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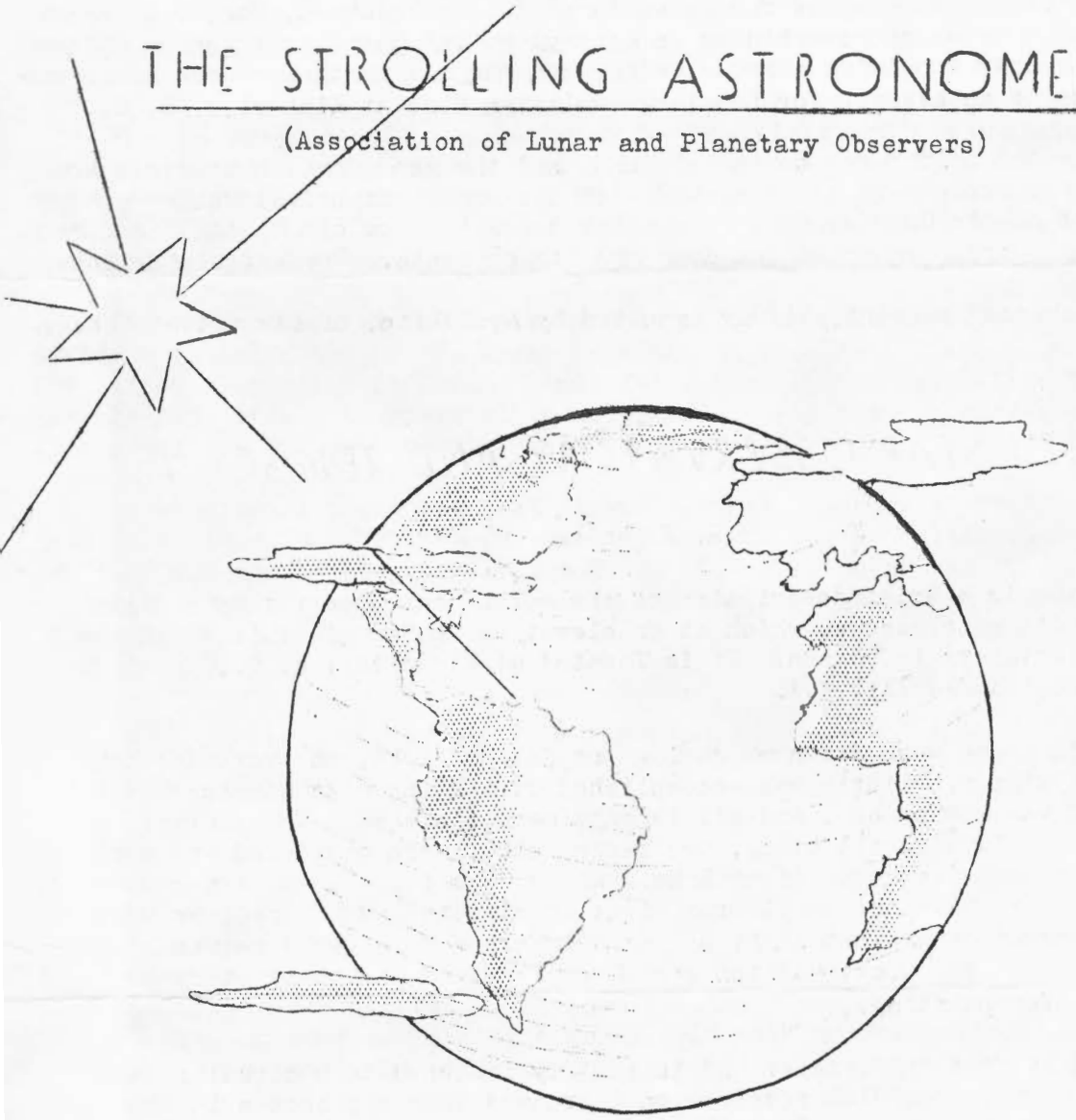

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F O R E W A R D

We have had frequent occasion in this pamphlet to speak of Mr. E. K. White of Chapman Camp, B. C., Canada. Mr. White has for some years been one of the most active lunar and planetary observers on this continent. He kindly contributed an article titled "Small Secondaries for Newtonians" to our Volume 1, Number 4; and he has published several short articles in Journal of the Royal Astronomical Society of Canada. Astronomy providing a good living when one has another source of income, our friend works as an assayer for the large Sullivan Mine at Kimberley, B. C.

