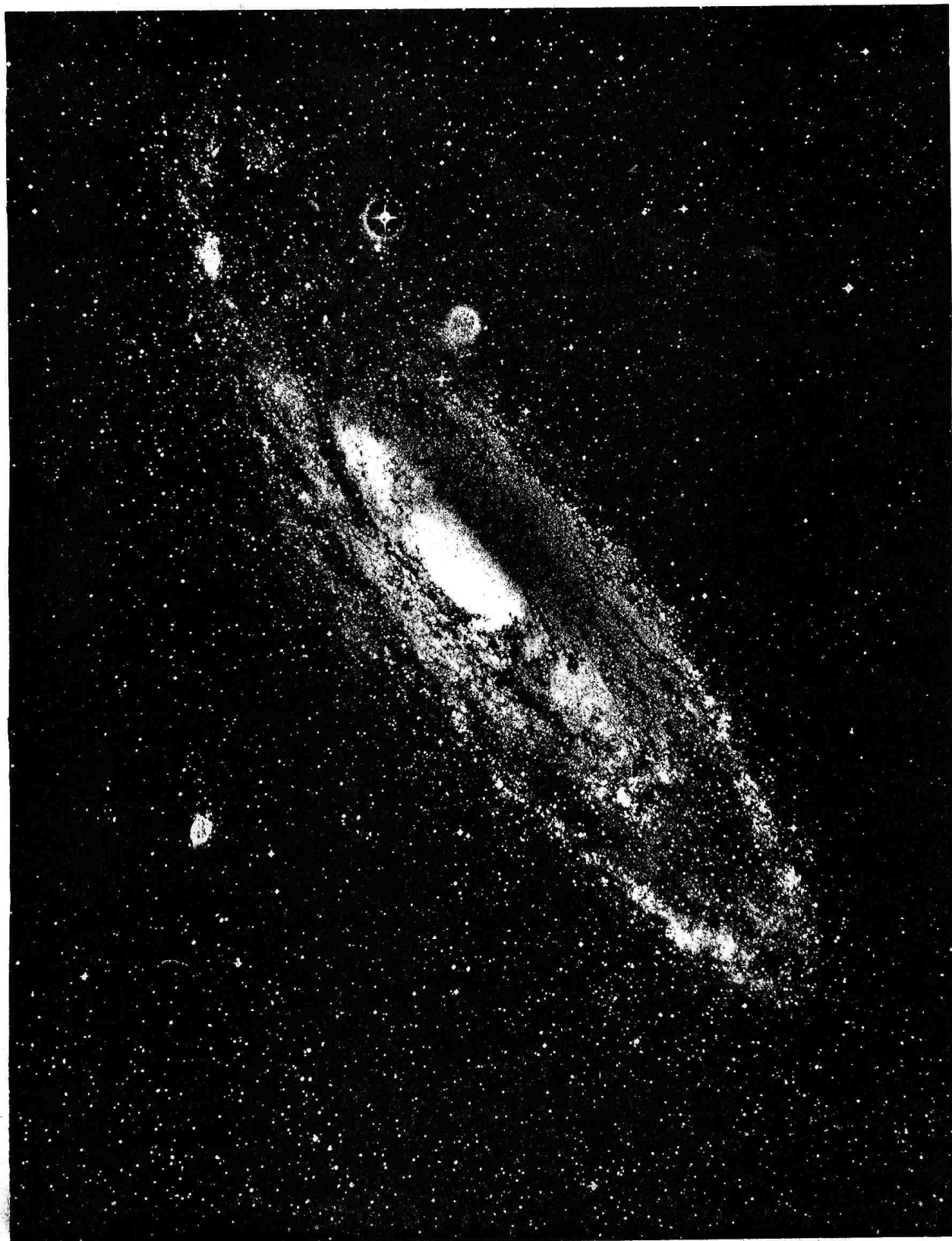


**THE WARREN
ASTRONOMICAL
SOCIETY PAPER**



volume six • number ten • october • 1974¹⁵

The Warren Astronomical Society is a local, nonprofit organization of amateur astronomers. Membership is open to all interested persons. Annual dues are as follows: \$2.00 for Student (K through college) Membership, \$4.00 for General Membership, and \$5.00 for a Family Membership. Add \$6.00 for a one year subscription to Sky and Telescope magazine. General meetings are held on the third Thursday of every month.

The Warren Astronomical Society Paper (W.A.S.P.) is published monthly, by and for the members of the Warren Astronomical Society. Subscriptions are free to all Warren Astronomical Society members. Personal advertisements by Warren Astronomical Society members are also free. Non-member subscriptions and advertisements are available upon arrangement with any of the editors of the W.A.S.P. Contributions, literary or otherwise, are always welcome. Contributions to the W.A.S.P. should be submitted to either of the editors listed below.

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	Michigan, 48077	Michigan, 48093
	268-9337	573-0937

The editors of the W.A.S.P. will exchange copies of this publication with other club publications on an even exchange basis. If your club would like to participate in such an exchange, please contact one of the above listed editors. The Warren Astronomical Society maintains correspondence, sometimes intermittent, with the following organizations:

THE ADAMS ASTRONOMICAL SOCIETY

THE ASTRONOMICAL LEAGUE

THE DETROIT ASTRONOMICAL SOCIETY

THE DETROIT OBSERVATIONAL AND ASTROPHOTOGRAPHIC ASSOCIATION

THE FORT WAYNE ASTRONOMICAL SOCIETY

THE GRAND RAPIDS AMATEUR ASTRONOMICAL ASSOCIATION

THE KALAMAZOO ASTRONOMICAL SOCIETY

THE MIAMI VALLEY ASTRONOMICAL SOCIETY

THE OLGELTHORPE ASTRONOMICAL SOCIETY

THE ORANGE COUNTY ASTRONOMICAL SOCIETY

THE SUNSET ASTRONOMICAL SOCIETY

Other organizations are invited to join this list.

THIS MONTH'S COVER BY: Kenneth Wilson

THIS MONTH'S STAFF INCLUDES: Ken Wilson, Ray Bullock, Doug Tracy,
Larry Kalinowski, Carl L. Noble

October

Event

- | | |
|----|---|
| 1 | U.S. National Aeronautics and Space Administration formed in 1958. |
| 2 | Messier Club Meeting at 8 p.m., contact Frank McCullough (791-8752) for details. |
| 4 | Sputnik, first man-made satellite, put into orbit by USSR in 1957. |
| 5 | New Moon |
| 9 | Astrophotography Club Meeting at 8 p.m., contact Larry Kalinowski (776-9720) for details. |
| 12 | First Quarter Moon. |
| 16 | Warren Astronomical Society Monthly General Meeting at 8 p.m., contact Frank McCullough (791-8752) for details. |
| 20 | Full Moon. |
| 21 | English astronomer Joseph Lockyer observes helium spectrum of sun's atmosphere in 1868. |
| 25 | Heinrich Schwabe born-German astronomer, discovered the eleven year sunspot cycle in 1789. |
| 27 | Last Quarter Moon. |

CLUB NEWS

By

Kenneth Wilson

Unfortunately, the switch on the mercury-vapor light south of Stargate Observatory has been disconnected. It is our understanding that the bulb burnt out and that when Edison was called to replace it, they disconnected our switch. If there are enough complaints from those members that are using the observatory, maybe Louis Faix (2nd Vice President, in charge of Stargate Observatory) will see about getting our switch reconnected.

*

As many of you know, there has been much recent discussion concerning the future of the Warren Astronomical Society. On August 28th a meeting was held to discuss some of the changes that have been proposed. It is hoped that this will be the first of many such meetings. In the final analysis, the future directions of the W.A.S. must be developed with the entire memberships, their needs and interests, in mind. The only way that the officers can do this is through an extensive input from the membership as a whole. So, if you have any ideas as to future directions and changes that you would like to see in the club, LET THE OFFICERS KNOW HOW YOU FEEL! The officers are there to serve you, but the only way that they can is by you voicing your opinions. Silent majority speak up, before it's too late!

*

*****A LETTER FROM THE EDITOR

Dear Readers,

As many of you may know, at the August general meeting, the Warren Astronomical Society adopted a list of the "Duties of the Officers of the Warren Astronomical Society" to its Constitution and By-Laws. One brief article in that list concerned the editorship of this publication. I, in all good conscience, could not agree with that article or its implications. I therefore proposed an amendment modifying and broadening that article. My amendment was defeated and the original list of duties approved by a majority of those members present. Therefore, as my only remaining alternative, I submitted my resignation as Editor to President Frank McCullough at the same meeting. This resignation becomes effective with this issue of the W.A.S.P.

This is a decision that I do not make lightly. I have been an editor of this publication for over five years now. I have grown up with the W.A.S.P. and I hope that it has grown with me. When I was first offered a co-editorship by Frank McCullough, I was a high school student with few major responsibilities. The W.A.S.P. changed all that. Since then, I have undertaken the monthly duties of harassing articles from our membership; hunting down duplicating machines; running off copy; collating; stapling and trying to put together an acceptable publication for our monthly meetings. I have seen our circulation grow from 40 to 100 copies an issue and our mailing list from 0 to over 20. The entire experience has been very enjoyable and character building for me. My pride and enjoyment has always nullified any irritations or frustrations. I'm sorry to say that this could not continue to be the case under the new provision of the Constitution and By-Laws. I was afraid that any reluctance, bitterness or frustration on my part over this article would have negative effects on the W.A.S.P. I love the W.A.S.P. and the W.A.S. too much to let that happen, so I resigned.

