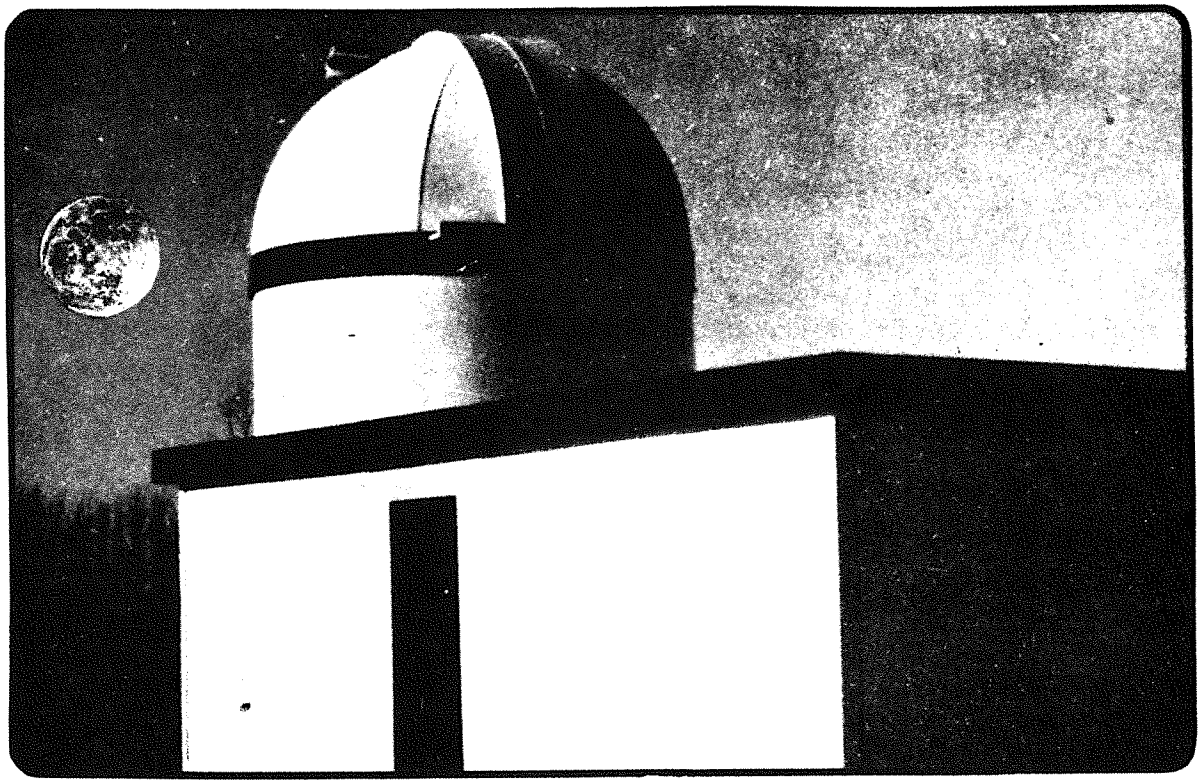

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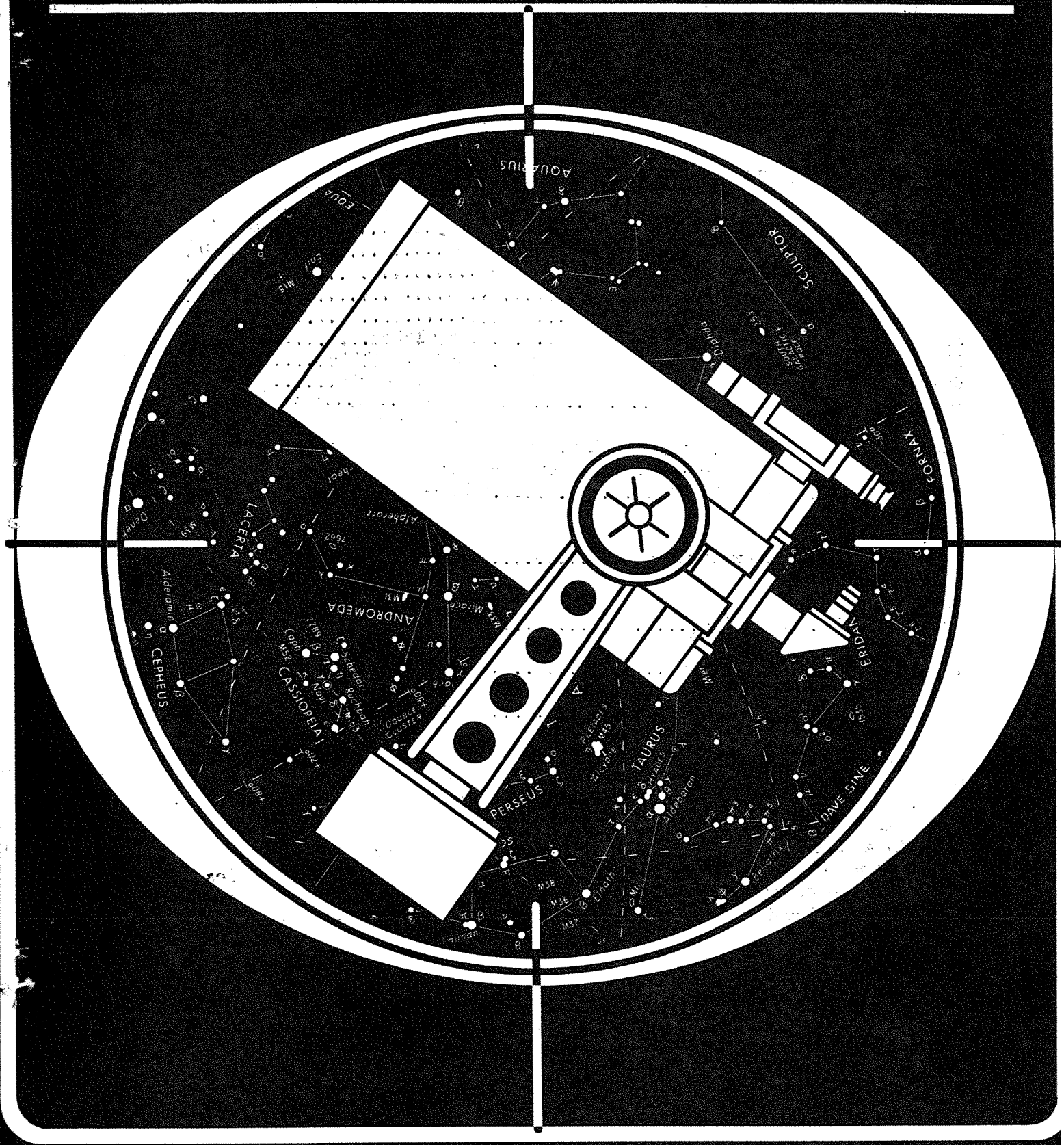

