.M. = 350°.

Fig. 6 - Mars
T. Saheki-8-in. refl.
June 5, 1950. 13^h10^m.
330X, 400X.
C.M. = 275°.

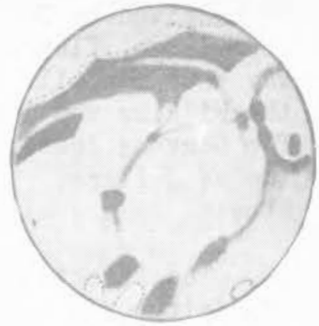

Fig. 7 - Mars
T. Saheki-8-in. refl.
March 23, 1950.
$12^h\ 40^m$.
330X.
C.M. = 218°

ANNOUNCEMENT, REMINDERS, AND ACKNOWLEDGEMENT

We invite the attention of our readers to the back outside cover of this issue of The Strolling Astronomer. For some time several of our astronomical friends have been urging us to carry advertisements as an additional service to our readers. The ones that appear on the cover of this issue are intended as samples. We are equipped to reproduce all kinds of diagrams in advertisements. We invite those having goods or services to sell to the amateur astronomer to advertise in this periodical. For the present at least, all advertisements will appear upon the back outside cover, a very choice position. The Strolling Astronomer has readers in all parts of the United States, and indeed all over the world; moreover, it is taken by several astronomical societies. Rates for advertising will for the present be determined upon an individual basis; they will be standardized soon if sufficient interest developes.

We would very much like to include in our advertisements a column to expedite the exchange of astronomical goods and services among our readers. We receive inquiries at intervals from colleagues who wish to buy telescopes, lenses, rare books, and other items. We occasionally learn of other colleagues who have the same items to sell. An exchange-column should hence be a very real service to both parties. Rates for advertising in such a column, which we hope to institute quickly, will be five cents per word, including addresses.

Don't forget the Second Conference of Western Amateur Astronomers at Stanford University, Palo Alto, Calif. on August 14, 15, and 16. All who can are heartily invited to come. Those desiring detailed information should write immediately to Mrs. Dorothy R. Rossiter, 922 Roble Avenue, Menlo Park, California. The Peninsula Astronomical Society are the hosts. Plans made for the Convention include papers of interest to amateurs, astronomical movies, exhibits, and a visit to Santa Clara University and the Lick Observatory. Perhaps the most enjoyable feature of such Conventions, however, is the informal gatherings, the opportunity to meet and talk with fellow-astronomers previously known only through correspondence or by reputation. Long and lasting friendships will often be formed, for those who love the stars together are not strangers. The editor looks forward to seeing as many of you as can be there at Palo Alto on August 14, 15, and 16.

We remind our readers that the serial reproduction of the detailed and excellent H. P. Wilkins map of the moon will commence in our October, 1950, issue. A number of persons praised the reproduction of the Special Libratory Section in the July issue; the coming regular sections will be fully as good. For the sum of one dollar in addition to the regular subscription price, which sum must be received by September 15, we shall mail your copy of The Strolling Astronomer in a large, flat envelope during the period that the map is appearing; in this way your map will reach you unfolded and uncreased. Those who would like to have the Wilkins map immediately can order a photographic copy of its sections from The Stevens Agency, 202 S. Broadway, Albuquerque, New Mexico. The price is twelve dollars, including mailing and insurance. For two dollars more The Stevens Agency will furnish transparent covers for the sections of the map.

The Association of Lunar and Planetary Observers expresses its thanks to The Astronomical League for the many courtesies it received at the National Convention of the League at Wellesley, Massachusetts, on July 1, 2, 3, and 4. It was indeed very generous of the League to allow the A.L.P.O. so much time to present its recent observational results and future observational goals. We look forward to a future of profitable cooperation with the Astronomical League. We expect to carry in a coming issue a description of the Wellesley Convention; a number of readers who were there have written that it was a very enjoyable and successful gathering.

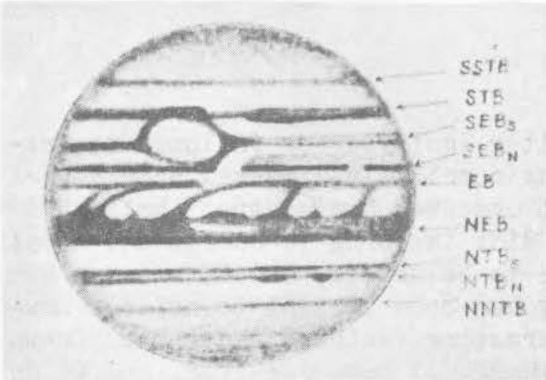

Fig. 8 - Jupiter
E. J. Reese-6-in. refl.
July 8, 1950. $7^h\ 3^m$.
240X.
$C.M._1 = 260^o$, $C.M._2 = 263^o$

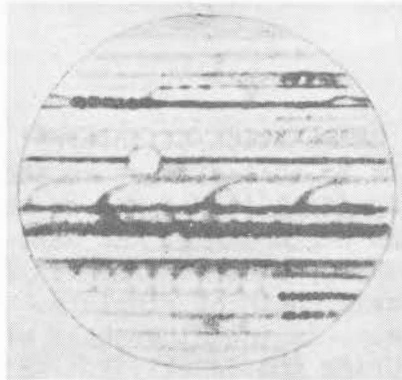

Fig. 9 - Jupiter
E. E. Hare-12-in. refl.
July 1, 1950. $8^h\ 18^m$.
200X.
$C.M._1 = 280^o$, $C.M._2 = 336^o$.