As my final action as editor, I would like to thank all of those people whose contributions have made my job easier over the years. First of all I'd like to thank all of our many writers, especially Louis Faix, Dave Harrington, Larry Kalinowski, Chris Edsall and Walter Roudebush whose regular, high-quality articles made the W.A.S.P. the great publication that I feel it is. Many thanks to the countless unsung heroes that have help to collate and staple.

And, most of all I want to thank the membership of the W.A.S. for their constructive comments and gracious support. I hope that these same people will continue to aid my successors in what can be a very difficult job.

I would also like to apologize for any and all typographical, editorial and stylistic errors that may have appeared in the W.A.S.P. during my editorship. They are my fault and mine alone. And, finally, I apologize if I have in any other way offended anyone in the course of my duties as editor.

For the last time, I wish you,

Clear skies and good observing,

A handwritten signature in cursive script that reads "Kenneth Wilson". The signature is written in dark ink and is positioned above the printed name.

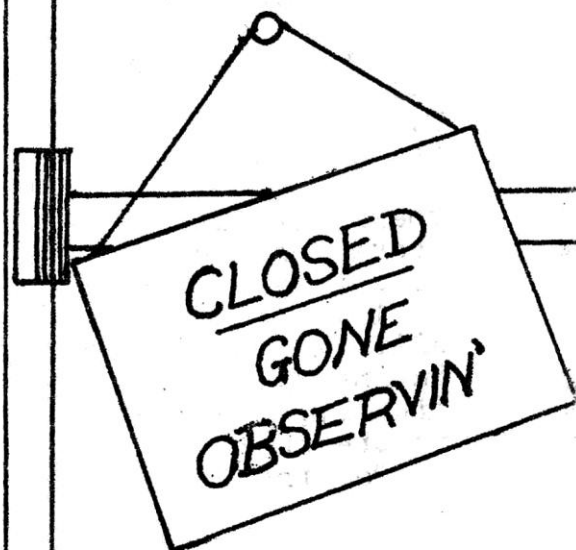
Kenneth Wilson, Editor-W.A.S.P.

SALUTE OF THE MONTH

This month I'd like to salute one of the newer W.A.S. members: Carl Noble. Since joining us, Carl has accumulated an impressive record of accomplishments. He has taken over as co-editor of this newsletter; writing many excellent articles and uncovering many new sources of others. He is currently serving (and serving well) as the First Vice president of the W.A.S. He arranged the meeting place for the recent W.A.S. educational program and put together an excellent W.A.S. display exhibited at Pepper's Camera Shop. As many of you that have talked to him will agree, Carl has 'almost limitless enthusiasm for our club and amateur astronomy. Despite his being a self-admitted beginner, Carl has become one of our organization's most valuable members; and all in less than a year!

-k.w.

YE OLDE
UNDERGROUNDE
TELESCOPE
SHOPPE



KW

THE

ASTROPHOTOGRAPHERS CORNER

by

Larry Kalinowski

"ONE POINT THREE TWO"

During one of "the astrophotography meetings held monthly at the residence of yours truly, the problem of haze was brought up. Haze had just recently spoiled what was visible during the last total lunar eclipse. The partial phases were visible during the first half of the event, but quite reddened. The reddishness being caused by a large amount of haze. Everyone realized that exposures would have to be increased to compensate for the haze, but how much?

The problem isn't a new one. Astrophotographers have been going through such disappointments ever since important astronomical, events such as eclipses, have been recorded on film.

Richard Lloyd, of The Detroit Astronomical Society, solves this particular problem by shooting some test shots on Polaroid film. Fifteen seconds after the film is exposed, one knows whether the exposure is a good one. Once the proper exposure is determined, the increase in exposure time can be applied to the rest of the pictures made that night, provided the sky conditions remain the same. If not, it is an easy task to determine the new correction for the proper exposure.

Some cameras are capable of determining their own exposure because of a built in light metering system. However, not all systems are through-the-lens systems which is what must be used when shooting through your telescope. If you are not shooting through your 'scope or the light sensor on your Camera is mounted somewhere on the camera body, the image of the Moon or Sun will be too small to correctly effect a proper exposure value. Your sensor will see mostly dark sky and cause an overexposure problem.

In order for everyone in the group (if it's an eclipse expedition or just a club get together) to benefit from a through-the-lens type of meter system, the shutter speed and f ratio must be known immediately. Some automated systems do not give you both. So the information remains in the camera and benefits only the camera owner.

There is one method that everyone can use that will help determine what the exposure should be if the basic exposure is known and the amount of haze can be determined. The trick, of course, is to determine the amount of haze in that particular part of the sky that you are going to do your shooting in.

If you're familiar with some of the constellations and the magnitude of the stars within them, the amount of haze can be determined quite accurately, though indirectly. Take the Little Dipper for instance. That group of stars contains second, third; fourth and fifth

magnitude components. If you're used to seeing the entire dipper, chances are you normally have a fifth magnitude sky and can easily tell when haze begins to obliterate that group of stars. If only the third magnitude star can be seen, then you have a two magnitude ($5-3 = 2$) haze. The haze has wiped out two magnitudes. Of course, no one is capable of remembering all the magnitudes of the navigation stars, so an atlas with that information would just about fill the bill. Old hands at observing, like some of the members of The A.A.V.S.O. are capable of determining magnitudes to a tenth (with an atlas), however, that kind of accuracy isn't needed. Accuracy to half a magnitude will suffice and all of us are capable of that with just a little practice.

Once you've determined how many magnitudes the haze has extinguished, it's quite easy to change that information to f stops for exposure correction. How? Multiply the number of magnitudes times one point three two. Now the title of this article becomes evident. Our f stop correction would be:

$$2 \times 1.32 = 2.64$$

The equivalent exposure correction of 2.64 stops would bring our exposure right up to snuff. Rounding that value off to two and a half would be good enough. Besides it's easier to determine the needed shutter speed or exposure time for half a stop than six tenths of a stop. Where did this magic value of 1.32 come from? It came from my pocket ••••• pocket calculator, that is. Those electronic marvels of the '70s.

A MATHEMATICAL EXAMPLE

Let's assume a four magnitude extinction. Four magnitudes are equivalent to a 39.06 times brightness change. If each magnitude represents a change of two and a half times, then:

$$2.5^4 = 39.06$$

To determine the equivalent in f stops, find the power of 2 that produces 39.06. (2 represents the brightness change of one f stop)

$$2^x = 39.06$$

$$x = \frac{\log 39.06}{\log 2}$$

$$x = \frac{1.591}{.301}$$

$$x = 5.28 \text{ f stops}$$

The f stop equivalent for one magnitude is:

