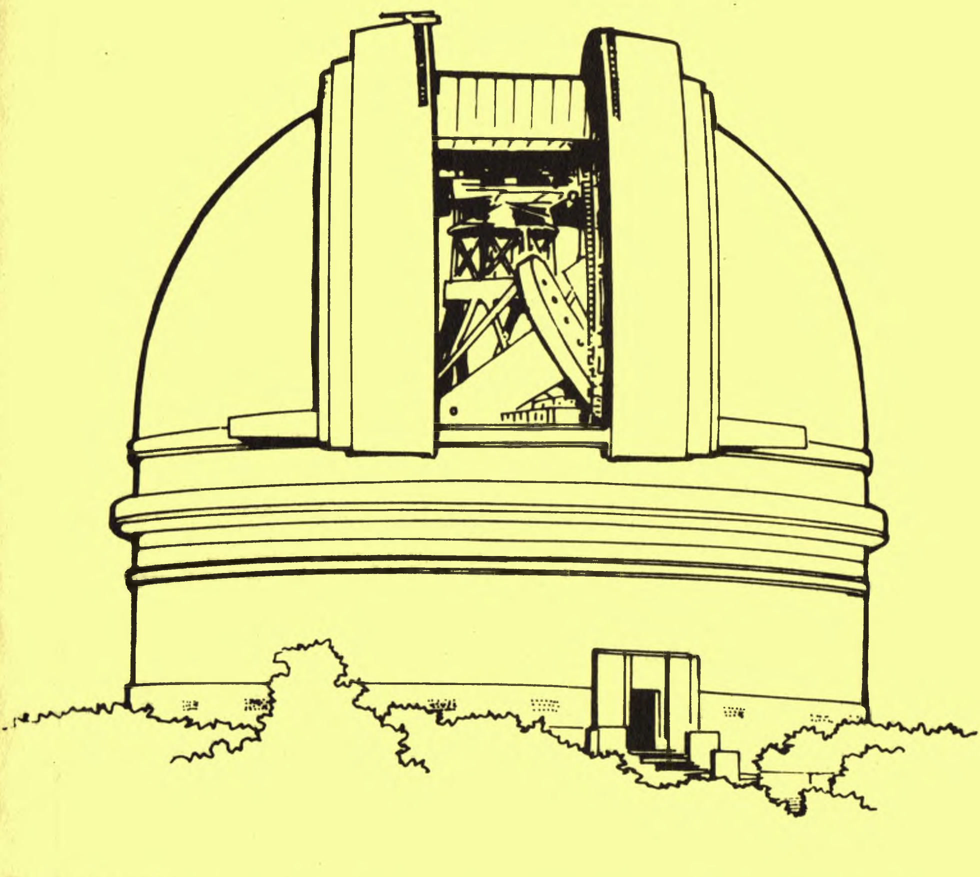
NOVA NOTES



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NN's NEWS MONITOR

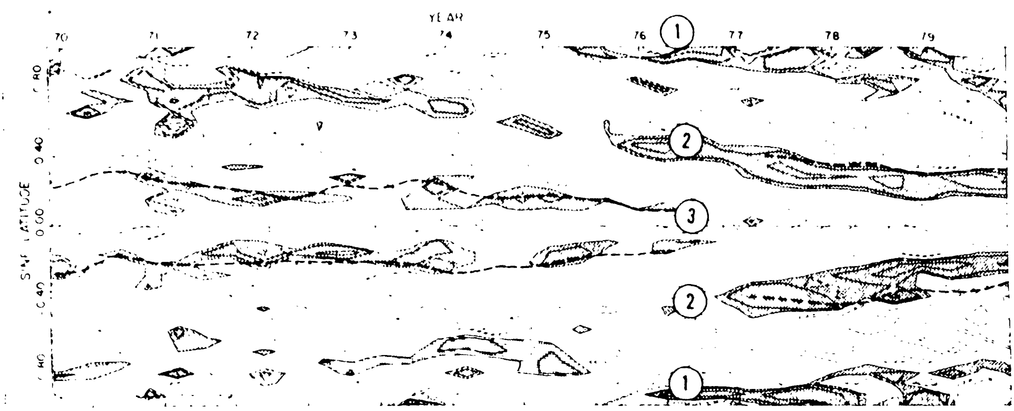
R. BROOKS

Solar Gas Belts:

In the mid 50's, a theory was proposed to explain the 11 year sunspot cycle. This was based on the internal magnetic field of the Sun and the fact that the equatorial regions spin faster than the polar regions--25days vs. 33 days per rotation. The speculations were that the magnetic field becomes wound up by the differential rotation in the interior and that the sunspots were regions where the magnetic field was attempting to release the trapped energy. The explaination as to why the field reversed after each 11 years of the in fact 22 year cycle, was not found.

Two Mount Wilson astronomers, Robert Howard and Barry LaBonte have been observing the Sun's atmosphere systematically since 1966. Using the tower telescope at Mount Wilson, they were measuring the upward velocities in the atmosphere but after 13 years and 24,000 measurements, they have found something totally unexpected which may help explain the 22 year cycle. They have detected bands of gases moving at different rates (see diagram)--there are in fact 2 fast and 2 slow moving bands in each hemisphere at any time. The difference in velocity averages 3 km/sec and it is along the boundaries of the bands where sunspot activity is greatest. There is a simple analogy with the Giant Red Spot of Jupiter and the smaller white spots which appear at the boundaries of bands on the giant planet. The 'friction' of the gases moving at different speeds cause turbulence and mixing of gases with the resulting formation of spots.

