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OCCULTATION RECORDED

Michael Boschat of the Halifax Centre, R.A.S.C. has been mentioned in the April, 1980 OCCULTATION NEWSLETTER, from which the following is a re-print.

Michael Boschat, who is restricted to observation from his home location, saw only a ten-second occultation of Z.C. 508 (5-Tauri) on January 26. Both events were gradual, apparently diffraction effects perhaps enhanced by the stars duplicity, known from spectra. A graze of 5 Tauri was first ever observed with a transported telescope. Leonard Kalish observed it near Castaic Junction, CA, in 1962 September; that graze was on the bright limb.

Occultation Data:

Mo	Dy	Star#	Mag	%Snl	CA	Location
1	26	0508	4.3	66+	1S	Halifax, N.S.

#St	#Tm	Apcm	Observer	WA	b
1	2	13	Michael Boschat	178	72

Michael Boschat has been an avid occultation observer and comet hunter for a number of years. He is also interested in plotting meteor showers. If anyone else would like to collaborate with Michael on any of these observations, please call him at home. His telephone number is 455-7527.

ANNUAL-MAY DINNER MEETING

Minutes of the May meeting of Halifax Centre - the ANNUAL MEETING. This was held at a Chinese restaurant and was "jolly good". The Burke Gafney award was given after a worthy competition to WILLIAM J.CALNEN. His paper was "Designing a Helical Antenna for Radio Astronomy". A very thorough study of the subject and this could well be done by an amateur.

We were honoured to have Prof. JOHN PERCY as our guest speaker- President of the R.A.S.C., Editor of The Observers Handbook, Professor of Astronomy at U.of T. He gave us a brief history of The David Dunlap Observatory.

C.A.Chant got astronomy rolling in Toronto and started the R.A.S.C. He began the tradition of public speaking with enthusiasm and inspired a young man who later became wealthy. This man died but his widow gave the money to build this observatory in his honour. When it opened in the late '30's it was the second largest (74") in the world. There is a rumour that because of city lights that the observatory is useless now. Nothing could be further from the truth.

74"-- Continuing work on radial velocities. A new spectrograph will be installed soon which will be largely electronic- no more pesky little glass slides. RS Canum Venaticorum, Spectroscopic binaries, Algol and thefirst work demonstrating that Cygnus X1 must have a black holeassociated with it.

19" built by R.K.Young is used for Cepheid variables

6" refractor that is 100 years old is used for comparison stars in this study. City smog can't stop this.

24" is used for new instrumentation development. Dr. Percygave a strong impression of enthusiasm hard work in a very busy department. They even have two telescopes on the roof of the physics building right down town- a 6" and a 16". With all this they recently discovered ASTEROID TORONTO. This does not need avery large telescope,just patient dedicated work.

The U.of T. also is responsible for the Algonquin radio telescope facility and has a 24" one atChile.

The conclusion we were led to come to was that SMALL is good in fact better than the enormous instruments that are largley dedicated to large scale projects. Ultimately I would suppose the optimum would be the HUMAN EYE.

Wow! Dr. Percy is in the fine tradition of the former great men of the D.D.O. who could inspire.

The "prospective" minutes of the June meeting of the Halifax Centre R[illegible]S.C. How can there be minutes for a meeting that has not yet happened you may ask. the trick is that the speaker will be your secretary and he has some idea about what he will say.

SOLSTICES AND SIMILAR PHENOMINAE together with a demonstration of a 5000 year old computor.

The subject is mind boggling and be prepared to be suitably boggled. Who were the "beaker people"? What date could be ascribed to these "monuments"? Where are the Nodes now? Why would you want to Know?

/ For every smooth talker and shyster there has to be a sucker or two. This is in the way of an apology from your secretary because he fell for it. So don't fall for it. I refer to " the international Star Registry". One can "buy" a star for $25. and have it "registered"and all that. A real meaningless put-up job.

So learn something! This star shall be known as- BLUENOSE ASSEMBLY. (it's real name is 5 Pupis)
To find it it is---

RA 7h 46m 30s Dec -12° 09'
HR 3029 (Harvard Bright Star Cat.
BD 11 2106 (Bonner Durchmusterung)
HD 63336 (Henry Draper)

V 5.52 (Visual magnitude)
Sp dF5 (Dwarf- spectral type F- 5
Parallex +.013"
VR +27Km/sec (radial velocity)

THIS IS A DOUBLE STAR!! (twice our [my] money's worth)
Dm 2.1 (difference in magnitude)
sep 3.8" (separation)

So, sorry John Percy, there it is. As he said it is still 5 Pupis. But didn't you learn something? Like how to spell Durchmusterstrungblat. Or was it ?

R.Murray Cunningham
Secretary

THE JUPITER EFFECT - FACT OR FALLACY

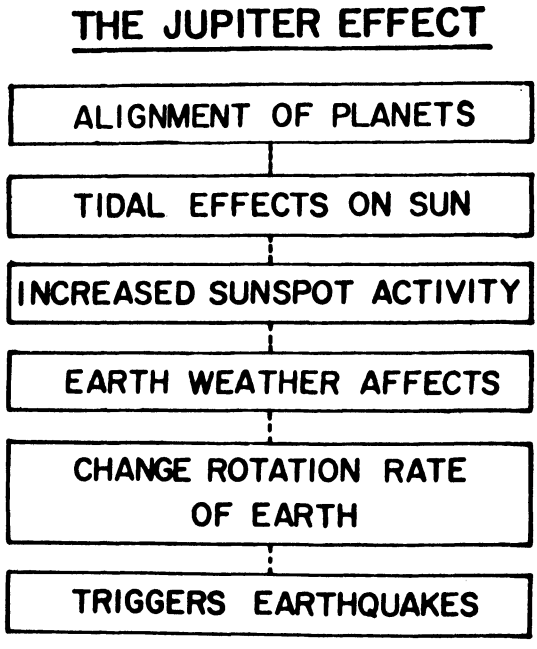
The following is a re-print of an article from SASKATOON SKIES, the Saskatoon Centre monthly publication. The article was prepared by Gorden N. Patterson from a talk that he presented in March.