$$x = \frac{5.28}{4} = 1.32$$

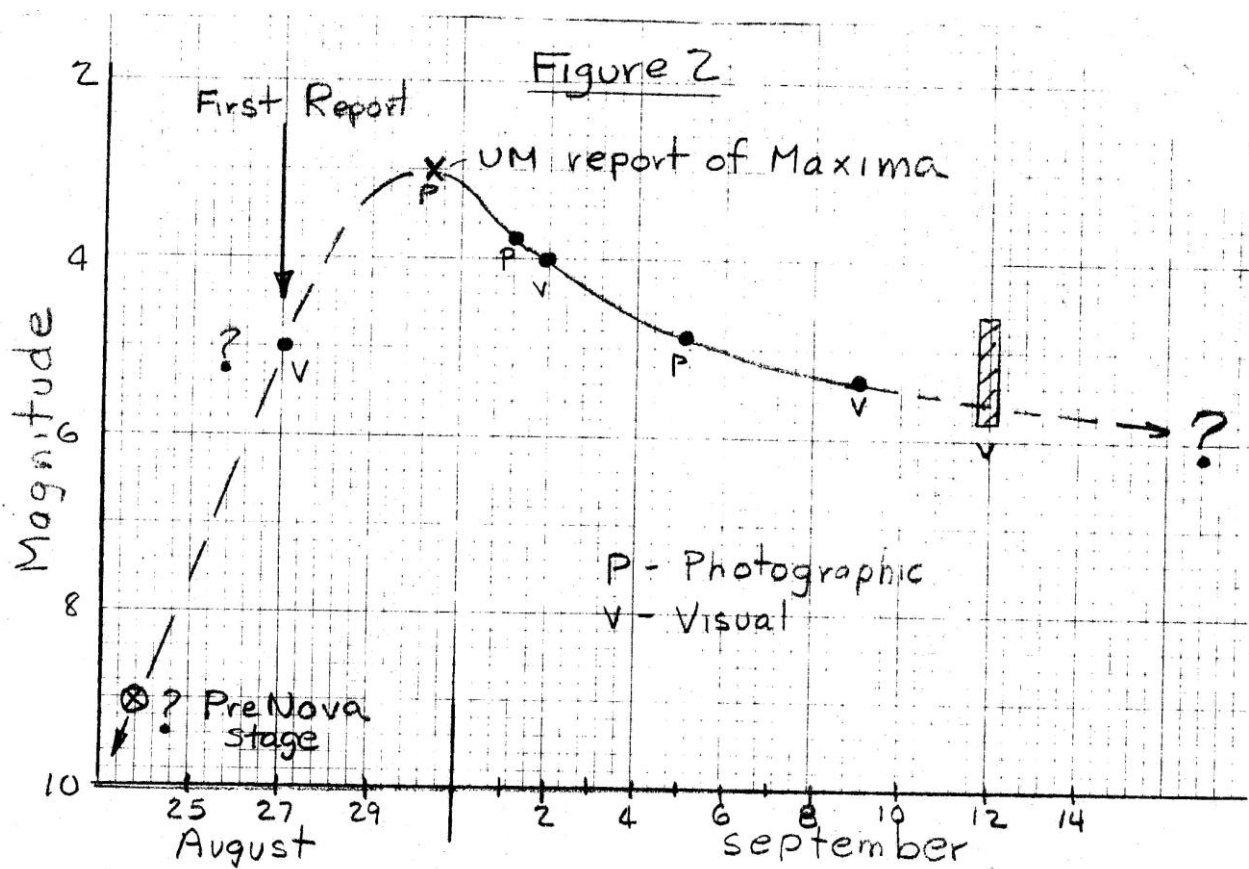
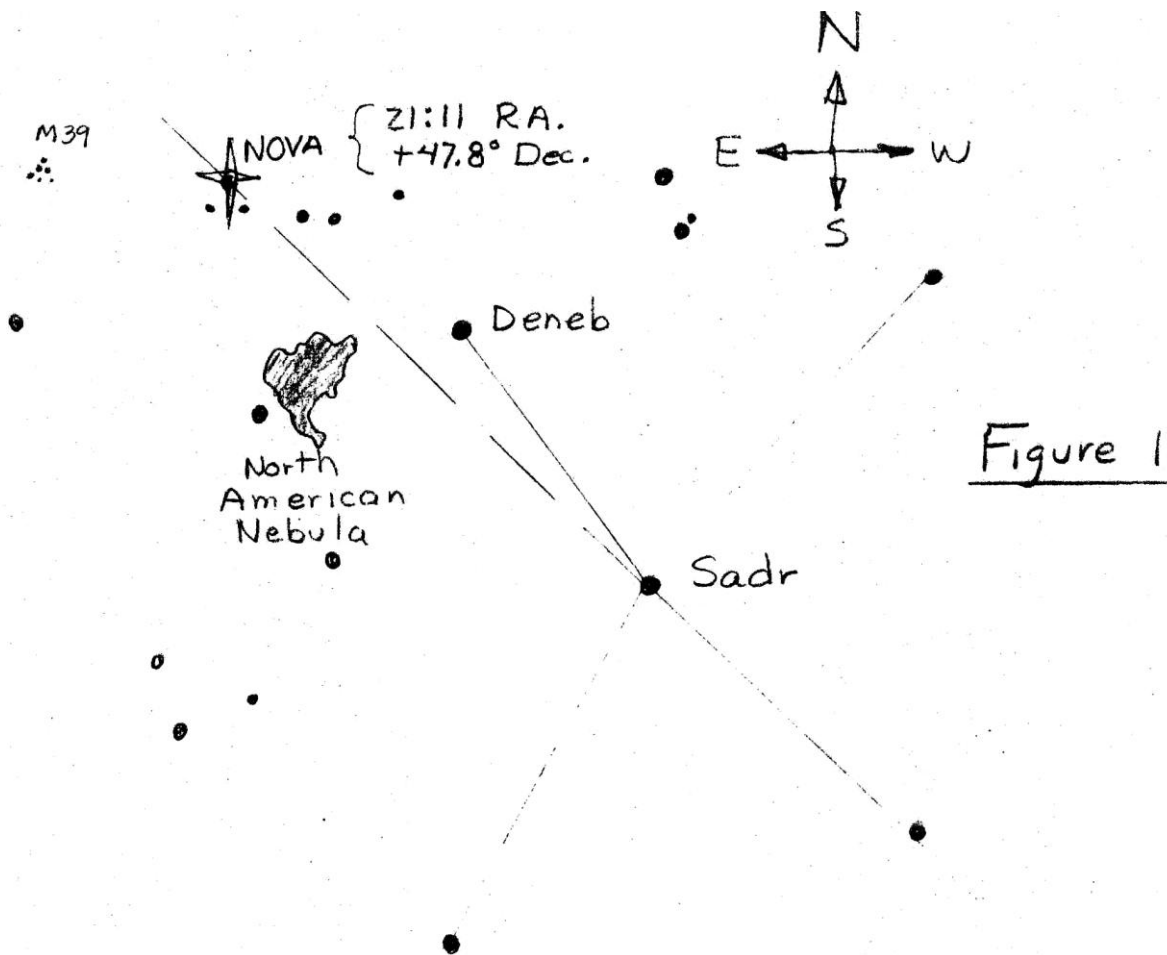
NOVA CYGNUS 1975

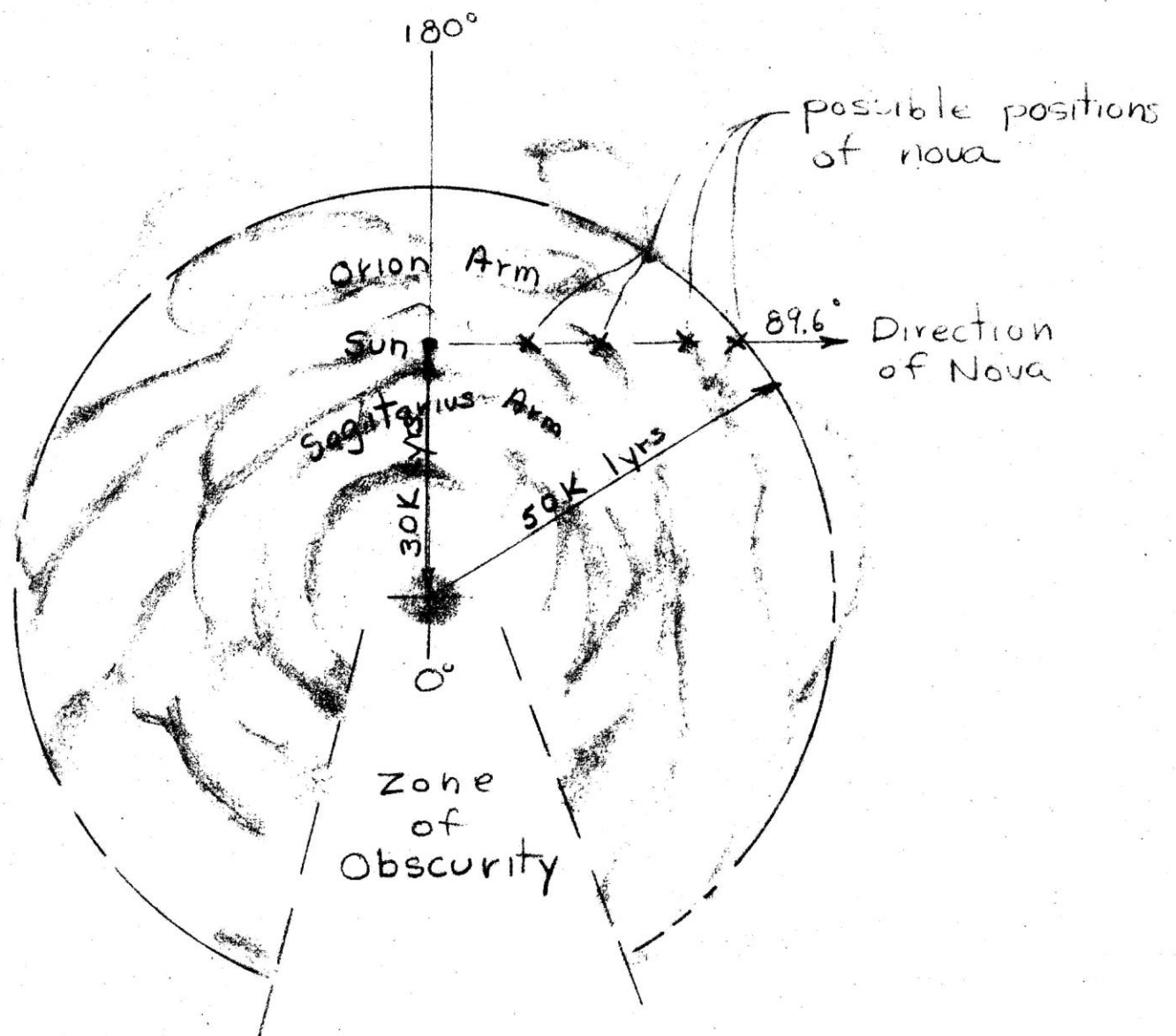
Louis J. Faix

One of the spectacular and rare events of astronomy occurred during the end of August and the first two weeks of September---a naked eye nova. The discovery was first reported by an amateur astronomer, K. Honda, of Japan on August 27th and was announced to America by Walter Cronkite (TV2) on Saturday, August 30th. To old sky watchers, the exploding star was a conspicuous object in the northeast sector of the constellation Cygnus. Located at 21 hours, 11 minutes R.A. and $+47.8^{\circ}$ Dec. the nova was easily found just above the famous North American Nebula. (See Figure 1) Reports from the University of Michigan Observatory indicated maximum brilliance of 3.0 magnitudes was achieved on August 31st. Both visual and photographic observations were made by the writer for the following two weeks (See Figure 2). The nova faded rapidly for the first week after maxima dropping to the limit of naked eye detection, magnitude 5.6, by September 12th. The shape of the light curve suggests Nova 1975 Cygnus will remain a conspicuous telescopic object for some months.