FIRST REPORT ON JUPITER IN 1950

by F. E. Hare

With Mars in the evening sky, observations of Jupiter have begun on a later schedule than usual. As this is being written, in mid-July, a number of observations have been received from the following: T. A. Cragg (6-in. refl.), E. E. Hare (12-in. refl.), E. J. Reese (6-in. refl.), T. Saheki (8-in. refl.), and S. C. Venter (12-in. refl.). Eight drawings have made a very fine complement to the descriptions and other data.

No major changes have been detected since the last views of the previous apparition. A listing of the belts in order of decreasing conspicuousness for July 8 when the C.M. was (I) 260°, (II) 263° by Reese are: NEB (red-brown), STB (brown), NTB (red-brown), SEB_n (red-black), SEB_s (orange), EB (gray), NNTB, SSTB. The incomplete estimates by the other observers agree well with the above as an average for the whole disc, except that where the SEB is rated as a single belt it is second in prominence. As so combined, it was given a warm brown tinge in most of Saheki's notes. Hare saw something of the same reddish coloring in the high-latitude belts.

The two Tropical Zones are no longer the outstanding white ribbons of 1949 and are rated no brighter than the Equatorial Zone. In the STrZ following the Red Spot Hollow the duskiness appears in the form of disconnected clumps. A mid-section, (II) 0° to 43° on July 1, is more solid.

In The Equatorial Zone Shakei, Reese, and Hare have smoke-like plumes arising from the North Equatorial Belt in a drifting-to-eastward curve before reaching the Equatorial Belt. Only one of these plumes(at (I) 100°) returns to the NEB to form a prominent complete loop. At the outbreak of the 1949 Disturbance in the South Equatorial Belt an attraction with the projections on the NEB was seen to produce smoky eruptions as each projection overtook the Disturbance. Cragg's report of activity in the EZ includes a pencil-line thin belt next to the SEB of April 18, but principally speaks of bright white clouds. One of these, on May 21 at (I) 33°, lay near the SEB. In June and early July Reese and Hare each saw two gaps in the SEB_n - together three gaps - one of which was at (I) 260° and keeping closely the same longitude.

A question of interest to all who saw Jupiter last year or followed the reports is that of whether the SFB Disturbance has completely simmered down and of what effect it has had on that belt. The best observed hemisphere, halfway around beginning at the RSH, looks about as it did: the SFB_n is narrow and hard; the SFB_s, wide and faint. Reese shows the SFB_s to be double, and Hare has drawn it as a chain of ringlets. No recent changing has been brought to notice, however. In the other half of the belt some interesting features have been drawn by Cragg and Saheki; but no succeeding reports have yet been received, and we do not know if changes are taking place. In his April 16 drawing Saheki shows that the SFB_s begins to get darker near (II) 140°.

The Red Spot Hollow is reported, and with excellent agreement among the after-midnight band of observers, as a large white oval completely encircled by a darkish border, by the STB on its south, the cupped SFB along its north, and dusky arms, of its own manufacture, bridging the STrZ. The 1949 transition from its positive phase to its negative shell has been so complete that little is left of the Spot within. Something remains within the Hollow, but evidence of its tenuity is the slightly differing form in which it is seen by each observer. Reese faintly outlines the eastern half as a rim just inside the arm of the Hollow; Hare draws a wisp crossing the Hollow from NW to SF, curving southward; while Cragg on April 18, when the Hollow was far east of the C.M., was able to see, by using a blue filter, a very faint Red Spot in the SF part. (West, or preceding, is to the left in a simply inverted view with south at the top.)

That the South Temperate Belt still offers much variety is already well indicated by early reports. Four or five enclosed light areas have been seen. Saheki described a dark section which he observed on April 16 (C.M. II 144°) as dark-like a straw rope - and another prominent section on May 21 (C.M. II 357°) as irregular and knotted. By July the latter object had attained a darker north edge and is shown in a drawing by Reese. Two drawings by Cragg both depict a gradual tapering from very narrow to wide.

Several prominent elements of the STB were observed in 1949. However, some of our marks either faded or became so embroiled that the threads of their footmarks on longitude charts were broken. How long may some of them be followed? I am sure Reese could give us the answer. The writer, with only his own charts for reference, has attempted to project the motion of three STB marks which had been timed for about four months, to see whether any would line up with 1950 objects, with the following results:

Mark	First and Last seen		Daily Drift	Projected	(Observed)
	1949	1949		1950	
p. wide	June 20 330°	Oct. 26 232°	0°765	253 days to July 6 39°	(40°)
f. wide	June 22 227°	Oct. 23 141°	0°70	251 days to July 1 326°	(317°)
f. wide	June 23 80°	Oct. 10 360°	0°755	272 days to July 9 155°	(138°)*

The first example of apparently perfect identification needs qualification, however, because the observed (II) 40° is now the preceding end of a wide solid section - it is preceded by a hollow shell, an enclosed light area of some 18°

* 138° an estimate

in length. The second example is probably the surest case of identity, for the agreement is as good as could be expected from the data at hand. It was, and still is, a prominent mark. The last example is less certain unless it can be seen that my drifts of 1949 were all too slow. This object, unlike the others, had to make a passage of the RSH.