A book entitled "The Jupiter Effect", written by John Gribbin and Stephen Plagemann, first published in 1974 and republished in the popular pocket-book format in 1974 and in 1978, has given rise to all forms of speculation by various individuals, evangelical groups, and also the media, so much so that a religous tract distributed recently is forcasting 'Unimaginable Chaos'. Other less sensational literature is forecasting severe earthquakes, particularly in California in 1982. Is there any real fact and/or truth in these statements, and is there a "Jupiter Effect"?

Most astronomers, both amateur and professional, will probably take those statements in the book with a large helping of salt, but will they be in a knowledgeable position to refute those statements if any of their friends or associates present the subject to them for explanation, especially as the book was written by two graduate physicists and astronomers? How many astronomers came forward to publicly refute statements made by various ophthalmologists during the 1979 solar eclipse? I think it is time we stood up to be counted when such statements as those made in "The Jupiter Effect" are allowed to promote hysteria among the more gullible of our population.

The Book, "Jupiter Effect", is based on a chain of probable happenings or results starting from an alignment of the planets to a final ending of catastrophic earthquakes in 1982. Figure 1 diagrams this 'chain', and I propose in this article to investigate each of these links thoroughly to establish their authenticity or otherwise. Like any chain, the strength is only as good as the weakest link, and if any link breaks, the entire 'chain' becomes useless.

Figure 1: The Jupiter Effect Chain



The first link of the chain is "Alignment of Planets". The authors state: Between 1977 and 1984 the planets of the Solar System will be moving into an unusual alignment in which every planet is in conjunction with every other planet; that is, all the planets will be aligned on the same side of the Sun, an event that is supposed to recur every 179 years. This quotation has been further amplified in the previous-mentioned religous tract to add: "but in 1982 the nine planets will not only be on the same side of the Sun, but will be in p e r f e c t a l i g n m e n t. (The italics are my own).

What is meant in astronomy by the word 'alignment'? The normal meaning is that the Sun, the Earth, and another planet are precisely lined up, and this is referred to as an opposition, or an inferior or superior conjunction. I have prepared Table 1 to show the senodic periods of all the planets with relation to each other. On examination of this Table,it can be seen that there is no synodic period that equates to 179 years, nor is there any sub-multiple of this figure. This makes the first 'link' in the chain look a bit weak. However, one small crack does not break the link: we must look a bit further yet.

If one takes a listing of all the oppositions and the conjunctions as shown in the 1980 Observers Handbook, it is possible to calculate forward to 1982 to determine whether such as the St. Andreas fault in California, is due to have a severe earthquake in the near future, but all the resources of the USA geological services have been mustered to find a solution to this problem.

FREQUENCY OF OPPOSITIONS IN THE SOLAR SYSTEM

PLANET	MERCURY	VENUS	EARTH	MARS	JUPITER	SATURN	URANUS	NEPTUNE	PLUTO
MERCURY	XXX	144.65 days	115.93 days	100.93 days	89.92 days	88.73 days	88.25 days	88.13 days	88.09 days
VENUS	144.65 days	XXX	583.91 days	333.91 days	236.99 days	229.49 days	226.36 days	225.54 days	225.26 days
EARTH	115.93 days	583.91 days	XXX	779.93 days	398.89 days	378.09 days	369.66 days	367.49 days	366.74 days
MARS	100.93 days	333.91 days	770.93 days	XXX	816.48 days	733.85 days	702.73 days	694.93 days	692.26 days
JUPITER	89.82 days	236.99 days	398.89 days	816.48 days	XXX	19.85 yrs	13.81 yrs	12.78 yrs	12.46 yrs
SATURN	88.73 days	229.49 days	378.09 days	733.85 days	19.85 yrs	XXX	45.37 yrs	35.87 yrs	33.44 yrs
URANUS	88.25 days	226.36 days	369.66 days	702.73 days	14.81 yrs	45.37 yrs	XXX	171.37 yrs	127.13 yrs
NEPTUNE	88.13 days	225.54 days	367.49 days	694.93 days	12.78 yrs	35.87 yrs	171.37 yrs	XXX	492.41 yrs
PLUTO	88.09 days	225.26 days	366.74 days	692.26 days	12.46 yrs	33.44 yrs	127.13 yrs	492.41 yrs	XXX

Table 1-

Frequency of Opposition in the Solar System

Would it not be wonderful if we could use a close grouping of planets to give an accurate earthquake forecast? Think of all the seismologists who would suddenly become astronomers!

I would like to end this article with a quote of the summary prepared by Jean Meeus, a very learned planetary astronomer in Europe, who reviewed the "Jupiter Effect":

Several statements, on which the recent book "The Jupiter Effect" is based, are invalid: The planets will not be"aligned"in 1982, and such an alignment has no effect on solar activity:,

planetary tides on the Sun are negligible: tides raised on the Sun by Venus, Earth, and Jupiter have a period of four months, not 11 years, and Wood's curve has no physical justification: there are not more sunspots visible at the eastern limb of the Sun than at the wetern one: the mean number of sunspots is the same at Venus' inferior and superior conjunctions: the influence of solar flares on sudden changes in the Earth's rotation and on earthquakes is not prooved. This leads to the conclusion that there is no evidence for a correlation between planetary positions and earthquakes. The "Jupiter Effect" does not exist.

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Eddy, Dr John A. (1975) The Case of the Missing Sunspots, Scientific American.

Gribbin, J & Plagemann, S., (1974) The Jupiter Effect, Macmillan, London; Walker, New York.

Meeus, Jean., (1975) Comments on the Jupiter Effect, ICARUS 26, 1975

EDITORS NOTE:

For more lengthy and detailed notes of Mr. Patterson's article please contact the editor of Nova Notes. Space and time limited the amount of reproduction. However this timely article is worthwhile pursuing.

GALAXY CLASSIFICATION--A REVIEW

JEFFREY J.E. HAYES
Dept. of Astronomy, SMU
& Halifax Centre

Man is by nature a classifier--we like to pin labels on everything we see about us, and this trait carries over into our sciences. Consider, for example, astronomy. Astronomy's aim is to study and understand the objects which surround us in the universe. To do this, the astromer must classify the objects he sees. What I propose to do in this paper is to discuss (albeit briefly) the various classification schemes used for galaxies.