Last summer the editor and several friends had the good fortune to visit Mr. White at his home. They were so impressed with his excellent private observatory, perhaps the best one in Canada, that the editor began to urge him to tell readers of The Strolling Astronomer about the dome and its contents. The article follows.

There is enclosed a print, kindly supplied by Mr. White, of his private observatory.

NORTH STAR OBSERVATORY AND TELESCOPE

by E. K. White

The following is a brief description of the North Star Observatory and its equatorial reflecting telescope, which at an elevation of 3600 feet is the highest astronomical observatory in Canada. It is located at Kimberley, B. C., latitude N49° 41', and longitude W 115° 59'.

Plans for the dome were drawn up during the fall of 1945, and work was begun on the ribs that winter. Little was accomplished during the next summer; but the following winter was a busy one, and all 19 ribs were finished. The shutter doors and other parts, including wall studs, two rings, etc., were completed and were painted in the basement workshop of my home. As soon as the snow went next spring, (not until April here) a concrete floor 18 feet in diameter was poured, as was also the pier. Erection of what might be termed a pre-fabricated dome was begun around May first. In two weeks all the gores were on; and the observatory was complete, except for painting.

The dome is 15 feet in diameter and is rigidly fastened to a circular wall 5 feet high. The whole building revolves on 8 grooved wheels 6 inches in diameter running on an angle iron track. The wall and dome sheathing material is 1/4 inch thick resin bonded 3-ply fir veneer. Studs, rings, and ribs are of wood, assembled with screws and corner brackets which will allow the observatory to be readily dismounted and moved if ever necessary. The shutter doors are of the double transverse type having 4 roller bearing wheels per door, 3 inches in diameter, which run on angle iron tracks top and bottom. An endless cable arrangement described by Scanlon in A. T. M. A. is utilized. The building is painted white outside and flat black within. The total cost of the observatory building was not much above $200.

Apart from the instrument, furnishings consist of two stepladders 6 and 9 feet high, a bench, and an upright desk with shelves and drawers and a desk lamp. An adjustable electric fan stand for tube ventilation is also kept in the dome.

The telescope was built in 1941-2. The mounting is of the German equatorial type, the pedestal being cast iron and of good rigidity. The polar axis has Timken roller bearings. The driving clock is powered by a small induction motor geared to the main telescope worm by a war surplus ball bearing gear box made by the Sperry Gyroscope Company. This unit has a friction variable speed device that enables the rate to be accurately adjusted to star time, or any other for that matter. The clock will hold a star in the field for an hour or more. The mounting has a 16-inch diameter delination circle, divided into single degrees, and an hour circle and slip ring circle, each divided into 5-minute intervals.

The telescope itself was designed for planetary work and contains one or two perhaps unusual features worth mentioning. The elliptic flat secondary is only one inch along its minor axis; and the focus of the 7-inch primary is 100 inches, giving F/ (14.3). The tube is 10 inches in diameter and of sheet steel. A 2-inch aperture refractor finder of 11x is mounted on the tube.

The performance of the instrument seems to be quite excellent, for it will divide both Delta and Lambda Cygni in seeing 6 (scale of 0 to 10, with 10 best), the latter star being at Dawes' limit for 7-inch apertures. Diffraction rings are clearly visible on stars at focus, particularly those around fourth magnitude, with powers of 300 or 400 when seeing is above 7.