In analyzing old photos of the same area (September '72), it was noted that no trace of a star could be detected at the location of the nova. Photo analysis, using the Schultz method previously described in the WASP, indicated that the minimum detection limit of the old photo was 8.8 magnitude. This indicates that the star had flared to at least 200 times its previous luminosity. Local observers and astrophotographers reported distinct coloration variously described as salmon, pink and ruby. The pronounced color added to speculation that the star has blown off its outer shell and the cool red color is due to rapid expansion and decompression of a gaseous envelope. A new planetary nebula may have been born but will take hundreds of years to develop. Other possibilities for the pink color exist and a final conclusion will have to await spectrographic analysis by professional astronomers.

The nova is located at Galactic latitude 0° and longitude 89.6° . Overlaying this vector on a radio map of our galaxy made by Barry E. Turner and knowing that the galactic radius is 50,000 light years and that the sun is about 30,000 light years from the galactic center, we can make some estimates of the distance to the nova. The maximum distance could not exceed 40,000 light years or the nova would be outside the galaxy. In reality, the nova is probably in one of the adjacent arms. Otherwise, dust in the galactic plain would obscure the light from the nova and we wouldn't see it so brightly. Assuming the nova is in an adjacent arm, the distance probably lies between six and ten thousand light years. It's interesting to note that we're seeing an event that occurred before the Babylon sky towers were built.





Milky Way Galaxy as surveyed in Spectral
Frequency of atomic Hydrogen & Hydroxyl radical
by Barry E. Turner

Figure 3

OBSERVATIONAL ASTRONOMY

by kenneth wilson

Tired of high gas prices, congested highways and crowded resort areas? But you still have a yearning for new vistas? Well, take a sightseeing tour that won't cost you a cent and you won't even have to leave your backyard! Tour a constellation tonight! Blow the dust off that telescope or pair of binoculars and pick out a constellation that's up. Then examine everything of interest in it. Get to know every nebula, cluster and double star.

But, like any tour, it helps to have a plan in advance so that you won't miss anything. Preparation for a constellation tour consists of getting a good star atlas (Norton's or the Skalnate Pleso, for example) and a good list of the points of interest. Before each chart in Norton's is a list of interesting objects, but they aren't listed by constellation. Similar lists will be found in many astronomy texts or the annual Canadian Observer's Handbook. But probably the most useful lists are those arranged by constellation. A somewhat brief, but adequate, list of this type will be found in Muirden's Amateur Astronomer's Handbook. Another is Olcott's Fieldbook of the Skies which includes some constellation mythology as well. But probably the most extensive list that's currently available is Vol. II of Webb's Celestial Objects for Common Telescopes available in paperback by Dover.

Whatever sources you use, try to compile a list of all the objects visible in the constellation with your telescope. Then, spend the evening getting to know the constellation. Start with your lowest power, widest field) eyepiece to scan the constellation. Then use the high powers only on the small objects like close doubles and small clusters. Take your time; if it's a big constellation finish up the next night. And carefully record your observations.

If you take one of these little trips every week, you'll get more out of your telescope and you'll get to know the sky on an intimate basis equaled by few amateur or professional astronomers! To help you get started, this month's "Constellation of the Month" will tell you what to look for in Lyra.

*

CONSTELLATION OF THE MONTH

by kenneth wilson

Lyra (the Lyre) is well placed for early evening observation in the fall. Its stars supposedly represent Hermes' harp. It seems that Hermes became angered at Chelone because she wouldn't attend the nuptials of Zeus and Hera, so Hermes turned her into a tortoise shell from which he constructed a harp. It's a small constellation, easy to cover in an evening, but there are several interesting objects to observe. Try your telescope on these:

Vega, at a dazzling +0.5 magnitude, is the brightest star in Lyra. Its name is Arabic for "fallen eagle". This blue-white, A1s star is only 26.5 light years away. This bright star is excellent for lining up your finder, collimating your mirror or checking out the quality of your optics.

(CONT. NEXT PAGE)

CONSTELLATION OF THE MONTH (CONT.)

ϵ Lyrae ($18^h42^m.7 +39^\circ 17'$) - The famous double-double in Lyra. The first pair are $2.7''$ apart and therefore resolvable to the naked eye of a sharp-eyed observer. Each one of these components is itself a double; $\epsilon 1$ consists of a 6.0 and a 5.06 magnitude star separated by $2.7''$ and, $\epsilon 2$ consists of 5.14 and 5.37 stars $2.3''$. These two are good tests for a 2-inch telescope.

ζ Lyrae ($18^h43^m.0 +37^\circ 33'$) - A nice double consisting of a greenish 4.2 magnitude star separated from a 5.5 magnitude white star by $43''.7$.

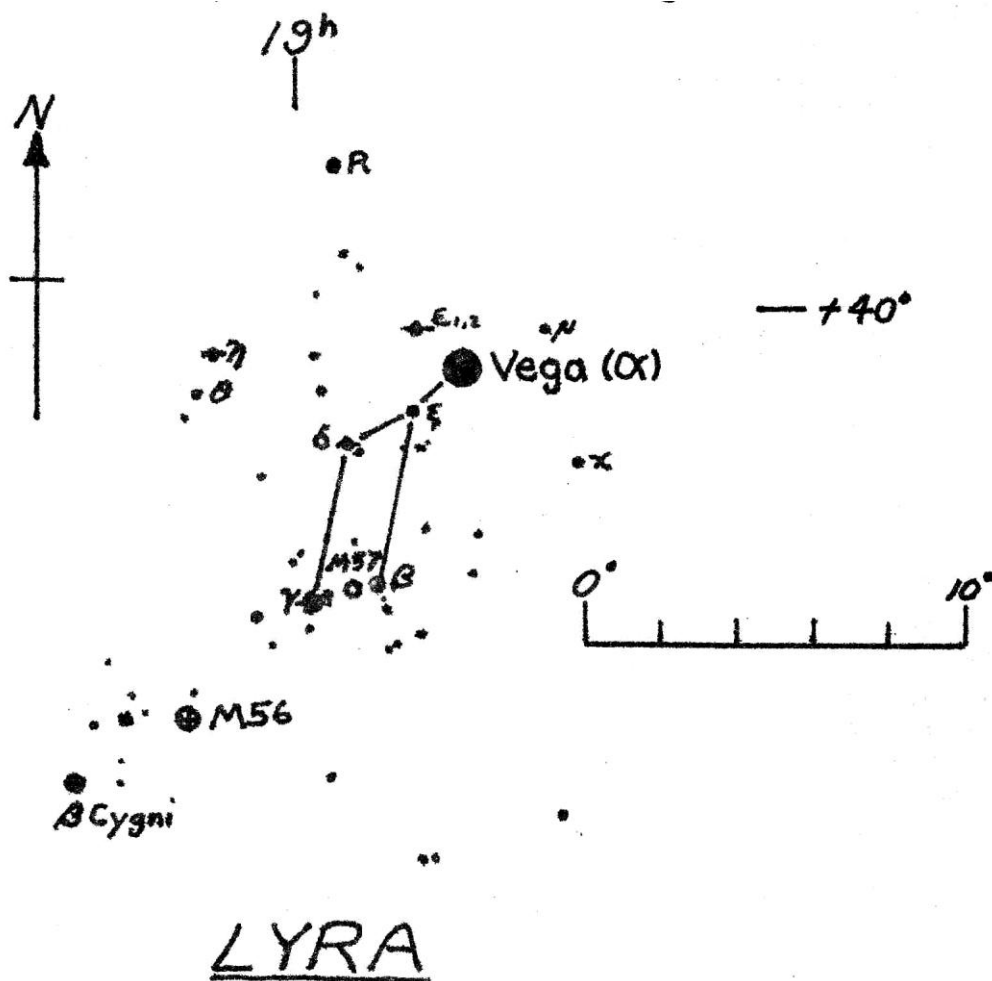
η Lyrae ($19^h12^m.1 +39^\circ 04'$) - Another nice double consisting of a white 4.40 magnitude star and a blue 8.7 magnitude star separated by $28''.12$.

β Lyrae ($18^h48^m.2 +33^\circ 18'$) - Famous eclipsing binary that varies in rightness from 3.4 to 4.3 magnitude in 12.93 days.

κ Lyrae ($18^h53^m.8 +43^\circ 53'$) - variable star with a 46 day period. Varies from 3.9 to 5.0 in magnitude.

M57 (NGC 6720) ($18^h52^m.5 +30^\circ 00'$) - The famous Ring Nebula. A small ($1.2'$), but easy planetary nebula of ninth magnitude. It's about 5,000 light years away. The central star is 14.7 magnitude. Webb describes the nebula as "...somewhat oval and bears magnifying well..."

M56 (NGC 6779) ($19^h15^m.4 +30^\circ 07'$) - An eighth magnitude globular cluster. It's resolvable in a good six-inch (Size: $1.8''$). Webb describes it as "faintish, in a fine and rich region".



THE TELESCOPE AND THE BICENTENNIAL

-Raymond Bullock

Since the entire country is getting prepared for our bicentennial I thought it was only right and proper that I bring up a little known story about George Washington and the telescope. I have never told this story before because I was afraid of being stoned by my audience. I have decided to take that risk for the sake of history, besides I hope to be out of range by the time you finish reading this.