Galaxies as systems of stars external to the Milky Way were recognized as such only in 1925, due to the work of Edwin Hubble at Mt. Wilson. Strangely enough, Hubble was not the first to devise a classification scheme for galaxies. The honour goes to M. Wolf of Bonn in 1909. At the time of Wolf's paper, however, galaxies were not thought to be huge aggregates of stars at great distances, but small near-by solar systems 'in-the-making'. Wolf's original scheme used the spherical appearance of the nebulae as the classification parameter. Spherical nebulae, such as planetaries were classified as type 'a'; spiral galaxies, such as M51 were type 'w' objects; with elliptically shaped and lenticular systems occupying intermediate positions.

By the mid 1920's Hubble and Humason had carried out their research into galaxies to a point where they could classify galaxies in terms of their overall appearance. They noted 3 general categories--elliptical, spiral, and **irregular.** The definitive work on this research came with the publication of Hubble's Realm of the Nebulae in 1936. It was in this book that the now famous 'tuning-fork' diagram first appeared (fig. 1). Of the three broad categories above, Hubble also recognized sub-divisions within each. These sub-divisions are as follows:

1) elliptical are aggregates of stars which superficially resemble star clusters. They are, however, far more massive and remote than any visible globular cluster. They are sub-divided on the basis of ellipticity; E0 being the most spherically symmetric and E7 being the most elongated,

with classes in between.

2) lenticulars (SO) were first found by Hubble in the late 1930's and are basically 'armless' spirals. They are somewhat intermediate between E7 ellipticals and early spiral galaxies.

3) spirals are the galaxies which resemble Catherine wheels, and they were broken into 2 major groups, 'normal' spirals and 'barred' spirals (with a bar of stars running through the nuclear bulge. These types were denoted as 'S' and 'SB' respectively. Furthermore, Hubble noted that the looseness of the spiral arms could be used as a parameter as well. Spiral systems were divided into Sa, Sb and Sc types (as well as barred spirals) with Sa denoting tight, closed-up systems and Sc denoting loose, open systems.

4) irregulars are galaxies which Hubble could not classify in any other way. They range in form from the Small Magellanic Cloud, to some of the interacting systems seen in Halton Arp's Atlas of Peculiar Galaxies(1966).

Needless to say, Hubble's original classification scheme has not survived unmodified. Harlow Shapley as early as 1940 modified Hubble's scheme by adding the types Sd and SBd to denote very loose spiral galaxies, rather than calling them'late Sc' systems as Hubble would have. Allen Sandage has also modified the original Hubble scheme by introducing intermediate types (ie, Sab or Sbc). The most extensive revision of Hubble's scheme was done by G. de Vaucouleurs (1958, 1964).

In de Vaucouleurs' scheme, 'normal' spirals are denoted SA, while he retains the notation SB for barred spirals. He also retains Shapley's types Sd and SBd, along with introducing an intermediate type between Sd and Irregulars, types Sm and SBm. In barred spirals de Vaucouleurs also indicates the form of the spiral arms; if the arms begin tangentially to a ring structure upon which the bar terminates, these are type 'r'; if there is no such ring structure these are type 's'. These designations are suffixed to the morphological class. For 'normal' spirals the characteristics of the arms are also noted. This is done by using the subscript 'm' or 'f'; denoting

respectively 'massive' and filamentary' arms. As one can see, de Vaucouleurs' scheme can be very specific in denoting a galaxy's morphology.

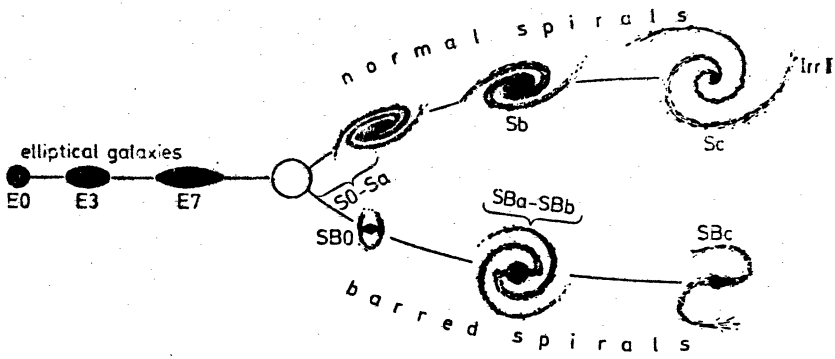
The last classification system that will be discussed here will be the scheme of Morgan and Mayall(1958/9). This is a two dimensional scheme in that one uses both morphology and spectral type. The spectral type is deduced by observing the dominant spectral features of the galactic nucleus. The scheme uses the same sort of designation as the Yerkes system for stellar classification (ie, OBAFGKM) except in lower case script. Also, because nuclei are not uniformly all one stellar type, there are intermediate types. As well as this spectral designation there is a morphological one. These are: E (ellipticals), S (spirals), B (barred spirals), I (irregulars), N (small brilliamt star-like nuclei in a faint envelope), L (galaxies with low over-all surface brightness). Also, there are indices indicating inclination—from 1 for circular to 7 for elliptical. Of these classes, the two most widely seem im the literature are the N-galaxies and the cD galaxies, the latter beimg supergiant elliptical galaxies mear the cemtre of rich galaxy clusters.

By way of an example, I will show the differences betweem the 3 classificatiom schemes mentiomed. The galaxy chosem for this purpose is M51, a spiral galaxy im Cames Vematicies (NGC 5194).

Hubble's	de Vaucouleurs'	Morgam's
Sc	SAB(rs)bc	af53

(the umderlimings im de Vaucouleurs' imdicates which form domimates).

Im conclusiom, galaxy classificatiom is mot as easy as it seems at first. This is to be expected im a field where one is dealimg with such huge systems (30 kpcs im diameter and with masses about 10^{11} that of the Sum), which umtil recemtly were thowght to be part of our owm galaxy! This paper, by virtue of its lemgth, has by mo meams discussed other classificatiom schemes, motable amomg them vam dem Bergh's and Holmberh's. However, I have emdeavored to discuss the 3 most (argueably) widely used classificatiom



Classification of galaxies

schemes. Notwithstanding their differences, all classification schemes spring from Hubble's original system (excepting Wolf's system which predates Hubble's). The reason Hubble's system has survived, though modified to various degrees, is that it can accomodate, as no other system can, the tremendous range and variety of characteristics visible even in the most cursory glance. Its flexability, (a characteristic which makes or breaks any theory or classification scheme) has insured that Hubble's classification in whatever modified form it takes, will be used by astronomers for some time to come.

