MERRY CHRISTMAS

The W.A.S.

F.M.

REFRACTOUR LENSES

Dec.-Jan. 1971-72

The WASP

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Cover by: Frank McCullough

by

Kenneth Wilson

A. Martian Volcano?

Some of the photographs sent back recently BY Mariner 9 strongly suggest the existence of Martian volcanoes. Four volcanic collapse craters have been detected by their numerous rimless craterlets and many concentric fractures of their rims. According to Harold Masurksy of the U.S. Geological Survey, one of these volcanic craters may still be active.

If active volcanoes do exist on Mars; surface heat, water and other chemicals of necessity to life as we know it may also be present.

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New Data on the Martian Moons

Mariner 9 has also Bent back some remarkable pictures of Mars' two moons; Phobos and Deimos. These moons have an interesting background. They were both predicted by Jonathan Swift in his book Gulliver's Travels long before Asaph Hall discovered them in 1877. Since then there has been much debate as to their origin; one school believing that they were captured by Mars, the other believing they were formed from Mars itself.

Mariner's pictures show two potato-shaped moons with low albedoes of reflectivity. Phobos is the closer of the two satellites to Mars. It is about 16 kilometers pole to pole and 23 kilometers at the equator. It revolves around Mars every 7 hrs, and 39 min. Deimos is approximately 9 kilometers pole to pole and 11 kilometers at its equator. It revolves around Mars every 30 hrs and 18 min.

Their odd shape and low reflectivity may be clues to their origins. Their rigidities are much greater than any of the planets because their potato-like shape have not been squashed into spheriodal shapes by gravitational forces; as the planets have. The low albedoes could mean a surface composed of basalt, which has a dark appearance. If they were composed of basalt, it would infer that the two moons evolved from the same molten state as did Mars. But this surface material could be of the same origin as the carbonaceous chondrite meteorites. This would imply that the moons were captured asteroids.

About the Mariner 9 mission, astronomer Carl Sagan said, "This is a remarkable testimony to mankind-the first time man has seen close up the satellites of another planet ... it's cosmonical!"

Variations in Coronal Temperature

Recent data sent back to the earth from the Orbiting Solar Observatory (OSO)-7 indicates major differences in the temperature of the solar corona, which had previously been thought to be homogeneous in temperature. Calculations place the temperature at the solar poles at about 1.8 million degrees F. The other region of the corona is composed of two belts extending 20° to 30° north and south of the solar equator. This area is about 2.6 million degrees F. Hot spots, active regions and storm centers related to solar flares are 6 to 8 million degrees F. Flares themselves vary from 10 to over 70 million degrees F.

This preliminary data tends to support the theory that there are seasonal variations in the size of the cool polar regions of the corona. According to this theory the cooler areas are largest during periods of minimum solar activity and smallest during the maximum of the 11-year cycle

The following news notes are from Chris Edsall.

A Letter to "Physics Today", December, 1971

The present stagnation in high-energy physics, and perhaps in physics in general, can best be understood by historical analogy. If the present mechanisms for funding research and for publication of scientific information had existed 400 or so years or so ago when the laws of planetary motion were being discovered, The Physical Review would have been full of such papers as "A Ten Epicycle Fit to the Orbit of Mars" and "A Fifteen Epicycle Fit to the Orbit of Jupiter". Copernicus and Kepler may well have had their papers rejected by the referees as being contrary to present Scientific knowledge or as simply too speculative.

The astronomical telescope would not have been invented yet, and it is doubtful that Galileo would have been able to obtain funding for the development of such an unconventional device. However, the Astronomical Exploration Commission (ARC) would be spending 250 million Thalers on the National Astrolabe Laboratory (NAL), which would consist of an astrolabe one mile in diameter and its supporting equipment. While younger astronomers would complain that the expenditure of such an enormous sum on a single piece of equipment was depriving them of support and even employment, the populace would be reassured by the "leading" (that is, well funded) astronomers of the day that such a device was absolutely necessary for the progress of planetary science since it would enable one to determine the position of a planet to a thousandth of a second of arc and hence determine the parameters in the epicycle fits to five more decimal places.

Several years later, Isaac Newton, an undergraduate at Cambridge, having heard that there are no jobs in physics would decide to go to law school.

Is Anybody Out There?

The question of extraterrestrial intelligent life has reached the stage of serious discussion. Russian and American experts met in September to coordinate their efforts, establishing a joint committee to direct future research efforts. The group includes four Russians, a Czech, and four Americans: Frank Drake, Carl Sagan (Cornell Univ.), Philip Morrison (MIT), and Bernard M. Oliver.

Two Soviet searches are continuing. In one, a 50 foot radio telescope is examining 50 nearby stars at what are believed to be logical wavelengths for signals. Twelve have been checked so far. In the other program, short bursts of radio noise are monitored by four observatories at all wavelengths. If receivers separated by a continent pick up simultaneous signals, they can be assumed to be coming from space.

What are the chances of hearing from another civilization? In a study published as "Habitable Planets for Man", 600 million planets capable of supporting life in our galaxy are estimated. Calculations indicate one such planet within 27 light-years of earth, two within 34 light-years, five within 47 light-years, ten within 59 light-years and 50 within 100 light-years.