The new observations may point to an explaination of the 22 year cycle. The high velocity bands appear at the poles and gradually migrate towards the equator--in fact taking 22 years to do so. A new high velocity band forms as one dissipates at the equator thus ending a cycle. The bands at intermediate latitudes then become the source of the spots of the next clcle which ends in 11 years while the band forming at the pole will not be responsible for spots until it reaches mid-latitudes in about 11 years. In the diagram



the bands marked (1) will be responsible for the solar maximum predicted for 1991. The dissipation of bands (2) about 1987 will correspond to the next solar minimum.

Although we are still far from fully understanding the complexities of the solar interior, these new observations add an important clue to the puzzle. The cause is yet to be explained but one more of the effects has been identified. Whether the new evidence will fit the 1955 theory or require complete rethinking has yet to be determined.

MYTHOLOGY IN ASTRONOMY

Part II

Diane Brooks

Zeus's innumerable seductions included Europa, the daughter of the King of Phoenicia. To attract her attention, he changed himself into a handsome bull. When Europa sat on his back, Zeus carried her through the Mediterranean to Crete where she became the mother of three sons, including Minos, a renowned King of the Minoan civilization whose most sacred symbol was the bull. Europa gave her name to the continent of Europe, and in recognition of this affair, Zeus created the constellation, Taurus.

When Europa disappeared, her father sent her brother, Cadmus, to search for her, under penalty of exile if he failed. When Cadmus could find no trace of Europa, he accepted his fate and consulted the oracle of Delphi for advice. The oracle told him to follow a cow that he would encounter in a deserted place and to found a city in the first place that she rested in the grass. The city was to be named Boeotia. Everything that the oracle predicted came to pass. In a desire to give thanks to Zeus, Cadmus sent his men to fetch spring water for libations. Unknown to them, a terrible serpent sacred to Mars dwelt in a cave by the spring. It attacked and killed all Cadmus' followers. The avenging Cadmus slew the serpent and, at the direction of his patron goddess, Pallas, he planted the dragon's teeth in the soil. From the teeth sprang up an army of men who fought each other until five were left. These survivors were destined to be Cadmus' comrades and to assist him in founding Boeotia. The serpent who fostered these special men was immortalized among the stars as Draco.

Leda was yet another object of Zeus' affections. This time disguised as a swan - symbolized by the constellation, Cygnus - Zeus fathered two children, Pollux and Helen, who became the wife of Menelaus, King of Sparta. Helen was the mythological cause of the Trojan wars. With her husband, Tyndareus, Leda bore two more children, Castor and Clytemnestra, the notorious wife of Agamemnon of Mycenae. Although Pollux was immortal, by virtue of having been sired by a god, and

Castor was a mere mortal, the half-brothers were inseperable. They both became known as Dioscurus, meaning "young son of Zeus". When Castor was fatally wounded in battle, Pollux' grief moved Zeus to transfer half of Pollux' immortality to Castor, so that each lived on alternate days. Zeus also placed them in the sky as Gemini, the Twins. A different myth claims that the eternal Pollux rises as the morning star, while the mortal Castor sets as the evening star. The morning star has alternately been identified as Lucifer.

The adventures of Castor and Pollux included accompanying Jason and the Argonauts in their quest for the Golden Fleece. The Fleece had come from a wondrous ram, represented by the celestial Aries, which Hermes had given to the two young children of King Athamas of Boeotia as a means of fleeing their cruel stepmother. Only one child survived the journey across the Hellespont to Colchis, and to give thanks for his safe arrival, he sacrificed the ram to Zeus and offered the Golden Fleece to the king of his new country. Jason's quest of the Fleece originated as a task set him by his uncle who had captured Jason's inheritance. Jason was forced to fetch the Fleece before he could claim his rightful throne. After many perilous incidents, the Argonauts succeeded in capturing the Golden Fleece.

Perhaps the best known hero of mythology is Hercules, known to the Greeks as Heracles. Both his mother, Alcmene, and his supposed father, Amphitryon, were descendants of the hero, Perseus, but Hercules' actual father was probably the ever ardent Zeus, who wished to sire a strong protector of gods and men. When Hercules' birth was imminent, Zeus vowed that the next descendant of Perseus would rule Greece. Zeus' long suffering and grudging wife, Hera, who managed childbirth, induced the wife of another descendant of Perseus to give birth prematurely. Thus, the weak Eurystheus was born before Hercules, and Zeus was forced to accept him as ruler of Greece.

The spiteful Hera continued to plague Hercules throughout his life. She sent Lyssa, the Fury of madness, to inject him with the delusion that his wife and children were actually those of his rival, Eurystheus. In a blind rage, Hercules killed them. To absolve himself of this crime, he was advised by the oracle of Delphi to place himself at the disposal of Eurystheus for twelve years. The cowardly Eurystheus feared the powerful Hercules and devised twelve apparently impossible tasks which he commanded Hercules to perform. The twelve labours have been more recently associated with the twelve signs of the zodiac, but it is unlikely that there was any connection. Two of his labours have been commemorated in constellations, namely, the defeat of the Nemean Lion - Leo - and the destruction of the Lernaean Hydra - Hydra. As part of the latter task, Hercules also triumphed over a large crab which Hera had sent to assist the Hydra. The crab came to be known as the celestial Cancer. Hercules' greatest labour was considered to be his victory over Hades and death when he removed Cerberus from the underworld. The other labours were to exterminate the Stymphalian birds, to clean the stables of Augeias, to steal the girdle of Hippolyte, Queen of the Amazons, to fetch the golden apples of the Hesperides, and to capture the Ceryneian hind, the Cretan bull, the mares of Diomedes, the cattle of Geryon, and the wild boar of Erymanthus. On his way to find the wild boar, Hercules became involved in a battle with Centaurs, and in the course of the struggle, he accidently wounded his old tutor and friend, the wise Chiron, who was the sole immortal Centaur. Chiron's remorse that he had been injured by his former student drove him to beg Zeus to retract his immortality. Zeus agreed and Chiron died, but is still remembered as Sagittarius.

