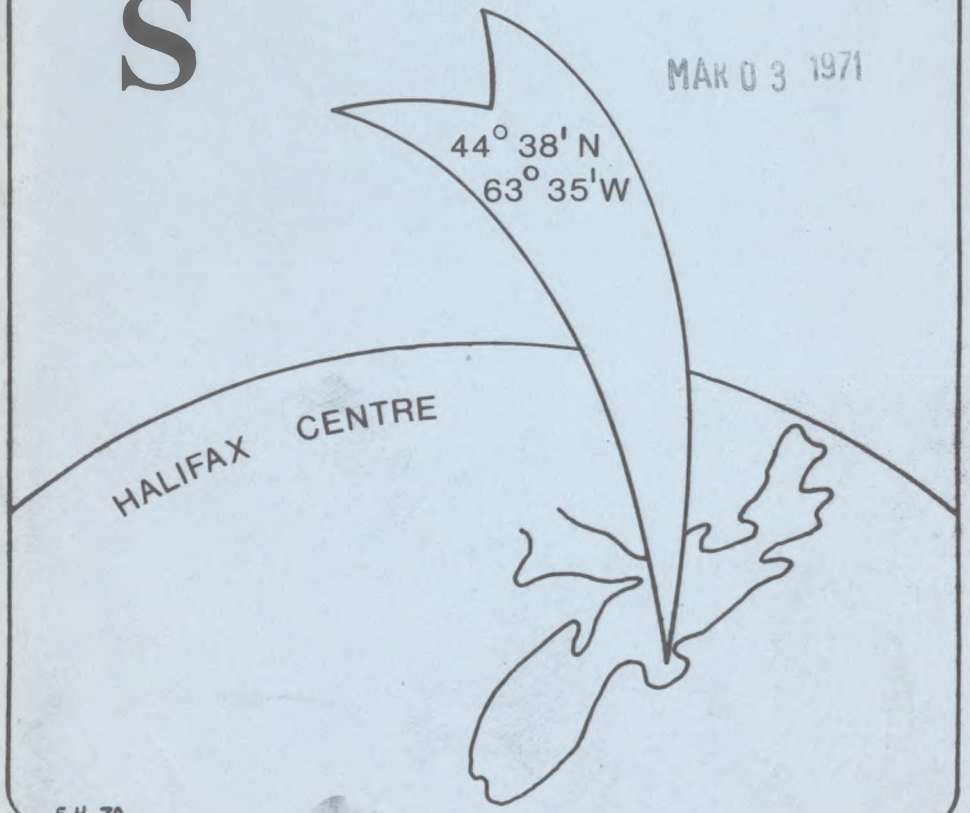
FROM

HALIFAX CENTRE R.A.S.C.
1747 SUMMER ST.
HALIFAX, N.S.

TO

ROYAL ASTRONOMICAL SOCIETY,
252 COLLEGE ST.,
TORONTO, ONTARIO.

NOVA NOTES



E.H. 70

E D I T O R I A L

A Brief History of Astronomy in Canada.

Canada is a large and, until a few centuries ago, unchartered country. Early astronomical observations all related to determinations of time and star positions used to fix geographical longitudes. One of the earliest attempts at fixing position was made by Jesuit priests from observations of eclipses.

In 1835 an observatory was proposed for Upper Canada, but although instruments were offered, no funds were made available. In 1840 a magnetic observatory was built at Toronto and a 4½" refractor telescope was added later. In 1854 an observatory was built in Quebec to provide mariners with the correct time. An 8" equatorial refractor was added in 1864.

In 1851 the first observatory in Canada was built at King's College, Fredericton to house, a 6" refractor. In 1855 a longitude was determined by telegraphic linkage with Harvard and an observatory was built at Kingston.

In 1862 the McGill Observatory opened, mainly for collecting meteorological data.

British Columbia joined Confederation on the understanding that a transcontinental railway would be built. This required astronomical observations in the mountainous regions to enable accurate surveying.

