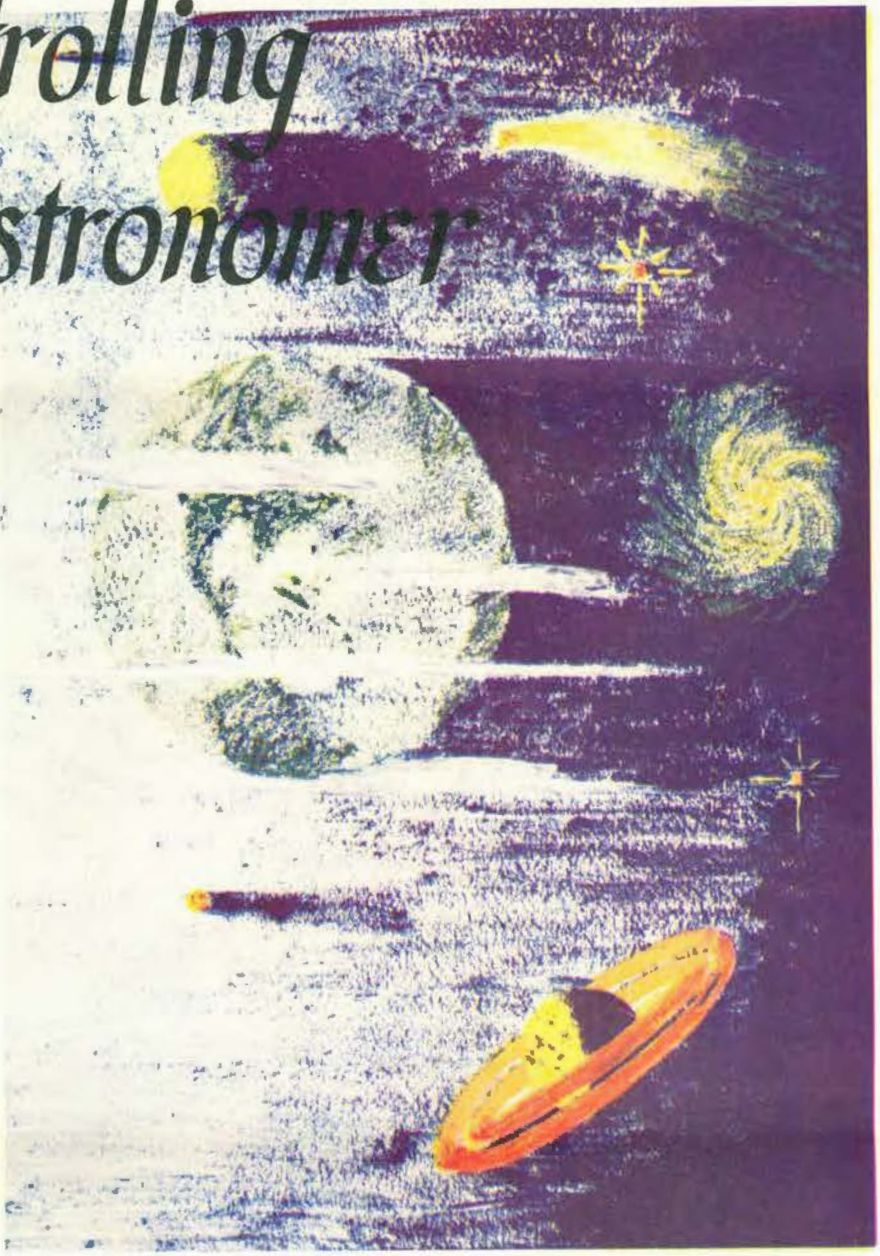
The Strolling Astronomer

Volume 5, Number 3. March 1, 1951

ASSOCIATION OF LUNAR AND PLANETARY OBSERVERS



Mailing Address

The Strolling Astronomer
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S T A F F

-Editor-

Walter H. Haas
167 W. Lucero Street
Las Cruces, New Mexico

-Counsellor-

Dr. Lincoln LaPaz, Head of Mathematics Department
Director, Institute of Meteoritics
University of New Mexico
Albuquerque, New Mexico

-Acting Venus Recorder-

Thomas R. Cave, Jr.
265 Roswell Avenue
Long Beach 3, California

-Acting Jupiter Recorder-

Edwin E. Hare
1621 Payne Avenue
Owensboro, Kentucky

-Acting Mercury Recorder-

Donald O'Toole
114 Claremont Avenue
Vallejo, California

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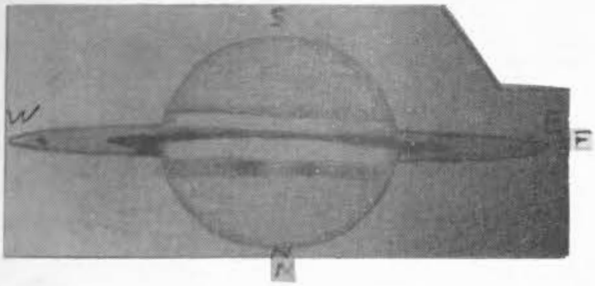


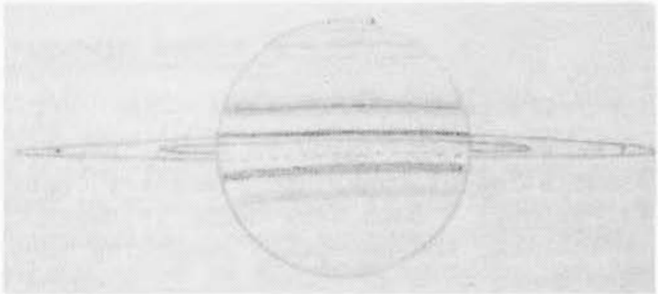
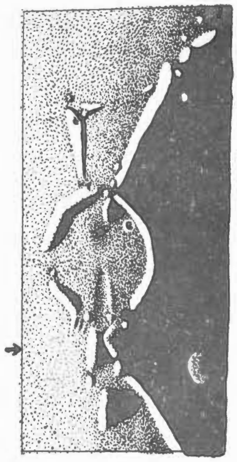


Fig. 1. Saturn
L. T. Johnson. 10-inch refl.
Dec. 9, 1950. $10^h\ 32^m$, U.T.
221X, 300X.