In closing, I might say that it was a great pleasure to be honored by a visit last July, shortly after the observatory was opened, by Walter Haas, Frank Vaughn, Ted Hake and Ken Lighty, all of the U. S. Clear skies prevailed during the week of their stay; but as usual the seeing was never above 4, yet a good bit of observing was done nevertheless.

SOME SUGGESTED OBSERVATIONS OF MARS

by Walter H. Haas

The rapidly approaching opposition of Mars on February 17 will find the planet almost as far from the earth as it can be on such occasions. However, the position in Leo will cause Mars to culminate high in the sky for observers in middle northern latitudes; and it will be possible to see a fair amount of detail with ordinary-sized telescopes of good quality throughout February and March. Now one can, of course, entertain one's self with casual and occasional examinations of the planet. However, planetary studies grow much more fascinating when one observes regularly, systematically, and purposefully. Moreover, the eye attains a degree of training in this process scarcely credible to a casual observer and learns to perceive distinctly details invisible at first. In the thought that some of our readers might like to study Mars while it is close and to report their findings, we here suggest some possible programs. What we say will be no news to experienced members.

A few simple rules must be followed in recording the observations. It is essential always to note the date and the time, unless one's object is to fill wastebaskets. The date must include the year (by no means obvious, after a few of them have elapsed); and the sort of time used (E. S. T., C. D. S. T., etc.) must be reported. One should also note with each observation the magnification, the seeing or steadiness of the atmosphere, and the transparency. In order to study changes on Mars to best advantage, it is well to use largely or wholly one eyepiece, thus removing one source of error. And, of course, one should report

the telescope employed. A notebook is just about a necessity for useful observing, and it will pay dividends to have everything as handy and convenient as possible around the telescope for the recording of notes and drawings.

Drawings of Mars are the fundamental method of study. Few first-class planetarians are artists, but cubists are not in demand for this work. There is no excuse for not learning to make accurate drawings of what one sees. The drawings must be made at the telescope. Either they must be completed in 15 minutes, because of the rotational drift of the markings; or else, if such haste is not feasible, one must draw the coarse detail first, within the 15 minutes, and then place the finer markings relative to the gross ones. The drawings should show what one sees, not what is on some map of the planet; and they should never be altered afterwards to conform to such a map. Many observers find a scale of two millimeters to the second of arc convenient on their drawings, the angular diameter being extracted from tables. The phase, if detectable, may be drawn in at the start of the observation.

Another interesting program is the study of colors in the polar caps, their bordering dark bands, the maria, and other features. If it be true that visual impressions of color are very vexing things to analyze, such work is not exactly dull on that account! Reflectors are here preferable to refractors, of course. To eliminate several sources of false seeming changes in color, one should record all estimates of color with the same telescope and eyepiece; and one should observe only when the sky is clear and dark (free of twilight). Bad seeing is also best avoided. A careful use of color filters may serve to detect hues not visible directly. For example, a bluish mare will look dark with a red filter, lighter with a blue filter.

Central meridian transits on Mars follow the same procedure as on Jupiter (Strolling Astronomer, Volume 1, Number 3, pp. 6-8). One notes, to the nearest minute, when a Martian feature is midway between the sunrise and sunset limbs (or between the limb and the terminator). This time allows the Martian longitude to be computed. In order to locate the central meridian of longitude, one may orient the disc by means of a polar cap, presumably the north cap early in 1948. Also, one may use the direction of drift in the field and certain angles listed in the Ephemeris.

Occasionally, one sees small white projections on the edge of the disc. These are Martian clouds. The appearance of such objects should be noted carefully. Great efforts should be made to reobserve them on subsequent nights. A stationary cloud will reappear 37 minutes later on the next night since Mars will then have made a complete rotation. This period is a risky guide, however; for the cloud may be drifting over the planet's surface. The study of such drifts may aid greatly in understanding Martian meteorology. The longitude of a cloud-projection is determined by the time of its visibility; the latitude may be estimated at the telescope or may be measured from a drawing. Naturally, a cloud may vary in size and brightness between two presentations. Visibly projecting clouds are often part of white areas close to the limb or the terminator, which areas will bear watching on that account. So will the polar caps.