Between labours, Hercules joined Jason as one of the Argonauts. He married Deianeira, daughter of the King of Aetolia, but he and his wife had to flee this country when Hercules accidently killed one of his father-in-law's servents. He asked the Centaur, Nessus, to assist Deianeira in crossing a river, but when Nessus attacked her, Hercules mortally wounded him.. The treacherous Centaur advised Deianeira that his blood would maintain Hercules' fidelity. As his final adventure, Hercules captured Iole, whom he had always loved. Desiring to sacrifice to Zeus, he requested his wife to send him a white tunic. Knowing that Iole was with him, Deianeira soaked the tunic in the Centaur's blood which she had saved. As soon as Hercules donned the tunic the poisonous blood began to consume him.

In agony he built his own funeral pyre and prepared for death. But before the flames could touch him, Hercules was received by the gods on Olympus and became immortal.

The reign of Cronus had been known as the Golden Age for the wealthy life of plenty that men enjoyed. Themis, the goddess of justice, taught men right and moderation. Zeus' reign was designated the Silver Age, still rich, but not as contented as the former era. The Bronze Age witnessed the coming decline of man, as peaceful solutions to conflicts were no longer accepted. Finally, the Iron Age was populated by decadent, weak and self-absorbed men in competition with each other. At this point in time, Themis' daughter, Astraea, also called Dike - justice and truth - scorned man and retreated to the company of the gods on Olympus. Astraea, who is said to have weighed the planets on a balance - symbolized by the celestial Libra - before flinging them into space, is depicted as Virgo, the Virgin who, disgusted with man's folly, rejected his company and abandoned him.

This account of astronomical myths was not intended to be complete. It is merely a sampling of the wealth of fascinating stories behind the constellations and the meaning of planetary and stellar names. For further reading, the author recommends Star Names; Their Lore and Meaning by Richard Hinckley Allen.

OBSERVING WITH A SMALL TELESCOPE:

The Telescope; In refering to small telescopes I have in mind, I include everything from 60mm size to 100mms. The most common type bought are the Japanese models, available locally, from several stores. They advertise 300X and the unwary amateur sets out to buy one, then of course , only to be disappointed at seeing a planet as a tinted ill-defined smudge. Many amateurs own telescopes of this category and useful results can indeed be obtained with them.

First, discard the solar filter (screw-in type) unless you wish to increase the possibility of losing your eyesight. Second, don't use the 'barlow' since this can result in severe chromatic aberration. This is sufficient reason for you to give up astronomy. Use the eyepieces that come with the telescope and later on when you become more experienced with your telescope then buy more powerful ones. Don't overtax your power, 200X is quite enough, for the refractor and the reflector.

The Planets; Mercury will be a blob of light, though in 'real good seeing' it's phases can be observed. Venus will show only it's phases and if streaks are seen on it's surface, it is time to see your eye doctor. For best results I recommend medium power, 80X to 175X. Mars is best seen at it's closest to us. Even a 60mm telescope will show some markings at 175X. Jupiter will show it's belts and the red spot when using 175X. 45X will show Jupiter's 4 largest moons, although 15 have now been tentatively discovered.

Saturn at 175X will show the rings, when they are again visible to us. Beside the wide open rings we should also be able to see 3 of Saturn's 12 moons. Uranus and Neptune will be star like but you should be able to notice the difference. Although Uranus is greenish in color, you may not see it that way, perhaps blue. Do not expect to see Pluto and it's single moon. Pluto is only 14th. magnitude, from it the sun looks like a bright star.

The Sun and Moon; Project an image of the solar disc onto a white card and you will see the sunspots, faculae and if the seeing is good, the rice grain texture or granulations of it's surface. Also note the limb darkening. If you like you can buy solar filters that fit over the front of your telescope. The are very good and work best at 45X to 100X.

The moon will show you craters, rills and other features. For lunar observing it is best to use 80X to 175X and for lunar occultations, good results are found at 45X. Look at the moon when it is near a crescent stage, this will give you features that stand out in greater detail due to the sun's low angle of incidence.

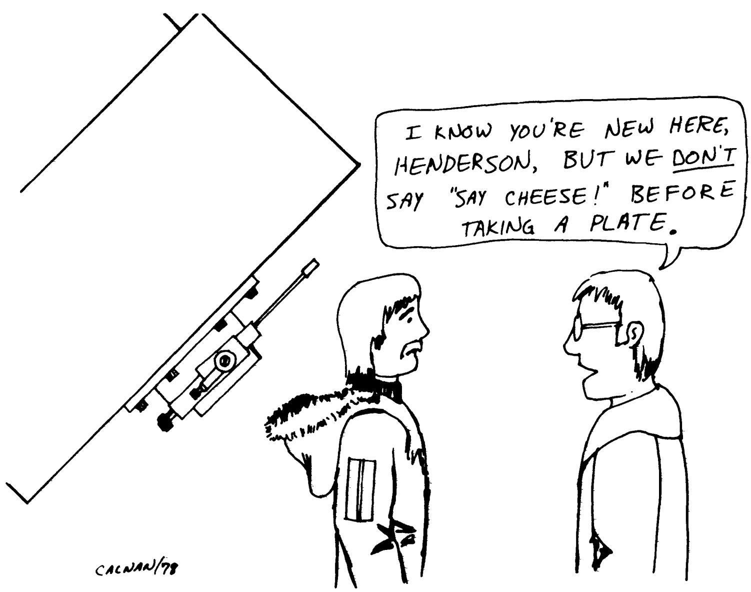
Deep Sky; For deep sky viewing low powers are best, 45X will do quite nicely. You will be able to see many Messier objects. For double stars somewhat higher powers are necessary, say about 175X. Try splitting doubles near your telescope's limit by using averted vision. This is done by looking to one side of the field of view. No matter what type of lelescope you are using, it takes a lot of practice to become an experienced observer and learn all of the tricks required for successful viewing.