Fig. 2. Saturn
T. Cragg. 6-inch refl.
Jan. 24, 1951. $8^h\ 5^m$, U.T.
104X



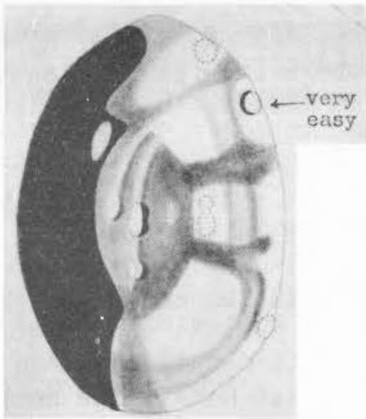
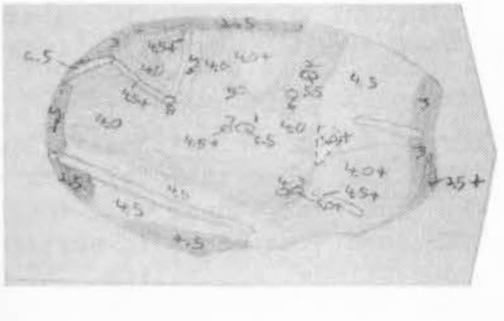


Fig. 3. Lunar Crater Guericke.
H. G. Allen. 3.5-inch refl.
Dec. 18, 1950. $2^h\ 0^m$, U.T.
200X
Colongitude = 15°0

Fig. 4. Lunar Crater Aristarchus
E. J. Reese. 6-inch refl.
March 31, 1950. $5^h\ 20^m$, U.T.
240X.
Colongitude = 60°2



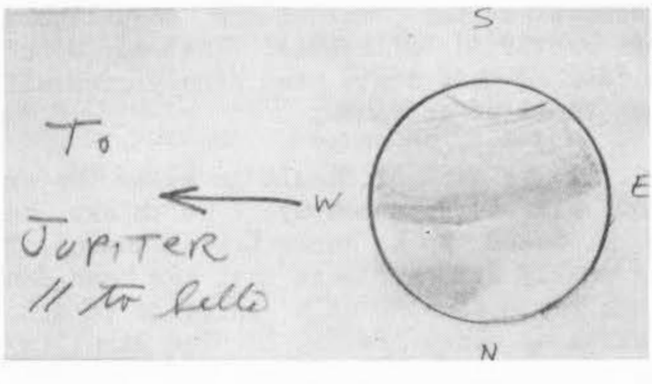


Fig. 5. Lunar Crater Plato
W. H. Haas. 18-inch refr.
Nov. 1, 1944. $8^h\ 8^m$, U.T.
300X
Colongitude = 96°2

Fig. 6. Jupiter III
T. R. Cave, Jr. 36-inch refr.
Aug. 17, 1950
$7^h\ 20^m$, U.T.
740X.

FOURTH BIRTHDAY OF THE A.L.P.O.

With this issue we reach the fourth anniversary of the founding of the Association of Lunar and Planetary Observers and its periodical, The Strolling Astronomer. Both were begun in March, 1947, in the hope of stimulating, co-ordinating, and generally promoting the observation of the moon and the planets. They began with an appeal to interested persons to buy six issues of our celestial scandal-sheet in advance - and we were pleasantly surprised, it may now be admitted, to be able to continue to function after those six months had passed. It is a pleasure to record that most of our "charter members" are still members of the A.L.P.O.; those who have thus been with us from the beginning are D. P. Barcroft, A. Boivin, G. Brown, R. N. Buckstaff, T. Connors, C. M. Cyrus, H. Dall, C. A. Federer, J. I. Gant, Jr., F. M. Garland, W. H. Haas (who can't easily help it), T. R. Hake, (Miss) A. I. Hoth, L. T. Johnson, I. Kimball, L. La Paz (Counsellor), R. C. Maag, H. W. Metzger, R. Missert, O. E. Monnig, R. L. Moore, A. W. Mount, J. J. O'Neill, E. J. Reese, C. P. Richards, D. W. Rosebrugh, M. Rosenkotter, N. J. Schell, E. A. Sill, J. R. Smith, H. D. Thomas, C. W. Tombaugh, F. R. Vaughn, Jr., E. K. White, H. P. Wilkins, and the Yakima Amateur Astronomers. Three members have passed away in death: Professor G. Bruce Blair of the University of Nevada, H. A. Delano of York, Penna., and L. J. Wilson of Nashville, Tennessee.

We think that we can point with justifiable pride to growth during the last four years. In the spring of 1947 there were only a few dozen members of the A.L.P.O., and only a very few of these did not live in the United States. Now we have more than 180 members, who are literally scattered over the whole world. There are at present more members in California than in any other state and more in Los Angeles County than in any other metropolitan area. Rival Chambers of Commerce please note! The number of pages in The Strolling Astronomer is almost doublt what it was four years ago, and by means of smaller margins and a generally improved format the amount of textual material published has increased to perhaps four times what it was in our first few issues. We have been able to add two features unique among American astronomical publications, to our knowledge. The first is a page (or more) of illustrations as a regular feature, most of them drawings of lunar and planetary subjects with ordinary-sized telescopes by our members. The second is the serial reproduction of H. P. Wilkins' very excellent and detailed map of the moon. In addition, persons having goods and services to sell to the amateur astronomer may now advertise on our back cover. Our readers might like to know that articles published in The Strolling Astronomer are listed in the comprehensive annual catalog of astronomical literature, Astronomischer Jahresbericht. This catalog may be ordered from the Astronomische Rechen-Institut , Heidelberg, Augustinerstrasse 15, Seminarienhaus, Germany. We are gratified, of course, that our work has been thought worthy of inclusion in a catalog that lists many highly specialized and very technical publications in the field of astronomy.