Vol 22, No. 1 W I N N I C E N T R I C S . 1983
************************************ January/February

WINNICENTRICS is the Bi-monthly publication of the Winnipeg Centre of the R.A.S.C. It is compiled and printed by members and friends of the Winnipeg Centre.

Please send all articles for inclusion in the Winnicentrics to the centre address below. All articles for publication must meet certain standards of veracity, language, and good taste. Any length of article may be submitted, but the editorial staff reserve the right to condense or serialize if necessary. Deadline for articles is the 20th. of the month preceeding publication.

CENTRE ADDRESS: Winnipeg Centre, R.A.S.C.
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Canada.

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EDITORIAL SPOTLIGHT:

Over the last few months I have been receiving feedback from a few of the other R.A.S.C. Centres across the country. This is to put the record straight; We are <u>not</u> asking the other centres to pay a subscription fee to Winnicentrics, rather we are doing what seems to be common practice at other centres by charging non Winnipeg Centre members a nominal fee to cover the postage of the magazine. I notice that a subscription to some of the other centre newsletters ranges from about $2 per year up to about $10 per year. This fee is only asked from individual R.A.S.C. members who wish to receive our publication. I hope this will clear up any misunderstanding that some of the centres had. Also thankyou to those of you that sent in your $2 subscription.

Editor Mr. G Westcott.

NOTICE

During the first two weeks of December, it was noticed that the mounting base of the C-14 had become unstable. Further investigation revealed that the disc made of particle board that sits between the telescope and the pier has rotted away to the extent that the bolts holding this layer down to the top of the pier have pulled right through. To remedy this situation a new piece of material must be put down to replace the old piece. Until such time as this situation is corrected the observatory instrument will not be open for use. Any member having access to a socket set with a reach of more than two inches please contact Andrew Lawless as soon as possible. Thankyou.

Observatory Director Mr. A Lawless.

JAN. & FEB. MEETINGS

JANUARY 14th. 1983 FRIDAY..... 8:30pm.

ROOM 217, LOCKHART HALL, UNIVERSITY OF WINNIPEG.

PROGRAMME: Centre member Mr. Grant Gussie will giva a lecture on the use of Hertzsprung-Russell diagram.
This lecture should prove interesting and also eductational to our centre members.

FEBRUARY 11th. 1983 FRIDAY..... 8:30pm.

ROOM 217, LOCKHART HALL, UNIVERSITY OF WINNIPEG.

PROGRAMME: Guest speaker Mr. Ed Torz from the Manitoba Camera Club.
Mr. Torz will be showing some of his applications for black and white films. Also subject and topic matter will be discussed.

OTHER MEETINGS THIS YEAR: MARCH 11. APRIL 15. MAY 13. JUNE 10.

FOR DETAILS ABOUT THE GENERAL ASSEMBLY TO BE HELD IN QUEBEC THIS YEAR CONTACT CENTRE SECRETARY STAN RUNGE.

NEW YEARS MESSAGE.

With Christmas over and already into the second week of January, we have to pause and contemplate upon what we would like to see happen in 1983. Not so much as what we want out of the Center but what we can contribute to make the Center more inviting to others. Remember all the parts make a whole, everyones contribution, no matter how small or insignificant it may seem, helps to get one organization all working together. To help with the expenses this year the center magazine Winnicentrics has been forced to open its pages to advertising. We invite all astronomy related and photographic advertisers who are interested to write to the center address for details.

The observatory is still in need of major repairs. I feel that if we had the money the free help wouldn't be too far behind. Work to be done hopefully this year: New dome shutter, Pier top to be replaced General painting and maintenance of building and grounds. The continuing degradation of Glenlea as a serious observation site should be questioned, every time one goes out to do some viewing the light polution seems to be just that little bit worse, however for the amateur it is an excellent site. Public lectures will be as usual this year at Riding Mountain National Park over the July long weekend and the last week in July. So for anyone that wants to get away from it all for a couple of weeks we need volunteers for lectures at Riding Mountain.

In all this year should prove to be a very interesting and busy time. Before you all rush to get your tools and paint brushes my family and I would like to wish you, the members of the Winnipeg Centre a very happy and prosperous New Year.

