NATIONAL NEWSLETTER

February, 1980

Supplement to the JOURNAL OF THE ROYAL ASTRONOMICAL SOCIETY OF CANADA

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STEPS TO
THE STARS

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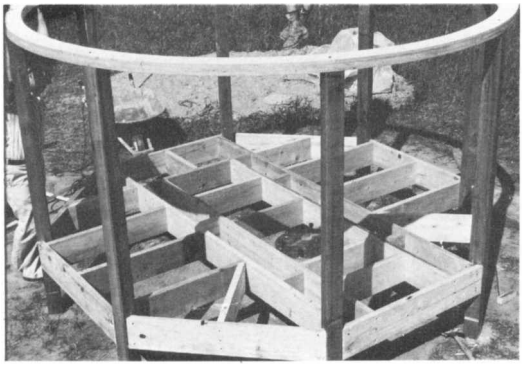
RYSTROM
OBSERVATORY
SASKATOON



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Reflections of Reality

by Roy Bishop
Halifax Centre

Except for the imaging elements in the eyes of animate matter, the most common type of optical element is the plane mirror. Every quiet body of water and window pane provides mirror reflections. Although a reflecting plane cannot form a useable image by itself, the "virtual" image associated with this simplest of optical elements is nearly perfect. The image is free of geometric distortions, chromatic aberration, and all the other aberrations associated with lenses and curved mirrors.

Despite the near perfection of the mirror image however, it differs from the real object in an interesting and profound way: unless the object possesses a high degree of symmetry, the object and its image cannot be superposed. Any asymmetric system, such as the Pleiades, a human hand, or a periwinkle, cannot be oriented to correspond to its mirror image. The mirror world is so like the real world, yet so different. A plane mirror transposes an object, point by point, perpendicular to its plane an equal distance behind the mirror. Because of our own bilateral symmetry and tendency to mentally project ourselves into the image space, it is often said that a mirror reverses objects left for right – a convenient but misleading statement since a mirror inverts front to back, not left to right.

The image produced by a single plane mirror in general does not correspond to reality. For combing one's hair the difference is not serious and usually even goes unnoticed despite the fact that the person in the mirror parts his hair on the opposite side; but, try to read a newspaper in a mirror! It is very difficult to tell if a photograph of an unfamiliar scene has been reversed left for right unless it contains some bilaterally asymmetric, man-made object. This is

because a mirror image of a natural scene is a possible real situation, at least on a macroscopic scale. Asymmetric molecules exist, but those due to inanimate processes occur in an equal (racemic) mix of left and right handed forms. However, living matter contains many types of asymmetric molecules that are entirely left handed or right handed. An example is the DNA molecule which has the shape of a right handed helix. Although a mirror reflected person is permitted by the laws of nature, such an individual would likely soon die since his molecules would not be compatible with the handedness of the molecules in ordinary food. The molecular asymmetries in living things are apparently due merely to a chance occurrence early in the history of life some four billion years ago. However, an asymmetry displayed by inanimate matter at the subatomic level seems to be more profound and is said to violate conservation of parity, a quantum mechanical concept involving a mirror reflection.

In astronomical work reversed images can be troublesome. The comparison of telescopic views with star charts is significantly more difficult if the former are mirror images. Aesthetically, the fact that a reversed view of the sky does not correspond to reality goes beyond mere inconvenience. Fortunately it is not necessary to dispense with mirrors to obtain unreversed images. All that is necessary is that there be an even number (0, 2, 4, ...) of reflections in the system. A familiar example is a slide projector: the reverse side of the slide is projected (in effect one reflection) and we view the light reflected from a screen (a second reflection). Systems having an odd number (1, 3, ...) of reflections provide reversed images. Below are examples of telescopic systems having various numbers of reflections (n):

n = 0 Unaided eye.
Refractor without a star diagonal.

n = 1 Refractor with a star diagonal.
Reflector with observer at the prime focus.

n = 2 Newtonian reflector.
Cassegrain type without a star diagonal.
Refractor with a roof prism star diagonal.

n = 3 Cassegrain type with a star diagonal.

n = 4 Binoculars (porro prism type).
Cassegrain type with a roof prism star diagonal.

Only the Newtonian provides both an unreversed image and a comfortable viewing angle while also avoiding the decrease in image quality associated with diffraction in a roof prism.

Black Hole in Journal Files

Jeffrey Hayes, who has recently moved to the Halifax area, is grieving over the loss of a couple of issues of the *Journal* from his files. If any members of the RASC can supply the missing ones, he would very much appreciate hearing from them.

The missing numbers are:

Vol. 71, Nos. 1 & 2, Whole numbers 544 & 545.

Please drop him a line, or mail the copies to:

Mr. Jeffrey Hayes,
Department of Astronomy,
St. Mary's University,
Halifax, N.S.,
B3H 3C3

Does Anybody Know ... ?

Some members of Calgary Centre are trying to locate information regarding a reported long-playing record which contains selections of music and associated sound samples on the record sent into space attached to the Voyager spacecraft. They refer us to the November issue of *Sky and Telescope* (Vol. 58, No. 5, *452*), a review of the book "Murmurs of Earth, the Voyager Interstellar Record" by Carl Sagan et al. May we follow this up by asking if the record has ever been released for public acquirement? If anybody knows, please advise:
Calgary Centre, c/o Calgary Centennial Planetarium, Box 2100, Calgary, Alta. T2P 2M5.