It is more difficult to assess the exact value of our contributions to lunar and planetary astronomy. We think, however, that the observational work of E. J. Reese, E. E. Hare, L. T. Johnson, T. Saheki, and some others will compare favorably with the best that has been done. At the same time there is certainly room for a considerable increase in A.L.P.O. observational activities; it requires no close reading of The Strolling Astronomer to find that about a dozen people are doing almost all of the observing. Although some of our observational programs are best carried our with apertures above ten inches and instruments of the very best optical quality, others are less exacting - there is something for everyone. It is just possible that you might see something important tonight which will otherwise go unobserved! We hope in the future for more liaison with professional astronomers on problems where amateurs can make observations helpful to professionals, such as the Uranus program described in our February, 1951, issue. We desire to work with the Astronomical League on the general problem of how the thousands of telescopes built and owned by American amateurs can best be put to useful work. Finally, we like to think that we are playing a small role in spreading the general cultural benefits of the study of astronomy and in giving some pleasure to our readers and friends.

The occasion of our fourth birthday is a good time to express our thanks to some persons to whom we are indebted. Many others we must omit for lack of space. However, we certainly should express our thanks to The Stevens Agency of Albuquerque, New Mexico, our "publishers" from July, 1949, to the present. We owe to them our illustrations, our reproductions of the Wilkins lunar map, our lovely (indeed, colorful) front cover, and our advertising page. Without their very considerable assistance - to say nothing of photographic skill! - all these features would be impossible. We further extend our special thanks to Mr. H. P. Wilkins, the Lunar Director of the British Astronomical Association, for his kind permission to reproduce his map of the moon. We are indebted to the Section Recorders, both past and present, for working up observational data submitted to them and for submitting Reports at suitable intervals to The Strolling Astronomer. These Recorders have been C.B. Stephenson and D.O'Toole for Mercury, T. R. Cave, Jr., for Venus, and E. J. Reese and E. E. Hare for Jupiter. We thank all those colleagues who have contributed articles to The Strolling Astronomer during the past four years. The editor certainly wants to see this flow of material continue, for he doubts not that the quality of the periodical is likely to be in inverse proportion to the fraction of it which he has to write himself!

The A.L.P.O. has enjoyed from its first months the encouragement and cooperation of various observers and societies in foreign countries. Among the societies there should be particularly mentioned the British Astronomical Association in England, the Bund der Sternfreunde in West Germany, and the Oriental Astronomical Association in Japan. Publications have been regularly exchanged with certain groups in England, France, Germany, and Switzerland. The beautiful and artistic drawings of Japanese observers have been a truly valuable addition to our records. Individual observers in Canada, England, Germany, Denmark, South Africa, and a few other countries have sent us material of value. The articles in our February, 1951, issue by E. L. Pfannenschmidt of Germany and Lorenzo Orestes Giacomelli of Argentina are good examples.

The future of the A.L.P.O. will naturally depend upon the interest and support of its members. We have made a good beginning. There is much that we can carry out, and should carry out, in the future. With the continuing cooperation of all of you we look forward to having in four more years, or in March, 1955, a larger and more active A.L.P.O. and an improved Strolling Astronomer.

Errata in February Issue. In the top row of illustrations on pg. 1 Figures 1 and 2 were interchanged. In the bottom row of illustrations on pg. 1 there were two drawings of the lunar crater Conon by Mr. S. Ebisawa with a 13-inch reflector. The caption given for Figure 6 refers to the right-hand drawing only. The left-hand drawing in the bottom row is thus left undescribed. Mr. Ebisawa made this drawing upon July 25, 1950, at $11^h 30^m$, U. T., colongitude = 40°0.

Readers might like to insert this information beneath this drawing. On pages 12 and 13 of the February issue the name of E. Herrero Ducloux was misspelled in several places. In the lower half of pg. 14 Mr. Giacomelli's statement should read: "I consider that I have now gone to the sources of information most important for the object I desired."

Introduction. Major James R. Randolph, 490 Tremont Ave., Orange, New Jersey, is a new contributor to The Strolling Astronomer. He is a college teacher of mechanical engineering and has lectured upon rockets and space travel. Among his published articles are "Can We Go to Mars?" in Scientific American for August, 1928, "What Can We Expect of Rockets?" in Ordnance for January-February, 1939, and "Occupation of Mars" in Ordnance for March-April, 1947. He is a past editor of The Journal of the American Rocket Society and has published several articles therein.

Major Randolph's subject, that of life on Mars, has been a very lively one during the last 60 years. Perhaps no other topic in the whole field of astronomy has been discussed at such length. In spite of this tremendous flow of ink, we think that readers will find some new ideas in Major Randolph's article. It should be noted that his arguments are illustrated by two figures on pg. 5.

Mathematically minded readers might be interested in the formula from which the black body temperatures quoted below are obtained. It is:

Exponents

$$T = 707\,(93{,}000{,}000)^{0.5}\,\frac{K^{0.25}}{R^{0.5}}$$

where T is the temperature in Fahrenheit degrees, R is the distance from the sun in millions of miles, and K is a constant for given conditions. Values of K are 1 for a surface perpendicular to the sun's rays (giving the maximum temperature for any R), $1/\pi$ for the mean daily temperature of a planet at the equator, and 1/4 for the average temperature of a perfectly conducting sphere. The equation is discussed in "Limitations of Space Travel" in The Journal of the American Rocket Society for September, 1947.

ARE THERE PEOPLE ON MARS?

by James R. Randolph

Anyone who has studied maps of Mars, such as those made by the late Percival Lowell, has noticed that the earthly pattern they most resemble is a transportation map of a flat country. (Figure 1 on pg. 5). The "canals", with only a few exceptions, follow great circle courses from one important point to another, their junction points being for the most part the "oases", or the "bays" in the blue-green areas called "seas". Such a pattern of straight lines connecting important points will be observed on a college campus where the students are allowed to cross the lawns wherever they please. It will be seen in an airlines map or a steamer map of the Pacific. It will be seen in a railway map of a prairie state or in a highway map of a level state in which highway location has not been influenced by a section gridiron, as it has in most of the prairie regions of North America.

(Refer to J. R. Randolph's article in this issue.)