The story begins two hundred years ago this very month. As hostilities between England and the Colonies grew the situation became very touchy for people living on this side of the Atlantic. Everyone was accusing everyone else of being a British sympathizer.

Let me briefly describe the two main political factions. In England there were the Whigs, who were sympathetic to the Colonists, and the Tories, who backed King George III. Likewise in the Colonies, those who favored breaking with England were referred to as Whigs, while anyone supporting the King was a Tory. (Some coincidence!)

What has all this to do with telescopes? Well, George Washington was aware that Tories in the Colonies had been passing information along to the British, so he decided to try spying on them. He procured a telescope (I believe it was a Celestron 5) and tried watching one house in particular from his Mount Vernon Estate. He assumed the people in that house might be aiding the enemy ever since a steady stream of tired, hungry Red Coats began flowing into the house, and a steady stream of well-fed, armed Red Coats, carrying maps left it.

Washington set his telescope up and discovered, to his dismay, that a large cherry tree blocked the view. He had no alternative but to cut it down with his Black and Decker chain saw. (Now, dear readers, be serious. Obviously Washington didn't have an electric saw since there was no electricity at the time. Ben Franklin had talked of electricity, but everyone thought it was the ravings of a mad man, besides Franklin was always out flying kites in the rain, he was obviously unbalanced. Washington's saw was gas powered.)

With the tree out of the way Washington had an unobstructed view of the house, but saw to his horror that the house had an unobstructed view of him! Worse yet, the enemy had a Celestron 8!! What to do? ---

Washington realized that he must build some sort of shelter from which he could spy without letting the enemy know he was watching them. Soon a great deal of activity was going on at Mount Vernon. Workmen would come and go. Since Washington was a surveyor he laid out the floor plans himself, saving a bundle of money in the process. A round tower began to take shape, rising higher and higher until it was the tallest structure on Mount Vernon.

Everyone thought it was to be a new silo, except it was too narrow to hold much. Besides, everyone knew Washington had too many silos already, and was using most of them for storing I.C.B.M.s.

Finally the curiosity became too much for the people. A group of Whigs went to Washington and demanded to know what was going on. He refused to tell them, citing "Colonial security" as the reason. It was only after they threatened to sue him for violating the zoning ordinances that he recanted and took them over to the structure. He paused, looked at them and swore them all to secrecy. Then he produced a large iron key and unlocked the door.

To the amazement of everyone, the silo was not hollow. Inside was a spiral staircase circling up into darkness. They all followed Washington in and began the long, slow climb, starting each time the stairs creaked in protest of the weight.

Higher and higher they climbed until they began to believe they must surely be above the clouds. Suddenly Washington stopped. They had reached the top, another door had to be unlocked. As the group entered a large room, and their eyes became adjusted to the feeble light, they saw Washington's telescope mounted equatorially on a pitch fork. ("You want a fork mount, and this is the only kind of fork I have." the dealer had told him when it was installed.)

Washington opened a door in the roof and invited everyone to look over the countryside. They all "ooh'd" and "ah'd" at the view. Then Washington pointed out the enemy's house, and everyone appreciated his genius. He was able to look directly into the house with his telescope, where the lady of the house was in the process of ...-but that's irrelevant to this story.

Everyone cheered, for now they had a secret weapon. They could read the enemy's maps right under his nose, and he would never know it. But what to call this new structure?

"Well," said Washington, thoughtfully, "you know what this building is for. Let's call it OBSERVE A TORY."

*

(ED. NOTE: It seems that the W.A.S.P. has finally found a suitable competitor for Frank McCullough in the art of punmanship! Please direct your groans to Ray. And, in case you didn't get the answer to Ray's puzzle last month: The question was "How did Russell get out of prison?" and the answer was "Hertz Sprung Russell". So, it was all a big H-R plot.)

ANIMAL CRACKERS by Rog Bollen



SOME TRICKS FOR LOCATING THE CONSTELLATIONS

by

Kenneth Wilson

One of the most formidable tasks that an amateur astronomer undertakes is learning to recognize the various constellations. Since one can locate celestial objects quite simply via setting circles, many advanced amateurs and even some professional astronomers are familiar with only a very few constellations. Beyond the usefulness in finding celestial objects, a knowledge of the constellations is of great aesthetic value. There is history, horror, romance and adventure in the abundant celestial mythologies. And, being able to look up at the stars at any time of night or year and know their names is of tremendous personal satisfaction.

At the outset, it would seem a fairly simple matter to pick out and remember the basic constellations. After all, there are only 88 of them all together: they are all well mapped; and, you don't need a telescope to find them. There are however, a few difficulties involved. First of all, they just won't stand still; every minute, hour, day and season they appear to be moving due to the earth's rotation and revolution. This means that one can only locate an unfamiliar constellation by using the known ones as direction finders., Finally, most constellations don't look at all like their namesakes. But, all is not hopeless for the would-be constellation gazer. There are a few tricks of the trade that will be of some help. The following list of tricks was prepared several years ago by Doris N. MacMillan- formerly of the Cranbrook Institute of Science). I have taken the liberty of revising and expanding on this excellent list.

1.) Let's begin with the most well know star pattern: the Big Dipper. This group of seven stars is always found (in Michigan) in the northern sky. Actually, the Big Dipper is not a constellation, but only an asterism \a well known part of a constellation). The Big Dipper's stars form the hindquarters and tail of Ursa Major (the Big Bear) which is an official constellation.

2.) Take the two stars that form the front of the bowl of the Big Dipper and draw a line through them in the direction away from the bottom of the bowl. This line will always point to Polaris, the North Star. This star is at the tip of the handle of the Little Dipper. And, like the Big Dipper, the Little Dipper is also a part of a bear/constellation: Ursa Minor \the Little Bear).

3.) Along the line from the Big Dipper's pointers to the North star (about one third the distance to the North Star) will be found the star that represents the tip of the tail of Draco the Dragon). The Dragon's tail winds between the two bears, curving back behind the Little Bear. It then turns around again, ending with a trapezoid of four stars representing the Dragon's head.

4.) Draw a line from the middle star of the Big Dipper's handle through the North Star. This line will lead to a "wit shaped group of stars called Cassiopeia (the Queen of Ethiopia). Alongside her can be found her husband, King Cepheus. He's shaped like a five-pointed box house that a young child might draw.

(CONT. NEXT PAGE)

5.) Draw another line through the Big Dipper's pointers, but this time in the direction away from the North Star. This line will lead to the brightest star in the constellation Leo (the Lion). This star is called Regulus and appears to be the period at the bottom of a "backwards question mark" pattern of stars which represents the head of the Lion. A triangle of stars to the east represents the hindquarters and tail of the Lion.

6.) The handle of the Big Dipper is bent into an arc. Follow the projection of this arc, and it will lead you to the bright star Arcturus ("follow the arc to Arcturus"). Arcturus is at the bottom of a kite-shaped constellation called Bootes (the Herdsman). Bootes can also be thought of as a celestial ice cream cone, with Arcturus on the bottom at the peak of the cone. Alongside the ice cream cone is a semicircle of stars that could represent a second scoop of ice cream that might have fallen off the cone. This second scoop of ice cream is actually a separate constellation called Corona Borealis (the Northern Crown).

7.) Now, continue the line through the pointers further south to another bright star called Spica, in the constellation Virgo (the Virgin). The prominent stars of Virgo form a distorted "Y" configuration.

8.) Go back to the Dragon and relocate the four stars of his head. Nearby will be found a bright, blue-white star called Vega. Vega and a parallelogram of four fainter stars are the principle stars of Lyra (the Lyre).

9.) Southeast of Lyra is a cross shaped constellation called Cygnus (the Swan). The bright star at the top of the cross is known as Deneb.

10.) South of Deneb and Vega is another bright star called Altair (Deneb, Vega and Altair form an asterism called the Summer Triangle). Altair is the brightest star in the constellation Aquila (the Eagle) which is shaped like a large, ragged "T".

11.) Orion (the Hunter), a winter constellation, is very easy to recognize because of the many bright stars what it contains. Two of these stars, Betelgeuse (the brightest one in Orion and reddish in color) and Bellatrix form Orion's shoulders. Two other stars, Rigel and Saiph form Orion's knees. Finally, three equally bright stars in a row form Orion's belt.

12.) Draw a line through Orion's belt and extend it southeast. It will lead to one of the brightest stars in the sky, Sirius (the Dog Star) in the constellation Canis Major (the Big Dog). Canis Major resembles a slanted "T" with two, short stubby legs attached to it.

13.) Draw the line through Orion's belt again, but in the opposite direction to find the star Aldebaran, the bright red eye of Taurus (the Bull). The face and horns of the Bull are marked by a long, "V" shaped group of stars that stretch up over Orion. In the shoulder of the Bull will be found a cluster of six or seven stars that are known as the Pleiades.

14.) North of Orion will be found a pentagon of stars which mark the constellation of Auriga (the Charioteer). The bright star in this group is called Capella (the Goat star).

15.) Take Sirius and Betelgeuse and look for another bright star northeast of them that completes an equilateral triangle (an asterism called the winter Triangle). This star is called Procyon (the Little Dog star) in the constellation of Canis Minor (the Little Dog).

(CONT. NEXT PAGE)

16.) Northeast of the Winter Triangle are two, almost identical (twin) stars, called Castor and Pollux (Pollux is actually a little brighter than Castor) These two stars are at the top of a rectangular shaped constellation called Gemini (the Twins).