The Russian astrophysicist, J.S. Shklovskii and the American Carl Sagan, in "Intelligent Life in the Universe" came up with an estimate for the number of civilizations in the galaxy technically superior to our own. They placed this number between fifty thousand and one million, which would put the distance between technical civilizations in the range of a few hundred to a thousand light-years.

The Fallen Star

A STAR is gone! A star is gone!
 There is a blank in heaven;
One of the cherub choir has done
  His airy course this even.

He sat upon the orb of fire
  That hung for ages there,
And lent his music to the choir
  That haunts the nightly air.

But when his thousand years are pass'd
  With cherubic sigh
He vanished with his car at last
  For even cherubs die!

Hear how his angel-brothers mourn-
  The minstrels of the spheres-
Each chiming sadly in his turn
  And dropping splendid tears.

The planetary sisters all
  Join in the fatal song,
And weep this hapless brother's fall,
  Who sang with them so long.

But deepest of the choral band
  The Lunar Spirit sings,
And with a bass-according hand
  Sweeps all her sullen songs

From the deep chambers of the dome
  Where sleepless Uriel lies,
His rude harmonic thunders come
  Mingled with mighty sighs.

The thousand car-borne cherubim,
  The wandering eleven,
All join to chant the dirge of him
  Who fell just now from Heaven.

    -George Darley

THE POET'S CORNER
by Walter Roudebush

The Sun

The Sun, you glorious orb of day,
Ninety-four million miles away,
Will keep revolving in its orbit
Till heat and motion reabsorb it.

    -J. Davis

The Sunbeam

I dined with a friend in the East one day,
Who had no window sashes;
A sunbeam though the window came
And burnt his wife to ashes.

    Anonymous

Some Notes on the Star of Bethlehem

By

Kenneth Wilson

As the days grow shorter, the nights colder, Christmas trees are sold on every corner lot and Santa Clauses appear in every store; we know that Christmas all too quickly approaches. When one thinks about this season, one cannot help but think of the birth of Christ and the story of the Nativity. Basic to this story is the Star of Bethlehem. There have been many attempts to find an astronomical phenomenon accountable for this "star". There are no definite answers, but several interesting theories.

Surprisingly, there are few Biblical clues about the Star of Bethlehem. One of the few mentions of it is in Matthew 2: Herod, after summoning his advisors, then sent the Magi to Bethlehem, a small town four miles away.

> "When they heard the king, they departed; and lo, the star, which they saw in the east, went before them, till it came and stood over where the young child was.
> When they saw the star, they rejoiced with exceeding joy."

There have been many theories about this "star". The appearance of Halley's comet was reported by the Chinese in 12 B.C. They also reported two bright novae in 5 and 4 B.C. These three objects are all possibilities for the star.

The advent of modern high-speed computers has allowed us to easily backtrack on the positions of the planets in the distant past. With these computers, astronomers have calculated possible planetary conjunctions responsible for the Star of Bethlehem. The two most likely conjunctions are between Jupiter and Venus.

The first one occurred on August 12, 3 B.C., in the morning sky between 3:44 and 5:23 local time. The two planets were at a separation of 12' at a western elongation from the sun of 20.7°.

The second occurred on June 17, 2 B.C., in the evening sky from 19:04 to 22:02 local time. Jupiter and Venus were 3' apart and 45.4° away from the sun.

In both of these conjunctions, the planets came close enough to each other that they most probably would have been seen as one object (The double Alcor-Mizar has a separation of about 12').

Further evidence for these conjunctions comes from the Old Testament. In Numbers 24:17, Balaam foretells the future to Jacob.

> "I shall see him, but not now.
>   I shall behold him, but not nigh,
> there shall come a Star out of Jacob,
>   and a Scepter shall rise out of Israel..."

Traditionally the scepter and the lion have been symbols of the Jews. Therefore the star was probably predicted to be in the constellation of Leo. Both the aforementioned conjunctions occurred in the constellation of Leo. Thus, the brightness of brightness of Jupiter and Venus combined into one object, and the conjunction occurring in the predicted constellation, must have been an awe inspiring sight to the king and his advisors.

But, there is a flaw in the conjunction theory. Both conjunctions occurred after the accepted date of Herod's death. Perhaps there is a way out of this dilemma. The date of Herod's death is reckoned by a lunar eclipse, on March 13, 4 B.C. This eclipse covered only about a third of the moon and was probably not predicted. So this may not be the proper eclipse. There was another, quite long, total lunar eclipse on January 9, 1 B.C. This eclipse fits the dates of the two conjunctions mentioned above.

We may never know which theories are correct, but the interest in and significance of this famous "star" will never cease.

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OBSERVATIONAL ASTRONOMY
By Frank McCullough

M34

M-34 is an open cluster in Perseus. I found the object for the first time on February 28th, 1971, at 10:45 p.m. I used a 12½" Cassegrain and a pair of binoculars in my observations. A pair of binoculars does more justice to the object than a Cassegrain at 150x.

It is a very loose open cluster and at 150x the separation of the cluster is unbelievable.