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CONDENSED MINUTES OF THE NOVEMBER / DECEMBER GENERAL MEETINGS OF THE RASC WINNIPEG CENTER.

November 12, 1982.
Attendance: 28 members and 12 guests.

The meeting was called to order by Mr Westcott at 8:33pm. In the absence of the secretary Mr Runge, Miss Belkin recorded the meeting minutes. Mr Westcott announced that the Halloween party had been well attended and was a success for the second year running. Thanks were expressed to Dr Bochonko for obtaining use of the room, Miss Belkin and her family for all the excellent food, and last but not least to Dave Sine for doing the grocery shopping.
Councillors were reminded of a council meeting at Mr Westcott's residence on Sunday November 14.

An award to center member Mr Grant Gussie was then presented. Mr Gussie has observed all the Messier objects and is to be commended on his record keeping for his observations. He is the first person in the Winnipeg Center to receive this award.

Mr Westcott then introduced the guest speaker for the evening, Mr Ken Walsh head systems engineer at Bristol Aerospace.

Mr Walsh has worked on some of the major space projects, "Space Plasma Laboratory One" to name just one he has also designed and participated in the launch of 56 major rocket projects. His lecture was one of the most interesting that I have attended, He spoke about current projects and the sucesses and failures of past years. Most interesting were the auroral slides taken from the two orbiting satellites. From space our world looks totally different when an auroral storm is taking place. Mr Walsh explained how they thought that they had all types of aurora defined and then a new type comes along and they have to start again. Many questions were raised and long discussion was had. After the lecture Mr Westcott demonstrated some new Lumicon equipment, while everyone had coffee and doughnuts. Moved by Mr Sine seconded by Mr Stevens...Meeting closed 11:15pm.

Meeting held December 10, 1982.
Meeting called to order at 8:45pm attendance 21 members and 1 guest. Mr Westcott read letters to the members from National and other out of country members. He explained why all non-Winnipeg members should have to pay $2 a year to receive the Winnicentrics. Centre members are already paying this surcharge for postage. Volunteers were requested for repairs to be done to the pier. Six centre members volunteered.

The guest speaker for the evening was Dr Richard Bochonko, no stranger to the center. Dr Bochonko changed his topic due to shortage of material. His new topics "The Canadian Long Baseline Array Telescope" and "Starlab" orbiting telescope. As the first topic could involve Winnipeg as a proposed site for further investigation a lot of very interesting questions were thrown back and forth. In the long run it appears that the LBAT will be too expensive for Canada to take on alone. The final outcome however sad it may seem, could well be a joint mission with Canada and the U.S. forming GNAT "Giant North American Telescope". The second topic was about Starlab. This joint three country proposal would see the placement of a 1 meter or larger telescope in orbit. It would be a large-field f/18 instrument operating in the 10 angstrom wavelength having a $1/2^{\circ}$ field of view and resolution of 1/10sec of arc. Canada would provide the telescope, the Australians the imaging systems and the U.S. would place the scope in place. Out of the two projects this one sounded more useful and beneficial. Meeting closed 10:45 by a motion from the floor.

NASA NEWS

GALILEO ON WAY TO JUPITER.

The Galileo Jupiter probe will leave Earth on May 1986 riding atop the off then on again Centaur booster. The orbiter and probe will arrive at Jupiter in September 1988, with enough fuel for at least eleven satellite flybys and possibly more. Centaur also benefits the International Solar Polar Mission. With the new stage ISPM will fly directly over the suns poles instead of going the long way around via Jupiter. The direct route will allow 200 days over the poles instead of the origonal 140 days. Beyond Galileo and ISPM, Centaur is a better way to just about anywhere in the solar system. For flights to the inner planets, it allows heavier but less costly designs. For flights to the asteroids, comets, and the outer planets, it opens up new opportunities; NASA has been looking for the cheap alternative for years, it's kind of ironical that they should find it in their own backyard.

MOON ROCK PROBED:

John Delano, a scientist who found a gas bubble trapped in a piece of moon rock says the discovery might give other scientists a good idea how the Earth's satellite was formed. John is studying slivers of volcanic glass brought back by Apollo astronauts. The slivers were formed about 3.7 billion years ago. It is hoped to analyse the gas to get a complete chemical breakdown of its elements. While scientists believe that the gas in the bubble will probably consist of carbon monoxide and some hydrogen and nitrogen compounds, they are more interested in finding traces of other gases. The other gases such as argon, neon, krypton and zenon, would indicate earlier fissions, providing evidence for the fission theory that the moon was created from the Earth or the two bodies came from a larger body. Two other major theories say the moon was "captured" in its orbit by the Earth or the two formed about the same time and have shared the same area in space since.

BY THE DARK OF THE SILVERY MOON.

By Guy Westcott

It was a cold winter night, December 30th. 1982. The moon hung in the sky bright and sure. Hoare frost coated the trees and in the weird twilight of the nearly full moon made it look like a winter wonderland full of ice castles.

Andrew Lawless, Daniel Lawless and myself all piled into my car, along with an ample supply of hot coffee, telescope parts and cameras. With all this loaded we headed out to the Glenlea observatory site. This was to be the second total lunar eclipse of the year for the Manitoba area. Would the eclipse be as dark as the first? Many people said No! It would be too high in the sky this time.

Driving out to the observatory site we watched through frosted car windows as the last of the little cloud there was dissapated into the frozen sky. As we travelled south the moon flickered through the trees as they stood overseeing the road like frozen telescopes pointing toward the yet uneclipsed moon.