17.) On the opposite side of Cassiopeia from her husband King Cepheus, look for an almost straight line of three bright stars much farther apart than the stars of Orion's belt. These are the brightest stars of the constellation Andromeda.: (the princess).

18.) At one end of the line of stars of Andromeda there are four stars in the arrangement of a square that represent the body of Pegasus ,the Flying Horse).

19.) At the other end of Andromeda is a distorted-"K" shaped constellation called Perseus (the Prince).

By the time you learn to use all of these tricks, you should be able to use a star chart to locate anything that you want to find in the sky.

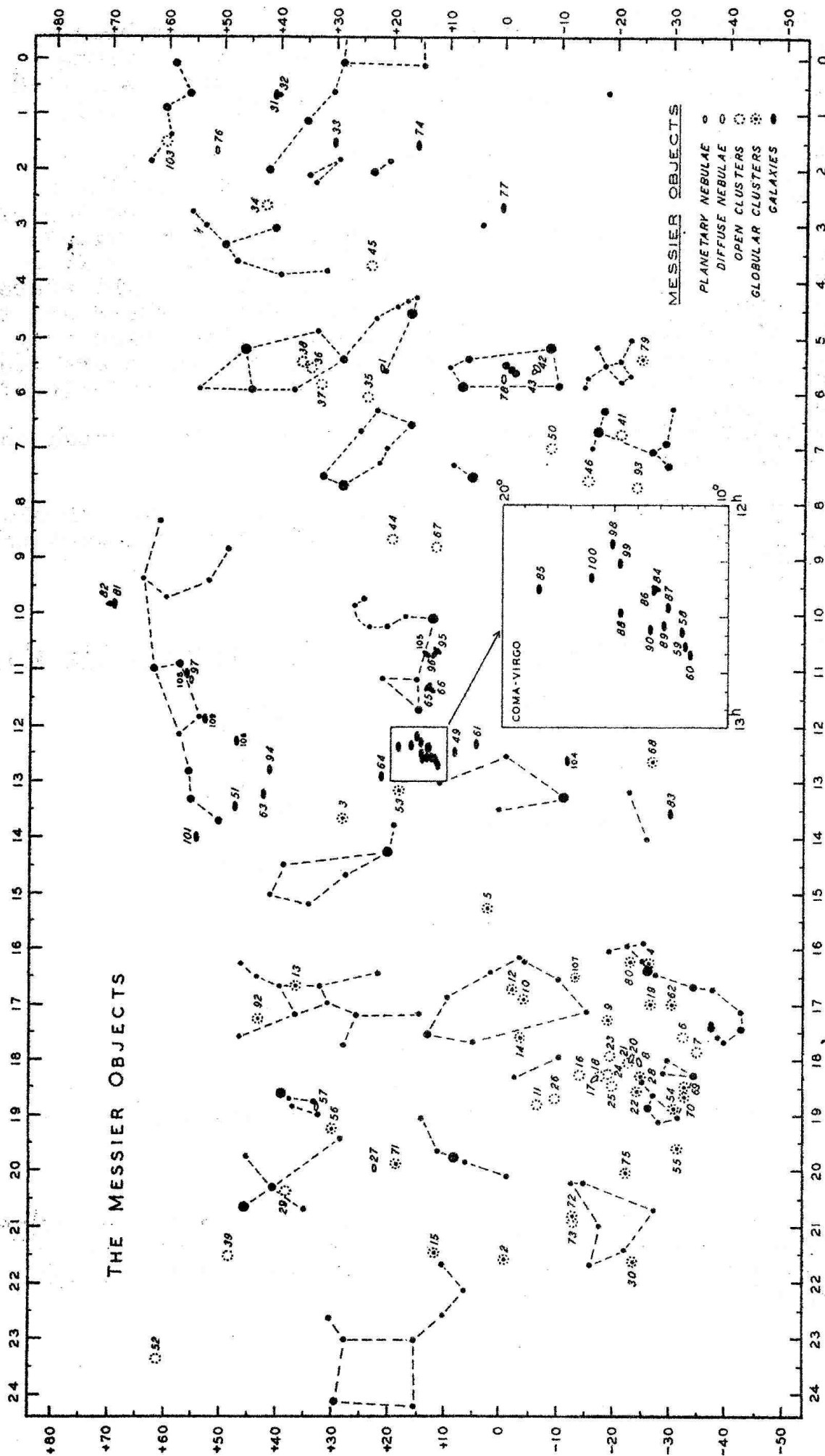
Bright star	Constellation	Distance (in light years)
Sirius	Canis Major	8.7
Arcturus	Bootes	36.0
Vega	Lyra	26.5
Capella	Auriga	45.0
Rigel	Orion	900.0
Procyon	Canis Minor	11.3
Betelgeuse	Orion	520.0
Altair	Aquila	16.5
Aldebaran	Taurus	68.0
Antares	Scorpius	520.0
Spica	Virgo	220.0
Pollux	Gemini	35.0
Deneb	Cygnus	1600.0
Castor	Gemini	45.0
Regulus	Leo	84.0

QUOTATION OF THE MONTH

"All knowledge is of itself of some value. There is nothing so minute or inconsiderable that I would not rather know it than not."

-Samuel Johnson: in Boswell's Life,
April 18. 1775.

THE MESSIER CLUB



THE MESSIER OBJECTS: Constellation and star names have been omitted from this chart for simplicity.

Chart courtesy SKY AND TELESCOPE

ASTRONOMY POPULARIZATION AT THE UNIVERSITY OF MICHIGAN

THE U-M ASTRONOMICAL FILM FESTIVAL has free showings the second Tuesday of each month, September, through April (third Tuesday of 1976 March) at 8 p.m., in Auditorium 3, Modern Languages Building, 812 East Washington, St. For a schedule of the current (Sixth Annual) Festival, which includes slide presentations as well as films see the separate, accompanying page. MORE INFO: 313-764-6575 irregularly afternoons and evenings (this is the office phone of the undersigned, who directs the Festival) or 313-764-0478 weekdays 9-5 and weekend afternoons (the Exhibit Museum, which can answer most routine questions about it).

THE U-M PLANETARIUM, in the Exhibit Museum (the one with the "lions"-actually they're pumas-at Geddes and North University) has public shows every Saturday and Sunday afternoon as follows:

September 6 through December 14 Saturday 3 p.m., Sunday 2:30 & 3:30

December 20 through January 4 Saturday and Sunday 3 p.m.

After January 4 To be announced (see. phone below)'.

The Museum itself is free, the Planetarium 25¢. Shows are informal, based on audience questions and current astronomical events, so every show is different. Shows are too long for young children (one hour, and you can't leave in the middle). Groups (15 or more) from schools, Scouts, etc. should arrange private showings on weekdays (phone number below for appointment); seating at weekend shows is too limited for them. MORE INFO: 313-764-0478 weekdays 9-5 and weekend afternoons.

TWO NON-CREDIT ADULT EVENING COURSES on astronomy, taught by the undersigned, are offered yearly by the University Center for Adult Education (MORE INFO: 313-763-4321 weekdays 9-5). "The New Universe" begins this year on September 22 and runs ten weeks; "The New Solar System" will be offered next winter. Neither course requires the other for understanding. They may be taken alone- or sequentially, in either order. Open to the general public (and U-M students too), the courses are nonmathematical and require no previous background. They emphasize new discoveries from both space- and Earth-based research; most of the material they cover is essentially unavailable elsewhere to non-specialists in the field.

TELESCOPES of the U-M Astronomy Department occasionally open, free to the public PEACH MOUNTAIN OBSERVATORY (85-foot radio telescope, to look at not through, the 52-inch optical telescope is no longer there, having been moved to Arizona to superior skies) is open 2 to 4:30 p.m. the third Sunday of each June, July, August, and September (i.e. the last time this year is September, 21). Drive 5 mi north of Ann Arbor on U.S. 23 to the first exit, North Territorial Road; then 10 mi west on North Territorial to the Observatory sign (on your right, 1½ mi past Dexter-Pitney Rd.). MORE INFO: 313-764-3430 weekdays 9-5.

The Department also presents nine VISITORS' NIGHTS a year on campus; weather permitting. You can look through the telescopes on Angell Hall, 435 S, State St., and regardless of weather, there are lectures, films, exhibits, etc. They are usually held three successive Fridays in September-October, three in April, and three in June-July. MORE INFO: 313-764-3440 weekdays 9-5 a month or so before each series begins.

JAMES A. LOUDON, 1975 SEPTEMBER 3

THE SIXTH UNIVERSITY OF MICHIGAN ASTRONOMICAL FILM FESTIVAL

All showings free and open to public / 8 p.m. the second Tuesday of each month (third Tuesday of 1976 March) / Auditorium 3, Modern Languages Building, 812. E. Washington / sponsors: U-M Exhibit Museum, Planetarium, Residential College, and Department of Aerospace Engineering. / director: James A. Loudon / All films listed are new to the Festival, except "The Mystery of Stonehenge", last shown 1972 Oct. 17.

PROGRAM 1, / SKYLAB AND STONEHENGE / SEPTEMBER 9

SKYLAB-SPACE STATION I: at last, the post mission summary film,
THE MYSTERY OF STONEHENGE: a Neolithic observatory and computer. Also
GYROSCOPES IN SPACE from the Skylab Science-Demonstration Series and film clips
from Skylab 4, the last and least publicized mission.