You can obtain filters for the planets at reasonable prices and be surprised at the improvement they provide. Another useful item is a piece of window screening which can help to improve the quality of planet images. This is called an anti-diffraction screen. For daytime viewing a 'polaroid' filter can be a very useful item.

The Mount; Make sure that the tripod type mount is steady since this will also allow you to take photographs through your telescope at the prime focus or allow eyepiece projection . Remember a steady mount is a must. Likely candidates for this procedure are the Sun, Moon, Venus, Jupiter and Saturn. If the mount is equatorialized, then prime focus on the stars. It can be done!

Well, good observing. Maybe you will find a comet (an amateur did it with a 60mm refractor) or at least but most important you will get much enjoyment from your hobby.

Michael Boschat



OF RED DWARFS & WHITE GIANTS

No, the title is not wrong although it may be a bit confusing to those of us who have been brought up to think in terms of 'Red Giants & White Dwarfs'. Yet there is a group of astronomers who study the Red Dwarfs and White Giants. To all but these astronomers the Red Dwarfs, especially, are hum-drum. They are the longest-lived and most stable of all stars. They are also the most common type of Main-Sequence stars, posessing luminosities down to $10^{-6}\ L_\odot$, with the sun being in the middle (and Barnard's Star being a 'Red Dwarf'). So nothing much of interest happens to them - usually.

About two dozen of the thousands of Red Dwarfs that have been catalogued undergo brief periods of frenzied activity. These rare extroverts among the quiet dwarfs are called "flare stars".

At unprdictable times, they become as much as 10 times brighter than usual within a few seconds and then fade back to normal dullness within a few minutes or hours. It seems that great explosions take place on their surfaces.

They are called "flare stars" because the nature of their surface explosions seem very familiar to occasional eruptions on the Sun which are called "solar flares". Since the Sun is so bright to begin with, it is among the top 10% of the brightest stars, that solar flares don't add enough light to make any noticeable difference in its brightness - but they are mammoth explosions, nonetheless. More powerful than thousands of hydrogen bombs going off simultaneously, they blast gases outward into space at high speeds.

Often, when the ejected solar material reaches the vicinity of the earth, its effect can be noticed on our planet; radio communication is disrupted, brilliant displays of northern lights are generated and even electric power lines have failed as a result of solar flares.

The Sun's flares are so powerful, in fact, that if somehow they could be seen alone against the black background of space, they would be as much as ten times brighter than a typical red dwarf star. This and other bits of evidence lead some astronomers to conclude that red dwarf eruptions are the same kind of event as our star's flares.

Despite intensive study, the cause of solar flares remains unknown. Comparing the characteristics of flares of other stars with those on the Sun might help us better understand flares in general and perhaps eventually help us to be able to predict when solar flares will erupt.

Such predictions might well be necessary if the orbiting space colonies that some scientists envision are ever constructed. We on Earth are protected by the atmosphere from the x-rays and high velocity particles that are produced in solar flares. Space colonists without atmospheric protection would be dangerously vulnerable.

So the research goes on, even near the upper end of the Main-Sequence where the White Giants are located, just to the left. The White Giants and the Blue Super-Giants are the rarest of all the stars. These stars, like the Red Giants, have an outer loose envelope and will loose their mass if they have a close binary.

These large, hot stars approaching and within the blue spectrum include Rigel and Deneb. They have a mass of approximately sixty times greater than the Sun. These stars then, the Red Dwarfs and the White Giants, make up a group less familiar to us but none-theless as important as our own Sun.

Sources;
Jastrow & Thompson (1977)
Chronicle Publishing (1980)

Peter Steffin

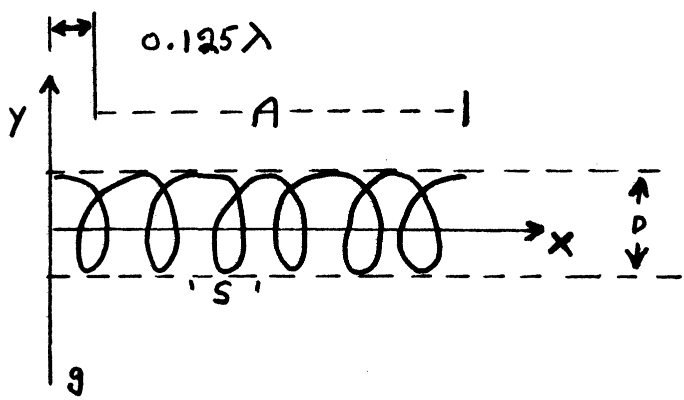
EDITOR"S NOTE:

Anyone wishing to obtain more information on the above subject matter should read "Exploring the Sun from your Backyard" by Rodger W. Gordon in STAR & SKY for July/80.

A HISTORY OF THE HELICAL ANTENNA

This article is a continuation of an article by the same title in the MAY/JUNE 80 issue of NOVA NOTES and was taken from an original paper by Bill Calnen for which he won the Simon Newcomb Award for 1980.