Perhaps the most interesting changes since 1949 that have occurred on the planet are in the Northern Hemisphere. Cragg remarks on the visibility of noticeably more high latitude belts. Saheki, Reese, and Hare join him in drawing structure to the North Temperate Belt not too difficult for transit work. Cragg, on May 21 at C.M. (II) 7°, and Saheki about ten hours later, C.M. (II) 357°, record the following end of a darker section of the NTB at about 7 °. Reese and Hare find the NTB to be double in some portions. The NNTB offers an even greater field to the longitude hunger, having four dark sections with sharply defined ends. One of these, on July 1, was seen by Hare to have a finely corded structure. The p. end was at (II) 6°. Some markings have been noted on two additional, narrow, far northern belts. Darkish blocks in the several Temperate Zones may serve to combine the last two into a wide belt at one place, to be replaced by a pairing of the central with the NNTB in some other places.

From time to time Mr. W. H. Haas has pointed out the need of transit work in Jupiter observations. In Vol. 1, No. 3, The Strolling Astronomer he gives some examples of estimating the time of central meridian crossing, with notes to identify the spots being timed. The nomenclature of belts is given there and on Figure 8 on pg. 3. Equipment needed is a clock adjusted to within half a minute, a lamp bright enough to see to write by and to make an occasional sketch of some part, and a table of longitudes for the year as is given in the yearly American Ephemeris and Nautical Almanac.

In addition to the value of determining the movement of cloud streams and the behavior of storm outbursts, it is of much interest to the observer to be able to identify and to follow what he sees on the Giant Planet. A long list of marks and their longitudes does not easily, however, give a clear picture of the action taking place. To "see" what is going on, it is customary to plot the observations on squared paper, arranging the dates vertically and the degrees of longitude horizontally. A convenient scale, suggested in the B.A.A. Methods, is 1/10 inch to 2 days and 1/10 inch to 4° of longitude. One sheet may be used for System I and another for System II. Graphs pertaining to marks in one belt may be traced in one color; those of another belt, in a different color. Such a method can not only be very interesting but can lead to more purposeful observations by showing where they are most needed. Mr. F. J. Reese, who for several years has been the foremost observer of Jupiter in the A.L.P.O. (and probably anywhere), has used the graphic method as perhaps the only one that can cope effectively with the volume of data which he himself has accumulated: more than 1400 transits in 1948 and over 1500 in 1949. When something especially interesting begins to happen, the phenomenon may be recorded more pictorially in strip sketches on its own sheet of graph paper, choosing a vertical scale that will permit a sketch for each observation.

Figures 8 and 9 on pg. 3 are representative recent views of Jupiter and can be studied in connection with much of the discussion above.

COORDINATE NUMBERS OF JAPANESE METEORITES

On pages 5 and 6 of our July issue there was an article by Mr. Sadao Murayama about the meteorites of Japan. Mr. Murayama is on the staff of the Physics and Chemistry Section of the National Science Museum in Tokyo and is also the Director of the Jupiter Section of the Oriental Astronomical Association. The coordinate numbers in the table below are Equatorial Coordinate Numbers; their use has been described by Dr. Frederick C. Leonard in Contributions of the Meteoritical Society in Popular Astronomy. The first four digits are the longitude of the meteoritic fall to the tenth of a degree; the last three digits, its latitude to the tenth of a degree. In Japan all longitudes are east; all latitudes, north.

Figures 1 and 2 on pg. 1 show the Sasagase and Kuga Meteorites, the reproductions being made from photographs kindly supplied by Mr. Murayama. These two were only recently identified as actual meteorites and were briefly described by Mr. Murayama in the July issue.

NAME	E.C.N.	LOCALITY
Ogi	1302,333	Haruta-Mura, Ogi-Gun, Saga-Ken
Yonozu	1389,377	Yonozu-Mura, Nishikanbara-Gun, Niigata-Ken
Fukue	1288,327	Fukue-Jima, Goto, Nagasaki-Ken
Kesen	1416,390	Kesen-Mura, Kesen-Gun, Iwate-Ken
Sone	1354,352	Sone, Syuchi-Mura, Funai-Gun, Kyoto-Fu
Otomi	1404,384	Otomi-Mura, Kitamurayama-Gun, Yamagata-Ken
Takenouchi	1349,354	Takenouchi, Itoi-Mura, Yabu-Gun, Hyogo-Ken
Fukudomi	1302,332	Fukudomi-Mura, Kinoshima-Gun, Saga-Ken
Tanakami	1360,349	Tanakami-Yama, Shimotanakami-Mura, Kurita-Gun, Shiga-Ken
Satsuma	1306,320	Hishikari-Machi and Hatsuki-Mura, Isa-Gun, Kagoshima-Ken
Shirahagi	1375,366	Shirahagi-Mura, Nakaniikawa-Gun, Toyama-Ken
Niho	1316,342	Niho-Mura, Yoshiki-Gun, Yamaguchi-Ken
Higashi-Koen	1304,336	Higashi-Koen, Fukuoka-Shi, Fukuoka-Ken
Okano	1352,351	Okano-Mura, Taki-Gun, Hyogo-Ken
Kanzaki	1304,333	Kanzaki-Gun, Saga-Ken
Kijima	1384,368	Kijima-Mura, Shimotakai-Gun, Nagano-Ken
Mino	1369,355	Mugi-Gun and Yamagata-Gun, Nagano-Ken
Sakauchi	1364,356	Sakauchi-Mura, Ibi-Gun, Gifu-Ken
Suwa	1381,361	Wada-Toge, Suwa-Gun, Nagano-Ken
Tomita	1337,346	Tomita-Mura, Asakuchi-Gun, Okayama-Ken
Tane	1363,354	Tane-Mura, and Hayami-Mura, Higashiasai-Gun, Shiga-Ken
Shiraiwa	1406,396	Shiraiwa-Mura, Senboku-Gun, Akita-Ken
Kushiike	1384,370	Kushiike-Mura, Nakakubiki-Gun, Niigata-Ken
Numakai	1419,433	Numakai-Machi, Sorachi-Gun, Hokkaido
Aba	1404,360	Aba-Mura, Inashiki-Gun, Ibaragi-Ken
Kurumi	1350,348	Kurumi-Mura, Mino-Gun, Hyogo-Ken
Kasamatsu	1368,354	Kasamatsu-Machi, Hashima-Gun, Gifu-Ken
Sasagase	1378,347	Sasagase, Wada-Mura, Hamana-Gun, Shizuoka-Ken
Kuga	1321,341	Kuga-Gun, Yamaguchi-Ken