PROGRAM 2 / LIFE IN THE UNIVERSE / PART I / OCTOBER 14

First of two programs to prepare you for next summer's Viking landings on Mars. Films include WHO'S OUT THERE? with Orson Welles and a cast of thousands (some of them human), also A NEW VIEW OF MARS and ORIGIN OF LIFE. In addition, a Viking slide lecture by, Jim Loudon.

PROGRAM 3 / EARTH / NOVEMBER 11

THIS LAND, a stunningly beautiful film on the, United States' history for the past 600 million years (why stop with a mere bicentennial?) A SKYLAB TOUR OF THE UNITED STATES, PART I: another Loudon lecture—the same history, as observed from 270 miles up.

PROGRAM 4 / DECEMBER 9

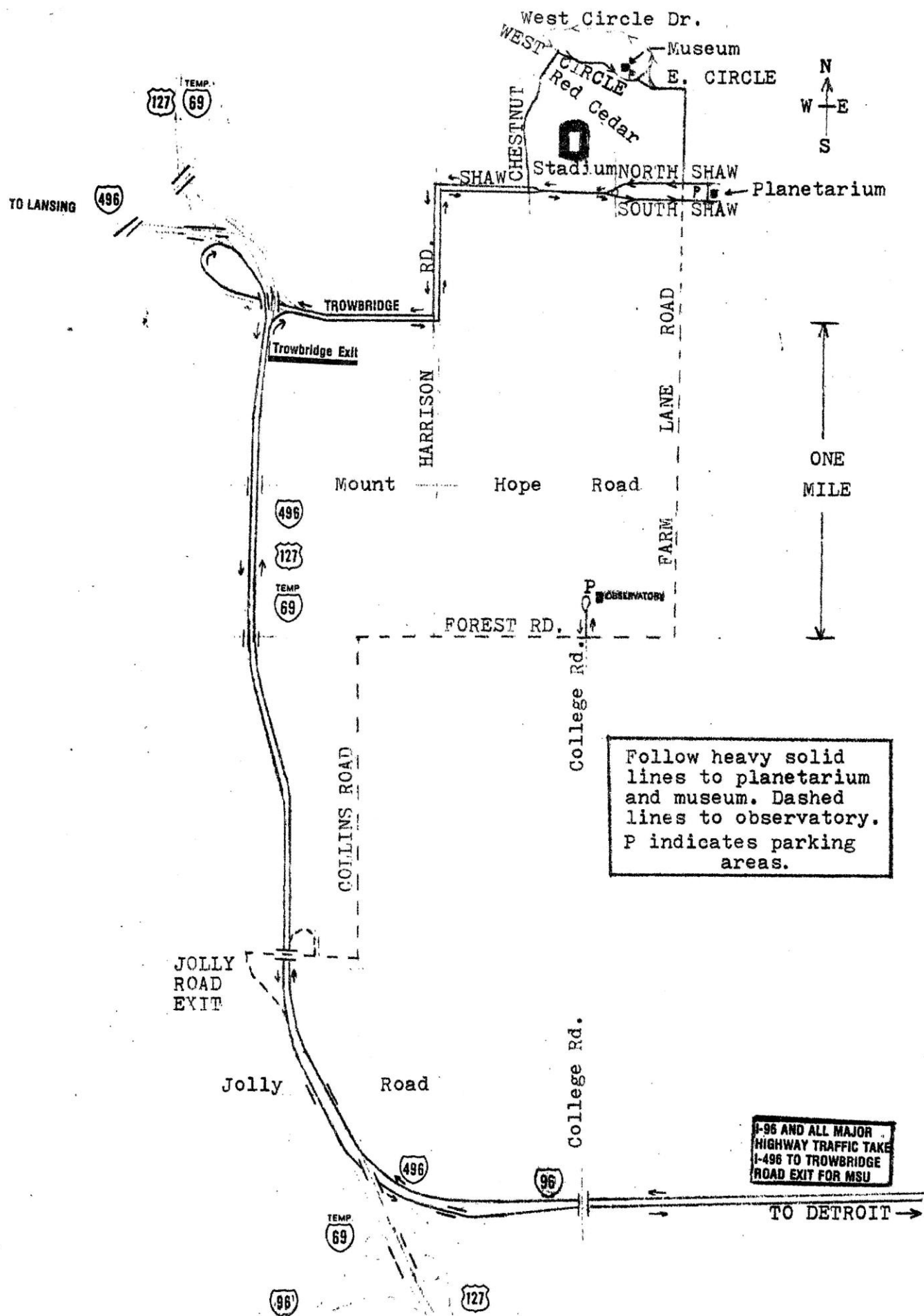
A RADIO VIEW OF THE UNIVERSE, in which radio astronomers investigate one of the most fundamental questions: is all of it the same age? APOLLO-SOYUZ FILMS AND SLIDES: behind the theatrics there was lots of solid science—a whole new branch of astronomy opened for example. Also PROJECT GEMINI MISSION REVIEW 1965, a look at where we were just ten years ago, and HURRICANE BELOW, on weather satellites.

PROGRAM 5 / LIFE IN THE UNIVERSE, PART II / JANUARY 13

PROGRAM 6 / APOLLO 14: FIFTH ANNIVERSARY / FEBRUARY 10

PROGRAM 7 / GODDARD MEMORIAL / MARCH 16 (third Tuesday of March)

PROGRAM 8 / APRIL 13



BOOK REVIEW CORNER: A book review by Doug Tracy on the text,

"Children of the Universe"

HOW ARE WE "CHILDREN OF THE UNIVERSE"?

The above title is that of an exciting book by Hoimar Von Ditfurth. He ties together the evolution of life on earth with astronomical phenomena in a new way. Let us take these phenomena one at a time:

1. *The solar wind*: A stream of atomic nuclei and electrons stream out from the sun continuously at high speeds - over 300 miles per second.
2. *The earth's rotation is steadily slowing down*: 200 million years ago the days were 23 hours long. 200 million years in the future, the days will be 25 hours long. The brake on the earth's rotation is the moon's tidal effect.
3. *The earth's magnetic field*: One of the most plausible theories explaining its existence is that the earth's liquid metal core has electrical currents caused by differential rotation of the core and crust. This theory is consistent with the fact that Mars and Venus have no magnetic field - Mars, because its core is nonmetallic; Venus, because it has no moon to slow its rotation and therefore cause differential rotation of core and crust. Our core is like a dynamo.
4. *The Van Allen radiation belts*: These belts contain trapped solar wind particles which are held 4,000 to 12,000 miles above the earth by the earth's magnetic field. Some particles pass thru to our upper atmosphere, but the majority are trapped in the Van Allen belts.
5. *Normal carbon 12 contained in CO₂ is changed to carbon 14 in the upper atmosphere by the solar wind that does not get past the Van Allen belts*. Carbon 14 is radioactive, with a half life of 5600 years. This is the isotope archeologists measure in carbon dating.
6. *The earth's magnetic poles have reversed many times in the past, meaning that what we call the north magnetic pole was at the south geographic pole many times and vice versa*. The proof of this is quite conclusive. Briefly, the proof is in lava and cosmic dust deposits, both magnetic and therefore laid down aligned with the earth's magnetic field at the time. Core drill samples show 1800 reversals at intervals of from 100,000 to 1,000,000 years.
7. *The earth's magnetic field has collapsed actually twice as often as it has reversed*. Some event disrupted the dynamo periodically, and the law of probability requires that the magnetic field was restored as often along the previous poles as along opposite. Thus the periods of magnetic field loss have occurred every 50,000 to 500,000 years. Estimates of the time period the earth was without a magnetic field after each collapse are 2,000 to 5,000 years.
8. *The probable cause of disruption of the earth's dynamo is the impact of huge meteors*. There is evidence showing that some of the most recent field reversals occurred concurrent with large meteor impacts. How the disruption occurs is not clear. Possibly the weak electrical currents within the earth's core are temporarily disturbed so that they flow randomly and therefore their magnetic fields cancel one another. After the disruption it takes a couple thousand years or so for the currents to again line up in unison so that they generate one large magnetic field.
9. *During the periods of no magnetic field, the solar wind particles bombard the unprotected upper atmosphere at many times the normal rate*. This greatly accelerates the production of radioactive carbon 14.

Now we examine the effects of the above events upon the evolution of life on earth. Life evolves or changes largely thru the agency of genetic mutation, which is the spontaneous variation of hereditary traits. Radiation causes mutations, and in particular, the absorption of radioactive carbon 14 into an animal or plant will cause mutations. Thus,

during periods of high amounts of carbon 14 in the atmosphere, mutations in all life are accelerated, and evolution gets a shot in the arm, so to speak. Most mutations are harmful, but a few are beneficial and will be perpetuated thru inheritance.

Perhaps now we can explain such sudden drastic changes in life on earth as the demise of the dinosaurs. They dominated the earth for 30 million years, and suddenly died out 200 million years ago. Probably what happened is that a huge meteor collided with the earth, stopping the earth's dynamo for a couple thousand years. During this time the earth was without its protective magnetic field, the solar wind particles collided with our upper atmosphere in great amounts, enormously increasing the generation of carbon 14. The dinosaurs, along with all other life, absorbed carbon 14, and produced extraordinary numbers of mutations. Since the dinosaurs had evolved into almost perfect adaptations to their environment, the mutations could not improve the species, but could only harm it. On the other hand, mammals had only begun to evolve and therefore had much room for improvement. They rapidly developed during this period to the point where they could successfully compete with the dinosaurs for the limited food supply. In a few thousand years mammals took over the world (with only a few small reptiles surviving).