Another worthwhile program is the recording of the relative darknesses of the different features. Such observations can only be of features on the disc at a given time; one cannot compare Syrtis Major and Solis Lacus, for example. Moreover, the observed darkness of a feature will vary with the planet's rotation because of the changing thickness of Martian atmosphere through which the line of sight passes. It would perhaps be better to observe not darknesses but conspicuousnesses, regarded as an integrated effect of intensity and size. Such relative conspicuousnesses can be easily obtained by observing the order in which the features disappear when the image of Mars is put out of focus.

Mars will scarcely be photogenic in 1948 when even at opposition the diameter of the focal image in a telescope with a focal length of 100 inches will be only 0.008 inches. Nevertheless, L. J. Wilson in our A. L. P. O. has obtained good results; and observers skilled in photography might well try their luck. Mr. Wilson's method is to make a dozen exposures or more on a single film as the planet drifts across the telescopic field. The best images are used for study. Interested members might like to reread his "Planetary and Lunar Photography" in Strolling Astronomer, Volume 1, Number 6.

ON RECENT OBSERVATIONS

A great many interesting reports on current lunar and planetary events have been received recently, and we only regret lacking space to discuss them as fully as we should wish.

Throughout December a brilliant north cap on Mars was much the most conspicuous feature on the planet. It was melting rather rapidly in its spring season and by January 20 was comparatively inconspicuous in poor seeing because of its small size, though still brilliant. T. R. Hake noted a rift in the north cap at C. M. 325° on January 4, using a 4½-inch refractor at 300x. We have no other reports of rifts, though W. H. Haas with a 6-inch reflector has suspected that the cap is not always of uniform intensity.

The north cap is still surrounded by a wide and notably dark band, which has been prominent in December and January. Indeed, during December this band was more conspicuous than the southern maria in most longitudes. It has probably been growing a little lighter with the passing weeks. Haas has often seen a thin black north edge to this band. Liquid water from the melting cap, possibly? R. Missert has reported some observations with his 6-inch reflector. On December 14 at C. M. 135° the north polar band was diffuse and very wide; he estimated that it extended southward to latitude 40° or 50° N. On December 23 and 25 at C. M. 42° and 32° respectively, this band was to him "short and dark, being darkest and widest at Acidalium." Its color was greenish blue. D. W. Rosebrugh has written of some observations that he made while vacationing in Palm Beach, Florida, during the recent holidays. Using a 6-inch reflector, he found the planetary views much better than at his home in Waterbury, Connecticut. He reports that the seeing was regularly 8 or 9 on a scale of 0 to 10, with 10 best; if such is true all year long, mass-migration to Florida is clearly indicated for all good lunarians and planetarians! Mr. Rosebrugh found the north polar band black and outstanding near the first of January.

The south cap still varies greatly and capriciously in its appearance; probably it is still composed of mists which condense and dissipate rapidly during the southern autumn. A few examples from the notes of Haas may be worth mentioning. At C. M. 358° on January 10 he could see no south cap. At C. M. 270° on January 17 this cap was moderately bright, rather diffuse, and about as large as the north cap. At C. M. 154° on January 23 the south cap was notably bright but so diffusely outlined that its size could scarcely be conjectured. At C. M. 316° on January 12 the south cap was merely a dull and diffuse whitening of the limb. The results of other observers accord with such fluctuations. D. W. Rosebrugh suspected a south cap, much smaller and dimmer than the north, at C. M. 344° on December 31 and remarked a moderately bright southern area, nearly as large as the north cap, at C. M. 18° on January 4. Splendid drawings by E. E. Hare in mid-January show no south cap, nor did R. Missert find one on several December dates. E. K. White with his 7-inch reflector saw no south cap on December 29 but did glimpse "a narrow dull white cap" on January 8.