The Colourful Pleiades

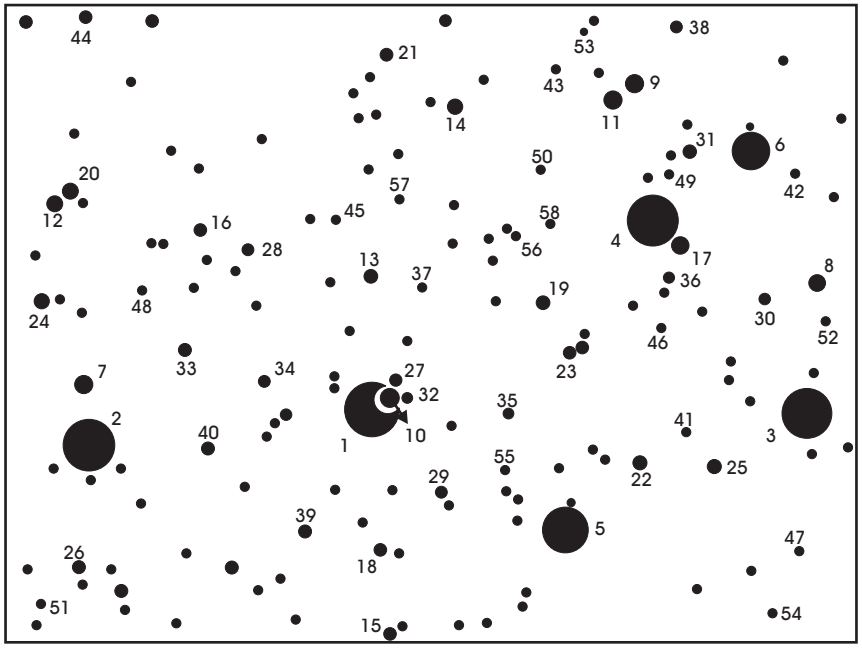
by Zdenko Saroch
London Centre

Every amateur astronomer knows about the North polar sequence and its use for photometric calibrations and testing the telescope performance. There are also other star fields of course, where the magnitudes of individual stars have been measured very accurately and one of them is the open cluster M45, the Pleiades, visible most of the night at this time of the year.

The following chart and table are showing stars up to 12^m vis., along with photographic magnitude and colour index for each star. The colour index, difference between the photographic and visual magnitude ($m_p - m_v$) is directly related to the surface temperature of the star and its colour.

At the first look at the table we see how the colour of individual members of this particular star cluster changes with their apparent magnitude, the fainter the star the more red it appears to be, a fact noticed by Hertzsprung in 1911 already.

It would be interesting to hear from observers to what extent is the reddish colour of some fainter stars in Pleiades noticeable, compared to the brilliant blue stars.



*	m_v	m_p	m_p-m_v	*	m_v	m_p	m_p-m_v
1	2,87	2,78	–0,09	30	8,58	8,92	0,34
2	3,64	3,56	–0,08	31	8,60	8,95	0,35
3	3,71	3,80	0,09	32	8,69	9,15	0,46
4	3,88	3,81	–0,07	33	9,05	9,54	0,49
5	4,18	4,12	–0,06	34	9,25	9,80	0,55
6	4,31	4,20	–0,11	35	9,29	9,75	0,46
7	5,09	5,01	–0,08	36	9,45	9,97	0,52
8	5,46	5,42	–0,04	37	9,46	9,93	0,47
9	5,76	5,72	–0,04	38	9,70	10,25	0,55
10	6,29	6,31	0,02	39	9,88	10,42	0,54
11	6,43	6,41	–0,02	40	10,02	10,58	0,56
12	6,60	6,57	–0,03	41	10,13	10,75	0,62
13	6,81	6,87	0,06	42	10,39	11,02	0,63
14	6,82	6,84	0,02	43	10,42	11,06	0,64
15	6,99	7,02	0,03	44	10,44	11,06	0,62
16	6,95	7,07	0,12	45	10,48	11,12	0,64
17	7,18	7,34	0,16	46	10,55	11,22	0,67
18	7,26	7,31	0,05	47	10,81	11,61	0,80
19	7,35	7,45	0,10	48	10,91	11,77	0,86
20	7,52	7,62	0,10	49	11,27	11,19	–0,08
21	7,66	7,87	0,21	50	11,34	12,20	0,86
22	7,85	8,05	0,20	51	11,35	12,13	0,78
23	7,96	8,28	0,32	52	11,40	12,25	0,85
24	7,97	8,15	0,18	53	11,71	12,58	0,87
25	8,04	8,25	0,21	54	11,83	12,87	1,04
26	8,12	8,34	0,22	55	12,12	13,14	1,02
27	8,25	8,51	0,26	56	12,16	13,31	1,15
28	8,27	8,63	0,36	57	12,61	13,79	1,18
29	8,37	8,67	0,30	58	12,89	13,68	0,79

The Rystrom Observatory: Part II

by G. N. Patterson

CONSTRUCTION OF THE DOME

Construction of the dome kept pace with the field work. The materials were purchased as needed to avoid a build-up that could not be protected from the weather. The dome itself was constructed in the open on a concrete base Mr. Patterson had had poured for a garage.