In a helical antenna, the helix is a geometrical shaped model of a wound conductor on a dielectric cylinder.



The electromagnetic energy received by a helix is dependent on the diameter of the coiled conductor and the spacing between each turn. In order to obtain symmetrical circular polarization, the number of turns on the helical axis (x-axis) must be greater than three. The beam-width and the antenna gain is determined by the number of turns coiled on the x-axis. The helix operates in an optimum mode if the circumference of each turn equals one wavelength of the operating frequency.

The spacing (s) between each turn of the helical conductor or driven element is equal to: $s = 0.25\lambda$. The diameter (D) of the coiled turns on the dielectric cylinder is equal to: $D = 0.31\lambda$. A ground plane (g) is mounted behind the helical conductor (y-axis). The use of the ground plane or screen reflector is to generate the beam mode along the helical axis. The dimensions of the ground plane is: $g = \lambda\ 2$. The first turn of the helical conductor has to be 0.125 from the ground plane for optimum performance of the beam mode. The axial length of the helical coiled conductor is equal to: $A = n \cdot s$. The total length of the dielectric cylinder needed to support the helical conductor is: $n \cdot s + 0.125\lambda$. To determine the length of the conductor necessary for the driven element: conductor length = $(n \cdot C) + 0.125\lambda$. The conductor diameter (d) of the driven element does not seem to be affected by the wide frequency range of the helical beam mode. The conductor diameter should be: $d = 5.56'10^{-3}\lambda$.

William Calnen

For a reading copy of the full paper please contact the Editor; NOVA NOTES.

(Available space has limited reproduction)

THE GENERAL ASSEMBLY IN REVIEW

R.C. Brooks

This years General Assembly, termed the Bluenose General Assembly, was once again hosted by the Halifax Centre and was a unique event in the history of RASC GA's. It was the first joint meeting with the Canadian Astronomical Society (CASCA) and, because of the success of the joint aspects of the meeting, may not be the last. The CASCA meeting was hosted by Saint Mary's Univ. and Saint Mary's was the venue for the activities between June 25 and June 30.

Wednesday saw the arrival of a few RASCals and most CASCA members. That evening, SMU hosted a reception in the university's Art Gallery for those who had arrived. Thursday and Friday were reserved for CASCA paper sessions and a number of amateurs took the opportunity to learn what Canadian researchers are studying. A group discussion on Thursday evening attracted a large crowd. The discussion considered Canadian participation in an international ultraviolet space telescope in the next ten years. The conscences seemed to be that participation in such a project was desirable, if not essential, if Canadian astronomers are not to be left out of the development of a space based research program. Retiring CASCA President, Dr. Carman Costain, of the Dominion Radio Astrophysical Observatory in Penticton, gave his retiring address to begin the Friday paper sessions. He gave an interesting account of his days as a graduate student at Cambridge University and the atmosphere which was so conducive to research at the institution.

The RASC's National Council met in the afternoon while people with displays were busy putting the final pieces together and the last of the 200 registrants and guests arrived in time for another wine and cheese reception hosted by SMU. With everyone keyed up for the weekend activities, and with friendships renewed, almost everyone attended the informal slide show which has become such a popular event at recent GA's. This was highlighted by the new NFB film "Road to Mauna Kea" which was shown by Dr. Jack Locke of the Herzberg Institute.

Saturday proved to be a most interesting day consisting of joint events of the two Societies. The invited and contributed paper sessions were a great success. The invited speakers (with topics) were: Dr. Helen Hogg, (Ninety Years of Variable Stars in Globular Clusters); Dr. Thomas Legg, (The Canadian Very Long Baseline Array--A Proposal for a New National Astronomy Facility); Dr. René Racine (Alii-nui, Kahunas and Menehunas on Mauna Kea, Hawaii--A Candid Glimpse of CFHT by its Director-to-be); and Dr. Ernest Seaquist (SS433--A New Stellar Phenomenon?). These were interspaced with 12 papers covering a wide spectrum of topics which were of interest to both amateur and professional. The joint paper sessions gave the professional and amateur a greater appreciation of the others work and the amateurs had a rare opportunity to mingle with active researchers and perhaps a few gleaned some new subjects towards which they may direct their efforts. The Abstracts of the papers will appear in the Journal.

The Saturday meals were also joint functions with a buffet at lunch and a lobster banquet in the evening. A lot of new friends were made while trying to tackle and penetrate the shell of the prehistoric creatures of the sea for which the east coast is so famous. Dr. John Percy, retiring RASC President, delivered the after dinner address--"In Praise of Smaller Telescopes". The festivities ended with the traditional presentation of awards. This years recipients were Stan Mott of Ottawa (Service Award) and David Levy (Chant Medal). The citations for these awards will appear in the Journal.

Sunday morning saw the completion of the RASC papers sessions and the afternoon was reserved for the most important event of the convention, the General Assembly. This is the Society's annual general meeting at which new officers are installed, the constitution revised, reports of the committees received and the general business of the group carried out. Following Dr. Percy's summary of the state of the Society (he concluded that it is very healthy in most respects), the incoming President, Dr. Ian Halliday took the chair and completed the business for another year.

The remainder of the activities were less serious and included the annual song competition begun by the London

Centre, another buffet at a local yatch club, and a trip on the famed Bluenose II. After disenbarkation, Dr. Helen Hogg was observed to be wearing an ear to ear smile and on querying she said "...never had such fun!" For those with shakier sea legs, there was a cruise on a motor launch to view the sites of the harbour. Participants had a choice of a trip to the Annapolis Valley and Black Hole or to the Bedford Institute of Oceanography on Monday. As only the Halifax Centre can, we arranged the Fundy Tides so that people could see the low and high tides in a most dramatic fashion and we also arranged to have Jacques Cousteau and his ship Calipso at BIO! Except for the final day, the weather was perfect.