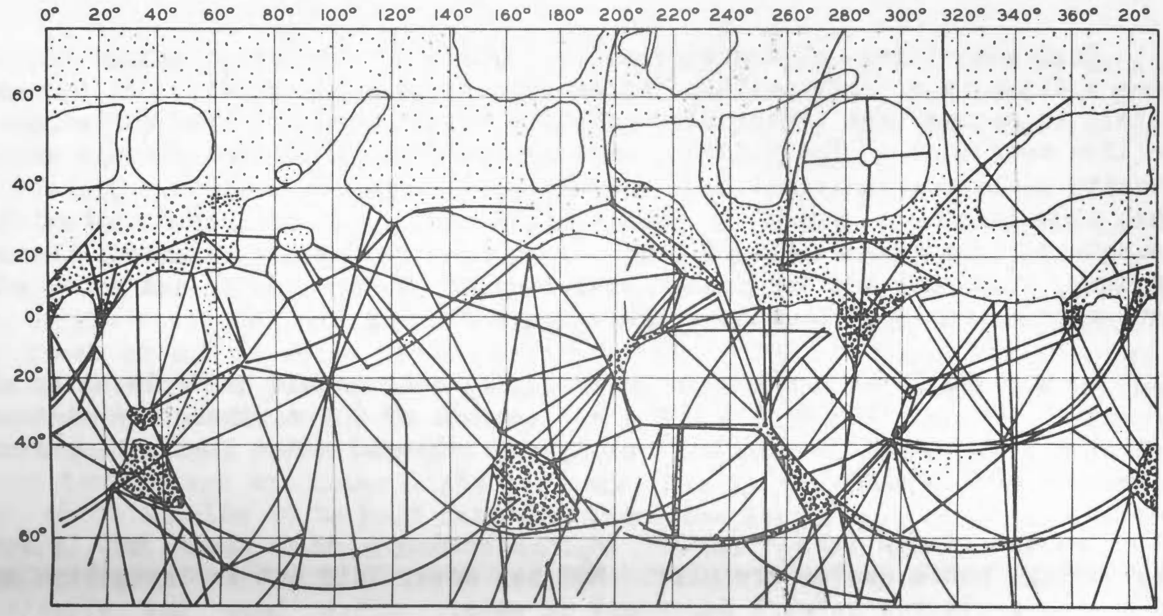


Fig. 1. Map of Mars on Mercator's projection, showing how the distribution of the "canals" resembles that of roads or railroads in a flat country.

Fig. 2. Imaginary view of a Martian desert "canal" from an altitude of 100 miles, showing how a concentration of homesteads within shopping distance of a railroad can explain its visibility from the earth.

That such lines of transportation, whatever they are, should be visible from a distance of forty million miles is also easy to explain. It is necessary merely to assume that the people who built those lines of transportation prefer to live near them. The planet is mostly desert so that the average population density would certainly be low, and the basic industry would be grazing rather than plow farming. Hence the people might easily be conceived as having their homesteads in a narrow belt of land along the highway or railroad, having their gardens, orchards, and fattening pastures near their homes, and using more remote regions for open grazing range (Figure 2 on pg. 5).

In the <u>maria</u>, or blue-green regions, grazing could be replaced by a form of agriculture similar to the big wheat ranches of the northwestern states, with a similar concentration of homes along the railroad and a similar appearance of a network of "canals".

The use of the term "canals" is in accordance with custom but is actually misleading; hence quotes are used. Man has never laid out an irrigation system, or a transportation network dependent on water, which bore the slightest resemblance to a map of the "canals" of Mars.

Against this obviously artificial appearance the argument is raised that intelligent life could not exist on Mars-that only "low forms of life" are possible in its climate. Let us examine this argument. First, as to the climate of Mars: It is possible to compute rather easily the temperatures Mars would have if it behaved as a black body in receiving and emitting radiation. Because of its greater distance from the sun its maximum surface temperature would be 113° F., as compared with 247° for the earth. Its mean equatorial temperature would be -30° F., as against a theoretical +70° F. for the earth's equator; and its polar regions in midsummer would be about -7° F. Temperatures measured with radiometers by Coblentz and Lampland were considerably higher than these. Temperatures as high as 80° F. were observed in the blue-green areas. Temperatures up to 50° F. were observed in the deserts. But temperatures at sunset were close to freezing, and temperatures at sunrise were in the neighborhood of zero.

The fact that actual temperatures are higher than black body temperatures (but well below the maximum of 113°) is due to the behavior of atmospheric moisture in producing clouds by night and clear skies by day. The absolute humidity of the atmosphere has a tendency to get stuck at that corresponding to 32° F. Moisture that condenses above this temperature comes down as rain and runs off or soaks into the ground. Moisture condensing at a lower temperature forms snow. It comes down much more slowly because its area is so much larger in proportion to its weight, and it stays on the ground until it melts or evaporates. It is thus available for remoistening the local air.

There are parts of the earth and times of the year in which theory gives black body temperatures as low as the daily averages on Mars, but the actual temperatures are well above freezing. This rise in the temperature is caused by nearby snowfields, evaporating in the sun; and the same increases over theortical temperatures appear to take place on Mars. When a Martian polar cap begins to melt in the spring it is surrounded by a temporary marsh which contains liquid water. Its mean daily temperature is above freezing. As the moisture from the polar cap spreads through the air toward the equator it raises local temperature averages above the freezing point and unlocks reserves of moistures, which can then be used by plant life. Some of the moisture also condenses at night, adding to the local supplies. Daily average temperatures below freezing are probably common all over the planet, except where they are raised by this heat-trapping effect of atmospheric moisture. Permafrost like that in northern Alaska and Siberia is universal. The "seas" really are seas but are solidly frozen clear to the bottom and are drifted over with soil.

If Mars had as much air per square miles of surface as the earth has, its pressure at the surface would be equal to the pressure found on earth at an altitude of 23,000 feet. This is due to the smaller size of the planet and its lesser gravitational pull. That Mars probably has this much air is suggested by the great height at which clouds are observed. That it could have more is suggested by the fact that Saturn's largest satellite, Titan, has a very noticeable atmosphere, whereas Jupiter's largest satellite, Ganymede, has not, although it is about thirteen percent larger than Titan. There is something about Titan's lower temperature and lower light pressure, due to its greater distance from the sun, which enables it to hold onto air where the larger and less remote Ganymede cannot. Now Mars has this same advantage over the earth, which could offset its smaller size.