A special jig was made to make the laminated ribs. This jig consisted of curved forms cut from sections of 4″ x 4″ posts, fastened to a sheet of three-quarter inch plywood to form a smooth curve with a radius of 614 inches. Each rib was made from six eight-foot lengths of one-eighth inch thick plywood, three inches wide, glued together as laminations and kept clamped in the mould for 24 hours to set solid. Nineteen ribs were required – fourteen as actual ribs for the dome, and the others as bracing sections between the ribs. As only one rib could be made each day, and some days were unsuitable due to weather, this part of the project took considerable time to complete.

The segments to form the castor ring, the dome base ring and the dome slot door frames, as well as the wall bracing were all cut from three-quarter inch plywood. This again was a time-consuming task cutting these segments into arcs of one-eighth of a circle with sabre saws. More than one hundred of these segments had to be cut out to a rough dimension. Final finishing was done after assembly with a high speed router.

A working platform, made from three sheets of three-quarter inch plywood, with one sheet cut lengthwise to make two two-feet by eight-feet sections, was assembled on 2″ x 4″ studding to form a working surface of 10ft x10ft. (less a couple of corners). A special metal center pin was mounted in this platform to act as a radius point for the router. All circle sizes and angles were carefully measured and marked out on this platform which saved considerable time later during the assembly of each ring. This platform was then used to mark out, and cut, with a router, all circular rings and segments for door frames, etc. After all these were finished, this working platform was itself cut out to make the floor of the new observatory.

The laminated rings for the castor ring, the dome base ring, the slot-door frames and the wall bracing, were each glued and screwed together on the working platform and then cut out to the required dimensions with the router on a long radius arm making accurate circles. The castor ring, three thicknesses of ¾-inch plywood, had sixteen cut-outs made on its top surface to carry the sixteen aluminum castors. This castor ring was later taken to the site and mounted on top of the 4″ x 4″ cedar posts. The dome base ring, also three thicknesses of plywood, overhangs the castor ring, on the outer dimension by one and one-half inches, and the bottom of this ring has a five-eighth inch deep slot cut to mate with the castors in the castor ring. The surface of this slot is covered with metal to provide a metal-to-metal contact with the castor.

After the rings had been made, the semi-circular frames for the dome slot door were made, two each of two sizes. The inner and smaller frames, two thicknesses of ¾-inch plywood, mounted the upper end of the ribs; the outer and larger frames, also two thicknesses of plywood, carried the sliding slot doors of galvanized steel. A special off-shoot slot in these frames permits installation and removal of the slot door sections.

When all pieces had been cut out and fitted, the working platform was routered out to ten-foot diameter and taken to the field site for installation as the observatory floor.

ASSEMBLY OF THE DOME

The laminated base-ring was mounted on four 4″ x 4″ timbers using lagbolts, the timbers being spread apart to support the ring across its diameter. Using a transit level, this base-ring was then very carefully levelled on the concrete working surface. Slots, ¾ deep and three inches wide were cut 45 degrees apart into the outer circumference of this ring for mounting of the bottom ends of the fourteen curved ribs. The inner frames of the dome slot door were then mounted with their inner surfaces 27 inches apart and braced where they joined the base-ring by using thick laminated gussetts that held these frames vertical to the base-ring. Installation of the ribs then started with the first ribs being placed at 90 degrees to the slot door frames. Over the next few days, all fourteen of the ribs were placed in the base-ring with their upper ends being sub-mounted in the slot door frames. All joints were glued and screwed for strength. Then the remainder of the ribs, (5) were cut to fit as bracing between each of the ribs for added strength. This dome skeletal structure was completed, ready for covering by August 15th. A pattern for the gore panel was made up and the covering gore panels cut out oversize from 1/8 untempered hardboard. Fitting each gore was a tedious task as the hardboard was being bent two different ways at the same time, (compound angles), and so had to be clamped every few inches, then fastened with screws every three inches along the length of the rib. Panels were mounted alternately, then trimmed along the centre of the ribs with a skilsaw, then removed, and then the other panels done the same way. When all panels had been fitted and cut to size, they were re-mounted using T-moulding along the center of the ribs to join adjacent panels. The upper edges of the ribs, gore panels, and T-moulding that projected past the slot door frames were trimmed off, and then the inner slot-door frames mounted. All joints, and gaps, including the T-moulding were carefully caulked to ensure the tightness of all joints, and then the painting started. Both the inside and the outside of the hardboard panels had been wall-sized twice before installation on the dome frame. Now, both inside and outside were given two coats of undercoating. The inside was then given a coat of flat black enamel, and the outside was given a coating of very high-gloss white enamel exterior paint to assist in reflecting heat. A five-inch wide galvanized metal skirting was added to the base of the dome and this metal trim and the edge of the slot door were trimmed in dark green enamel. This latter work was pushed a bit to meet a target date of September 2nd, the date set for moving the dome to

the field site. (Two weeks notice had to be given to obtain the crane and flat-bed truck). Inevitably, all work was not ready by moving day, and some had to be finished off at the field site.