Finally, but not least, the Display Competition was renewed with entries from across the country. Centre pride and inter-centre rivalry is one of the driving forces for this competition and results in some fine displays. In addition there were a number of exhibits not intended for the competition of which the most impressive was perhaps the scale model of the 3.6 m. CFH Telescope at Mauna Kea. The winners of the various categories were:

Category	Title	Name
1) Centre Display	Centre Activities	Winnepeg Centre
2) Individual	Solar Photos	Damien LeMay
3) Radio	Radio Sun	Rob Dick, Ken Tapping Chip Wiest, Jim Zillinski
4) Optical	X-Cygni	Rob McCallum, Mike Roney, Doug Welch
5) Atmospheric	Meteor Plotting	Rob McCallum
6) Design Project	Microprocessor	Brian Burke, Doug George
7) Open	Photo SN Search	Rolf Meier

In all there were 24 competitors including displays from four centres. Once again Ottawa Centre's very active observing group has taken the majority of prizes but with some planning perhaps our Centre could displace them next year.

The members of the Halifax Centre were pleased to be able to host the 1980 Bluenose General Assembly. Perhaps its has served to interest some of our members to go to Victoia in 1981!

BOOK REVIEW

The INVENTION OF THE TELESCOPE by Albert van Helden. Pages 67; 21 x 29 cm. Transactions of the American Philosophical Society, Vol. 67, Pt. 4, Philadelphia 1977. Price $6.00 US (paper)*.

Despite the fact that this work was published more than three years ago and despite the fact that it is probably the most important scholarly paper in English dealing with the first conceptions of the telescope, Albert van Helden's The Invention of the Telescope has probably not been widely read. Van Helden is Associate Professor of History at Rice University and has a working knowledge of several languages, and although not a direct translation, the present work is based on Cornelis de Waard's De uitvinding der verrekijkers (The Hague, 1906). De Waard brought to light many new documents relating to the telescope, but the original Dutch work has only partially been translated and only summaries and second hand accounts have appeared in English. The strength of this monograph lies in the completeness of the collection of documents and translations. Van Helden's analysis of the documents in the introductory essay will help the reader form his own conclusions from the mass of conflicting evidence even though you may not fully agree with the arguements presented.

The scenario for the genisis of the telescope is essentially the same as presented by Henry King in the History of the Telescope (London, 1955). However, van Helden's discsussion of the references to the use of lenses which predate the first Dutch makers is very interesting, revealing and much more extensive than King's treatment of the topic. It reveals a wide knowledge of the possibility of combining lenses to form an enlarged image of distant objects. The 13th c. references of Roger Bacon to optical experiments is delt with carefully and, as others before him, van Helden rejects the possibility that Bacon was actually in

* Available from: The American Philosophical Society, Independance Square, Philadelphia, PA.

possession of a telescope. More difficult to assess are the writings of John Dee, Giovanbaptista Della Porta, Leonard and Thomas Digges and William Bourne. They laid the foundations of lens theory and their familiarity with effects produced by lenses and mirrors would make it highly probable that they attempted to combine them. The descriptions given by these writers of the powers of such experimental instruments raise doubts about their actually having made a telescope to test. As van Helden points out, the quality and the power of the lenses then available (2nd half 16th c.) would suggest that, if a suitable combination was chanced upon, the magnification would not have warranted the exaggerated claims encountered in their writings.

The conflicting pieces of evidence in support of the prescedence claims of Lipperhey, Metius and Janssen are of course examined in considerable detail. The documentation suggesting that these Dutch makers copied an Italian example of the telescope suggests to van Helden that combinations of lenses had been used for some time--perhaps as early as 1588--and were far from being secret. By reviewing the use of optics for correction of visual problems, van Helden is not ready to yield priority to an unidentified Italian. He concludes that the power achievable was much too low to extend the potential of the normal eye and that early Italian "telescopes" were in fact used to aid those with defective vision. Thus we are led to the conclusion that as Thomas Harriot and Galileo were the first to demonstrate the scientific value of the telescope, Lipperhey and Metius were the first to achieve a useful magnifying effect with the telescope. It still remains probable that someone else was responsible for the invention of the telescope.

The reader of the Invention of the Telescope is presented with the evidence and one intrepretation--you may critize van Helden's ana lysis or you may create your own scenario. Van Helden has produced a first class example of historic research which will be of lasting value to scientific historians. His efforts will likewise be appreciated by those who are fascinated by the study of the development of scientific instruments and the casual reader will find the speculations as enthralling as a court drama.

R. Brooks

NOTICE OF MEETING:

The first regular meeting of the fall session will be held Friday 19 September at the Nova Scotia Museum on Summer St. The speaker will be Dr. William Lonc of the Physics Department, Saint Mary's University. As many of you know, Fr. Lonc has a very active interest in radio astronomy and the design of equippment to allow such observations. He now has several radio telescopes operating at different frequencies and he will be describing what he has observed and what he hopes to observe in the future. This will be at a level that the uninitiated will be able to benefit from and is a topic that all to often the amateur avoids. Radio observations of the Universe have revolutionized our concepts of astrophysical processes in the last 30 years and you should therefore attempt to understand the basis of that revolution.

OBSERVING MEETING:

Those who are keen to do some observing in the dark skies of Grand Lake are invited to Brian Guest's on Saturday 13 Sept. at dusk. If you require directions, you may call our Observing Chairman, Glenn Graham, at 443-8349. This event depends on "weather permitting".