In 1890 W.F. King persuaded the Department of the Interior to build an astronomical observatory on his Ottawa property. In 1905 the Dominion observatory opened at a cost of $310,000 after an original budget of $16,000. It housed a 15" refractor. Dr. King and his staff made excellent time and positional determinations and engaged in seismological, gravitational and magnetic geophysical research.

J. S. Plaskett received world wide recognition for his excellent spectrographic work with the Ottawa refractor. This led the government to decide to build a 72" reflector at the most suitable site in Canada, finally decided to be Victoria. In 1918 the Dominion Astrophysical observatory opened.

For years Canada was recognized as a leader in studies of stellar radial velocities and spectroscopic binary stars. In 1930's Dr.C.S.Beals developed high dispersion spectrographs and the study of stellar physics started. R.M.Petrie extended Plaskett and Pearce's studies of galactic structure and rotation.

A. McKellar made important observations of molecular spectra needed for the study of stellar evolution and the chemical history of the stars.

In 1935 the David Dunlap Observatory opened in Toronto with a 74" reflector.

In 1956 the government approved the building of a 48" reflector to supplement the 72" Victoria reflector. It is used as a coudé spectrograph and is recognized as one of the best in the world because of A. Mckellar's design and E.H.Richardson's improvements.

In 1964 the 150" Queen Elizabeth II telescope was announced to be built at Mount Kobau B.C. this project has been delayed because of lack of funds.

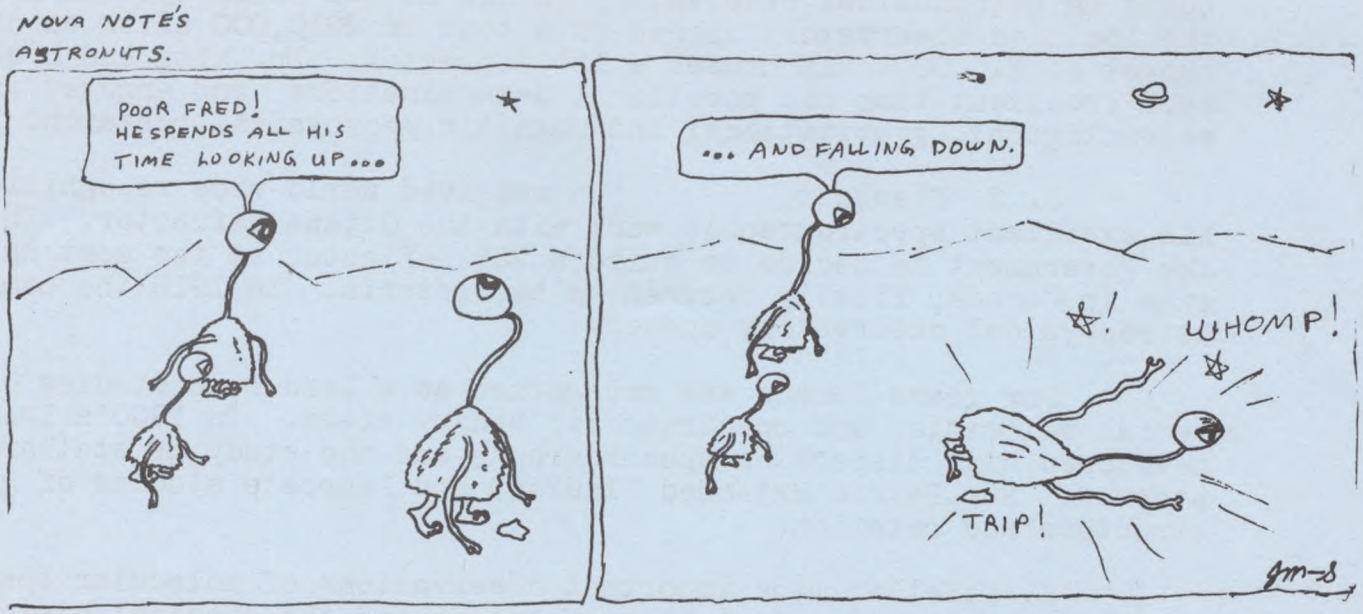
A.E. Corington began Canadian Radio astronomy of the sun at 10.7cm and now has the longest continuous series of observations extant. There is a 150' parabolic radio dish at Traverse Lake, Ont. and an 84' dish at White Lake, B.C.