MOVING

Moving day was set for September 2nd, and dawned clear and mild. The previous evening, the plastic cover had been taken off of the base of the observatory and the sixteen castors mounted in the castor ring.

All moving equipment and personnel arrived on time at 79 Baldwin Crescent. This even included the neighbors and their cameras for what turned out to be quite a field day for them. The crane was positioned on the driveway with the flat-bed truck out on the street. The dome, weighing about 500 pounds, hoisted easily, and was swung out over the lawns and settled down nicely on to the truck where it was chained down for the trip. The crane promptly left for the site, and shortly after, the flatbed, followed by a car with its lights on and flashing – the dome was so wide, the driver could not use his mirrors. The trip, however, was uneventful, though slow. The dome was off-loaded on to the ground at the field site for removal of the 4″ x 4″ base mounting timbers. The pier pedestal, 650 pounds, was lifted out of its trailer by the crane and gently lowered down over the mounting anchor bolts on the concrete pier. Then the dome was lifted up, swung over, and gently lowered down on to its castors. It would have been nice to conclude here and state that everything fitted, but such was not the case. A slight warp had developed in the dome base ring, but this was quickly corrected, and the dome turned on its castors – heavily, it's true, but turn it did – after all, a mass of 500 pounds requires a bit of effort to move. Four interior castors were installed to ensure the dome castor ring stayed centered over the castors, and it is hoped soon to install a mechanical dome-drive.

Does this mean the Rystrom Observatory is complete? Not really. There is a lot to do yet. The electronics have to be installed and wired in. The dome drive system has to be installed. Later, it is hoped to put in permanent underground wiring. It would also be nice to have a warm-up shed near the Observatory.

The financial summary shows that members contributions to the Observatory fund does not meet total expenditure – in fact there is a very large difference. Any contributions from members would still be appreciated, so the Observatory Fund will remain open indefinitely.

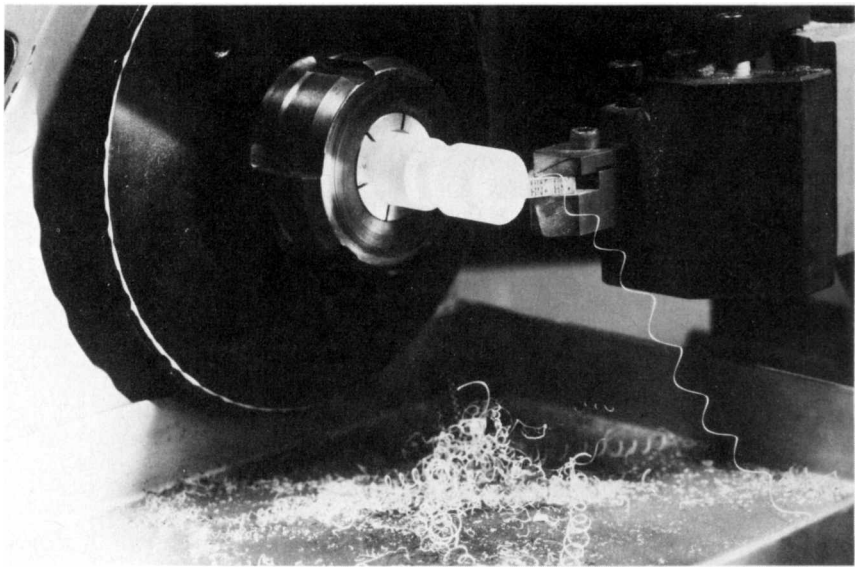
The sincere hope of all is that now that the Centre has its Observatory, more members will participate in active observational and photographic activities.

Note: The choice of the name for this observatory, THE RYSTROM OBSERVATORY, Saskatoon Centre, should be self-evident. Were it not for the kind cooperation and willing assistance of Mr. Ed Rystrom, this observatory would not exist. It is only fitting that we recognize his efforts on our behalf by naming our observatory after the man who made this dream of ours become reality.

Ambitious Programme Undertaken by our Editeur des Centres Français

Damien Lemay, whose contributions throughout the past few years are well known to our readers, has let the news leak out that he has undertaken a very demanding task. He is making a special project of making a photographic atlas of the sky from the north pole down to latitude minus 30°. This he is executing with his 5.5″ Schmidt astrocamera.

Damien estimates that the project will keep him busy for the next three or four years. So far he has accumulated some 200 photos, and he expects it to require some 800 more exposures; successful ones that is. We wish Damien many clear nights and the necessary restful days to go with them!



Machining of Glass

Recent research in the Philips Research Laboratories in Eindhoven, Netherlands, has shown that it is possible to machine glass in a lathe. To do this the glass has to be heated, which permits a continuous chip to be removed just as with many metals. It is even possible to select the conditions so as to obtain a transparent glass surface.

This machining method is of interest for the manufacture of aspherical lenses, that is lenses whose surfaces deviate from the spherical so that they are not readily produced by conventional grinding and polishing methods. The importance of such lenses is that they may give extra freedom in the design of optical systems and often allow a lens system to consist of a smaller number of separate elements.