THE LUNAR ECLIPSE OF OCTOBER 7, 1949

by Walter H. Haas

The circumstances of this total eclipse of the moon were as listed below. Here and throughout this article all dates and times are by Universal Time.

Moon enters penumbra	1949, October 6, $23^h\ 50^m$.
Moon enters umbra	October 7, $1^h\ 5^m$.
Total eclipse begins	$2^h\ 20^m$.
Total eclipse ends	$3^h\ 33^m$.
Moon leaves umbra	$4^h\ 48^m$.
Moon leaves penumbra	$6^h\ 3^m$.

It will be noted from these times that the eclipse was a bright twilight and early evening phenomenon in the Western States, while in the Eastern States it occurred later in the night with the moon at a higher altitude. In Western Europe, of course, it took place very late in the night. As usual, that bothersome and vexatious terrestrial atmosphere prevented a number of our best observers from seeing the eclipse. Many others were more successful, however; and the purpose of this article is to report and interpret their observations of the eclipse.

COLOR AND BRIGHTNESS OF ECLIPSED MOON

Many of the observers gave some attention to these matters, not only with the naked eye but also with binoculars and telescopes of various sizes. Different observers flatly contradict each other about whether the eclipse of October 7 was darker or brighter than the one of April 13, 1949. We might expect the October eclipse to be the brighter from the fact that the moon did not then enter so deeply into the umbral shadow; and precisely this result was obtained by Dr. Lincoln La Paz of the University of New Mexico, by the Messieurs Roques in France from a careful study, and by P. Chorley and D. O'Toole. Nevertheless, F. F. Brinckman, Jr., T. R. Cave, Jr., and P. F. Froeschner were all confident that the October eclipse was the darker. Perhaps the chief lesson to be drawn from such inconsistencies is that remembered viaual impressions can be very misleading. Any real accuracy will evidently demand careful comparisons of the total light of the moon in eclipse with that of stars,perhaps using out-of-focus images. If the moon remains considerably brighter than any available star, it may be further necessary to dim the moon's light by a known amount with some suitable device before making the comparisons.

Seven beautiful paintings in natural colors of the eclipse by Mr. G. B. Moxon of the Montreal Centre of the Royal Astronomical Society of Canada were kindly sent to us by Miss Isabel K. Williamson. These were made from $2^h\ 15^m$ to $4^h\ 30^m$ and thus show all phases of the eclipse from just before totality to an hour after totality. At this eclipse the north limb of the moon entered most deeply into the umbral shadow, and one would expect the familiar red coloration to be most intense there. That is exactly what was observed; the north limb looked blood-red to W. H. Haas, orange to B. Lane, copper to J. W. Reed, garnet to R. A. Wright, and orangeish-red to D. O'Toole and is a dark red-brown on

Moxon's paintings. Whatever the correct description of the color, it gradually faded out as one went from the north limb toward the edge of the umbra. Moxon, for example, indicated relatively little color outside of the northernmost fifth of the disc. The southern portions of the moon, which were least deeply immersed in the shadow, looked yellow or yellowish gray to Haas. They were almost white compared to the northern regions. To Hare at $2^h 40^m$ and later a large area in the southeast quadrant was bluish white in his 7-inch telescope, and this quadrant was so bright to his eye that the eclipse did not appear to be total. L. T. Johnson with a 4-inch reflector at 18X just before totality noted that the umbra had a blue edge about 10 minutes of arc wide, and J. W. Reed with a 6-inch reflector at 48X compatibly recorded a blue-gray hue next to the sunlit regions. During totality Wright observed on the limb a very beautiful green crescent, which revolved around the south half of the moon's limb so as to be always next to the edge of the umbra. Wright's green crescent is very probably the bluish band of Johnson and Reed; this band at the border of the umbra is a common feature of lunar eclipses, and it is somewhat surprising that more observers did not comment upon it on October 7. Near $3^h 5^m$ F. E. Brinckman was surprised to find the overall color of the disc to be "pale slate blue" in his 6-inch reflector at 45X. He obtained no such impression with the naked eye, but a blue color filter gave some confirmation to its telescopic reality.

SEARCHES FOR POSSIBLE LUNAR METEORS

One of our two principal observing-programs was the systematic survey of the moon for possible lunar meteors and possible lunar meteoritic impact-flares. The darkness of the moon in eclipse is naturally very favorable to such work. It was, to be sure, the opinion of a number of observers during both 1949 total eclipses that the lunar background is brighter then, and hence less favorable for such searches, than is the earthlit hemisphere each lunation a few days from new moon. Even so, an eclipse offers an opportunity for <u>important cooperative work</u> on searches for lunar meteors or impact-flares not available otherwise. In the table which follows the third column indicates the time at which each observer began and ended his searches. Both because interruptions often occurred and because searches are seldom 100 percent efficient, the number of minutes of effective watching in the fourth column is frequently less than the difference of beginning and ending times. The fifth column gives the estimated stellar magnitude of the faintest object that could have been seen against the moon. Observers had been requested to make a sketch of stars seen near the moon. Mr. C. B. Stephenson kindly studied these sketches and determined the stellar magnitudes of the faintest stars shown on them. When an observer supplied such a sketch, the number in parentheses in the fifth column is the stellar magnitude of the faintest star that he depicted on his sketch. Of course, one cannot see as faint stars against the moon as against the sky; and there is some uncertainty in estimating the limit against the moon from what was seen against the sky. When no sketch was supplied, the uncertainty is even greater. The sixth column shows what lunar area in sq. mis. was watched, the area of the whole visible hemisphere being 7,000,000 sq. mis.