Climatic conditions approaching those of Mars are found only in a few isolated parts of earth, such as the Himalayas and the Andes; and the argument that "only low forms of life can exist on Mars" derives from the character of life which is found in these Mars-like parts of earth. But a biologist notes that wherever he goes it is the smallest and simplest (in other words, the "lowest") forms of life that adapt themselves first to changed conditions. In terms of geologic time high mountains do not stay high very long. The Himalayas and Andes of today will be the Appalachians of a million years from now, and new Andes will have arisen in some remote part of the world. Hence if only "low" forms of life are found in these high mountains, it is because "higher" forms have not had time to develop.

However, Mars is a world without mountains. Its climate is the result of its distance from the sun and has existed as is at least as long as the earth has had its present climate. Hence, we could well expect to find on Mars a collection of living creatures as well developed and varied as those of earth but adapted to the climate of Mars instead of to the climate of earth. In the highest mountains and the coldest climates of earth we find both mammals and reptiles very much at home. The reptiles of those lands can stand freezing, but they have to be small enough to crawl into holes where the smallest mammals cannot follow. The smallness of mammals is limited by the fact that heat loss is proportional to the square of the dimensions, whereas heat production is proportional to the cube. Thus the colder the climate, the larger is the smallest mammal. Large mammals in these cold climates include the muskox, the caribou, the reindeer, many varieties of mountain sheep, the bactrian camel, and the three varieties of South American camels, besides bears and wolves. The grazing animals are quite well satisfied with the "low" forms of plant life available in their homeland. They could probably adapt themselves rather easily to the "low" forms of plant life available on Mars. What is more, in all these Mars-like localities we find Man. He has not developed a high civilization there; but when we examine the reasons, we find them similar to those which produce a low standard of living among the Indians on the reservations or the French in Canada - it's too easy for ambitious youth to "go white". Indians go to the white man's college and into his business world, where they soon cease to be classed as Indians. Canadian French learn English. Andeans and Tibetans leave their stony highlands for the richer lands and cities of the lowlands, and thus the highland population declines and may ultimately die out.

But where could a Martian go from Mars?

Ambitious and energetic men have always sought the most productive lands and have developed crop plants such as wheat from plants adapted to those lands. However, modern man is learning that he can do wonders with desert plants as well and even with such lowly plants as algae and lichens. He would have developed these into commercially valuable crop plants long ago if there had been nothing better in sight. Why could not Martians have done as well with such material?

When we examine the reasons why some races develop civilizations and others do not, we find that religion has more to do with it than any material factor. Always in the beginning of any civilization we find a few men who are not self-centered but are willing to sacrifice themselves for their God or their fellow men. Our modern Christian civilization differs from all others in that its unselfish men do not die out. In all civilizations there comes times when selfishness and greed appear to be all powerful. In all pre-Christian civilizations, and in such post-Christian civilizations as those of Islam and Communism, the unselfish men have stepped aside at these times, allowing greed to have undisputed sway. Then the civilization has ceased to progress and has ultimately died. Christian civilization has had these periods too, but the unselfish Christians have not gone off into seclusion. They have backed off, hand on weapon, eyes alert for a chance to strike back; and sooner or later that chance has come. Other civilizations, when they became static, have needed outside conquerors to make them become progressive again. Christian civilization has again and again broken through a shell of greed and started a new and vigorous growth, using the best of the old. There is no racial superiority in this, for Christian civilization is open to all races. It is simply that the Christian, because of his religious beliefs, cannot be scared into quitting. When we go back over the history of the way this winning principle came upon the earth, there seems no reason to believe that it could not have come upon Mars.

JUPITER 1950 REPORT No. 4

by Edwin E. Hare

Ganymede: Jupiter's largest satellite has an area approximately six hundred times less than that of Jupiter, as a telescopic image; and that is about the ratio of observability unless the small body has a different type of surface with markings of better or poorer contrast. There are scattered references (Sky and Telescope, Jan., 1950) of detail having been seen on J. III, but it seems doubtful that a complete chart has ever been obtained. Is, then, the visible surface not solid but cloudy and changing? Or is it merely too small? Referring to a drawing of Mars when its diameter was 4".0, Haas wrote (Strolling Astronomer, Vol. 3, No. 12) "The poor agreement with maps leads the editor to think that on such small discs features are badly misplaced and are drawn with grossly distorted shapes, even under very favorable conditions". Since the disc of Mars was then four or five times greater in area than Ganymede usually is, it would seem that large telescopes will be needed to do the charting. Nevertheless, it may be just within the range of amateur equipment to obtain some indication as to whether markings on the satellite are permanent or not.

Only a few drawings of Ganymede were submitted during the 1950 apparition. By chance, however, two different regions were observed by more than one observer. On Aug. 30 (U.T.) T. R. Cave, Jr. with 660X on his 8-inch refl. and, almost simultaneously, T. A. Cragg with a 12-in refr. and 833X were drawing the same surface. Both agree on a white south cap, which in Cave's sketch is surrounded by a dark shading extending almost to the middle where its edge is darker and equivalent to an SEB. In the same location Cragg also drew a dark north edge to a narrower shading. The confirmation on the two largest features drawn by either is excellent. As to lesser detail they drift apart. To Cave the north limb was shaded which, together with the dark limb next to the south cap, produced what he thought to be an illusion of ellipticity. Cragg saw a thin slice of a white north cap and in the same hemisphere two more white limb spots; all three are drawn many times smaller than the most minute detail detected on Jupiter by our band of observers.

Since it is generally believed that Ganymede keeps one face turned toward Jupiter it is useful to set up a provisional system of longitude geared to its orbital period of roughly 172 hours, beginning with 0° at superior geocentric conjunction. By this means a longitude of 301° is given for the C.M. of the Cragg and Cave observations.