What About the "Superconjunction of 1982"?

by Leo Enright
Kingston Centre

One day during the past summer when I was working on an "astronomical" project, I was asked by someone what I thought of the fact that within a few years all the planets would be lined up in the sky. The question seemed to convey the message that the person was very concerned and thought others should be also. I tried to assure him that this kind of planetary alignment should not cause great concern and its effect would be so absolutely microscopic that there was no instrument ever invented by man which could detect so miniscule a change in gravitational effect as that caused by this planetary alignment. (I believe one of my thoughts

may have been about how interesting observations might be for the nights when we could see this alignment, but, alas, it is just not so.)

Since that day I have had time to get at some facts behind that concerned question and to find out answers that could be given. But, why are some people so concerned? Will there be a grand alignment or superconjunction of all the planets in the next few years? Can such an alignment have any effect on the earth?

The reason some people are concerned is likely the result of newsmagazine or other media coverage of the so-called "alignment of 1982", or reports about a book that appeared in print in 1974 called *The Jupiter Effect*. There could be a slim chance that the concerned person had even read the book!

This book by John Gribbin and Stephen Plagemann tells about the planets in 1982, states that there will be a "superconjunction", and even says there will be "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". As a matter of fact that is not true at all. If one were to take his position on the sun, assuming it were possible, he would see the nine planets scattered out over a very wide distance along the ecliptic and this would be true for the entire decade of the 1980's. Let's be more precise and see how close all the planets do come to an actual alignment. It is true that the sector of the sky measured from the sun and in the ecliptic plane and containing all the planets will become somewhat smaller than usual at certain times in the 1980's. The minimum for the sector will occur on March 10, 1982, at which time the angular width of the sector will not be zero, but 95 *degrees*, ranging all the way from 170°, which will be the heliocentric longitude of earth, to 265°, which will be that of Mercury and Neptune. Is that an alignment or a conjunction? In fact, viewed from the sun, the planets will be scattered around the zodiac over a quarter of the distance around the entire sky. Even conjunctions of some individual planets occur rarely. The next Saturn-Uranus conjunction is in 1988; that of Saturn-Neptune is in 1989; Uranus-Neptune in 1993; and the next Neptune-Pluto conjunction is over 400 years away!

Not only does the book talk about something which simply does not happen, but the authors go through a very bizarre argument saying the tidal forces caused by the planets in alignment will increase, causing more sunspots and a greater chance of solar eruption, with the ejected solar particles causing unusual air movements on earth, which in turn could affect the earth's speed of rotation, which in turn would cause earthquakes. This strange and long argument has been shown to be ridiculous by a number of serious scientists. Probably the best published refutation of the book's thesis is that by the Belgian astronomer, Jean Meeus and published in the periodical *Icarus* in 1975. *The Griffith Observer* (January, 1975), also refutes the argument in an article called "The Great Earthquake Hoax". *The American Scientist* (Nov. 1974) and *Mercury* (July, 1979) also speak against it.

Again let us be precise, yet brief, with certain parts of the argument presented in the book. Firstly, what about the tidal forces of the planets? Calculations have shown the 'tide' raised by all the planets could be one millimeter! Compare that with the sun's diameter of 1,392,000 kilometers! Try to calculate what percentage change that would be!! Secondly, what about such forces causing an increase in sunspots? Meeus has stated that this is simply not true. Moreover, various studies have shown that it is absurd to consider any connection between either; (1) close approaches (forget alignments!) of planets and numbers of sunspots, OR (2) numbers of sunspots and earthquakes.

In regard to the first set of studies, it has been shown that there have been years (e.g. 1804) in which the largest planets more closely approached each other than they do in 1982, and yet the sunspot maximum at that time has been exceedingly weak. Moreover, it has also been shown that those planets which most effectively produce a "tidal effect" on the sun produce "tides" which have a period of 4 months – out of line by no less than a factor of 33 from the recorded sunspot cycle of 11 years. In fact, no correspondence whatever appears between this solar cycle and planetary motions.

In regard to the second set of studies, one involved 9000 earthquakes and one involved over 12,000, and they found no interdependence between sunspot and seismic activity. In fact, one

scientist has listed many major and catastrophic earthquakes which have occurred at sunspot minima; Jean Meeus has even pointed out that in 1943, near sunspot minimum, there were 40 major earthquakes (of 7.0 or more Richter magnitude), while in 1947, at the following very high sunspot maximum, there were only 25 similar earthquakes.

Taken together, these results seem to indicate that the long argument put forward in the book *The Jupiter Effect* must be considered as having a probability of zero. Yet many people have not investigated the facts enough to know that there is no real superconjunction to be expected in 1982, and that the arguments for supposed "dire consequences" are based on assumptions which are either definitely false, or unproven, or have probability of close to zero.

Hoping that it is not being too cynical, I think there are some predictions that can be made:

1) books like *The Jupiter Effect* will continue to cause concern,
2) books like *The Jupiter Effect* will continue to be published and will continue to sell well, (!)
3) some journalist(s) may discover that the major planets of the solar system make a closer approach in 1984 than they do in 1982, and publish that fact (with suitable alarming headlines) in about 1983,
4) someone, somewhere, if he can find something to point to, may at a future date say "It was all predicted by the planets," not realizing that a coincidence proves nothing and that probably neither planets nor sunspots had anything at all to do with it.

Quebec Supplier can Render Special Services to Astrophotographers

by Damien Lemay

Here are two pieces of good news for all amateur astrophotographers.