Observer(s)	Telescope	Interval	Number Minutes	Limiting Magnitude	Area
C. Bomgren	3-in. refr.	2^h15^m-2^h30^m	5	7.5	7,000,000
F.F. Brinckman, Jr.	6-in. refl.	3^h0^m -3^h10^m	10	8.5	7,000,000
G. Brown and others	6-in. refl.	totality?	?	8	7,000,000
T. R. Cave, Jr.	8-in. refl.	3^h15^m-4^h15^m	15	9	7,000,000
P. F. Froeschner	6-in. refl.	2^h20^m-3^h35^m	71	9.5 (dimmer than 10)[1]	7,000,000
F. M. Garland	3.5-in. refl.	totality?	10	7	5,000,000
W. H. Haas	6-in. refl.	2^h23^m-3^h38^m	53	9.5 (11.5-12.0?)[1]	7,000,000
E. F. Hare	7-in. refl.	2^h40^m-?	15	10	7,000,000
L. T. Johnson	10-in. refl.	1^h45^m-3^h30^m	13	8.5	2,000,000
B. Lane	3-in. refl.	2^h15^m-2^h55^m	32	7.5	4,000,000
R. R. La Pelle and others	6-in. refl,	2^h15^m-3^h38^m	80	8.5(9.3)[2]	7,000,000
R. R. La Pelle and others	10-in. refl.	2^h15^m-3^h38^m	80	9.5	7,000,000
R. C. Maag	4-in, refr.	2^h8^m-2^h58^m	34	7	6,000,000
J. W. Meek	5-in. refr.	3^h0^m-3^h40^m	38	8.5	7,000,000 then 1,400,000
Montreal Centre:					
1. R, Venor	12-in. refl.	totality	60?	10	7,000,000
2, Mrs. G. Hall & H, Newman	5-in. refl.	2^h15^m-3^h35^m	75	8(8.6)[3]	7,000,000
3, F. De Kinder	4-in. refr.	totality	70?	7	1,000,000?
D. O'Toole	6-in. refl.	2^h20^m-3^h32^m	67	9	7,000,000
J. W. Reed	6-in. refl.	2^h21^m-3^h57^m	61	8.5(9.3)	7,000,000
R. Schmidt	13-in. refl.	2^h20^m-3^h33^m	35	10	7,000,000
C. W. Tombaugh	12-in. refl.	totality	spasmodic searches	11	2,000,000?
University of New Mexico Astronomy Class	3-in. refr. and others	2^h30^m-4^h0^m	90?	7.5	7,000,000

1. Photographic stellar magnitude.
2. Another star of visual magnitude 9.3 near the moon was not shown on the sketch.
3. A star of magnitude 8.7 was not shown.

Special praise should go to the Springfield Stars Club of Springfield, Mass., for their very well planned program of lunar meteor searches under the guidance of R. R. La Pelle. Perhaps Mr. La Pelle is best known to our readers as the Activities Chairman of the Astronomical League. A six-inch and a ten-inch reflector were assigned to this program. It having been decided that an observer could not remain keenly attentive for more than five minutes, the observers were changed at each telescope every five minutes. They were never changed simultaneously at both telescopes, however. Therefore, the moon was always being closely watched by a Springfield observer, and most of the time it was being closely watched with a ten-inch telescope. Two stop-watches were on hand to time any phenomenon observed, and a general time-keeper watched the progress of the eclipse and supervised the changes of observers. Another person had a large scale photograph of the moon and stood ready to record the positions of any meteors or flares seen. We recommend the procedure just described to astronomy clubs wishing to study the coming total eclipse of the moon on September 26, 1950 (U.T. date).

The results of the searches were negative, with the following exceptions only:

Observer	Telescope	Time Seen	Position on Moon	Remarks
R. Venor	12-in. refl.	2^h26^m	just E of Kepler	a thin white flash, travelled south to north.
B. Lane	3-in. refl.	$2^h26^m27^s$	a little N of Grimaldi	a stationary flash, white.
P. F. Froeschner	6-in. refl.	2^h30^m (about)	in N part Tranquilitatis	suspected 2 bright flashes.
D. O'Toole	6-in. refl.	2^h43^m	in Frigoris N of Iridum	suspected a stationary flash, magnitude 9 or 10.
F. De Kinder	4-in. refr.	$2^h48^m11^s$	near Hyginus Cleft	a possible flash.
F. De Kinder	4-in. refr.	$2^h58^m12^s$	in Mare Crisium	a possible flash.
R. Venor	12-in. refl.	3^h8^m	just W of Ariadaeus	a thin white flash, travelled west to east.
J. W. Reed	6-in. refl.	3^h19^m	just W of Gassendi	suspected a white flash, magnitude 5-6.
F. De Kinder	4-in. refr.	$3^h25^m35^s$	just SE of Aristarchus	a possible flash.
F. De Kinder	4-in. refr.	$3^h25^m50^s$	NW of Grimaldi	a possible flash.
D. O'Toole	6-in. refl.	3^h27^m	in Nubium near Ptolemey	magnitude 8, perhaps moved 30" toward lunar SE.
R. Venor	12-in. refl.	3^h34^m	N edge Haemus Mts.	tiny flash, like a pin point.
T. R. Cave, Jr.	8-in. refl.	3^h39^m (about)	near Pico	strongly suspected a "flare", magnitude about 6.