P. M. Millman of N.R.C. and the atmospheric research group, working with the Dominion Observatory have more data on meteor spectra than anywhere else in the world.

O. K. Halifax Centre let's make some more history.

J.M.S.

Ref: "Astronomy in Canada." Ed. by Ruth J. Northcatt
The Royal Astronomical Society of Canada Journal Vol. 61 No. 5 Pg 211
Printed in Canada by the University of Toronto Press, 1967 -218



Notice of Meeting.

Date: February 19, 1971.

Place: Theatre of the Nova Scotia Museum
1747 Summer St. Halifax, Nova Scotia.

Time: 8:00 p.m. sharp

Speaker: Dr. Roy Bishop
Acadia University

Subject: Astrophotography

All members and guests are most welcome.

Members are urged to bring along to the Meeting, observational charts, or photographs which they have taken.
Our Lunar Co-Ordinator would like to see Committees set up to work on the following:

Planetary study
Lunar study
Deep Skies
Variables

Would you specifically like to concentrate on one particular program? Please let Walter Zukauskas know of your choice.

Newsletter is printed: thanks to the goodwill of the:

Nova Scotia Museum:

The regular meeting of the Halifax Centre, R.A.S.C. was held in the Audio Visual Room on January 15, 1971. Guest speaker for the evening was Dr. Mitchell from St. Mary's University. He gave a most informative lecture on The Structure of the Universe. Dr. Mitchell very kindly brought along a film on the building of the 200 inch mirror for Mount Palomar. This was an extremely interesting film. The program also included the film entitled "Fields in Space." (National Film Board).

The Society has been asked by the Museum to exhibit a display on the morning of February 13 - this will be an open house for school children. We are most grateful to Mary King for her offer to bring in her Questar for this occasion.

Our Librarian, Mr. McKenna requested that anyone requiring books from the Library, should contact him prior to the monthly meeting. Other books, 35mm. slides and films may be borrowed from Toronto. Mr. McKenna will order these if requested by members.

John Shaw showed his slides of the Venus, Mars, Jupiter configuration, due to the excellent colours, there was no mistaking each planet. Photographs taken by members were passed around, several were exceptionally good, especially one taken by Dr. Cunningham of the Solar eclipse, and in addition, photographs taken by a member from the Wolfville group.

It was moved by Peter McQuigan and seconded by Dr. Bishop that the meeting be adjourned at 10:30. Coffee was served.

E.H.

We welcome the following new members:

Ian McKenna
Remi Odense
Craig MacDonald
Dr. Cunningham
Paul Davison

Recent Advances in Cosmic Chemistry

Advances have been made recently in two important fields that concern organic molecules in the universe. Radio astronomers have recently discovered a number of organic molecules in space. These include formaldehyde, formic acid and cyanoacetylene. Together with hydrogen cyanide they appear to be quite widespread in their distribution. This discovery is important in connection with studies on how organic molecules that are involved in life processes are formed. They take on even greater importance with recent experiments involving the study of the composition of the primitive atmosphere of the earth and the prebiological synthesis of compounds important in life processes.

Experiments that have produced amino acids and nucleotide bases (important in the formation of nucleic acids) have previously been called into question because of the use of such compounds as hydrogen cyanide and formaldehyde in the laboratory synthesis of the compounds and the argument that these molecules were unlikely to have been present on the primitive Earth. Now with the discovery of these compounds as some of the more abundant in space the experiments gain greater weight.

One of the more remarkable things about these discoveries is that the more complex compounds such as formic acid seem to be produced in preference to more simple compounds such as ammonia and the hydroxyl radical. Scientists are now convinced that it is just a matter of time before even more complex molecules will be found. These discoveries do raise a number of questions, however, including the question that what mechanism is present to stabilise these compounds in the presence of large amounts of energetic radiation? Some question has been raised as to whether classical chemical kinetics can apply to the situation pertaining to these molecules as classical chemical kinetics deals statistically with large numbers of molecules (in the thousands of millions) whereas in space, encounters between molecules are liable to be rather rare occurrences and classical chemical thermodynamics is perhaps not equipped very well to handle this sort of problem.