1. The DIRECT FILM company is now in a position to render a unique service in the processing of colour film, whether for slides or prints. Film mailed to the address below will be given special treatment if marked "Astro Photo" on the back of the mailing package, adjacent to the closure.
   They suggest that if at all possible the first exposure on each roll be taken of a conventional subject. This will provide a reference for the technician in judging the processing so as to get the best rendering of your astrophotos. It is very difficult to estimate this when the film contains only subjects that are merely groups of spots or points.
2. Also, you can get the special spectroscopic types of film without ordering from unfamiliar sources. The types listed below are stocked and available:

   103a E specially suited for gaseous nebulae.
   103a F for general use.
   103a O for objects predominantly blue. (Ex.: Hyades)

   These may be ordered in cassettes of 36, 24, or 12 exposures, respectively costing $8.50, $6.50, and $4.50. Residents of Quebec should add 8% Provincial Tax. Address all communications to:

Les Distributions Astrolab,
C.P. 1906
Terminus Postal,
Québec 2, P.Q.

Nouvelles des Centres Québécois

de Damien Lemay

MONTREAL ET QUEBEC

A tous les amateurs d'astrophotographie, voici deux bonnes nouvelles pour vous:

1. La maison DIRECT FILM est maintenant en mesure de fournir un service unique pour le traitement de vos films couleurs, qu'ils soient en diapositives ou en photos. Lorsque vous remettez votre film à l'un de leurs magasins, il suffit d'inscrire "Astro Photo" au verso de l'enveloppe – maîtresse (sous le rabat).
   On recommande cependant que la première photo de chacun de vos films représente un sujet conventionnel. Ceci servira de repère au technicien qui sera alors en mesure de cadrer de la bonne façon vos photos astronomiques. Il est en effet difficile de se retrouver sur une pellicule montrant seulement des points.
2. Enfin, on peut se procurer les films spectroscopiques sans s'encombrer d'une commande à l'étranger. Les types suivants sont disponibles:

   103a E surtout pour les nébuleuses gazeuses (Ex.: M8)
   103a F général
   103a O objets bleus (Ex.: Hyades)

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Serendipity

by Jim Cobban
Toronto Centre

When, about the beginning of the Christian Era, Roman merchants travelled to India to trade the raw minerals of Europe for the finished industrial goods of Asia, they heard of an island far to the south, famed for its favourable climate, and for the wisdom of its rulers. This was the island of the lion people, Sinhaladwipa. The western merchants could not quite get their tongues around that profusion of Sanskrit syllables, and when they returned to the Roman Empire, they exaggerated the tales of this far off land beyond the furthest horizon, and they called it Serendip.

After the confusion of the barbarian invasions, when men from Europe once again travelled to those lands, as did Marco Polo in the thirteenth century, the centuries had modified the pronunciation of the name even by the natives of the island. So he heard the name as Zeilan, a name it has kept unitl recently, when a nationalist movement, considering Ceylon to be a name only of use to the English, has taken an old Sanskrit name of Sri Lanka for its republic. However the changing fashions of the years made it appear that the old island of Serendip had vanished from the face of the earth. Serendip became a word, like Shangri La, for a far off happy land of fantastic wealth.

Out of this background Horace Walpole coined the word "serendipity", to describe the fortunate discovery of something of value while searching for something else.

L12

Serendipity is one of the chief values of what is called “pure research”. It is the basis of those things which NASA calls “spin-off”, but there have been far more dramatic occurrences in the history of science.

Once upon a time there were two scientists, an astronomer and an archaeologist. They had never met, and they never would have seen any connection between their work if serendipity had not been in action. The astronomer was trying to establish a relationship between the sun-spot cycle and the amount of rain that falls. In Arizona, where he was working, this is important. To prove his point he collected rainfall figures from all over the state running as far back as he could go. That, unfortunately, was only about a hundred and fifty years, or only thirteen eleven year cycles, and while there appeared to be a relationship, the data was too short in time to have convinced his rightfully skeptical colleagues. Therefore he sought to find some way of pushing the count farther back in time. From what biology he had studied over the years, he remembered that the thickness of the annual rings grown by trees is dependent upon the weather in the year while that ring was growing. From living trees he got a sequence of ring thicknesses going back over two centuries. From buildings put up by the first American settlers he pushed that sequence back another century and a half, and from the Palace of Governors, in Santa Fe, New Mexico, erected by the original Spanish Conquistadores in 1609, he obtained cores from beams that stretched his sequence back to the late fifteenth century when the trees which had gone to construct that building started growing.

Meanwhile, not far away, an archaeologist was studying the origins of the pueblo people, and their strange skyscrapers. According to the present population of the area, they were preceded into the land by a nation they called the ancient ones, the Anasazi, from whom they obtained much of their culture, and who built some of the most amazing structures, and spread a network of irrigation canals across valleys that now cannot be told from the surrounding desert. In these ancient pueblos, the archaeologist found evidence to back up these legends. By Carbon-14 dating, it had been determined that during the second half of the 13th century, an invasion from the north had forced the abandonment of many of the pueblos. The details of these migrations were confused. The radioactive dating technique was good only to give an estimate of the time when the pueblos burned to the ground. For any of them, a fifty or sixty year span was the closest idea that could be obtained, and it was vital for understanding the processes at work to determine the sequence in which the various pueblos were abandoned. The archaeologist expressed his frustration in an article on his investigations, published in a magazine of south-western archaeology.