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3) G. de Vaucouleurs, in Reference Catalogue of Bright Galaxies (ed. by de Vaucouleurs and de Vaucouleurs) U. of Texas Press 1964

4) E. Hubble, in Realm of the Nebulae, Yale Univ. Press 1936

5) W.W. Morgan, Pub. A.S.P. 70, 394 (1958)

6) M.Wolf, Pub. Ap. Inst. Koing., 3, #5, (1909)

7) H. Arp, Ap. J. Suppl., 14, #123, 1, (1966)


BAN
DEODORANT
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PROTECTION
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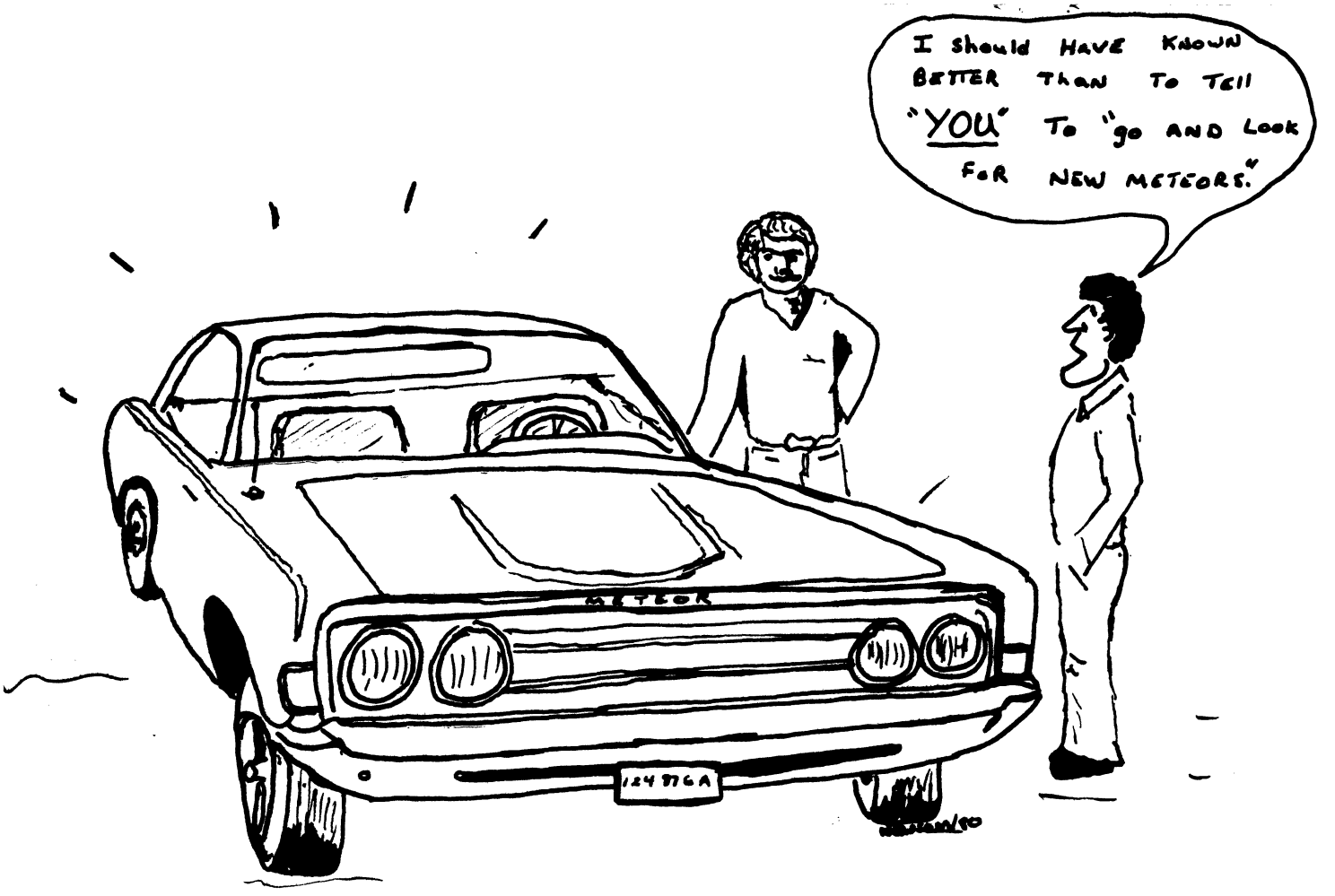
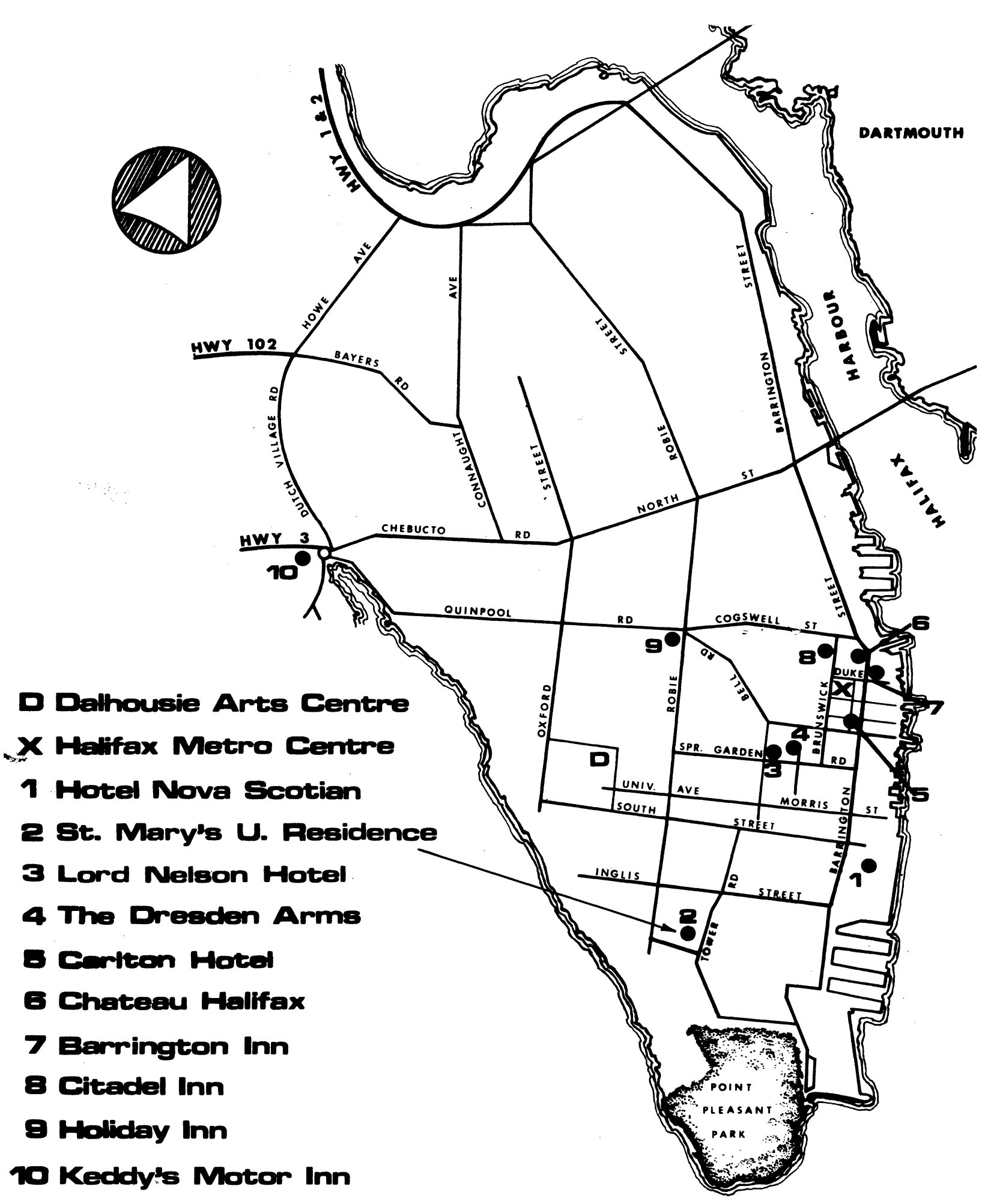
JUST RAN OUT
PERKINS:
YOUR FIRED!
NEWCOM/90