The second important discovery recently deals with a recent meteorite which fell at Murchinson, Australia on September 28, 1969. There has always been controversy about whether the organic carbon compounds found in meteorites have been produced by inorganic or biological means. There has also been the problem of contamination of the material during handling. These questions seem now to have been settled with the study of this meteorite. This resulted from the study of amino acids found in the meteorite. As is known biologic process distinguish (in a large number of cases) between mirror images of the same chemical compound, just as left and right hands are distinguished. The mirror images of the same compound are called the L and the D isomers respectively. In proteins which are made from amino acids, the amino acids are all of the L type and consequently organisms produce L amino acids but not D amino acids in order to make these proteins. A chemical reaction however will produce a 50:50 mixture of the L and the D isomers and when we analyse for the presence of L and D forms we can say if we find a 50:50 mixture that it was most likely a chemical reaction that produced these compounds. Such an analysis was done on the meteorite and it was found that a 50:50 mixture

was present for two or three of these amino acids. Further evidence for the non-biologic origin of these amino acids came from the presence in the meteorite of some unusual amino acids not normally found in proteins. An interesting point about these amino acids were that they were also found in laboratory experiments to simulate the primitive Earth atmosphere and the formation of organic molecules by non-biologic processes in this atmosphere. Apart from the fact that painstaking steps were taken to ensure that the meteoritic material analysed came from the parts of the meteorite unlikely to have come into contact with terrestrial contamination, the presence of very low amounts of the amino acid serine were present. This is the amino acid that is usually found as a contaminate due to the presence of fingerprints etc. on laboratory glassware and as such serves as a useful indicator to show the absence of terrestrial contamination in this case.

Thus there is now quite convincing evidence for the non biologic formation of organic compounds, both in deep space and in meteorites.

D. J. Hook

References: Nature 228, 923 1970
Nature 229, 225 1971.

Recently, the Soviet Union announced that its unmanned Venera 7 has in December, made the first soft landing on Venus's torrid surface and sent back data from there for more than 20 minutes.

Venera 7 clearly was another technological achievement for the Russians, who have recently concentrated in their space program on unmanned projects. According to the report, Venera 7's instruments reported that the surface temperature on Venus was as ferocious as scientists had predicted. It was 475 degrees centigrade, allowing a 20 degree of error. In Fahrenheit, that means that Venus's surface where Venera 7's instruments lay ranged from 847 to 923 degrees above zero. This means that it is impossible for oxygen to exist in any quantity on the planet's surface.

Venera 7's instruments also reported that the air pressure on the planet's surface was equivalent to 90 atmospheres or 90 times that of earth at sea level - with a margin of error of 15 atmospheres in either direction. Because more than 90 per cent of the atmosphere is carbon dioxide, the density of the atmosphere at the surface was about 60 times greater than that of earth, the report said.

The combination of scorching heat, crushing pressure and dense air, makes it highly unlikely that any human could long endure on the surface, even in the most technologically advanced life support systems. Because

of the thick, dense clouds that surround the planet, it is impossible to see the surface from earth. And because the space capsule must land on the "night" side - facing earth - to facilitate radio communication, no television pictures were possible.

Venera 7 was launched on August 17 on its 120 day journey to Venus, the closest planet to earth, and second closest planet to the sun. At the time of landing, the distance between Venus and the earth was about 36.3 million miles, while the radio signals took three minutes and 22 seconds to rearch the earth.

Instant Astronomy: circa 1969

Twinkle, twinkle little star
We know exactly what you are:
Nuclear furnace in the sky,
You'll burn to ashes by and by

But tick, tick, tick pulsating star,
Now we wonder what you are:
Magneto-nucleo-gravity ball,
Making monkeys of us all!

And twinkle, twinkle quasi-star,
You're the limit, yes you are:
With such indecent energy,
Did God not say you couldn't be? Anon.