We arrived at the observatory at 2:15am, still with plenty of time to set up our equipment. We appeared like fire breathing dragons as our breath spewed out while we unloaded, we would have to be careful of our cameras and eyepieces in these cold temperatures. The radio reported a cool -26°C.

The moon started to enter the penumbra at about 2:48 am. You could see very little difference in brightness and no limb darkening until about 15 minutes later. A darkening on the upper limb, was first to show. It slowly spread across the moons surface. By 3:45 it was starting to get really dark. Andrew had to content himself with observing through his C-8 as he had left all his film sitting in the warm back in Winnipeg. After about an hour and a half I went to check my C-90 only to find the focus totally frozen. I could only hope that it was in focus when it had frozen. By 5:33am we were deep into totality, I am sure that it got a few degrees colder when the moon went out.

The moons disc was totally dark now, a silvery grey disc could just be made out by staring for a period through binoculars. After your eyes dark adapted, a faint orange tinge was visible along the top limb.

Slowly the warming light began reflooding the moons surface, drawing the dark curtain away from the familiar landmarks.

Cameras were clicking away, reminding me of the solar eclipse of a few years back. As the first thin sliver of moon reappeared someone called out that you could almost see a diamond ring effect and jokingly put on his sunglasses. A couple of the astronomers could be heard discussing why the eclipse had turned out so dark. It's the volcanic ash in the upper atmosphere for sure, said one of them. After all the moon is a lot higher now than it was last summer, so it should have been a lot brighter.

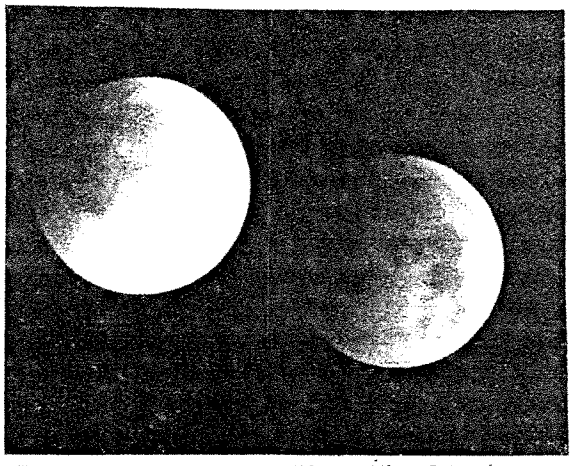
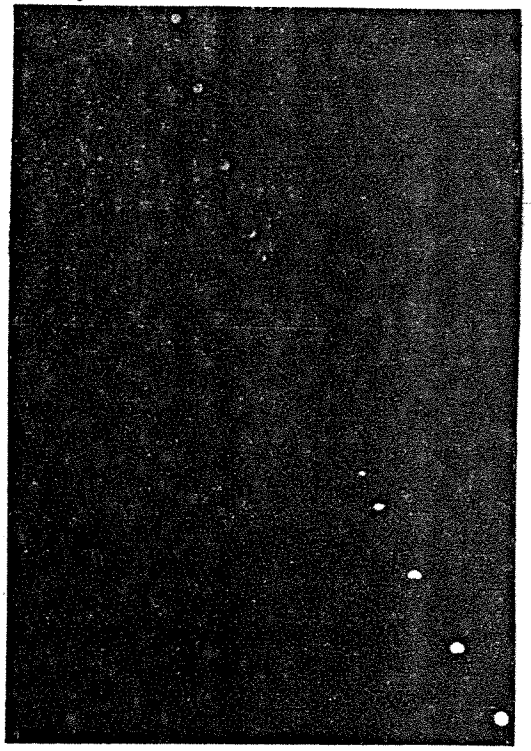


Photo taken at 3:50am & 4:10am
Tri-X f5.6 at 1/500 sec. Dec. 30/82

By 7:15 am the eclipse had finished. The warming sun was peeking over the trees in the South-East and over my shoulder to the West, the not quite full moon was slowly settling toward the cold ground. It was hard to imagine that just a few short hours ago the moon had been wandering through a vast cone of shadow spread out by the Earth. We started packing up our equipment, lovingly for those pieces that had worked, a few swear words and a drop-kick for those that hadn't. The drive back to Winnipeg was warming and pleasent with a stop on the way for breakfast under the big M sign. What a place to end, under the big Moon.

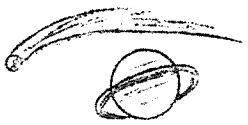
All photos & sketch by author.

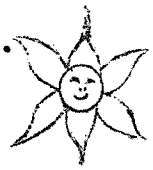


Time lapse photo on XP-1 film.
15 exposures over two frames
using a 28mm lens.

This sketch, just before totality shows two stars just about to disappear behind the moon's limb.

6. SKY NOTES.





By Brenda Belkin.

MERCURY: Jan. 15 R.A. 19h 53m, DEC -17° 59'
Feb. 15 20h 12m, -20° 21'

Early January is the best time to view speedy Mercury. It can be seen low in the South-West at sunset. Later in the month and on into February it's too close to the sun to be seen.

VENUS: Jan. 15 R.A. 20h 58m, DEC -18° 46' Mag. -3.3
Feb. 15 23h 26m, -5° 04' -3.4

Venus reappears low in the South-West at sunset during the end of January. It will increase its height above the horizon everyday, and by the end of February Venus will set about 3hrs after sunset.