Several northern features are now dark and conspicuous. Here one must mention Mare Acidalium, the Propontii (seen as one) and the Wedge of Casius. Reese has seen Acidalium to consist of two spots, with the southern the smaller; this observation confirms Tombaugh's (January Strolling Astronomer, pg. 8). There is some question whether Acidalium joins directly to the north polar band or whether there is a light separating space, and observers might give attention to this matter in February. Hake has commented on the large size of Casius, and Hare and Haas confirm its magnitude. On January 11 Hare saw Casius, Copais, and several other dark areas to be merged into one very large and very dark shading. On January 18 Haas compatibly remarked a large dusky shading north of Syrtis Major, "from which it is separated by a whitish band." Hare suspected Ismenius as "a faint smudge" on January 7.

Among the most easily seen canals on the planet are Jamuna, Hades, and Nepenthes, all of which have been recorded by several observers. In January Hades was distinct enough but scarcely as intense as on some occasions late in 1947. Nepenthes is much less intense than near the 1941, 1943, and 1946 oppositions. An incomplete list of other canals recorded in December and January would include Gehon, Ganges, Tartarus, Cerberus, Styx, Erebus, Laestrygon, and Adamas. Somewhat unexpectedly, no canals have been seen emanating from the north tip of Syrtis Major.

The southern maria have sometimes looked faint, especially the more southerly of them. This appearance is probably only an observational effect, however, for the best views show them fairly dark. Hare alone has been able to see some structure to the maria; he has observed variations in the tone of Cimmerium and Syrtis Major. (Good views in 1941 showed considerable delicate detail of this kind.) Hare could not see Atlantis but instead drew Sirenum merging with Cimmerium. Neither has he drawn Hesperia, and others agree with him about both objects.

Only a few notes on Martian colors have reached us. Missert on December 23 found the southern maria greenish and Acidalium greenish blue. Reese on December 30 thought Acidalium "dark chocolate brown" and the southern maria "delicate blue-green." Did Acidalium change? Both observers were using 6-inch reflectors. Hare on January 18 and 19 thought Charontis, the Propontii, and Stymphalius dark brown but Casius and the southern maria slate blue. Using filters to aid in perceiving slight tints, Haas made a number of color observations between January 10 and 25. The north polar band usually looked bluish gray to him. The dark areas, both northern and southern, were nearly gray, perhaps showing some blue. The Propontii looked brownish gray on January 23 and 25 (confirming Hare?).

In January Haas saw numerous bright areas near the limb or the terminator of Mars. These are presumed to be clouds. They become invisible a short distance from the edge of the disc. They are worth watching as a source of cloud-projections at the edge of the disc, though Mars may be rather remote this year for such delicate observations.

A drawing by E. K. White with a 7-inch reflector at 9 a.m. on November 11, M. S. T., is of interest as having been made in daylight. The drawing shows the north cap, its polar band, Cimmerium-Tyrrhenum, Casius, Nepenthes, and Hellas.

A drawing by Hare at C. M. 195° on January 19 shows a remarkable amount of detail. Mr. Hare comments: "The canals Erebus and Styx were less evident at the times when the numerous marshes or lakes were resolvable."

There follows a brief ephemeris for observers of Mars. Again, D is the apparent angular diameter; D⊕ is the areocentric latitude of the earth; ⊙ is the areocentric longitude of the sun; and C. M. is the central meridian of longitude. The data are given for 9 p.m. by P. S. T. on each date and corresponding times in other time-zones. The C. M. increases at a rate of 14°.6 per hour. The Martian season now corresponds to May on the earth-spring well advanced in northern hemisphere.