The astronomer, revelling in the joy of his own particular hunt for ways of extending his sequence of tree rings beyong its five century span, was searching for more samples. His attention was drawn to the archaeology magazine where he read of the work being done on the pueblos. Until now, like many North Americans, he had forgotten that another race had preceded Europeans into the west of America. He wrote to the archaeologist, explaining his theory of the relationship between the rain-fall and the eleven year sun-spot cycle, and how he was using the thicknesses of the tree-rings to determine the amount of rain that fell in years when no meteorological data was kept.

The idea of determining the climate and its variations during the period of his investigations was also of interest to the archaeologist, since it would explain some of the motivation for the migrations. Therefore he took core samples from several beams in two of the pueblos he was investigating and sent them with appropriate identification to the astronomer. He went back to the problem of trying to determine the order in which the pueblos had been abandoned, using pains-taking microstratigraphic techniques which attempted to identify layers of dust laid down in individual years.

The astronomer quickly went to work examining the new cores. To his frustration, while the various cores all confirmed the relationship between rain-fall and thickness of tree rings across a wide area, the sequence did not overlap with the existing sequence dating back only to the mid fifteenth century. He therefore wrote to the archaeologist, thanking him for the samples, and explaining why they did not fit in. As a final note he pointed out, however, that the tree rings indicated that the one pueblo had been abandoned four years after the other!

Astonishingly enough, neither of the two scientists throughout their correspondence had realized exactly what this tool could do. Between them, completely by accident, they laid the basis for the only method of dating which allows us to specify, to the year, when events occurred during prehistory, dendrochronology. It was as if two and two suddenly equaled four hundred.

Categories and Rules for Bluenose General Assembly Display Competition

as approved by the Planning Committee

(La version française suivera en NNL d'avril)

Display Categories

1) Best Centre Display
2) Best Individual Display
3) Best Radio Observing Project
4) Best Optical Observing Project
5) Best Atmospheric Phenomena
6) Best Design Project (Completed)
7) Open Category

Rules

1) This competition is open to all RASC members in good standing.
2) All entries must never have been entered before in any G. A. Display Competition.
3) All work must be original and remains the property of, and responsibility of the owner.
4) All audio-visual entries must be "self-contained" in the Displays Room; no judging will be done outside the Displays Room or outside the time allotted for judging.
5) Exhibits must be entered in one category only.
6) Members may enter as many categories as they wish.
7) Any Entrant may designate another member to take the exhibit to the G. A. Display Competition.
8) Prizes will be allocated by the judges; if any category is deemed not worthy of an award by the judges, then none shall be given.
9) All Entrants must have submitted a Displays Competition registration form, post marked not later than May 31, 1980.
10) Entry forms may be obtained from and should be returned to:

Bluenose General Assembly
c/o Peter J. Edwards, Displays Chairman
8 Sullivan's Hill
Bedford, Nova ScotiaB4A 1N8

11) Cheaters should *NOT* get caught!

The Displays Committee is looking forward to assisting all exhibitors with their display(s) in any situation which may develop. We are prepared to handle most problems but if a pressing problem arises I can be reached by phone at (902) 835-3615. All other enquiries may be addressed to the same address as indicated in Rule 10.

April 26 Named as 'Astronomy Day 1980' by Associated Societies

Saturday, April 26 (1980) has been set aside for Astronomy Day 1980 by many amateur astronomy groups, planetaria, museums and observatories.

The Astronomical Association of Northern California, Western Amateur Astronomers and the Astronomical League are asking their members and affiliated societies to conduct public astronomy activities on Astronomy Day in a joint, nationwide effort.

Most Astronomy Day activities, which began in 1973 in the San Francisco Bay area, include public star parties and exhibits, although telescope making demonstrations, films, lectures, planetarium shows and guided tours of observatories are also popular. Many parks, schools and public museums have scheduled activities manned by local amateur astronomy groups or students.

The most effective programs seem to be those held at shopping malls or museums where large crowds can be expected if spurred by support from local news media.

Although most activities can be expected over the April 26 weekend, in some places Astronomy Day will be held on other, more convenient dates. In a number of places Astronomy Weeks have been declared in cooperation with local or state officials.

Special information packets are available with helpful suggestions for those interested in organizing local observances. In California and Nevada contact Douglas Berger, 510 Castro St, #J, San Leandro, CA 94577; in other states write Irene Sacks, Morris Museum, PO Box 125, Convent Station, NJ 07961.

Thomas Colwell,
Chairman, Public Relations,
Astronomical League.

SOME EASTERN NEWSLETTERS

For many Society members their only contact with their Centre is through their Centre's newsletter. Whether published monthly or bimonthly, the newsletters contain information on Centre meetings and activities, star parties and observing tips and reports. Following are the current editors and newsletters for some of the eastern Centres.