I should HAVE KNOWN BETTER THAN TO TELL "YOU" TO "go AND LOOK FOR NEW METEORS."
METEOR



MAP COURTESY OF HALIFAX VISITORS & CONVENTION BUREAU

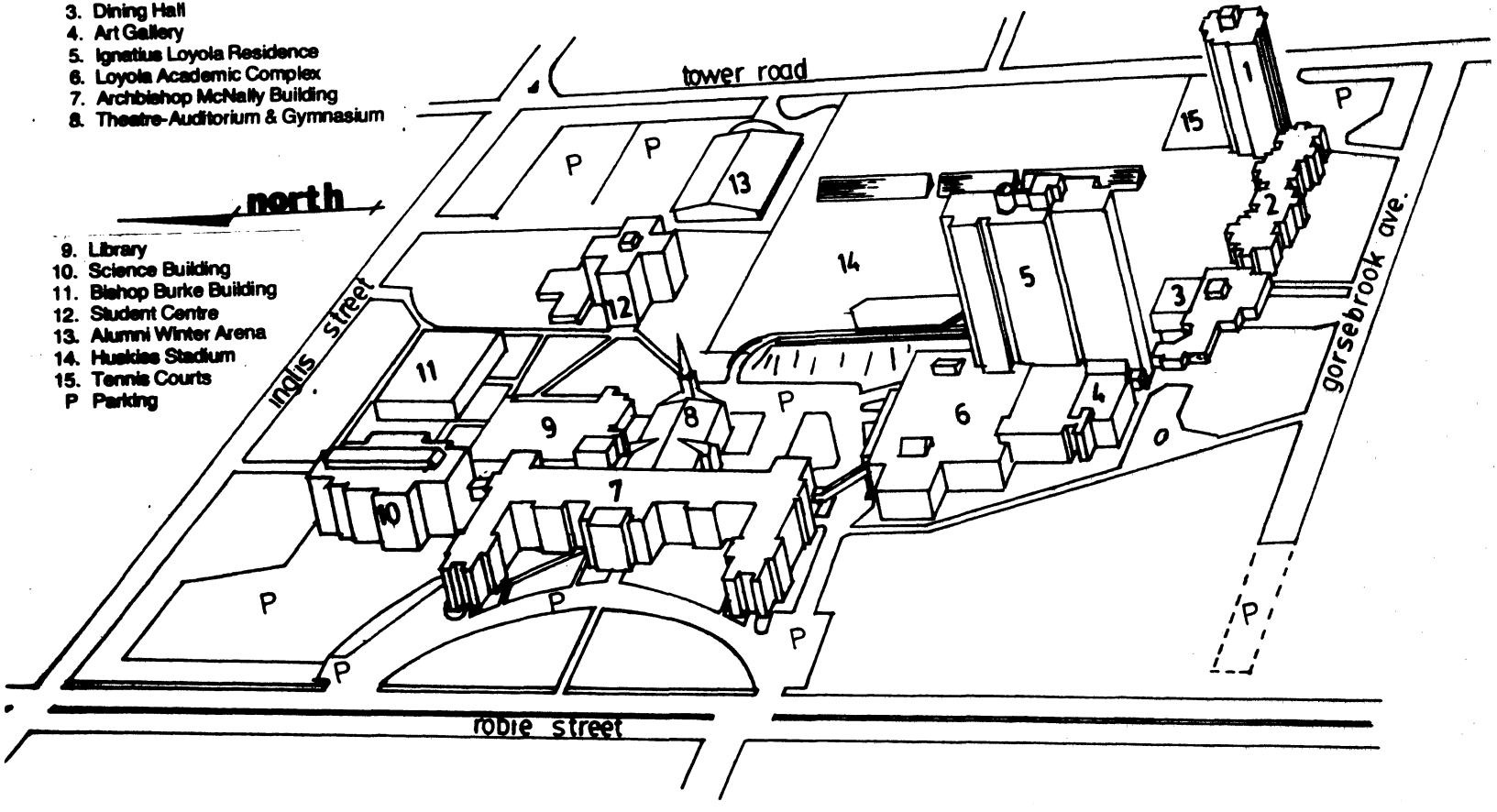
Saint Mary's University
Campus Guide

1. Edmund Rice Residence
2. Vanier House Residence
3. Dining Hall
4. Art Gallery
5. Ignatius Loyola Residence
6. Loyola Academic Complex
7. Archbishop McNally Building
8. Theatre-Auditorium & Gymnasium

north

9. Library
10. Science Building
11. Bishop Burke Building
12. Student Centre
13. Alumni Winter Arena
14. Huskies Stadium
15. Tennis Courts

P Parking



METEOR PROJECT-2

The summer months are almost upon us and with them the activities of the warmer wheather. This is also the time that astronomy takes a back seat to the extra demands that will now befall us. However this is also a good time to prepare for fall viewing, especially the expected meteor showers. Michael Boschat has sent a list of meteor showers that should bear watching. Thanks to Michael for the following article.