JOIN A CLIQUE.

Sometimes members of an organization become aware that things are being run by a clique - a small group of people. And usually an investigation shows that such is indeed the case. But instead of being a sinister, power-seeking group as the word suggests, the clique is usually found to consist of faithful members who are present at every meeting, who accept appointments to committees and sincerely believe that the more one puts into his organization the more he will get out of it.

Should you ever feel that your organization is run by a clique, do not be alarmed. It is suggested instead that you join it. This can be done simply by attending meetings regularly, if possible, taking a more lively interest in the activities, making constructive suggestions and accepting responsibility. Before you realize it, you will become a member of the clique and will be surprised to know how anxious they are to have you.

News from other Centres:

Mr. K. E. Chilton, President, Hamilton Centre:
- Mr. Chilton is Chairman of the National Committee for the 1972 Eclipse. He is looking to Halifax for someone who would be willing to act as liaison between our Centre and the Committee.

Mrs. Inez N. Beck - Lunar Co-Ordinator
International Union of Amateur Astronomers
Chio, U.S.A.

In future, we will be receiving I.U.A.A. lunar newsletter. Mrs. Beck would like to hear from us in regard to any lunar work conducted by our Centre.

One of the experiments to be conducted during the Apollo 14 mission will be the search for water in the form of ice. Some scientists believe ice could be located at a depth beyond the suns heat penetration. A device has been developed which will fire cartridges into the lunar surface creating seismic waves which could detect such concentrations of ice.

- Time of typing - January 26, 1971
Apollo 14 astronauts due to take off for the craggy Fra Mauro highlands on January 31, 1971.

How to make a Telescope.

The telescope that amateur astronomers usually use is either a refractor or a reflector. The refractor is the proper name for that type of telescope such as is seen at rifle ranges etc. where the user looks through it pointed at the object being viewed. This telescope consists of two lenses only. The large one at the front is the object glass, and the one (or system) at the rear is the eye-piece.

A refractor with a 2 inch diameter object glass can introduce a number of interesting astronomical nights to the beginner. Objects such as the lunar craters, phases of Venus, Moons of Jupiter, the wider double stars, and the larger nebulae can be viewed.

Individual optical items such as object glasses, prisms, eyepieces etc. may be obtained fairly inexpensively from such dealers as Edmund and Jaegers, etc. Catalogues may be obtained from these firms.

For the amateur who wants a larger instrument, the Newtonian reflector type of telescope is recommended. The optical parts consists of a main mirror, a flat or diagonal mirror and an eyepiece. A six inch diameter concave main mirror is a size with a compromise between cost and performance.

There are two ways to go about making a reflector. One way is to buy all the optics, and mirror cells (holders for the mirrors) etc. and then to incorporate everything into a body complete with a sturdy mounting.

The other which is far cheaper is to make all the mechanical parts such as the mirror cells, eyepiece holders etc. and also the most expensive optical part which is the main mirror. Making a mirror of quite good quality is not difficult if perseverance is applied. The thing to do is to buy a mirror kit (a 6 inch kit is recommended for beginners) and then obtain one or the other of several good telescope making books, which describes not only mirror making but also the construction of the rest of the instrument. (See- All about telescopes by Sam Brown, issued by the Edmund Scientific Co. 101 East Gloucester Pike, Barrington, New Jersey 08007).

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Undetected Galaxies in "Backyard".

Astronomers have discovered two previously undetected galaxies in the earth's galactic backyard. Location of the two galaxies named Maffei 1 and Maffei 2 and their apparent size and distance from earth was reported in The Astrophysical Journal by astronomers from the University of California at Berkeley, the California Institute of Technology and the Carnegie Institution of Washington. The newly discovered galaxies are named after a young Italian astronomer, Paolo Maffei, who reported in 1960 that he had found two strange objects on infra red photographs made at Frascati, Italy.