Tsuneo Saheki, using his 8-in refl. at 500X on Aug. 22, when the C.M. was 269°, saw a whitish south cap, as in the other observations above. The dark mark he saw most clearly was an almost exact copy of Syrtis Major, and fainter detail increased a resemblance to Mars as seen at C.M. 250°. His fainter band, the proto-Cimmerium, is in the position of an SEB and is therefore like Cragg's belt but without the darker edge. Saheki's principal marking apparently ought to be central at about 300° but is absent from the two other drawings.

In an earlier report we described much difficult Jovian detail drawn by L. T. Johnson on Aug. 26. The good seeing was further used for a look at satellite III. The C.M. was 100°. A vague south cap (or south-preceding limb) was drawn, and there was shown a faint belt equivalent to an NEB, with a large hump on the north edge in the following quarter. His instrument is a 10-in. Johnsonian reflector (<u>Scientific American</u>, Sept.,1949), used at 526X. On July 14 E. E. Hare observed longitude 98° with a 12-in refl. at 525X and saw a belt in the location drawn by Johnson. Instead of one large hump he drew two minor ones staking off the same area. Hare was unable to see either polar cap. This observation was the only one when he felt confident of the objectivity of the belt-like feature. On several other inspections still fainter markings at the limit of detection usually assumed a more vertical pattern,along with a suspected whitened north limb. But he noticed that <u>by turning his head at the eye-piece there was an unmistakable tendency for these ghostlier features to take up the new position angle</u>!

In spite of the above limitation Hare noted,in June and July, that the preceding limb was dusky and gave a flattened, or elliptical, aspect to the disc. In August the effect disappeared, only to reappear on the following limb in October. If these results are verified, then it becomes evident that the true roundness or ellipticity of satellites can only be gauged near opposition, when the phase effect is negligible.

Donald O'Toole made a drawing of Jupiter III on Sept. 4 with 300X and only 6 inches of aperture. He wasn't too sure of the reality of the markings and admits that a larger scope is needed, but he depicted a whitish band from north to south with a gray band on each side. Longitude of the white band would be 210°.

Here we end the short 1950 Ganymede Report with a few examples of possible detail but with little progress toward an acceptable charting of surface markings or toward deciding the permanency of those markings.

Postscript by Editor. Near $5^h 50^m$, U.T., on Aug. 13, 1950, T. R. Cave, Jr., and W. H. Haas observed Ganymede with the former's 8-inch reflector at 650X in fair seeing. They independently recorded a white south cap and a dark "equatorial" band, the former feature being the more distinct. The diameter of the south cap was estimated at 25°-30° by Cave and at 39° by Haas. The C.M. in the system used by Mr. Hare was 162°.

Near 7^h, U.T., on Aug. 17 nine members of the A.L.P.O. carried our a program of independent, near-simultaneous observations of Ganymede at the Lick Observatory. Dr. C. D. Shane, the Director, kindly gave them the use of the second largest refractor in the world for this project. Perhaps never before was so comprehensive a program carried out on this satellite, at least with such a large telescope. It is planned to compose a paper upon the results obtained and to publish it either in this periodical or elsewhere. Figure 6 on pg. 1 is one of the drawings made at Lick. The C.M. on this occasion was 7°.

OBSERVATIONS AND COMMENTS

We would like to remind our readers of the numerous phenomena of the satellites of Saturn now occurring. These are eclipses of satellites in the shadow of their primary, occultations of satellites by Saturn itself, and transits of satellites and their shadows across the face of Saturn. Detailed predictions appear on pp.31-35 of the 1951 Handbook of the British Astronomical Association. The phenomena involving Titan should be observable with ordinary-sized telescopes; those for the other satellites will probably be difficult with less than 12 inches of aperture.

Only a small number of observations of the planet Saturn during its present 1950-51 apparition are yet on hand. Figures 1 and 2 on pg. 1 indicate the recent appearance of the planet. We hope that A.L.P.O. members will give the planet more attention during March. Saturn will be at opposition on March 20 and will thus be above the horizon most of the night all month. We especially recommend that our readers watch closely the shadow of the ball on the rings and the shadow of the rings on the ball during the coming weeks. The shadow of the rings on the ball will theoretically disappear near the middle of March, and the shadow of the ball on the rings will theoretically disappear at opposition on March 20. Careful observations of the visibility and appearance of each shadow during March and early April can hence supply valuable information about the size of the smallest spots and streaks on a planetary disc that can be revealed by our telescopes.

Mr. T. A. Cragg has submitted drawings of the very remote Mars on January 24 and 25. He employed a 6-inch reflector at 208X in poor seeing. The angular diameter of the planet was only 4"3. Quantity $\odot$ was close to 262° so that the season on Mars was about two weeks before the summer solstice of the southern hemisphere. The south pole was tipped toward the earth by about 23 degrees. The south cap was apparently smaller to Cragg than to D.O'Toole on November 5, 1950, at $\odot$ 212°, as we would expect from the normal spring melting. On January 24 and 25 Cragg saw the north cap only as a small, indefinite white patch on the north limb; probably its visibility suffered from the large southern tilt of the axis mentioned above. It is difficult to identify the dark markings shown from comparisons to maps of Mars; but Sinus Sabaeus is apparently present, and perhaps

Syrtis Major is shown badly misplaced on the disc. An accurate depiction of the markings on such a small disc would appear to demand much more than six inches of aperture. Cragg drew a bright cloud on the sunrise terminator on January 24 and a smaller one on the sunset limb on January 25.

Mr. H. G. Allen observed the lunar crater Guericke on December 18, 1950, at colongitude 15°.0, using a 3.5-inch reflector at 200X in good seeing. His carefully executed drawing is reproduced as Figure 3 on pg. 1 Except for the brilliance of the east rim and a mountain near the open north end of the crater, the whole formation was dull in appearance. A diffuse dark spot in the southern part of the floor appeared to grow darker and larger during the 30 minutes required to make a drawing. Mr. Allen suggests that the dark area was showing more contrast with the lightening floor. When viewed two hours later on December 18, the diffuse dark area showed no further change.