During the fall and winter months the following meteor showers should be watched.

DRACONID	OCT. 9	VAR. (20,000/1933) (1,000/1946)
ORIONIDS	OCT. 20	25 per/hour
S.TAURID /ARIETID	NOV. 5	15 per/hour
N.TAURID	NOV. 10	VAR.
BIELID	NOV. 14	VAR. (5,000/1827) (10,000/1885)
LEONID	NOV. 16	VAR. (10,000/1883) (1,000/1867) (1,000/1967)
GEMINID	DEC. 13	50 per/hour
URSID	DEC. 22	15 per/hour

In the past few years the Russians have recorded an increase in the PERSEID and LEONID showers.

In my writing to the Russians they acknowledge that there are usually 5 or 6 groups of amateur observers that do their viewing from mountainous regions in the Crimea.

For us in the city remember to use 20 second exposures with Tri-X film. If you are outside of the city you can increase your exposure up to one hour. If a meteor crosses your camera field of view just as you are beginning your exposure, release the cable and go on to your next one. This would normally apply to people viewing in the city.

Note down the time (in Universal time) that the meteor was observed and its color, magnitude, train, sound (if any), and the duration (in seconds) it was observed. This data helps in determining the radiants position. You can put your camera 40^{o} away from the radiant since at times when a camera is pointed at the radiant you will get point meteors that will be dots on your film.

A stationary mount is best for meteor work but you can use a driven mount if you wish.

Baseline work should not exceed 90 miles (145 km). Those interested in baseline work should call me at least one week before the expected shower at my home phone which is 455-7527.

One last thing, color film is of little value in meteor photography unless you want an extra pretty picture. This is normally due to the color emulsions of the film.

So GOOD LUCK and start clicking those cameras.

MICHAEL BOSCHAT

THE AIRY DISC BRILLIANCE FACTOR

Michael P. Edwards

Why is it that a small increase in telescope aperture gives an apparent increase in resolution which appears to be considerably greater than the actual resolution inprovement given by aperture increase or the increase in light grasp would indicate? Particularly in viewing a Globular Cluster, say M13, many amateurs have wondered why an 8-inch telescope will clearly resolve stars through the core of this object, while in a 6-inch averted vision must be used, and in a 4-inch M13 appears as an amorphus blob.

A diffraction limited telescope will focus 80% of the light from a faint star inside a small round ball at the focal plain. This small round ball is referred to as the primary maxima in the light distribution or the Airy disc. The size of this Airy disc, measured in arc seconds, is determined by the aperture of the telescope only. Under perfect conditions, an 8-inch telescope will produce an Airy disc image from a faint star having a diameter of 0.5 arc seconds (the actual angle subtended by even the closest star is about 0.2"). A 4-inch will produce an Airy disc of 1.0 arc

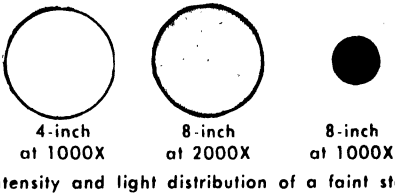
seconds. In other words; the Airy disc diameter, measured in arc seconds, decreases as the telescope objective increases in diameter.

The maximum magnification at which any telescope can be used is limited by the power at ahich the Airy disc dominates.This is about 60 diameters magnification per inch of aperture of the telescope. The optimum magnification for a telescope is where the Airy discs of stars can just be noted as small round pin points in the field of view-- about 20 diameters magnification per inch of aperture.

If you compared telescopes of different aperture at a power that is increased as aperture increases, say 60 diameters per inch of aperture, the apparent diameter of the Airy disc would remain constant; but its intensity would increase by the aperture ratio squared. As an illustration, the image of a star viewed in a 4-inch telescope at 240 power would be a small round ball. In an 8-inch at 480 power the small round ball would be the same size but four times brighter.

Suppose now that you compare the two telescopes at the same actual power, say

160 power, which is optimum for a Globular Cluster. The Airy disc of the eight inch would have half the diameter of the Airy disc of the 4- inch, but since four times the light is concentrated into one-fourth the area, the Airy disc will appear 16 times more brilliant. This is called the Airy Disc Brilliance Factor. To establish a scale-- let the Airy Disc Brilliance Factor of a 3.5-inch telescope be one. On the same scale the brilliance factor for a 5-inch is 4.2 and for an 8-inch it is 27.5



Intensity and light distribution of a faint stellar image under ideal seeing conditions for a 4 and 8-inch telescope. Only the primary maxima or Airy disc is shown in this comparison for simplification.

The above is taken from Celestron Techniques, October 1971, Vol. 1 No. 2

MPE

MYTHOLOGY IN ASTRONOMY

Diane Brooks

When the ancient Greeks looked up at the clear night sky, they saw not merely specks of light, but their gods and heroes immortalized on the dome of the world. The lights that moved against the "fixed" background of stars, they called "wanderers", the Greek word of which gives us the term "planets".

Our principal source in mythology of the origin of the world is the Greek poet, Hesiod. According to him, nothing existed at first but Chaos, a deep, empty space. From Chaos appeared Gaea, the earth, and Eros, love, followed by Erebos, darkness, and Nyx, night. The union of Erebos and Nyx produced Aether, the clear sky, and Hemera, the day. Gaea bore Oranos, called Uranus by the Romans, who was the sky strewn with stars.