MEMBERSHIPS DUE:

The RASC's membership year begins 1 October 1980. Therefore we would ask you to bring a cheque to renew your membership this month. The fees are unchanged--no inflation here--at $16.00 regular; $10 youth (under 18 years); and $200 for life membership. Make cheques payable to:

HALIFAX CENTRE, RASC

and bring it to the next meeting or mail to:

Sherman Williams, RR 1 Horton Bluff Rd.,
Avonport, N.S., B0P 1B0.

NOW YOU SEE IT, NOW YOU DON'T

Mike Edwards

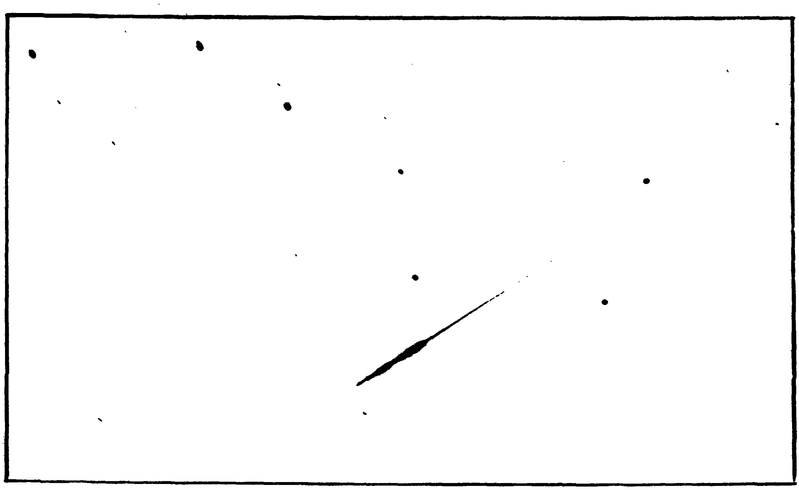
Monday evening, August 11th, saw approximately 30 Halifax Centre members gather at Maktomkus Observatory in Avonport. This observatory, as you will recall, is owned and operated by Dr. Roy Bishop, 2nd Vice-President of the RASC and Halifax Centre alternate representative to the National Council. The observatory, with the 200 mm. telescope, is built onto the Bishop home. We want to thank Roy for having us to his home on the evening in question and for the tour of his observatory.

You might ask why we chose this particular evening to visit Avonport.! Come now, and you say you call yourself an astronomer ?! The event was, of course, the Perseid meteor shower.

We arrived at Maktomkus between 6:30 and 7:00, as the Centre provided a chicken barb-a-que, with chief cook Randall Brooks under the chef's hat. Following the first annual (?) **Perseid Meteor Shower/Chicken Barb-a-que** the group was entertained by a tour of Maktomkus Observatory itself. As the evening progressed and we watched the distant cloud formations one member who will remain nameless, but between you and me he ownes Jovian Scientific, was heard to ponder as to whether the showers might come before the clouds or not. Nevertheless the showers did come before the clouds that evening. The sky only became clearer as it became darker and darker.

The first exclamation was to be heard as many were settling down and others were preparing their cameras and tripods. Throughout the session people would change their viewing areas only to miss seeing a bright meteor pass through where they had been looking without any sightings. Several bright meteors were seen. Some brighter than -6 in magnitude estimates. One of the many sightings was captured by Norman Scrimger's camera, and is shown below.

As mid-night drew close and people realized that they had a one hour drive back to the lighted lands of Halifax/Dartmouth, an end was called to the most successful meteor observing session held by the Halifax Centre in recent times. Maybe we could do it again on December 13th. That time it will be on a Saturday.



A Perseid Meteor passing through the Big Dipper as captured by Norman Scrimger.

THE FOURTH ANNUAL C O W

The fourth annual Camping / Observing Weekend (C O W) of the Halifax Centre was held this year in Kejimkujik National Park during the weekend of July 18-20. We had good weather and as an added attraction we were invited to visit the observatory of Dr. William Holden in New Albany on Sunday.

We had a lovely group campsite with lots of space all to ourselves, away from the headlights, Coleman lamps and blaring transistors of the regular sites. For this you pay a price by having to pump your water and park your car in the nearby parking lot, but you can drive into the site to load and unload your tent and telescope. You also get a huge pile of firewood, a group campfire area and a kitchen shelter for dining if it rains. All this and cupboard space for hiding your food from the racoons. The camping area was on top of a drumlin (a large hill made of clay and rocks left over from the ice age) which had an open field that sloped southward giving a view of the lake in the day time and a view of the Sagittarius region of the Milky Way in the evening. This and more for only 50¢ per person per night - where were the other 28 of you campers that we had room for? Spending more than 50¢ a night, I bet, like the non-camping observers in the rustic luxury of Milford House a few miles up the road.

Friday night, like last year, was a beautiful clear night providing great opportunity for observing the summer skies. After a quick look at the moon before it set in the trees, we got to see a variety of Messier objects, double stars, even Uranus and Neptune. Sorry folks, not Pluto, unless it was written on the side of one of those aircraft.

After Friday's late observing we had to scramble to get to Larry Caldwell's solar observing display on Saturday morning. It was worth the effort as there were over 20 sunspots and we could distinguish the umbra and penumbra on some of them. Afterward he showed the film "Satellites of the Sun" and by special request "Spring Fever", a tourist film from the days before Kejimkujik was a park.