MARS: Jan. 15 R.A. 22h 02m, DEC -13° 09' Mag +1.4
Feb.15 23h 33m, -3° 45' +1.4

All through the month of January Mars will be above the horizon at sunset, It will set about 3hrs later. In February it is a lot less favorable due to Mars being low in the South-West at sunset.

JUPITER: Jan. 15 R.A. 16h 08m, DEC -20° 06' Mag -1.4
Feb. 15 16h 27m, -20° 52' -1.6

Jupiter is the morning star throughout January. Unfortunately Jupiter will remain low on our horizon for pretty well the entire year. On February the 17th Jupiter will be only 0.8° North of Uranus. Try using a pair of binoculars to find the other planet. This would also be the ideal time to try out that new camera you got for Christmas.

SATURN: Jan. 15 R.A. 14h 09m, DEC -10° 27' Mag + .8
Feb. 15 14h 12m, -10° 34' + .7

Saturn rises after midnight all through January and stays prominent in Virgo until October.

LUNAR NOTES:	JANUARY	FEBRUARY
LAST 1/4	6th.	4th.
NEW	14th.	13th.
FIRST 1/4	22nd.	20th.
FULL	28th.	27th.

DID YOU KNOW?

On the first mission to one of the bright regions of the Moon, astronauts carried seeds from many plants to study the possible effects of space travel on the seeds. Seeds for Arizona Sycamore trees grown from the seed carried on the Apollo 14 mission in 1971 are now available for sale. The tree, now thriving on the University of Arizona campus, is a large and excellent shade tree. Proceeds from the sale of these seeds is used for educational programs in the Flandrau Planetarium. The seeds cost $1 per packet and are available by writing to the Flandrau Planetarium Gift Shop, University of Arizona, Tucson, AZ 85721.

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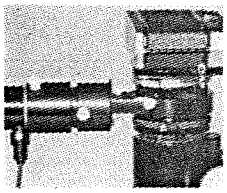

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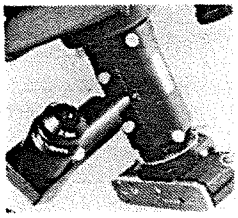

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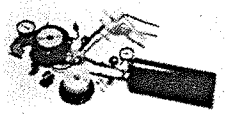

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MAGAZINE REVIEW

If you are really into deep-sky observing and astrophotography, here is a new magazine just for you. ASTROMEDIA, the publishing body for Astronomy magazine, has brought out a baby brother. Each issue promises to be full of informative articles written by deep-sky observers like yourself. Coverage of observing activities, star parties and interviews with prominent astronomers, are also some of the features offered by this new glossy. I might also mention that it is to be filled with handy observing aids, maps, charts, and the world's most beautiful deep-sky photographs, taken by the subscribers, of course.

If you are looking for a deep-sky experience you can reserve your copy of the premier issue now. Send no money, if you like what you see, return the invoice with payment; if not, simply mark "cancel" and you owe nothing. Clip out coupon at the right and send to ASTROMEDIA.

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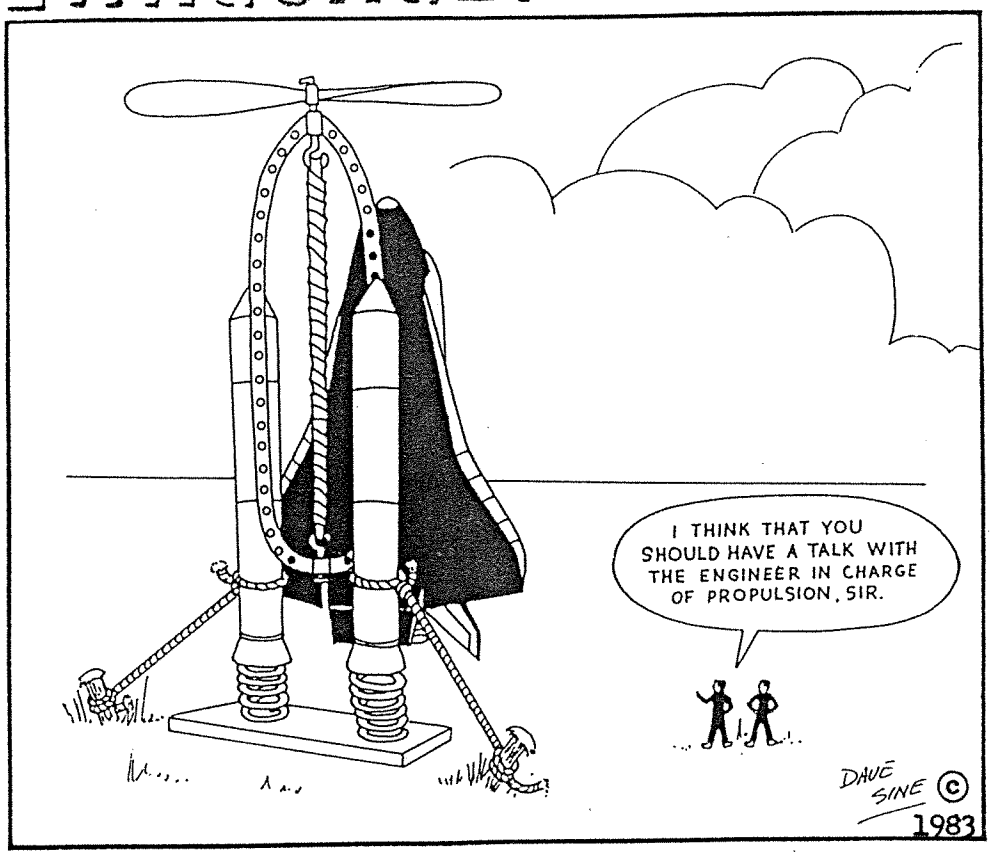
SINE LANGUAGE.



