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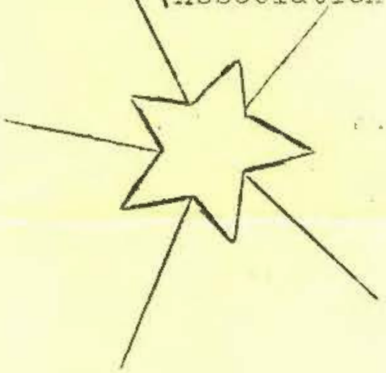
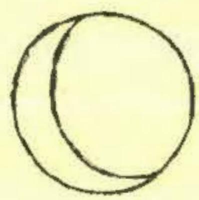
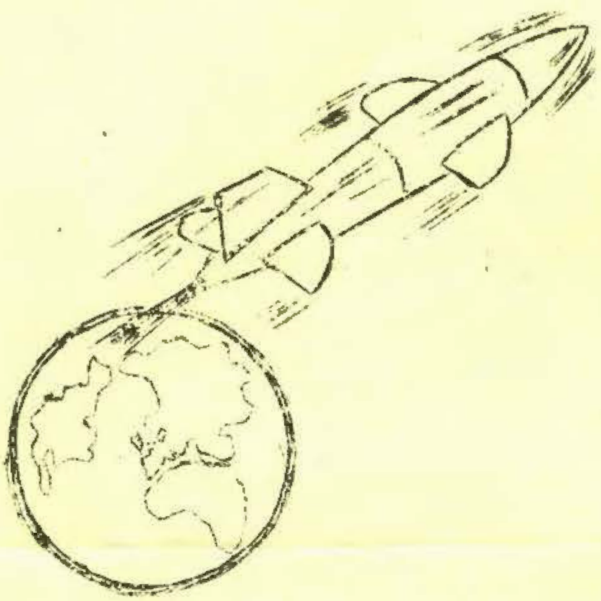
THE STROLLING ASTRONOMER

(Association of Lunar and Planetary Observers)







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THE STROLLING ASTRONOMER
Institute of Meteoritics
University of New Mexico
Albuquerque, N. M.

CANOPUS

By - BERT LESTON TAYLOR

(Published in Amateur Astronomy, Vol. 2, Page 85, 1936)

When quacks with pills political would dope us,
When politics absorbs the livelong day,
I like to think about the star Canopus
So far, so far away.

Greatest of visioned suns, they say who list 'em,
To weigh it science always must despair,
Its shell would hold our whole dinged solar system,
Nor know 'twas there.

When temporary chairmen utter speeches,
And frenzied henchmen howl their battle hymns,
My thoughts float out across the cosmic reaches
To where Canopus swims.

When men are calling names and making faces,
And all the world's ajangle and ajar,
I meditate on interstellar spaces
And smoke a mild seegar.

For after one has had about a week of
The arguments of friends as well as foes,
A star that has no parallax to speak of
Conduces to repose.

Reading of Interest to Planetary Observers

There are several interesting articles regarding the conquest of space appearing in the July issue of Mechanix Illustrated, but there appears one on page 107 of particular interest which contains a definite challenge to America; in fact, it is entitled "Britain's Challenge" by Alfred Eris.

This article, based upon an exclusive interview between Mr. Eris and officials of the British Interplanetary Society, states that British scientists have set up a five-stage program which will end in the voyage of a "Made-in-Britain" space ship to the moon. According to Mr. Eris, the British are setting about this seemingly impossible task, enlisting the support of all available scientific brains, in a systematic manner with only one thought in mind; namely, success - to be the first to conquer space and travel to the moon. The moon, of course, will be the first step toward conquering space to Mars and other planets.

The Strolling Astronomer highly recommends this article. It will spur the imagination and give zest to planetary observation.

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INTRODUCTION

Dr. A.F.O'D.Alexander is the Saturn Director of the British Astronomical Association. His work on Mars and the sun is well known there. Since he assumed leadership of the Saturn Section in the autumn of 1946, Dr. Alexander, with laudable energy, has enrolled more than 35 members in it, including several outside the British Isles. He has planned an excellent and comprehensive program of observations on this planet; regular work for the users of small telescopes includes estimates of the color and intensity of different parts of the ball and the rings, drawings of the planet (especially in good seeing), and timing central meridian transits of any bright or dark spots visible on the ball. Dr. Alexander expresses his wish to cooperate in Saturn studies with The Association of Lunar and Planetary Observers, and we urge all interested members to correspond with him. His address is: 1 Athelstan Road, Dorchester, Dorset, England.