Among the objects listed above there is only one possible example of agreement in time of appearance of an object and in its position on the moon, namely, for the objects seen by Lane and Venor near $2^h\ 26^m$. The times and positions reported may very well be identical; the observers had absolutely no knowledge of each other's work and were 2,000 miles apart. Do we here have at last a duplicate observation of a meteoric object near the surface of the moon? In my opinion we cannot be sure; perhaps we could be more certain if both observers had supplied more detailed descriptions of the object or objects. It is unfavorable to the thesis of identity of the two objects that Venor's moved while Lane's was stationary. Lane employed 84X; Venor, 70X. The differing powers can scarcely explain the differing impressions of motion. It is also curious that the Venor-Lane object or objects was not seen by any of 13 other observers watching near $2^h\ 26^m$, though it is true that some of these were not observing the moon continuously.

The remaining objects, all recorded by one observer only, are in my opinion best interpreted as illusions or terrestrial meteors or both, with the possible exception of the ones seen by Venor with a comparatively large 12-inch telescope. Both Froeschner and O'Toole considered that small bright lunar features near the limit of visibility were a fruitful source of illusory points of light. It should further be noticed in the table above that most of the objects were of uncertain reality even to their observers. Terrestrial meteors, of course, can be seen projected against the moon only in a very restricted portion of the earth; lack of confirmation by other observers hundreds or thousands of miles away is to be expected. While watching for possible lunar meteors Haas saw one terrestrial meteor, and Schmidt saw several; their long paths and rapid motion revealed their nature. (To be continued)

MARS AND SATURN IN MAY-JULY, 1950

During the last month we have received observations of Mars from these colleagues: J. C. Bartlett, Jr. (3.5-inch refl.), T. R. Cave, Jr. (8-inch refl.), C. M. Cyrus (10-inch refl.), S. Ebisawa (13-inch refl.), W. H. Haas (6-inch refl.), M. B. B. Heath (10-inch refl.), R. F. Missert (8-inch refr.), G. D. Roth (4.4-inch refl.), T. Saheki (8-inch refl.), and E. K. White (7-inch refl.). We are especially indebted to Mr. Saheki, the Director of the Mars Section of the Oriental Astronomical Association in Japan, for his very kindly sending copies to us of all his extensive observations of Mars. On July 11 this observer made his 144th drawing of the 1949-50 apparition! The rest of us have a goal to shoot at in 1952. Although Mr. Roth's name will be new to most of our readers, he is active in the Bund der Sternfreunde in Germany and frequently uses color filters to excellent advantage in planetary studies. It is good to see so much contuining interest in the receding Mars. We particularly urge A.L.P.O. members employing large and excellent telescopes to keep watching the planet for as long as they can see markings. The angular diameter will decrease from 6".7 on August 1 to 6".0 on September 1. Between these dates the tilt of the north pole toward the earth will decrease from 23° to 18°, and quantity ⊙ will increase from 157° to 174°. On September 12 ⊙ will reach 180°, marking the vernal equinox of the southern hemisphere and the autumnal equinox of the northern one. It may well be that the south polar cap will become very prominent in August late in the southern winter.

The north polar cap continued to be small and brilliant during May, June, and July. That it was at least at times prominent is shown by the fact that White distinguished it on July 10 when he could perceive no other feature on the disc. There is evidence that the cap looked smallest and most brilliant in the best views. Its color was white or nearly so, Haas seeing the cap about equally well with several different color filters. Saheki and Haas often found a bright core of cap to be surrounded by a dimmer and diffuse whitening. Moreover, Hare on May 17, while the central meridian of longitude (or C.M.) ranged from 278° to 293°, found the north cap to be elongated north-south and to overlie and conceal the bounding north polar band near the C.M., this band being visible both east and west of the cap. He repeated this observation on May 23 and 24. Surely Hare saw an atmospheric cap, and it appears natural to interpret the Saheki-Haas appearances as representing a surface cap enveloped in Martian mists. The north polar band around the cap had been growing progressively less conspicuous for a number of months and was quite invisible to most observers after the end of May, though Heath sometimes saw it faintly in June. Bartlett sometimes suspected that the north cap projected off the limb of Mars, perhaps an effect of irradiation. Haas continued to measure the angular diameter of the north cap on his drawings and to estimate it as a fraction of the diameter of Mars while at the telescope. From May 21 to June 19 he obtained average values of 18° from 8 drawings and 15° from 5 estimates. From June 20 to July 20 he obtained average values of 25° from 4 drawings and 24° from 2 estimates. He feels rather uncertain, though, that the cap was actually growing larger and also suspects that his values are too large. On May 23 and 24 Hare estimated the diameter of the north cap to be 15°. On June 26 Cave thought the cap about the same size as three weeks previously. It may be recalled that near May 22 Saheki and Ebisawa agreed in giving the north cap a diameter of only about 3°(pg. 13 of June issue), and Murayama also then found it very small. We have from Saheki more recent diameters of 4°5 on June 5 and of 3° on June 6. Usually, however, the cap was so tiny to Saheki that he saw it by glimpses only and felt unable to estimate its diameter; he often compared its size to that of a star seen in his 8-inch telescope. Figure 6 on pg. 1 shows the very small size of the north cap to Saheki. It was probably even smaller to him from mid-June to mid-July than from mid-May to mid-June, though there is no definite evidence of a complete disappearance of the cap up to early in July. The diameters obtained by the Japanese observers are so much smaller than those found by others that the editor would suggest that the Japanese observers have seen a tiny remnant of the surface cap while the others have recorded a larger, surrounding atmospheric cap.