For the rest of the day everyone did their thing whether canoeing, swimming, exploring or just baking in the sun. Saturday evening the park programme was entitled "Ghosts in Keji", really a park history from the Mic Mac times to the present. Back at the campsite fire we saw a different type of ghost, the ones that silently sneak across the sky obscuring the stars. As the clouds thickened and eyelids drooped from Friday's late hour and Saturday's sun, the campfire was doused and snores descended on the campsite. Certain reliable sources, interrupting their sleep to investigate raccoon noises in the wee hours, claim that the clouds had disappeared - oh well.

After Sunday's frisbee session we broke camp and headed for New Albany to see the newly built observatory of Dr. William Holden. After showing his observatory and demonstrating the sliding roof, he announced that his observatory was available for use by members of the Halifax Centre. Refreshments were provided in his house, where he showed off his darkroom and where all sorts of awards and diplomas were displayed including citations and artifact from his expedition to the wilds of South America. We thank Dr. Holden for his hospitality and his generosity.

In summary, it was a very successful and enjoyable weekend and Keji is the best observing site we've had in our four camping-observing weekends. The park has lots of day time activities and the group campsite, besides being a bargain, can be reserved so you don't have to leave home at noon to get a site. See you next year.

Dale Ellis

UNIVERSITY OF WESTERN ONTARIO TELESCOPE

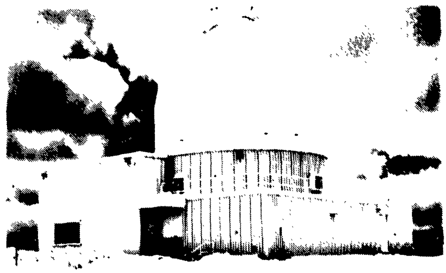
Astronomers at The University of Western Ontario are using what has been described as the most versatile optical telescope in Canada to make photographic and electronic stellar observations from their new observatory, 15 miles north of London, Ont.

The telescope is a reflector with a primary and secondary mirror forming an optical system of the Ritchey-Chretien type. The actual aperture of the primary mirror is 48.6 inches making it the third largest in Canada.

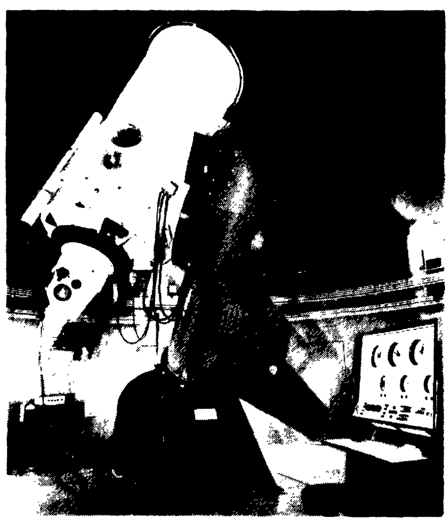
In 1966, the University received a $350,000 grant from the National Research Council of Canada towards the purchase of the telescope. An order for the telescope was placed in the same year and construction of the dome began in 1968, following approval of a capital grant from the Ontario Department of University Affairs.

The telescope provides for direct photography of the sky with a field of 1.3 degrees, a relatively large value by the standards of astronomical instrumentation. The camera for direct photography is placed at the location of the image obtained with the Cassegrain focus.

The camera may be replaced by a Cassegrain spectrograph, an instrument for analysing the light from the stars to determine their chemical compositions, temperatures, velocities of approach and recession and other properties.



Observatory housing the University of Western Ont. telescope



Telescope with spectograph as seen from Observatory control room.

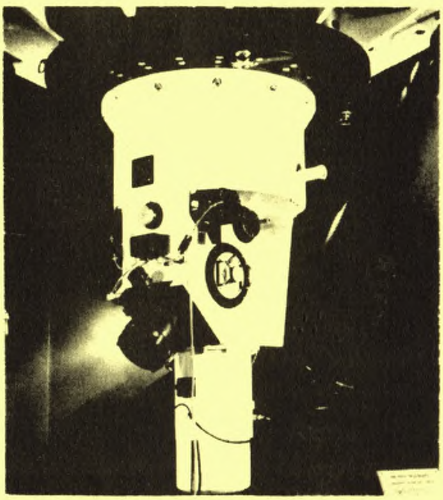
To provide an alternative location for the focus, which remains essentially fixed in position, a flat mirror in the tube of the telescope may be swung into position to divert the light through a special mounting called the Nasmyth focus. This focus is appropriate for measurement, by means of photometers, of the brightness and color of celestial objects. The system is very practical for astronomy students.

The University of Western Ontario telescope also includes another system called the Coudé focus. In this system a second flat mirror is used to divert the light towards a screen, for instance, in such a way that the image of the celestial object remains fixed whatever the rotation of the telescope. This system permits the use of a large spectrograph in a room thermally insulated to prevent radiation errors. It will be used to analyse the chemical composition, the temperature and other properties of stars. This will be the second Coudé spectrograph in Canada and the only one in eastern Canada.

The optical, mechanical and electrical system will produce images of stars on the photographic plates of the camera with diameters of 0.002 inch under favorable conditions. This corresponds to an apparent diameter of the star in the sky of one second of arc.

The observatory is situated on 300 acres of farmland. This location was chosen to minimize interference from city lights and smoke while allowing rapid access from the campus of the university.

The telescope is housed in a 30-foot diameter dome. The dome has insulation, double wall construction, ventilating fans and heat reflecting paint on the exterior to maintain interior air temperature at very nearly the same temperature as the outside air. This is in order to avoid production of poor images that result when the telescope looks through turbulent air caused by warm interior air escaping from the dome slit, to mix with exterior cold air.



Close-up of one of the spectographs as used with the telescope.

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Peter Steffin

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