We heartily commend the translation of Monsieur de Vaucouleurs' paper on Mars to the serious attention of our readers. Much first-class lunar and planetary research was carried on in France throughout the war years. The ruddy planet is still too remote from the earth and too close to the sun in the sky to show any but the coarsest features. As it approaches its February, 1948, opposition, we shall give it more space in The Strolling Astronomer and shall gladly report herein what our members see.

(Turn to Page 2 for Dr. Alexander's article.)

Physical Conditions on Mars

BY

A.F.O'D. ALEXANDER

An important statement of the results of recent observations and of research into the conditions on Mars is contained in a paper entitled "L'état actuel de nos connaissances sur la planète Mars" by Monsieur G. de Vaucouleurs (Secretary of the Commission de la planète Mars, Societe Astronomique de France), published in Ciel et Terre in 1944. The following is a summary of the main conclusions:

At the end of winter in each hemisphere the Polar Cap is very large (50° or 60°). It shrinks slowly at first, then more rapidly. By mid-spring, cracks appear; and fragments break off. The familiar dark fringe is a real phenomenon, though often exaggerated by contrast; it is best seen in late spring when the melting of the Cap is most rapid. In summer the Cap becomes very small, a few degrees only in diameter, and sometimes even disappears. During late summer, autumn, and most of the winter the Cap is covered by a whitish veil. Towards the end of winter it reappears, very large, and soon becomes white and brilliant. Then the cycle is repeated.

The Caps probably consist of thin ice, snow, or frost; and though there is probably melting into water around the edge, most of the shrinkage seems to be by evaporation, owing to the low atmospheric pressure. The fissures, detached parts, and brightest areas appear always at the same places. The final residue of the Southern Cap is always centered 7° from the true Pole.

While Mars certainly has an atmosphere, the evidence is against the presence of hydrogen, helium, ozone, ammonia and methane, and is doubtful as to carbon dioxide. The most searching spectroscopic tests at the Mt. Wilson Observatory have failed to show any trace of oxygen or of water vapour on Mars. It has been concluded that the atmosphere of Mars contains less than 5% of the water vapour in ours, and that, as the test for oxygen is more sensitive, the quantity of oxygen in the atmosphere must be less than one-thousandth of the Earth's. So the Martian atmosphere must be made up of inert gases, undetectable spectroscopically, such as nitrogen and argon. There are two types of clouds: blue (probably fog or high icy cirrus, mainly found beside the dark regions and over the Polar Caps) and yellow (probably dust or sand, but very widespread and persistent, owing to the feebleness of the winds, and situated nearer to the ground). The atmospheric pressure appears to be only about one-twentieth of the terrestrial but is still sufficient for water to exist as a liquid on the surface.

The soil temperature is fairly high in the dark regions at noon in summer (up to 86°), but even on the equator the nights must be very cold. Climatic conditions are (astronomically speaking) only a little more rigorous than on the Earth, but with more pronounced daily and seasonal variations of temperature.

The light-colored regions are probably deserts of sand or dust. The surface of Mars shows little relief with no mountains higher than 6,000 to 9,000 feet, but bright spots at certain points (Nix Atlantica, Nix Olympica) suggest isolated peaks capped by ice or cloud.

The dark regions have characteristic permanent shapes, but show variations in detail. Sometimes a light area adjoining a dark one will darken temporarily, perhaps for some years. There are regular seasonal extensions of certain dark markings (Syrtis Major, Pandorae Fretum) on to light neighbouring regions, followed some months later by retreat. The chief seasonal changes seem to be strictly connected with the shrinkage of the Polar Caps. In spring, starting from the Cap, a brown band extends rapidly towards the equator, changing the color of the dark areas from grey, bluish, or greenish to brown or tints of maroon, violet, or carmine. By summer most dark regions have undergone this change of tint.

The darkening spreads from the melting Cap in the following manner: In winter the dark regions look pale and vague in outline. In early spring the circumpolar area becomes very dark. During spring the darkening extends rapidly over the temperate regions, reaching the equatorial zone, and even crossing into the other hemisphere. During summer the polar region becomes pale again. The darkening is inclined to follow great arteries (e.g., Hellespontus) in line with fissures in the Cap, at a rate of 11 miles per day. This darkening may perhaps be due to a flow of surface water. The wave of general darkening, probably due to moisture transferred as invisible vapour through the atmosphere, advances on a broad front at 28 miles per day.