From March 15 up to at least May 24 Hare saw a narrow white collar adjacent to the dark north polar band from about longitude 180° to about longitude 260°. Reese and Japanese observers found a similar bright lane in the longitude of Acidalium (pg. 12 of June issue and Figures 3 and 4 on pg. 1 of July issue). These objects would appear to be persistent clouds or mists near the edge of the shrinking cap.

In May and June the south polar cap was still rapidly variable in size, brightness, and position; it was evidently still an atmospheric object. Nevertheless, it very probably <u>averaged</u> more conspicuous than in previous months; and there is good reason to think that in July a southern surface cap was at last revealed to view. From June 23 to July 11 Saheki consistently observed a very bright south cap, which grew larger during this interval. This cap even possessed a dark border on July 11, a feature already suspected by Shaeki on June 26 and July 3. <u>Possibly</u> Bartlett saw such a border on July 23. On July 14 and 17 Haas stressed that the south cap resembled the north cap in size and brightness. We might note that quantity $\odot$ was 138° on June 25, near which date a surface cap perhaps became visible. On June 6 Saheki measured the diameter of the south cap on a drawing to be 48°. Haas estimated 39° on May 23 and 29° on July 20; measures of his drawings on July 14 and 17, perhaps his only ones showing a southern surface cap, give 27° and 29° respectively. Employing filters, Haas found the color of the south cap to be sometimes white, sometimes bluish white, and sometimes yellowish white. Others recorded chiefly white. Bartlett on May 28 at C.M. 180° saw a projecting white (Type I) cloud on the terminator very close to the south limb. He suspected a projecting of the south cap on one or two other occasions.

Those who have followed A.L.P.O. observations of the polar caps in 1949-50 will surely be interested in the following independent record communicated by Mr. M. B. B. Heath in England. Very large in October, by late March the north cap had shrunk to half that size. It continued to shrink, with minor fluctuations, up to about May 3, when $\odot$ was 112°, being a small bright kernel soon before May 3. From May 6 to June 30 it sometimes was a small bright kernel and sometimes looked a little larger. On May 29 Heath found it "certainly smaller" than on May 28. The color also changed progressively from yellow and yellowish white (near March 27) to grayish white (March 29 and 30, April 3, 6, and 7) to bright white (April 12 to May 6). On May 12, 13, and 31 it was white with diffuse, yellowish edges, an appearance also seen several times by Murayama. In June Heath found the north cap white or yellowish white. In early October the bounding north polar band was broad and very dark. By late March it was much narrower and fainter, and it continued to decrease in width and intensity throughout April, May, and June. In October, March, and April the south limb was always dull white. In May and June this south cap was extremely variable in size and brightness. At times the whitenings of the south cap extended far to the north and partially veiled southern surface features.

Martian clouds continued to be seen in great numbers, some being blue (Type I) and others yellow (Type II). The great majority of them lay near the edge of the illuminated disc. There was very frequently seen a bright area on the limb near the equator (Figures 5 and 6 on pg. 1); it was occasionally even more brilliant than the north cap. It is curious that near the middle of May, when $\odot$ was about 118°, both L. T. Johnson and W. H. Haas began to see this limb-cloud about equally well with different color filters. Previously the cloud had been much more brilliant to them in blue light. The editor would prefer to think that the increasing distance of Mars made it more difficult to recognize the desired distinctions rather than to think that any change in the planet's meteorology occurred. Different observers sometimes saw bright arcs along the limb; and Bartlett often observed a well-developed light along the whole limb, but this appearance was very variable for him. He may well have made a significant observation on July 22 at C.M. 18° when he found no trace of surface detail in mediocre conditions but did see a limb light brightest with a yellow filter. Bartlett proposes that a general dust haze concealed the surface features. It is favorable to this explanation that under the very same conditions on July 23 at C.M. 1° Bartlett perceived Mare Acidalium, Sinus Sabaeus, and Mare Erythreum, while the limb light was absent in this view. There is some evidence in Bartlett's observations on other June and July dates that the markings were difficult when the limb light was conspicuous, much easier when it was absent. Like Saheki, Heath thinks that Martian clouds prefer certain regions of the surface and records Tempe, Isidis Regio, Libya, and Chryse as places where he saw clouds at least twice. By about the middle of May Mars was so distant that one would scarcely expect cloud-projections to be observable. Nevertheless, Saheki drew several bumps on the sunrise terminator on June 12 and 15; and Bartlett found a bluish white cloud, perhaps over Thaumasia, to project on the terminator on June 13. On June 2 at C.M. 132° Bartlett observed Thaumasia to be very white, as if clouds covered it; and he saw no trace of Solis Lacus, which he did observe on other occasions. Martian clouds often revealed themselves by concealing surface features. Figure 6 on pg. 1 shows an excellent example of a veiling of Syrtis Major. Perhaps Syrtis underwent some further obscurations by clouds late in June; but observations by Bartlett, Cyrus, and Haas contradict each other.