PRODUCT REPORT.

By Mike Pendleton

Recently, advertising for Lumicon Inc. has had a tendancy to surface here and there in the Winnicentrics. This is just as well for they seem to be right on the money with their line of products. They range from film hypering kits to complete astrographic telescopes, this also includes everything in between. One such item that I aquired and tested is the Lumicon "Super-Finder".

The "Super-Finder" objective is housed in a black PVC tube and consists of an 82mm 3 element lens, the effective standard focal length is 301mm - a fast f3.7. This unit is available in almost any configuration in all modes that one would ever need. It may be purchased as a lens with a standard 2" drawtube which threads onto an camera adapter or it can be used with a special adapter to accomodate a standard 1¼" diagonal.

Optically this lens is superb. In performance it has absolutely no light fall off, it yields maximum light gathering and extremely crisp image definition. At the moment I use this lens as the main photographic instrument on a 6" f5 Newtonian telescope. If I use a 2X teleadapter with my 35mm camera, I get 15 X magnification, this is nearly identical to my 6" at prime focus. Because of this I can use the main telescope as a guide scope during deep sky photography, this allows the magnification to reach a minimum 5X/inch in guiding capabilities.

Until recently I was using my Newtonian at prime focus and guided with a 2.4" Tasco pushed to its limit. The biggest disadvantage of the Tasco was that the eyepiece was at the mirror end or bottom of the Newtonian tube - this always produces lots of laughs when it's 20 below and you're shooting at the zenith. Using the super-finder as a lens it's more centrally located, this adds to a better balance and more stability. No more stiff neck, cold knees from bowing

to the East, and best of all no more flaring temper.

The biggest plus about the finder/lens is its finder-scope mode. With a nice wide field or even a higher powered eyepiece, it provides an absolutely breathtaking view of most common objects. It also has a plus as a portable instrument in its own right, high resolution, crisp images, coupled with good color rendition. A good sturdy tripod and a little ingenuity is all that is left for one to quest after.

Now a few words of caution about the super-finder. Rumour has it that the unit comes in two tube lengths. I can assure you that this is no rumour. Bear in mind that when considering a purchase, specify either visual or photographic mode. The photo/lens version uses an 11" tube while the visual finder has a 9½" tube. What happens if you want to use both versions alternately?

This problem is complicated in terms of a limited use. After I obtained my 11" tube version I found that I could not move the eyepiece and diagonal in close enough to obtain a focus at infinity. This is where the knowledge of ray traces plays a vital role. I was able to determinethe right focal point for both visual and photographic, a happy medium, or so to speak.

This process took a considerable amount of research to make sure that I had enough range in the visual mode when using various eyepiece focal lengths. By fine tuning the system I arrived at a perfect point. This was when the tube has to be shortened. I noted that with a 32mm shorter focal plane I had no loss of light and still I had plenty more room to spare. It would certainly seem self defeating to take a fast system such as this and ruin it by cutting of a lot of the light. In the end we reached the perfect medium of use as a telephoto lens system and also as a visual finder. Thanks to Jack Marling for his very helpful advice during the modification process.

All in all I would have to rate the Super-Finder as a very high quality instrument, both visually and photographically. Lumicon is to be complimented for a truly innovative and quality minded instrument. Amidst the forest of newfangled products the price also stands out like a fire, they list from $150 to $180 U.S. and this includes all extras required to modify the system for both uses. In reach of most amateur pocket books.

Mike Pendleton was a member of the R.A.S.C. Hamilton Centre until last year, while packing up a telescope he fell into the crate and was shipped to Winnipeg. I still think the Hamilton Centre was behind the shippment. It came C.O.D. We were so curious to see what would be in such a funny shaped case that we totally ignored all the "ARRR BILLY" warning labels. Only after the crate was opened and the dreaded Captain Humdinger double was free, did we realize what we had released on an unsuspecting Winnipeg. No more peace and quiet at the observatory, the summer nights are now punctuated by "ARRR BILLYS". But don't worry Hamilton all is not lost we're now working on a method to return Mikie to Hamilton. We have just borrowed a Black Brant Rocket from the Planetarium and we are now trying to miniturize Mike and his telescope for shippment back East. AIRMAIL???

ooOoo

A STAR IS BORN. CONGRATULATIONS TO MIKE & DENISE PENDLETON ON THE OCCASION OF THE BIRTH OF THEIR DAUGHTER COURTNEY DEANNE PENDLETON. BORN ON JANUARY 2, 1983. AT 22:22. WEIGHING IN AT 8lbs 3oz.

MIKE HAD A FLAT BATTERY!!

COMPUTER SOFTWARE FOR THE AMATEUR ASTRONOMER. By Brenda Belkin.

Last issue I wrote a computer program for storing information on Messier and NGC objects in personal computers. After getting much positive response to the program, I believe that many amateurs are enthusiastic to combine their computer know-how with their astronomy hobby. Since more and more people are purchasing home computers, the need for personalized software will be increasing as well.

Starting with this issue of Winnicentrics, I intend to write a series of astronomy related programs of interest to the amateur. The programs are in TRS 80 Basic, Model III. Some of the programs will be short and others will be fairly long, this is according to the amount of spare time that I have from university and the amount of available time on Guy's TRS-80.