The vegetation theory is not necessarily the only possible explanation of the dark regions, and cannot be regarded as firmly established, because vegetation would have to be uncommonly hardy and adaptable to withstand the great variations of temperature, the general rigor of the climate, and the very low pressure and usual dryness of the atmosphere. Moreover, on the arrival of what is assumed to be moisture, the tint changes from green to brown; and the absence of oxygen in the Martian atmosphere is against the likelihood of green plants, which would supply it. Also the greenish areas become darker in infrared light and not lighter as on Earth.

The streaks or "canals" found by Schiaparelli 70 years ago, whether they be unbroken formations or not, are still observed in the same places, share in the seasonal cycle of the dark areas, and can develop into very prominent dark bands (Cerberus, Nepenthes-Thoth, etc.) capable of lasting several years or even decades, but also of becoming faint and insignificant again.

With regard to the possibility of life on Mars, M. de Vaucouleurs suggests that few, if any, terrestrial living beings could adapt themselves to Martian conditions.

(NOTE: The above resume in English of his paper has been approved as correct by the author.)

(Signed) DR. A.F.O'D.ALEXANDER

Is The Moon Changeless?

BY

WALTER H. HAAS

Simon Newcomb once described the moon as: "A world which has no weather, and on which nothing ever happens". This statement summarizes well the opinion of most professional astronomers about our satellite. There can surely be no doubt that the surface density of any lunar atmosphere is less than 1/5,000 the surface density of the earth's atmosphere and that, as a consequence, physical conditions on the moon are very unlike those on our globe. Yet, as far as empirical evidence goes, such statements as Newcomb's are quite unjustified. The great majority of those astronomers who have made special observational studies of the moon, so-called selenologists, have been of the opinion that changes do occur on the moon or at least that there exist lunar phenomena not explicable by known physical laws.

Many changes in the appearance of certain lunar objects have been reported. Unfortunately, the objects in question have usually been all too cursorily examined (visually) before the time of the suspected change; and the evidence is hence inconclusive. Systematic and prolonged photographic programs at large observatories might well settle the question of whether such changes do occur, but such programs have not yet been attempted. Of the existing possible lunar changes, the best-evidenced is a disappearance of a crater called Linné sometime before 1866. Linné is now seen as a white area; there is within it a delicate crater at most three or four miles in diameter. This crater has been observed by F.R. Vaughn, C.M. Cyrus, E.K.White, H.M.Johnson, E.J.Reese, G.Fournier, V.Fournier, and me, probably also by still others. I consider it out of the question that our crater can be the one described before 1866, doubtful enough that it could even have been detected with the crude telescopes of those days. E.Neison's Moon contains a good discussion of the Linné problem.

The late Professor W.H.Pickering initiated the study of periodically varying lunar areas. For example, in the crater Eratosthenes he found dark areas which develop and later fade out each lunar day. These he regarded as some form of lunar vegetation. Near the crater Conon a number of bright areas, which fluctuate in intensity during the course of the lunar day, indicated to him clouds and snowfields. Color-variations on the floor of the walled plain Grimaldi he interpreted as caused by vegetation.

Most astronomers did not accept Pickering's theories about the lunar surface. They instead explained the apparent changes as due only to variations in the angle at which sunlight is incident upon the lunar surface. They thus continued to consider the moon a dead world.

The chief lunar problem to which a number of members of The Association of Lunar and Planetary Observers have given attention in recent years is: Are these periodic lunar changes due only to variations in the solar illumination of the lunar surface, or do they represent real physical changes?

One of the best places to study such changes is the lunar crater Plato. On its floor are white spots (actually craters, at least in part), bright streaks, and darker shadings. These details are delicate. Over a period of 75 years Plato has been studied by such skilled observers as A.S.Williams, P.B.Molesworth, W.H.Pickering, W.Goodacre, G.Fournier, V.Fournier, and H.P.Wilkins. The numerous first-class lunar observers who have examined this formation almost all agree that there occur irregular variations in the visibility of the spots and streaks. In other words, the visibility of the detail fluctuates from month to month and from year to year, in a manner not dependent upon lighting alone. May it be that otherwise unrevealed lunar vapors periodically obscure some of the features?

In the northeastern part of the floor of the crater Conon a triangular white area, with its base on the wall of Conon and its apex near the center of the floor (at maximum extent), develops and then dwindles away each lunation. This "cloud", as it has been called, was studied by W.H.Pickering. In more recent years F.R.Vaughn and I have given much time to it. A casual scrutiny of our records indicates that the aspect of the "cloud" is very probably sometimes different in different lunations when the illumination from the sun is the same.