ORBIT (Hamilton Centre)
Clive Gibbons
516 Bridgman Avenue
Burlington, Ontario
L7R 2V4

REGULUS (Kingston Centre)
Leo Enright
P.O. Box 141, Stn. A
Collins Bay, Ontario
K7M 6R1

ASTRONOMY LONDON (London Centre)
Eric Clinton
306–41 Coverdale Street
Chatham, Ontario
N7L 2V1

SKYWARD (Montreal Centre)
Lucille Surette
9356 Basile Routhier
Montreal, Quebec
H2M 1T8

NIAGARA WHIRLPOOL (Niagara Falls Centre)
Robert Jedicke
7129 Warden Avenue
Niagara Falls, Ontario
L2G 5P7

'SCOPE (Toronto Centre)
Randy Attwood
c/o McLaughlin Planetarium
100 Queen's Park
Toronto, Ontario
M5S 2C6

La Société Royal d'Astronomie du Canada
Assemblée Générale

27–30 juin, 1980

L'Assemblée Générale se tiendra cette année a Halifax, ville historique, dans les locaux de l'Université St. Mary's. Le Centre de Halifax sera heureux d'accueillir aux Maritimes tous les astronomes, professionnels ou amateurs, ainsi que leurs amis.

Exceptionnellement cette année la rencontre sera organisée conjointement par notre Société et la Société Canadienne d'Astronomie, les deux sociétés coopérant pour certaines activités les 27 et 28 juin. Cependant les membres de la S.R.A.C. qui désireraient assister à toutes les seances de la S.C.A. sont conseillés d'arriver à Halifax le 25 au soir au plus tard. La première activité concernant proprement la S.R.A.C. sera la réunion du Conseil dans l'après-midi du 27 juin: le soir il y aura une réception avec projection de diapositives. Les principales activités de l'Assemblée se termineront un pique-nique, dimanche soir 29 juin. Des excursions aux alentours sont projetées pour le 30.

En ce qui concerne les séances de travail, MM. les membres sont invités à proposer des communications, d'une durée de dix minutes, sur tout aspect de l'astronomie. Des résumés des communications proposées sont à envoyer avant le 20 mai à Dr. R. M. Cunningham, 6299 Payzant Ave., Halifax, N.S. B3H 2B2. L'Assemblée organisera également cette année, comme d'habitude, un concours de travaux d'amateurs: pour de plus amples renseignements consulter la page L13 de ce supplément. Demander les formules d'inscription à Peter Edwards, 8 Sullivan's Hill, Bedford, N.S. B4A 1N8.

Venez donc nombreux. Rendez-vous à l'Est, où le Canada prit naissance et où on a la primeur du lever des étoiles.

ASSEMBLÉE GÉNÉRALE 1980

Vous êtes prié de faire parvenir les renseignements ci-dessous au Secrétariat d'Accueil, soit G. A. Planning Committee, do Randall Brooks, Department of Astronomy, St. Mary's University, Halifax, N.S. B3H 3C3.

☐ J'assisterai
☐ J'assisterai peut-être } Nombre de personnes _____

☐ Je demande au comité d'Accueil de s'occuper de mon hébergement. Type de logement souhaité

☐ résidence universitaire ☐ hôtel ☐ motel

☐ Je m'occuperai moi-même de mon leogement

Indiquer vos dates probables d'arrivée et de départ: 25 26 27 28 29 30 1

Nom _____

Adresse _____

_____

Centre local _____

Royal Astronomical Society of Canada
1980 General Assembly

June 27-30

The 1980 General Assembly will be held on the coast of the North Atlantic, in the historic city of Halifax, at Saint Mary's University. The Halifax Centre extends a maritime welcome to all amateur and professional astronomers and their friends. A special feature of the 1980 Assembly is that it will be a joint meeting with the Canadian Astronomical Society. Both societies will join for several events on June 27 and 28; however, R.A.S.C. members who wish to take in all the C.A.S. papers sessions should be in Halifax by the evening of June 25. The first functions specifically involving the R.A.S.C. will be a council meeting Friday afternoon (June 27) followed by a reception and film-slide show that evening. The main portion of the Assembly will end with a picnic on Sunday evening, June 29. Tours are being scheduled for June 30.

Members are reminded of the papers sessions. Ten minute papers by any member on any aspect of astronomy are welcome. Abstracts of proposed papers must be sent before May 20 to: Dr. R. M. Cunningham, 6299 Payzant Ave., Halifax, N.S., B3H 2B2. The popular display competition will be another feature of the 1980 Assembly. Details appear on page L13 in this newsletter. Entry forms may be obtained from: Peter Edwards, 8 Sullivan's Hill, Bedford, N.S. B4A 1N8.

We hope to hear from you soon. Plan to come to the East where Canada began and where the stars rise first!

1980 GENERAL ASSEMBLY

To assist in planning for events and accomodations, as well as to receive registration forms, please fill out this form and send to: G. A. Planning Committee, c/o Randall Brooks, Department of Astronomy, St. Mary's University, Halifax, N.S. B3H 3C3.

☐ I plan to attend
☐ I may attend
} Number in my party _____

☐ I wish the G.A. Committee to make arrangements for me.

Accomodation desired: ☐ on campus ☐ hotel ☐ motel

☐ I will make my own arrangements

Circle expected dates of arrival and departure: 25 26 27 28 29 30 1

Name _____

Address _____

_____

Centre affiliation _____