The nine astronomers who wrote the article in the Astrophysical Journal said that interstellar dust in the Milky Way Galaxy, of which earth is a part, has obscured the two galaxies and delayed their detection. The discovery means astronomers must revise their concept of what they call the local group of galaxies, those nearest earth. The local group previously was believed made up of five galaxies - the Milky Way, of which the sun is a minor star, The Andromeda Galaxy and three smaller satellite galaxies. The article reported that Maffei 1 and Maffei 2 are only twice as far away as Andromeda - making them close indeed on the inter-gallactic distance scale. The new galaxies are estimated to be about three million light years from earth. Studies indicate that Maffei 1 may be as large or larger than Andromeda - the largest galaxy in the area of the solar system.

The Royal Astronomical Society of Canada is an organization devoted to the advancement of astronomy and allied sciences. Membership in the Society is open to anyone in the world interested in astronomy. The total membership, which is composed largely of amateurs, also includes most of the professional astronomers in Canada.

The Society has a long history. Its origins go back to 1868 when eight amateur astronomers founded a Toronto astronomical club. An expanded group obtained a charter in 1890 under the Revised Statutes of Ontario as the "Astronomical and Physical Society of Toronto." In 1903 King Edward VII permitted the use of the word "Royal" and the name of the Society became "The Royal Astronomical Society of Canada".....