Figure 5 on pg. 1 is a drawing of the famous lunar walled plain Plato with a large telescope, obtained in fairly good seeing near full moon. The numbers beside the craterlets indicate their relative conspicuousnesses, with 1 being the most easily visible; the other numbers are intensity numbers on the Standard Lunar Scale of zero (shadows) to ten (most brilliant marks). It was the editor's experience while using the Flower Observatory 18-inch refractor that the floor of Plato under high lighting presents a complex pattern of bright spots and streaks and darker shadings and exhibits little contrast.

Mr. A. Hestin at Acy-en-Multien (Oise), France, has reported making a number of drawings of Plato and has contributed one of them. He advocates that Plato be studied with a rather powerful instrument and a low magnification because the faint half-tones on the floor disappear when more magnification is used. His drawing just mentioned was secured with a 12-inch reflector at 100X and 75X. As of December 15, 1950, Mr. Hestin had not been able to divide sharply the twin craterlets in the north central part of the floor; these are numbered 3 and 4 on Figure 5. He points out, however, that this pair is very clearly separated on an enlargement of a contact print which he made from a 1919 Mount Wilson photograph at sunset illumination. On this print the "cavities" of the two craterlets are comparable in size, but the eastern one is surrounded by a bright ring that increases its <u>apparent</u> size. Considering that we here have a fruitful source of erroneous impressions of relative size, our French colleague concludes that the craterlets should be compared only when their rims are clearly visible in order that the diameters of the craterlets themselves may be obtained, hence only under low illumination. E. E. Hare has advanced the same argument in correspondence. Gladly granting this point as regards the true sizes of the craterlets themselves, the editor still thinks that seeming differences in the relative sizes of the two high-sun bright spots, which then mark the position of the twin craterlets, under near-identical solar lighting from one lunation to another require an explanation. Both high-sun and low-sun comparisons should be a worthwhile study for those A.L.P.O. members having optics good enough to divide clearly these twin craterlets.

We have received five drawings of the lunar crater Aristarchus in recent weeks. Two by E. J. Reese with a 6-inch reflector are on March 31, 1950, at colongitude 60°.2 (Figure 4 on pg. 1) and on April 10, 1949, at 51°.5; two by E.E. Hare with a 12-inch reflector are on September 24, 1950, at 61°.4 and on April 29, 1950, at 52°; and one by F. E. Brinckman, Jr., with a 6-inch reflector is on January 24, 1951, at colongitude 106°.0. (Colongitude is the lunar eastern longitude of the sunrise terminator, measured all the way around up to 360°.) The views by Reese and Hare under low morning lighting show two rather inconspicuous dark bands on the east inner wall of Aristarchus. Both observers noted V-shaped projections on the morning shadow where it crossed these two bands, and Reese proposed some months ago that this appearance indicates that the dark bands lie at a lower elevation than the rest of the wall. In his September 24 view with fairly good seeing Hare found the northern of the two bands to be resolved occasionally into a few terraces and ridges with shaded and sunlit slopes (but not black shadows). Perhaps we here have an important hint about the topographical nature of dark wall bands not only in Aristarchus but in a number of other lunar craters. Hare's September 24 drawing shows <u>much fine detail</u> and leaves no doubt of the superior resolving power of a 12-inch aperture as compared to smaller instruments. Reese has recorded two shallow craterlets on the southeast rim of Aristarchus, the northern one being an easy object to him (Figure 4); and both observers have indicated a mound or hill near the foot of the east inner wall between the two principal dark bands. Both have noticed a hill in the northern part of the floor (Figure 4). The two craterlets mentioned do not appear to be present on H. P. Wilkins' map of the moon.

In his <u>splendid</u> view on September 24, 1950, Hare noted that there are five sharp bends in the northern loop of Schroeter's Valley, as has already been reported in B.A.A. publications by the British lunar observers Burrell and Wilkins. Hare further noted that the "Cobra's Head" near the south end of Schroeter's Valley appeared to be a greatly widened portion of the Valley, containing what looked like a large landslip broken loose from the east wall.

On November 6, 1950, E. J. Reese spent 39 minutes in searching for possible lunar meteors but saw none. He watched most of the earthlit hemisphere, the moon being about 3.5 days before new. F. A. Keysor, 415 No. Ashland Ave., La Grange Park, Illinois, has expressed his keen interest in cooperating with other A.L.P.O. members in planning simultaneous searches for possible lunar meteors. (Refer to pp. 12-13 of the January <u>Strolling Astronomer</u>.) We urge our readers interested in such cooperative observing and living within a few hundred miles of Chicago to correspond with Mr. Keysor on this subject.

On November 6 Reese found the earthshine, as viewed in a 6-inch reflector at 60X, to be a cool bluish-gray color with a plate yellowish tinge in the brighter regions. Manilius and Menelaus were the most conspicuous of the bright spots visible. Out-of-focus images showed the total light of Menelaus, which was slightly the brighter, to be perhaps one magnitude greater than that of a star of stellar magnitude 7.8 (C. B. Stephenson kindly identified this star and furnished its magnitude.) Proclus and vicinity was scarcely as bright as Censorinus and vicinity - a surprising difference from the full-moon aspect. Although Proclus was barely visible, Censorinus was very bright and stellar in appearance. An in-focus estimate by Reese would give Censorinus a stellar magnitude of about 8.8.