When the moon is eclipsed in the earth's shadow, very great changes in the temperature of the lunar surface take place. If we are dealing with lunar vegetation, clouds, snow, etc., we might well expect some eclipse-induced effects as the solar heat is withdrawn and then later resupplied. If periodic changes are due to varying lighting only, though, an eclipse can have no effect. A number of lunar eclipses have been observed to determine whether the passage of the shadow does cause abnormal changes in appearance, i.e., departures from the normal cycle of development in ordinary lunations. Most changing lunar areas are unaffected; but some have betrayed eclipse-induced changes, and some objects have been affected differently at different eclipses. It may be worthwhile to give some of the positive results. On October 16, 1902, W.H.Pickering found a very pronounced enlarging of the Linné white area. On May 14, 1938, N.W.McLeod found the south tip of the dark area in Riccioli invisible after reëntering sunlight. On March 2, 1942, H.P. Wilkins found very definite effects on the relative intensities of dark areas in different parts of the floor of Stoefler. At the eclipse of August 26, 1942, aided by very clear skies and good seeing(!), I found an unmistakable lightening of a dark area in Atlas. A progressing return to normal darkness was noted during the four hours after Atlas reëntered sunlight. H.P.Wilkins reports that on December 8, 1946, there was a darkening of the southern part of Grimaldi, a fading to invisibility of the south tip of the Riccioli dark area, and an enlarging of Linné.

An excellent, if rather difficult, observational program that can shed much light on the problem of lunar changes is the taking of photographs of the earthlit hemisphere of the moon. The difficulty here is the lack of light. The question is whether our changing lunar areas look the same when illuminated by the earth as when illuminated from the same direction by the sun. A large telescope would be a great advantage in this investigation.

I commend the study of lunar changes to our readers. He who goes into this subject may decide that the moon is much less dead than he has been told.

Universal Time

In The American Ephemeris and Nautical Almanac, a book that the serious lunar and planetary observer can hardly get along without, and in other similar almanacs the times of astronomical phenomena are given by Universal Time, also called Greenwich Civil Time. This Universal Time is the local mean solar time at longitude 0°. The Universal Day begins at midnight, and its time is reckoned on a 24-hour basis. Universal Time is five hours later than Eastern Standard Time, six hours later than Central Standard Time, seven hours later than Mountain Standard Time, and eight hours later than Pacific Standard Time. For example, 9:13 P.M. on July 12, E.S.T., is 2^h13^m on July 13, U.T. Again, 3:14 A.M. on July 20, M.S.T., is 10^h14^m on July 20, U.T. Further, 5:42 P.M. on July 25, C.S.T., is 23^h42^m on July 25, U.T.

Some of the members of the Association of Lunar and Planetary Observers (e.g., L.J.Wilson and E.J.Reese) use Universal Time directly for recording observations. Some others, like O.E.Monnig and E.K.White prefer to record observations in the local time system and to make later the conversion to U.T. needed to compute such data as Jovian longitudes and Venusian phase-angles.

Seeing and Transparency

BY

WALTER H. HAAS

The distinction between these terms is not clear to many amateur astronomers and is perhaps not even clear to some professionals primarily concerned with theoretical research.

The transparency is simply the degree of clearness of the air. The seeing is the degree of steadiness. Usually incoming light-rays are irregularly refracted as they pass through air-strata of different densities. The results show themselves in the twinkling of the stars (perhaps a delight to poets but not to observing astronomers) and in fuzziness and vibration of a telescopic lunar or planetary image. One gets the very same effect by looking at outside objects through an open window in the winter, with a radiator just below the window.

It is far from true that good transparency always means good observing, and it is equally false that good seeing and good transparency go together. There may well be rather an inverse correlation between seeing and transparency. T.W.Webb in his Celestial Objects for Common Telescopes and W.F.Denning in his Telescopic Work for Starlight Evenings, among others, point out that nights with mist or haze sometimes produce lovely lunar and planetary views. The loss of light due to the mist or haze is itself a drawback, of course, naturally less serious with large apertures than with small ones. Nevertheless, with only a 6-inch telescope I had some of my best views on foggy nights.

Incidentally, good seeing will to some extent produce the same advantages as good transparency for seeing faint objects. The explanation appears evident: with less vibration a faint star has a smaller spurious disc, and with more vibration its light is spread out over a larger area so that the star may become quite invisible. I recall one very clear morning in August, 1944, in Upper Darby, Pennsylvania (very clear as Upper Darby skies go). In the telescope, however, the fainter satellites of Saturn usually visible in the Flower Observatory 18-inch refractor were scarcely to be discerned. The seeing was vile, and the pronounced air-tremors obviously blurred out the satellites.

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