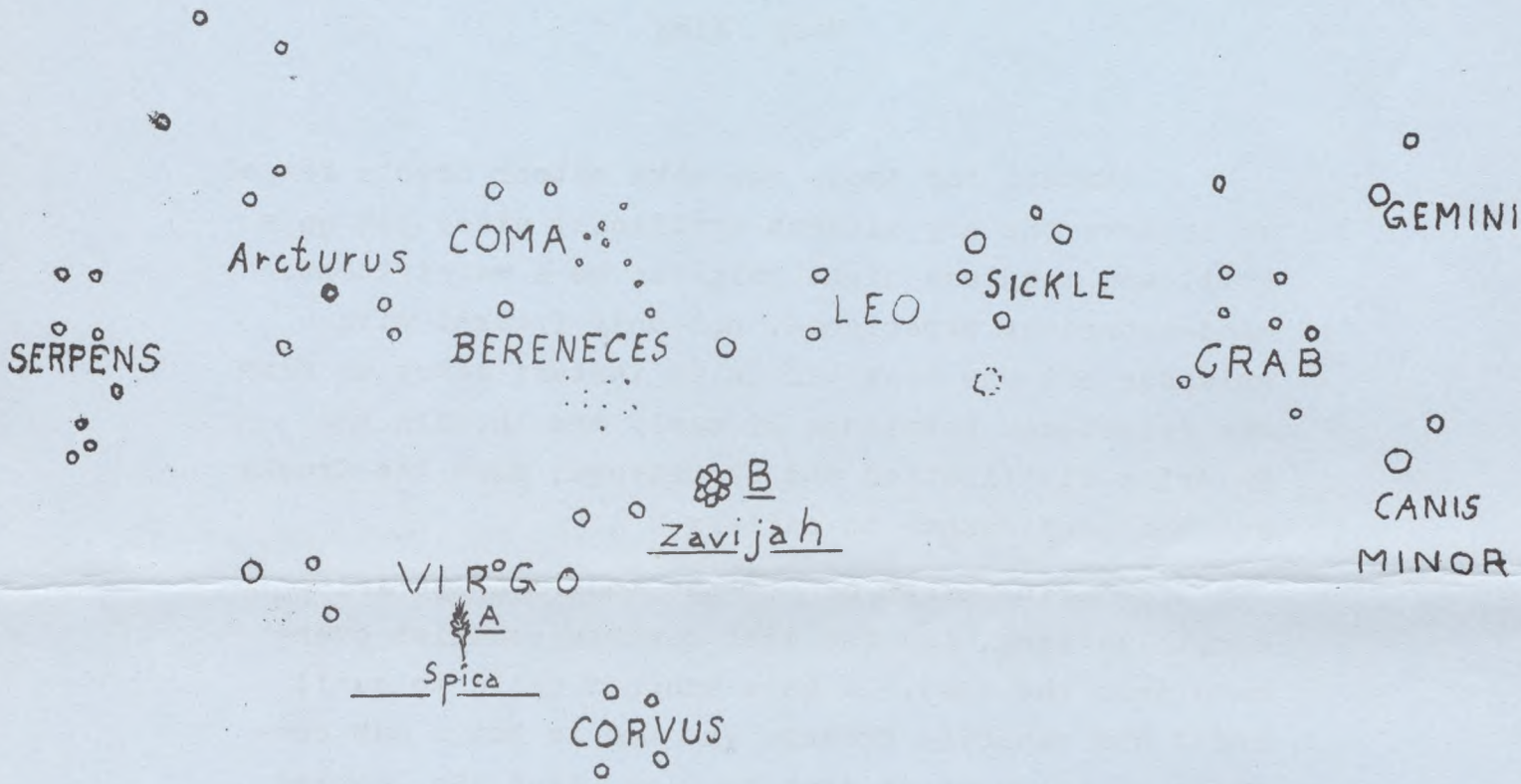
STAR STARING

Mary King

Except for those who make meteor counts few of us observe the sky without artificial aids, yet on a still and moonless night this can be a magnificent, mind-expanding experience, not only fraught with splendor but one that can in an instant carry us from the frightened babblings of early man through the Sumerian civilization and Stonehenge, past the Greeks and the renaissance to pulsars.

During March one of the most awe-inspiring constellations, Leo the lion marches southish overhead into the west. I have known a child to quail under his menacing crouch, yet Leo is but a cub compared to the ancient Arabian lion, Asad who covered one third of the sky; stretching from Arcturus in the northeast and Spica in the southeast to Gemini and Canis Minor in the west.

One of Asad's paws extended to Gemini the other, contracted, terminated at Canis Minor. Cancer was "The Lion's Mouth" and "The Sickle" his head. Coma Berenices, the end of Asad's tail was, in those days known as "The Tuft" or "The Coarse Hair". Spica marked one of his hind legs and Arcturus the other. Corvus was his haunch.



CONSTELLATIONS OF THE GIANT LION

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F.J. Badiny, Altaic People's Theocracy

Gambel & Braidwood, An Early Farming Village in Turkey
Scientific American, April 1970

G.de Santilland & H.von Dechend, Hamlet's Mill

R.H. Allan, Star Names

The Atlas of the Universe, Rand McNally

But thousands of years before Asad of the Arabians, whose recorded history goes back only to 1000 B.C., the Sumerians and probably men long before them knew a giant lion in the sky.

In 12000B.C. Spica, A Virgo was the star rising with the spring equinox and became the home of the fertility goddess of wheat. But by 10000 B.C. precession had carried the spring equinox to Zavijah, B Virgo and this star became the home of the fertility goddess of dates.

Men have roamed the mountains of Turkey for some 200,000 years but only since 9000 B.C. have they lived in agricultural settlements. About 5000 B.C., when the Sumerian civilization rose from these settlements Spica and Zavijah were definitely placed on a lion in the sky: Spica, "The Star of the Divine Head of Corn" was on the "shin-bone of the lion" and was the home of the fertility goddess Nidaba; Zavijah, "The Star of the Divine Date Cluster" on the "hind leg of the lion" housed Sarpanitu, goddess with the power over the fertility of the date palm. The Divine Date Cluster was our Coma Berenices, and the Divine Head of Corn was the east "wing" of Virgo.

These characters will be passing across the evening sky until about the end of June. If you miss them in the sky take in a country fair and you will probably see some of them either in person or in symbol as the decorations on the ever-circling merry-go-round.

PICTURES FROM TWO DIFFERENT MERRY-GO-ROUNDS

Top Left	Sarpanitu's Date Cluster on the Saddle.
Centre Left	One of the lions of Ningirsu, a Sumerian God whose symbol was an eagle and two lions. This merry-go-round also had the eagle on one of the horses.
Lower Left	Virgo (probably as Erigone with her dog, Maera who told her where her murdered father lay buried).
Centre Right	Giant sky lion.
Lower Right	The tail of Serpens, the Constellation following the giant in the sky and on the merry-go-round.
Centre Inset	Nidaba's Head of Corn on the saddle.