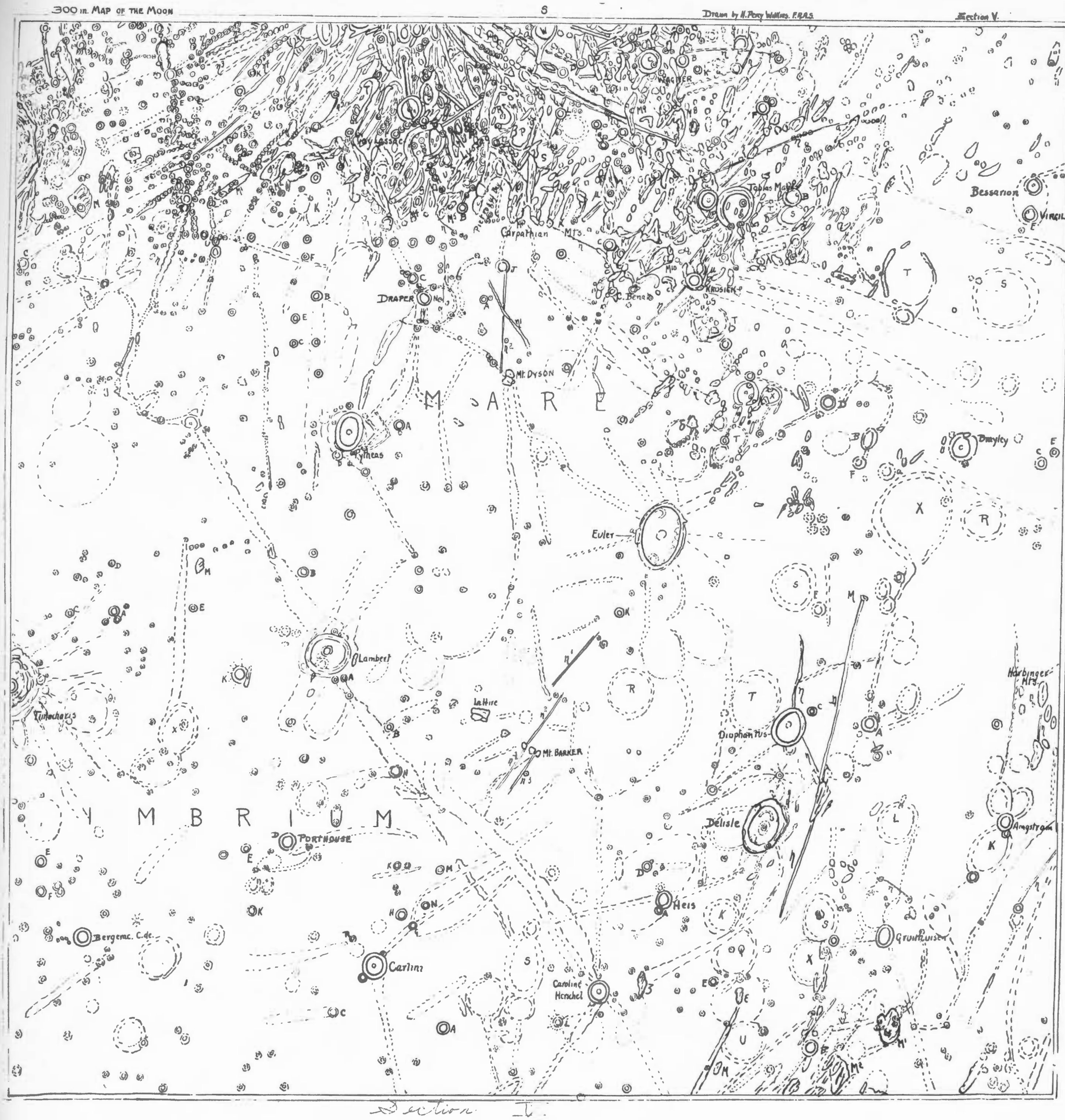
F. E. Brinckman, Jr., made a drawing of the walled plain Grimaldi with his 6-inch reflector on January 24, 1951, at colongitude 106°.2. Although the illumination is thus similar to that for J. C. Bartlett's two drawings reproduced as Figures 2 and 3 in our January issue, it is hard to find much resemblance in the drawings. Brinckman quite fails to show the very dark edges depicted by Bartlett.

On Brinckman's drawing the north-south Central Bright Streak does not extend farther south than perhaps two-thirds of the way from the north end of Grimaldi to the south end. Some dark streaks and spots in the northern third of the plain that were conspicuous to Brinckman are apparently althogether absent on Bartlett's drawings. Brinckman found the southern part of Grimaldi to be quite devoid of any pattern of detail and to be neutral gray-brown in color.

From time to time in Volume 4 of The Strolling Astronomer we reported moving dark objects seen against the sun or the moon by several of our members. L. T. Johnson of La Plata, Maryland has communicated his record of a moving dark speck which he saw against Jupiter on July 29, 1950, at 5^h 26^m, U.T., using his 10-inch reflector at 300X in poor seeing and a hazy sky. The object moved across the disc of Jupiter somewhat south of the equator and toward a direction of about 10 degrees south of "west", where "east-west" is taken as the direction of the belts on the planet. The black speck had an angular diameter of about 0".5. It was seen for only 0.5 to 1.0 seconds and disappeared as soon as it passed off the disc of Jupiter. The object was approximately round and was in sharp focus. Johnson is positive that what he saw was not a bird. He doubts that it could have been a grain of dust in the telescope because of the extreme sensitivity of the ellipsoidal secondary of his Modified Gregorian Telescope to focus. If it were in space between the earth and Jupiter, he points out that it must have been at least two or three miles away to be in sharp focus. He further points out that its failure to shine by reflected light against the sky (unless merely too weakly to be seen) would mean that it was within the earth's shadow and hence not more than a few thousand miles away, for Jupiter on July 29 was 31^o away from the anti-sun point in the sky. Johnson gave a table of corresponding values of distance, diameter, and velocity of the object. "Velocity" must here mean geocentric velocity and can only be the component perpendicular to the line of sight.

Distance	Diameter	Velocity
2,500 miles	30 ft.	0.4-0.8 m.p.s.
1,000 miles	13 ft.	0.13-0.30 m.p.s.
100 miles	16 ins.	55-110 m.p.h.
10 miles	1.6 ins.	5.5-11 m.p.h.
5 miles	0.8 ins.	2.8-5.5 m.p.h.

In a later letter on September 6, 1950, however, Johnson wondered whether the whole phenomenon was actually in his eye. Tiny objects are known to float around in the liquid of the eye and to throw their shadows upon the retina. Although these are usually out of focus, Johnson remarks that one of them might come close enough to the retina so as to be in sharp focus; and he thinks it unlikely that what he saw was actually an object in space between himself and Jupiter.



SECTION V

OF

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

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