Date	D	D⊕	⊙	C. M.
1948, February 5	13".5	+18°.9	55°	5°
February 10	13 .7	+18 .5	57	321
February 15	13 .8	+18 .1	59	278
February 20	13 .8	+17..7	61	234
February 25	13 .7	+17 .3	63	191
March 1	13 .4	+17 .0	66	147

The Ring C "mystery" continues to receive attention from several observers. D. W. Rosebrugh writes of several views with a 6-inch reflector and excellent seeing between December 28 and January 4, inclusive. The C projection at the C. M. was 1/2 as wide as Cassini's at the ansae. Off the ball, Ring C was barely visible on December 28 as a "pearly glow" at the east ansa only, where it filled about 2/5 of the space between the ball and the inner edge of Ring B. E. J. Reese reports that on January 7 in rather good seeing, he found the C projection at the C. M. to be between 1/2 and 2/3 as wide as Cassini's at the ansae. R. Missert had several good views of Saturn from December 14 to 25, good enough to show Cassini's in front of the ball. The Ring C projection at the C. M. was about 1/3 as wide as the shadow of the rings, though at the limbs it equalled that shadow. Alternately, Missert made the projection at the C. M. 1/2 as wide as Cassini's at the ansae. Ring C at the ansae filled perhaps 1/3 of the space between the inner edge of B and the ball. The views did not allow confident judging, the observer reports. T. R. Hake in good seeing on January 4 found the projection only 1/4 as wide as Cassini's at the ansae. (Hake's small refractor once revealed Encke's Division.) White on January 8 made this fraction 7/10. This observer called Ring C violet gray off the ball. During December Hare found Ring C to fill, on the average, about 1/2 the space between B and the ball. On December 24 it appeared eccentric in excellent seeing, being wider at the west ansa than at the east. A. F. Alexander informs us of some observations of Ring C by F. H. Thornton with an 18-inch reflector. (Would that we had one!) Numerical estimates are unhappily lacking; but it appears significant that on December 20 the C projection was usually "barely discernible," being seen as "an exceedingly thin line" in the best moments. Haas made a number of observations of the Crape Ring between December 10 and January 20. When seen well, the projection at the C. M. was at most 1/2 as wide as Cassini's at the ansae, perhaps only 1/3 as wide. The best views emphasized the extreme narrowness. Ring C off the ball was difficult for this observer and filled 1/3 to 1/4 of the space between Ring B and the ball. From these reports and ones summarized in earlier issues the editor would conclude that: (1) Ring C is now surely actually narrower than in 1938-June, 1947. (2) Ring C had a constant width in September, 1947-January, 1948. (3) Observers should keep watching the ring closely while the relative Saturnicentric latitudes of the earth and the sun change during February and March.

Observers should examine the two Saturnian shadows whenever possible during February. That of the ball will presumably be invisible for some days near opposition on February 9. It is expected that a (spurious) dark band will outline each limb during this period. The two bands should be carefully compared in regard to intensity and width. The shadow of the rings must cease to exist north of the rings early in February. However, observers should watch this position closely for the curious dark band recorded by several observers in early 1947

after geometric shadow vanished. And remember, negative observations of either shadow may be as valuable as positive ones. In mediocre seeing on January 25 Haas easily saw the black and narrow shadow of the ball; the shadow of the rings appeared as dark as the Ring C projection (not black) but somewhat less conspicuous.

E. E. Hare has now confirmed a delicate Equatorial Band on Saturn near the middle of the bright Equatorial Zone. Haas has confirmed White's "South Temperate Belt" between the South Equatorial Belt South and the South Polar Belt. Haas also saw the space between the S. T. B. and the S. E. B. S. to be as bright as the E. Z. on January 12 with an image good enough to show Encke's Division faintly. Ring A showed "a definite pale bluish color" to White on January 8.

Very unsatisfactory views of Jupiter in January have shown an intense South Equatorial Belt North (?), often the most conspicuous belt on the planet. The Red Spot and its Hollow have escaped detection to date (January 25).

S U B S C R I P T I O N R A T E S

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S T A F F

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