When keying in the program, pay particular attention to the exact coding listed. A missing comma here and semicolon there can really make a difference. Also, typos are sometimes missed in the proofreading. If there are any problems at all I hope that you will call me and perhaps I will be able to help. If you have any programs that you have tried and think that other members would be interested in, please let us know. Regardless of the type of computer you have we can possibly adapt programs.

This program is about Lunar photography. The computer will ask you a series of questions about your particular combination of telescope/lens eyepiece/ASA rating etc. etc. and will calculate for you exposure time, magnification, image size on negative, all based on the figures you feed in at response to its questions. This is an extremely useful program and takes up 3.4K of memory.

```
5   ?"RECOMMENDED EXPOSURE TIMES FOR LUNAR PHOTOGRAPHY"
10  ?:?:?TAB(20);"LUNAR PHASES"
15  A$="THIN CRESCENT":?TAB(18);"(1)"A$
16  B$="WIDE CRESCENT": ?TAB(18);"(2)"B$
17  C$="QUARTER PHASE":?TAB(18);"(3)"C$
18  D$="GIBBOUS PHASE":?TAB(18);"(4)"D$
19  E$="FULL PHASE":?TAB(18);"(5)"E$
20  ?TAB(18);"(6) ESCAPE PROGRAM"
25  ?"INSTRUCTIONS:  ":?
30  ?"ENTER  NUMBER TO LEFT OF DESIRED PHASE"
31  ?"AND PRESS RETURN."
35  INPUT R
36  ON R GOTO 100,200,300,400,500,620
100 REM THIN CRESCENT
105 GOSUB 1000
107 ?:? "FIIM SPEED USED?:  ":INPUT Q:?"FOR";A$
110 V=T*T/Q/8: GOTO 600
200 REM WIDE CRESCENT
205 GOSUB 1000
207 ?:?"FIIM SPEED USED?:  ":INPUT Q:?"FOR" ;B$
210 V=T*T/Q/15:GOTO 600
300 REM QUARTER
305 GOSUB 1000
307 ?:?"FIIM SPEED USED?":INPUT Q:?"FOR";C$
310 V=T*T/Q/36:GOTO 600
400 REM GIBBOUS
405 GOSUB 1000
407 ?:?"FIIM SPEED USED?":INPUT Q:?"FOR";D$
410 V=T*T/Q/80:GOTO 600
```

```
 500  REM FULL
 505  GOSUB 1000
 507  ?:?"FILM SPEED USED?":INPUT Q:?"FOR";E$
 510  V=T*T/Q/200:GOTO 600
 600  IFV>=1THENPRINT"RECOMMENDED EXPOSURE:  ";INT(V)"SEC":GOTO610
 605  P=1/V:?"RECOMMENDED EXPOSURE:  1/";INT(P) "SEC"
 610  ?"DO YOU CARE TO REPEAT THE PROCESS? YES OR NO."
 611  INPUT A$
 615  IF A$="YES" THENGOTO 5
 620  ?:?:?TAB(30);"GOODBYE!":?:
 621  ?"COPYRIGHT 1983 BY B. BELKIN"; END
 625  STOP
1000  REM SUBROUTINE "MENU"
1005  ?TAB(15);"AVAILABLE PHOTOGRAPHIC METHODS"
1010  ?TAB(18);"(1) EYEPIECE PROJECTION"
1015  ?TAB(18);"(2) PRIME FOCUS"
1020  ?TAB(18);"(3) LENS/TRIPOD"
1021  ?TAB(18);"(4) DEFINITIONS"
1022  ?TAB(18);"(5) ESCAPE FROM PROGRAM":?:?
1025  ?"INSTRUCTIONS:  ":?
1030  ?"ENTER NUMBER TO LEFT OF DESIRED METHOD"
1035  ?"AND PRESS RETURN.":?:?
1040  INPUT S:?:?
1045  ON S GOTO 1050,1072,1088,1150,1121
1050  REM EYEPIECE PROJECTION
1052  ?"EXTENSION TUBE LENGTH IN INCHES?"
1054  INPUT D
1056  ?"PHOTOGRAPHIC F/RATIO OF TELESCOPE?":INPUT F
1058  ?"APERTURE OF TELESCOPE MIRROR IN INCHES?"
1060  INPUT A
1062  ?"EYEPIECE USED IN 'MM' ?":INPUT E:?"BARLOW? (Y/N)"
1063  INPUT J$
1064  IF J$="Y" THEN M=D*25.4/E+1:L=M*A*F*25.4:GOTO 1066
1065  M=D*25.4/E-1:L=M*A*F*25.4
1066  ?"MAGNIFICATION:  ";L/50 "X"
1068  ?"EFFECTIVE FOCAL LENGTH:  ";L "MM"
1070  ?"SIZE OF IMAGE ON NEGATIVE:  ";L/115 "MM"
1071  T=M*F:"EFFECTIVE F/RATIO:  ";T:GOTO 1120
1072  REM PRIME FOCUS
1074  ?"APERTURE OF TELESCOPE MIRROR IN INCHES?"
1076  INPUT A
1078  ?"PHOTOGRAPHIC F/RATIO OF TELESCOPE?"
1080  INPUT F:M=A*F*25.4/50:?"MAGNIFICATION:  ";M "X"
1082  L=M*50:?"EFFECTIVE FOCAL LENGTH:  ";L "MM"
1084  ?"SIZE OF IMAGE ON NEGATIVE:  ";L/115 "MM"
1086  T=F:?"EFFECTIVE F/RATIO:  ";T:GOTO1120
1088  REM LENS/TRIPOD
1090  ?"LENS FOCAL LENGTH IN 'MM' AND LENS F/RATIO"
1091  ?"SEPARATE NUMBERS WITH A COMMA."
1095  INPUT X,Y
1100  M=X/50:?"MAGNIFICATION:  ";M "X"
1105  L=X:?"EFFECTIVE FOCAL LENGTH:  ";L "MM"
1110  ?"SIZE OF IMAGE ON NEGATIVE:  ";L/115 "MM"
1115  T=Y?"EFFECTIVE F/RATIO:  ";T
1120  RETURN
1121  ?:?TAB(30);"GOODBYE!":?:?
1122  ?"COPYRIGHT 1983 BY B. BELKIN": END
```

```
1150  ?:?:?TAB(10);"DEFINITIONS:"
1151  ?"MIRROR APERTURE: DIAMETER OF TELESCOPE MIRROR"
1152  ?"EFFECTIVE FOCAL LENGTH: ACTUAL FOCAL LENGTH "
1153  ?"  OF TELESCOPE SYSTEM WHEN USED IN CONJUNCTION"
1154  ?"  WITH EYEPIECES ETC."
1155  ?"EFFECTIVE F/RATIO: ACTUAL PHOTOGRAPHIC F/RATIO OF"
1156  ?"  TELESCOPE SYSTEM WHEN USED IN CONJUNCTION WITH"
1157  ?"  EYEPIECES ETC."
1158  ?"PRIME FOCUS: CAMERA IS ATTACHED DIRECTLY TO BACK OF"
1159  ?"TELESCOPE."
1160  ?"EYEPIECE PROJECTION: CAMERA IS ATTACHED TO TELESCOPE"
1161  ?"VIA AN EXTENSION TUBE. EYEPIECE PROJECTS"
1162  ?"IMAGE TO FILM PLANE."
1163  ?"EYEPIECES ETC."
1164  ?"CONTINUE? YES OR NO.":INPUT B$
1165  IF B$="YES" THEN GOTO1000
1166  GOTO 1121
1170  PROGRAM CODE "------"
```