Oranos was the first ruling god and the ancestor of all other divinities. His mother and wife was Gaea, the earth-mother and goddess of fertility. Their many children included Cronus, known as Saturnus by the Romans, who ruled the maturity and life span of all living things. Frequently referred to as Father Time, he is often depicted as an old man bearing a sickle. Indeed, Cronus maimed his father, Oranos, with a sickle because of his harsh treatment of his children. This castration produced Aphrodite, the goddess of love. She was called Venus by the Romans. The term "venus" is derived from the same root as "venia" meaning indulgence and favour. In Syria she was known as Aphrodite Ourania, the Heavenly, alluding to her birth from Oranos, the sky.

Cronus succeeded Oranos as ruler of the world. He married his sister, Rhea, also a fertility goddess and an earth divinity. Their children included Zeus (Iuppiter), Poseidon (Neptunus) and Hades (Pluton). Cronus discovered from his mother, Gaea, that, like his father, he was destined to be overthrown by his youngest son. In an attempt to avert the fate that he had dealt to Oranos, Cronus swallowed each of his children as they were born. The distressed Rhea, determ-

ined to save one of her children, fled to Crete and there bore Zeus. She hid him in a cave on Mount Ida, and wrapped a large stone in swaddling clothes, which she presented to Cronus who immediately devoured it. Meanwhile, Zeus was cared for by nymphs and nursed by the goat, Amalthea. Out of gratitude, Zeus immortalized the goat in the constellation, Capricorn. Our term "cornucopia" or "horn of plenty" comes from the goat's horn which was granted the power of never being empty. When Zeus was an adult, he caused his father to expel his brothers and sisters who, being immortal, were unharmed. Zeus then conquered Cronus and became the father of the gods, thus ushering in the era of the Olympians.

With his brothers, Poseidon and Hades, Zeus cast lots for dominion of the sky, sea and underworld. The earth was managed in common by all three gods. Poseidon won the sea and Hades became ruler of the dead. Zeus, whose name means "Bright One", was lord of the sky and master of men. He was the first god to auger the future by sending to man signs, or diosemiai, in the form of thunder and lightening, comets, meteors, and eclipses of the sun and moon. Zeus was supreme over all except Night's son, Moros, or Destiny. In the dim shadows of dusk, Moros prepared his irreversible decrees which not even Zeus could overthrow. Nor did Zeus desire to change Destiny's resolutions for fear of injecting disorder in the universe he was responsible for governing.

Poseidon ruled the oceans and inland waters and dwelt in a palace in the Aegean Sea. His symbol was the trident with which he stirred up storms when he was displeased. Horses were often associated with him, including seahorses. He controlled the motion of the water and the tides; hence, the moon, which today we know affects the tides, has "seas" called "mare", which is also the name given to a female horse. Poseidon married Amphitrite who was reluctant at first. She fled, and Posiedon sent a dolphin to search for her and return her to him. The successful dolphin was rewarded with immortality among the stars.

Several other constellations came into existence through Poseidon's intervention in the quarrel between the Nereids and Cassiopeia, the granddaughter of Hermes and the wife of King Cepheus of Ethiopia. Cassiopeia boasted that she and

her daughter, Andromeda, were more beautiful than the Nereids. The nymphs of the sea urged Poseidon to avenge their wounded pride, and, in compliance, the sea god sent a monster called Borea to terrorize Ethiopia. Upon learning from an oracle that the only defence was to sacrifice Andromeda to Borea, the sorrowful king and queen chained her to a rock by the coast. Like all good stories, the tale of Andromeda ended happily. The hero, Perseus, son of Zeus and Danae, arrived bearing the head of the Gorgon, Medusa, whom he had killed as a task set him by the king of his land. Even in death the frightful head held the power to turn anyone who gazed upon it into stone. Perseus had succeeded in beheading Medusa only with the divine assistance of Pluto, Mercury and Minerva. The winged horse, Pegasus, arose from the first drop of the Gorgon's blood. With the dreaded head, Borea was easily dispatched, and Perseus claimed Andromeda as his wife. Today Cassiopeia and Cepheus are enthroned on the celestial sphere, while Andromeda, Perseus and Pegasus are depicted close by. Borea lurks in the form of Pisces.

One of Poseidon's sons, Orion, was a giant and an insatiable hunter of Boeotia. He sought Merope (not one of the Pleiades) in marriage, but her reluctant father, Oenopion, postponed the wedding. The drunken Orion forced his way into her room and was blinded by Oenopion. His sight was restored when he turned his face toward the rising sun. His thirst for the hunt led him to a proud boast that he would kill all the earth's wild animals. As punishment for his arrogance and to prevent him from executing his threat, Artemis, the goddess of the hunt, sent him a scorpion. This lowly creature stung the mighty giant and caused his death. To this day, Orion stalks the sky with his hunting dog, represented by Sirius, the dog star. He boldly pursues the Pleiades and the Great Bear, but is diminished in brightness when Scorpio rises.

Zeus' second brother, Hades, god of the underworld, came to be known as Pluton after his marriage to Persephone, daughter of Demeter, the goddess of the harvest. "Ploutos" means "wealth", and Pluton's dominion is beneath the earth where he causes shoots to germinate. Hercules is Hades' enemy because, as his twelth labour, Hercules brought Cerberus,

the dog who guards the gates of the underworld, up into the world of the living, thus defying Hades' power over the dead and the irrevocability of death. It is fitting that the planet, Pluto, whose domain is the dark, isolated depths of space, should have been named after Hades.

Zeus married his sister, Hera, and from this union was born Ares and Hephaestus. Ares, or Mars, the god of war, was accompanied in battle by his two sons, Deimos (dread) and Phobos (fear). Mars often rode to war in his chariot drawn by his horses, Aithon (red fire), Phlogios (flame), Conabos (tumult), and Phobos. As the planet demonstrates retrograde motion, its namesake favoured one side of a conflict, then the other. In Rome, Mars was elevated to the level of Jupiter in importance, by virtue of the Romans' belief that Mars was the father of Romulus and Remus, the founders of Rome. The Romans, in their high estimation of military power, were proud to consider themselves descendants of Mars.