We give a few odd bits of Martiana. On June 26 at C.M. 304° Cave strongly suspected that the large Casius-Utopia shading was very much darker than a month or more prior to that date. In early June Ebisawa succeeded in separating Sinus Gomer from Mare Cimmerium, as Hare also has done. Ebisawa thinks that the "new dark shading" he and Murayama observed in mid-April at the junction of Hydraotes and Iamuna canals (pg. 11 of July isssue) may have rapidly faded later in April. Early in July Heath reported: "In good air it was frequently observed that there was a marked difference in tint between southern and northern markings. The former frequently displayed tints of green, bluish green, or bluish gray. The latter were all more or less brown or brownish". He thus independently confirms the difference in hue between the two hemispheres that a number of other observers found (pg. 10 of July issue). Figures 5, 6, and 7 may be profitably studied in connection with the descriptions of surface features in our May and July issues. A drawing by Heath at C.M. 283° on October 3, 1949, when the diameter of Mars was only 4".7, shows remarkably accurately the main contours of southern and northern dark markings and even includes the bright bay indenting the southwest shore of Syrtis Major! Since ☉ was 18° on October 3, this "Libya gap", as it is often called, is evidently present over at least one-fourth of the Martian year. Heath recorded Elysium on April 6 as a pentagonal area bounded by canals and saw Solis Lacus faintly several times. On April 20, May 28, and June 4 he drew Lacus Niliacus to be fainter than Mare Acidalium.

During the last two months observations of Saturn have been received from J. C. Bartlett, Jr. (3.5-inch refl.), C. M. Cyrus (10-inch refl.), W. H. Haas (6-inch refl.), L. T. Johnson (10-inch refl.), G. D. Roth (4.4-inch refl.), and T. Saheki (8-inch refl.). Figures 3 and 4 are representative views. The planet was poorly placed in July and will be unobservable in August.

Bartlett and Haas continued to make estimates with standard color filters of the relative brightnesses of the east and west arms of the rings. One can expect a difference in color to reveal itself as a difference in brightness with proper filters; for example, if the west arm (left in simply inverted view with south at the top) is the more red of the two, it will be the brighter with a red filter. Bartlett made 16 estimates of this kind from May 22 to June 29. On 9 occasions he found the east arm the more blue and the west arm the more red. On 4 occasions the west arm was the more blue; the east arm, the more red. Once both arms were bluish; once both were reddish; once the colors were uncertain. Haas carried out 15 examinations of the ring-arms from May 23 to July 17. He always found the east arm brighter with a blue filter, usually clearly and distinctly so. Therefore, the east arm was the more blue for Haas; and Bartlett and he are at least in statistical agreement. With other filters and no filter Haas found little difference in brightness, indeed usually none, except that the west arm was usually slightly the brighter with a deep red filter. This result would indicate that the west arm was the more red. On six dates both Bartlett and Haas examined the ring-arms, though at times differing by several hours; their results sometimes agree and sometimes disagree.

Bartlett, who has been attentive to colors on the rings for some years wrote on May 27 that in his opinion any successful theory must explain these things:

1. The appearance is seen at all phases of the rings, whether opened widely or almost in the plane of vision.

2. The appearance is almost always restricted to Ring A.

3. The same color does not always lie on the same side of the ball.

4. No connection can be shown between the appearance of the phenomenon and the rotation period of the rings.

5. The phenomenon is random and relatively infrequent.

6. Color filters confirm its objective reality.

The fast-moving North Temperate Belt darker section observed from November 3, 1949 to April 15, 1950 was not recovered after April 15 with one very uncertain exception. On June 21 Haas found the preceding end of a darker section in the N.T.B. to be on the central meridian at $3^h\ 44^m$ (U.T., as usual). If this prec. end is the one in transit at $6^h\ 11^m$ on April 15 and if 167 rotations intervened, then one obtains a rotation-period of 9 hrs., 36.8 mins., comparing well with a period of 9 hrs., 36.0 mins. near April 15. For 168 rotations the period is 9 hrs., 33.4 mins. However, such an extrapolation is <u>very risky</u>. This darker section was apparently drawn by Saheki in the correct position on the disc on March 5 at $12^h\ 45^m$, though it is only fair to add that he did not show it on a few other occasions when it was presumably well-placed near the C.M.

Our nomenclature for Saturn is given by Figure 1 on pg. 1 of the March issue. The N.T.B. was weaker in May, June, and July than early in 1950 and was perhaps no longer double, the north component having become faint or invisible. Bartlett, however, in June and July repeatedly called the N.T.B. the darkest belt on the planet; and it is remarkable that his small telescope several times showed the south edge of this belt to be wavy. The South Equatorial Belt was still very easily seen and was double. A broad and dark South Polar Band was more conspicuous than its northern analogue. Several observers saw one or two belts between the S.F.B. and the S.P.B. (Figures 3 and 4). Bartlett often noted a North North Temperate Belt in middle northern latitudes (drawn occasionally by several other observers). In the zone between the N.T.B. and the N.N.T.B. Bartlett remarked sometimes gray festoons and sometimes white ovals, both aspects much reminding him of certain zones on Jupiter. The North Tropical Zone looked dull to Haas, definitely less bright than early in the year; and Bartlett found it dusky from June 26 to July 13. Bartlett often recorded a white cap on the north limb and a very dark hood on the south limb; Roth, however, wrote on June 15 that the South Polar Region had become bright (note Figure 3). The rings were definitely more dusky than most of the ball; and in July Haas thought that they might be as dark as inconspicuous belts in high latitudes, so poorly were the rings illuminated. We should note that the Saturnicentric latitude of the sun decreased from 1°.9 on May 21 to 1°.0 on July 16.