To find M-34 look a third of the way from Beta Persei (Algol) to Gamma Andromedae. Co-ordinates are: R.A.-2^{h}39^{m}; Dec.-+42 34'. The magnitude is 6th.
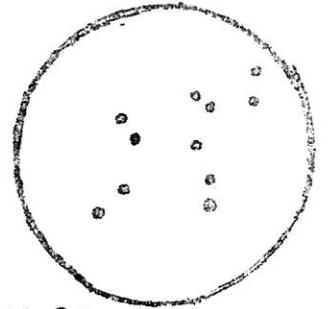
NGC 7009

7009 is a planetary nebula very bright and a very decent size in Aquarius. The color is a very prominent feature. It appears green and oval shaped. This oval shape has given the Saturn Nebula its name. I used a 6" reflector at 70x and 150x.

Look 1° west of Nu Aquarii. Co-ordinates are: R. A. -21^{h}; 01^{m}; Dec.- -11°, 34'. The magnitude is 8th.
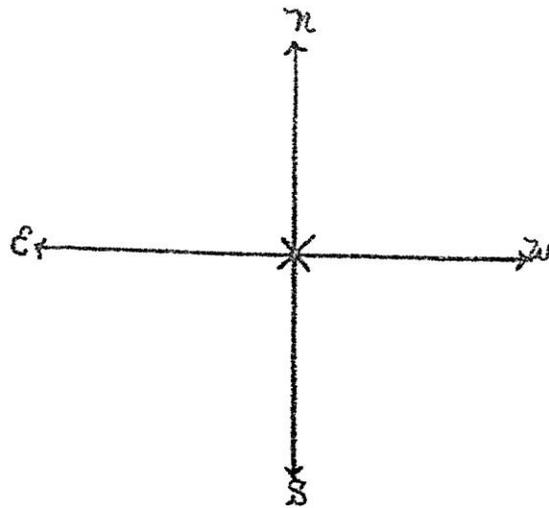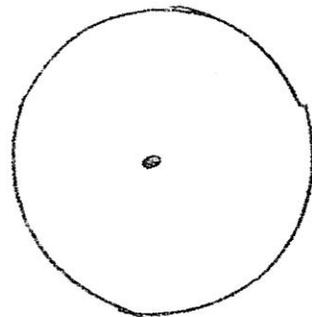
Milky Way

Perseus

M-34

γ₃

M-34   200X
12½" Cassegrain

Aquarius

β

τ₃

ξ

17   14

19

μ

7

ε

NGC
7009

ν

A-23   A-72

18

CAPRICORNUS

δ   γ

N

E   W

S

NGC-7009   6" REFLECTOR
70X

*(Maps taken from Norton's Atlas)

ASTRO-ALMANAC
By
Kenneth Wilson

JAN	EVENT (All times are in Universal Time)

1   Mercury at greatest western elongation (23°) at 14^h. Planetary magnitudes: Mercury- 0.0, Venus- -3.4, Mars- +0.4, Jupiter- -1.3 Saturn- -0.0.

3   Earth at perihelion. Maximum of Quadrantids (Jan. 1-4), coordinates 15^{h}20^m +52°

6   Mercury 8° north of Jupiter at 19^h

8   Mars at ascending node. Last Quarter Moon at 13^{h}31^m, Uranus 6° north of the moon at 20^h.

9   Lunar apogee at 4^h.

11   Pallus stationary at 7^h.

12   Pluto stationary at 5^h. Neptune 6° north of the moon at 14^h. Moon 0.25° north of Antares at 21^h.

14   Jupiter 4° north of the moon at 4^h. Mercury 3° north of the moon at 20^h.
15   Mercury at descending node.

16   New Moon at 10^{h}352^m.

17   χ Cygnids meteor shower, radiant: 19^{h}40^m+53°.

19   Venus 4°south of the moon at 8^h.

22   Lunar perigee at 5^h. Mars 5° south of the moon at 11^h.

23   Uranus stationary at 11^h. First Quarter Moon at 9^{h}29^m.

24   Planetary magnitudes: Mars- +0.9, Jupiter- -1.4, Saturn- +0.2, On the 29th: Mercury- -0.4, Venus- -3.5

25   Mercury at aphelion. Saturn 7° south of the moon at 10^h.

30   Full Moon at 10^{h}58^m, Lunar eclipse, the beginning of which should be visible in Michigan. Check "Sky & Telescope" for complete details. This is the last total lunar eclipse visible from this area until at least 1984.

31   Saturn stationary at 23^h.

The Salute of the Month

I don't think that there will be any disagreement with this month's selection for the Salute of the Month: Frank McCullough. If not for his editorship of "THE WASP", he would have been mentioned long ago. As I (Ken Wilson) am now co-editor with him, he can be justly honored.

His many contributions to the club can not all be mentioned in this short space. Some of the major contributions include being editor (and many times its sole contributor); present president of our club and past vice-president; principle organizer and head of the messier club; organizer of the two past Messier contests and this year's Christmas party; being one of the major workers at and on Stargate Observatory; ad infinitum.

In short, Frank McCullough is one of the foremost reasons why the W.A.S. is one of the most active clubs in Michigan.