Hephaestus (Vulcanus to the Romans) was the god of fire - an appropriate name for an intramercurial planet, if one exists. He personified fires of the earth, as manifested through volcanos. Originally, the lame smith-god may have represented celestial fire, as evidenced by his limp which may have forebode the zigzag of lightening. He was patron of black-smiths and arts forged through fire. Hephaestus constructed, among other things, the chariot of the sun which was driven by Helios.

The sun was personified by Helios (the Roman Sol), the son of the Titans, Hyperion and Theia; his sisters were Eos, known to the Romans as Aurora, the dawn, and Selene, the Roman Luna, the moon. Each dawn Helios set out across the sky in the golden chariot of the sun, drawn by four powerful white horses. From the surface of the earth all that could be seen was the dazzling wheel of the chariot. At dusk and the end of his journey, Helios embarked on a boat which returned him to his palace in the east to await the next day's passage. Helios has been known as the Untiring, by virtue of his indefatigable discharge of his duty to bring light and life to man. Helios' 350 cattle typify the days of a solar year, as reckoned in antiquity. Helios' seven sons, the Heliades, divided the day into hours. Later in antiquity

Helios was identified with Apollo, who was sometimes called Phoebus, the Bright; Artemis, Apollo's sister, was Selene's counterpart as goddess of the moon. The father of Apollo and Artemis was Zeus and their mother was Leto, goddess of the dark night. In his role as the god of prophecy, Apollo may have embodied enlightenment and knowledge, rather than the physical sun.

A son of Helios, Phaethon, became famous for his misadventure with the chariot of the sun. Stung by the taunts of Zeus's son, Epaphus, he boasted that his father had often allowed him to drive the great chariot across the sky. Epaphus' dare compelled him to beg his father for one favour which would prove Phaethon's divine parentage. Unsuspecting, Helios gave his word. Although horrified at Phaethon's request, he was forced to comply due to his binding pledge of assistance. But Phaethon's frail, inexperienced hand on the reins caused the powerful horses to take their own course. Plunging too close to the earth created deserts, droughts and fires deep within the ground, which occasionally erupt as volcanos. Flying too far away precipitated Earth's polar caps. This pandemonium could not go unnoticed or unchecked by Zeus who hurled a thunderbolt at the intruder. Phaethon's lifeless body fell into the river Eridanus. Both the river and Phaethon, as Auriga, the charioteer, were set into the sky as a reminder of man's hybris.

While Helios drove a mighty chariot drawn by four titanic horses, his sister, Selene, the moon, rode in a chariot drawn by two sedate silvery cows. Before her nightly ride, she bathed in Oceanus from which she provided the parched earth with dew during the hot, dry summer. As she induced plants to grow, farmers still plant certain crops according to the phase of the moon. It is believed that Selene and Helios had a special affinity for each other, but that they could meet only during new moon when Selene did not journey across the sky. One myth tells of Selene's love for Endymion, a mortal, who was granted immortality and eternal youth on the condition that he should be forever asleep. Every night the ardent moon enfolds the mortal in her rays. Another myth relates how the Nemean Lion was born to Zeus and Selene, falling to Earth from the moon. One of Hercules' twelve labours was to slay this beast, and the Lion is symbolized as Leo in the sky.

As Helios, the physical sun, came to be associated with Apollo's enlightening qualities, Selene, the corporeal moon, was identified with the moon's beneficial qualities to earthly life, as embodied by Artemis. Like the cold, white moonlight, Artemis aspired to chastity and demanded the same of her nymphs. But one of these nymphs, Callisto, became a mistress of Zeus who changed her into a bear to escape the jealous Hera's attention. Hera did discover this particular infidelity, however, and she convinced Artemis, in her capacity as huntress, to shoot the bear. In memory of Callisto, Zeus set the Great Bear into the sky. A female bear is often considered the symbol of Artemis herself. Callisto's son was Arcas who became the King of Arcadia, named after him, and a hunter. An alternate myth relates how Arcas unknowingly shot his mother in her guise as the bear. He became either the Little Bear, as companion to his mother, or Bootes, the Hunter. The name of Arcturus, the brightest star in the constellation, Bootes, was derived from Arcas, and it means "Chaser of the Bear".

Zeus had frequent love affairs, and from his union with Maia was born Hermes, known as Mercurius by the Romans. Hermes invented the lyre; the lyre belonging to Orpheus, a great poet and musician from Thrace, became the constellation, Lyra, in commemoration of Orpheus' amazing musical talents. The gods of Olympus adopted Hermes as their messenger, and in this capacity, the herald employed winged sandals to speed him about his tasks. It is fitting that the planet with the swiftest orbit around the sun was named after the god of twilight. Hermes is occasionally known as the one who makes the sky clear; as protector of flocks and herds, his duty was the care of the celestial herd of divine cattle embodying the clouds. As man navigated by the stars, Hermes guided him in his sea voyages. Hermes was frequently credited with the invention of astronomy. Alternately, astronomy is said to be the function of Urania (meaning "heavenly"), one of the nine Muses, who were the daughters of Zeus and Mnemosyne ("memory").Mnemosyne was a daughter of Uranus and Gaea.

Hermes' mother, Maia, was one of the Pleiades, seven daughters of Pleione and Atlas. They were the sisters of the Hyades who numbered five or seven. According to one myth,

Zeus turned the Hyades into stars in recognition of their care of him when he was an infant. Another myth relates their deaths when they jumped into the sea with Dionysus, the god of ecstasy, as he fled from Lycurgus who had accused him of stealing the wives of others. Their name may be derived from their brother, Hyas, who met a violent death in Libya and who was mourned by his sisters. Another derivation may be from the term, hyein, meaning "to rain"; the rainy season begins when the constellation rises. The Pleiades became stars after they took their lives in sorrow for their sisters, or to evade the unwelcome attention of Orion. The faintest star of the constellation is either Merope, who is said to conceal herself in shame because she was the only one of the Pleiades who married a mortal, or Electra, who shines dimly due to her grief over the fall of Troy. The Pleiades are named for their mother, Pleione, or after "pleo", meaning "I sail", as they are observable during the sailing season.

Zeus was attracted by the handsome Ganymedes, the son of Tros who founded Troy. Turning himself into an eagle, Zeus swooped upon Ganymedes from Mount Ida and carried him to Mount Olympus where he became the cup-bearer of the gods. This event is memorialized in the sky by the constellations, Aquila and Aquarius.

to be continued

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