One last thought- a prediction - it is worth pondering! We know that gigantic meteors have struck the earth in the past innumerable times at intervals of 50,000 to 500,000 years. Further, the intervals are shortening, which means that the solar system is apparently now passing thru a part of the galaxy with more meteors. So it is fairly certain that large meteor collisions will continue in the future. Somewhere, right now, there is a chunk of rock many miles in diameter on a collision course with the earth. It may impact tomorrow or in 100,000 years. But when collision comes it will start a chain of events which will considerably alter life on this planet.

D.P. Tracy
7 - 15 - 75

The above material was taken from:

“CHILDREN OF THE UNIVERSE”

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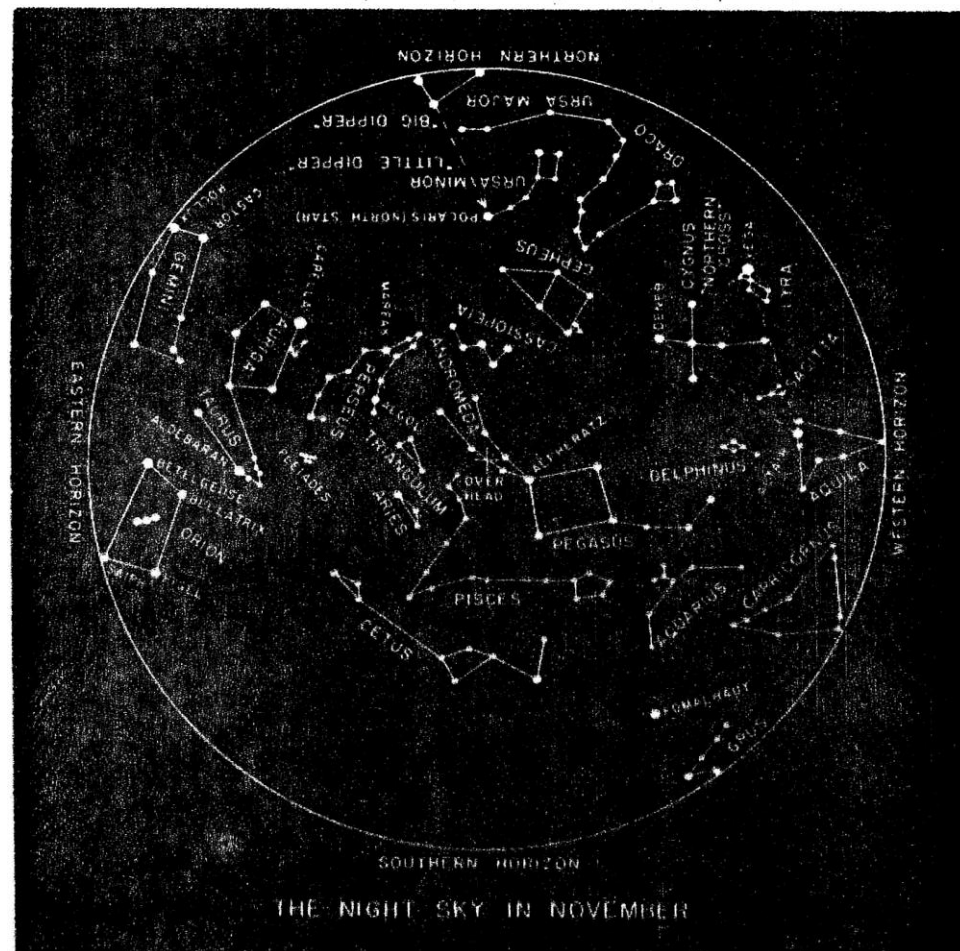
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If you have something to sell or trade, please contact the editors of the W. A. S. P. Ads are free to the members of the Warren Astronomical Society.



THE SKY FOR OCTOBER 1975

For further information, see "The Sky for January 1975".

The Sun—During October the sun's R.A. increases from 12 h 26 m to 14 h 22 m and its Decl. changes from 2° 51' S. to 14° 09' S. The equation of time changes from +10 m 13 s to +16 m 21 s.

Mercury on the 1st is in R.A. 13 h 21 m, Decl. 12° 30' S., and on the 15th is in R.A. 12 h 37 m, Decl. 4° 05' S. Inferior conjunction is on the 9th, but by the 24th it is in greatest western elongation, standing then about 17" above the horizon just south of east at sunrise, so for the last half of the month it is an easily observed morning star.

Venus on the 1st is in R.A. 9 h 56 m, Decl. 7° 56' N., and on the 15th it is in R.A. 10 h 31 m, Decl. 7° 04' N., mag. -4.2, and transits at 8 h 59 m. For about three hours before sunrise it dominates the eastern sky; greatest brilliancy is on the 3rd.

Mars on the 15th is in R.A. 5 h 57 m, Decl. 23° 30' N., mag. -0.4, and transits at 4 h 25 m. Moving from Taurus into Gemini, it rises late in the evening and dominates the parts of the sky between Aldebaran and the Twins.

Jupiter on the 15th is in R.A. 1 h 14 m, Decl. 6° 08' N., mag. -2.5, and transits at 23 h 37 m. This is the month of Jupiter's opposition (on the 13th) when it is at its brightest and rises as the sun sets and is visible all night. See map below.

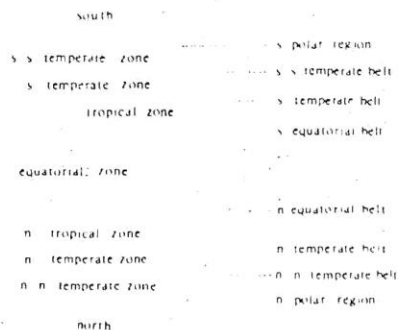
Saturn on the 15th is in R.A. 8 h 18 m, Decl. 19° 48' N., mag. +0.5, and transits at 6 h 44 m. In Cancer, it rises at about midnight.

Uranus on the 15th is in R.A. 14 h 00 m, Decl. 11° 45' S., and transits at 12 h 26 m.

Neptune on the 15th is in R.A. 16 h 34 m, Decl. 20° 26' S., and transits at 14 h 59 m.

JUPITER'S BELTS AND ZONES

Viewed through a telescope of 6-inch aperture or greater, Jupiter exhibits a variety of changing detail and colour in its cloudy atmosphere. Some features are of long duration, others are short-lived. The standard nomenclature of the belts and zones is given in the figure.



				OCTOBER E.S.T.	Min. of Algol	Config. of Jupiter's Sat. 0 h E.S.T.	Sun's Selen. Colong. 0 h U.T.
	d	h	m		h	m	°
Wed	1						10234 217.87
Thur.	2	04		Venus 1° N. of Moon. Occ'n.	11	40	30124 230.08 ^b
		18		Pluto in conjunction with Sun			
Fri.	3	12		Venus greatest brilliancy			3204* 242.30
Sat.	4	10		Moon at perigee (357,470 km)			34210 254.52
		22	23	☾ New Moon			
Sun.	5	19		Venus 4° S. of Regulus	8	30	43012 266.75
Mon.	6	08		Uranus 2° N. of Moon			41023 278.97
Tues.	7						42013 291.19
Wed.	8	22		Neptune 0.04° S of Moon. Occ'n.	5	20	41023 303.41
Thur.	9	06		Mercury in inferior conjunction			43012 315.62
Fri.	10						34210 327.83 ¹
Sat.	11	20	15	☾ First Quarter	2	10	3240d 340.03 ¹
Sun.	12	21		Ceres stationary			30142 352.22
Mon.	13			Mars at ascending node	23	00	10234 4.41
		10		Jupiter at opposition			
Tues.	14						20134 16.59
Wed.	15			Mercury at ascending node			1034* 28.76 ^b
Thur.	16				19	50	30124 40.93
Fri.	17	06		Moon at apogee (406,020 km)			32104 53.09
		15		Mercury stationary			
Sat.	18						32014 65.25
Sun.	19			Mercury at perihelion	16	40	30142 77.41
		13		Jupiter 5° S. of Moon			
Mon.	20	00	06	☾ Full Moon. Hunters' Moon			14023 89.57
Tues.	21	20		Orionid Meteors			42013 101.72
Wed.	22				13	30	4103* 113.88
Thur.	23						4012d 126.03
Fri.	24	20		Mercury greatest elong. W. (18°)			43120 138.19
Sat.	25	07		Mars 4° N. of Moon	10	10	43201 150.35
Sun.	26	16		Uranus in conjunction with Sun			4302* 162.52 ¹
Mon.	27	17		Saturn 5° N. of Moon			41032 174.69
		17	07	☾ Last Quarter			
Tues.	28				7	00	24013 186.87
Wed.	29						12043 199.05 ^b
Thur.	30			Mercury greatest hel. lat. N.			03124 211.24
				Venus at ascending node			
Fri.	31	03		Venus 5° N. of Moon	3	50	31204 223.44
		22		Mercury 4° S. of Spica			

^aOct. 10, 11, +7.60°; Oct. 26, -6.55°.

^bOct. 2, +6.65°; Oct. 15, -6.77°; Oct. 29, +6.76°.

¹Visible in S.E. of S. America.