IN THE TRS-80 THE ?s OUTSIDE OF THE PARENTHESIS PERTAIN TO THE STATEMENT PRINT. THE * PERTAINS TO THE MULTIPLICATION OF TWO SUBJECTS. A BOOK IS IN PRINT AT THE MOMENT THAT GIVES YOU ALL THE INFORMATION TO CHANGE APPLE II & PET PROGRAMS INTO TRS-80 PROGRAMS, IT ALSO WORKS THE OTHER WAY FROM TRS-80 TO PET OR PET TO APPLE. THE BOOK IS $5 FROM RADIO SHACK.

ooOoo

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LATE NEWS:
MASSIVE AURORA DISPLAY.....Between 10:30 pm and 11:00 pm on January the 9th 1983 myself and Andrew Lawless witnessed the brightest and most pronounced auroral display that we have ever seen. At maximum it must have covered at least 85% of the visible sky. It cast noticable shadows on the ground and was audible. Colors were bright and easily distinguished by naked eye, vivid reds, purples,blues and greens and in one instance the display burst overhead a brilliant white almost like a lightening flash. We watched enthralled as the aurora rolled and folded like a speeded up time laspse movie film of clouds rolling in. A complete loop formed overhead and was intersected by at least two bars running up and down the loop. It looked much like the slides shown to the centre by Mr Ken Walsh at a meeting a few months ago. The display was so impressive that I would swear that a 3 - D effect was seen and that the auroral charge reached right down to the ground. If any other RASC members across Canada saw this display (and got some photos) please let us know. I only bemoan the fact that I left my camera at home. G. Westcott.

GALILEO, GALILEI

By Jill Carroll.

REPRINTED from "Astronomy London" June, 1982

He was 69 years old, and his hair and beard were frosty white. His eyes, which had looked at the heavens through his telescopes and had seen more than any other human being since the beginning of time, were now dimmed with age. His reputation as one of the greatest scientists of his time had led kings and queens to vie for his services. Now he knelt before the dreaded tribunal of the Inquisition compelled to make public confessio of an error that was no error; "I, Galileo Galilei, ... abandon the false opinion ... that the sun is the centre (of the universe) ... I abjure, curse and detest the said errors." Some said that when the old man rose he muttered inaudibly, "E pursi muove" - "though the earth so moves (around the sun)".

No doubt he thought of the advice his father had given him as a boy: "... freely to question and freely to answer ... as well becomes those who are sincerely in search of truth." From early in life he had fought for truth against superstitious ignorance and relentless authority. The struggle had been a long one, against heavy odds; and he wondered now whether it had been in vain, for the inexorable voice of the Inquisition decreed in 1633 that Galileo's books be banned and that he be placed in confinement.

He was born in Pisa, Italy in 1564, one of a family of seven children, to a father who was a talented musician and a man of considerable education. Even at an early age, Galileo showed great promise. When he was 17, he entered the University of Pisa where he majored in medicine and also studied mathematics and physical science. While still a student there, he made observations that led to the invention of the pendulum used in clocks and other instruments for the precise measurement of time!

At age 25, with the assistance of the Grand Duke of Tuscany, to whose attention he had come as a result of his scientific work as a student, Galileo was engaged as a professor of mathematics at Pisa at a salary of about $65 a year. (At this time, mathematics professors were paid much less than all others because mathematics was considered of littl importance!) It was here that Galileo conducted the experiment for which he is perhaps best known. Before a multitude of observers that included many of his skeptical colleague from the University, he proceeded to drop a one-pound and a ten-pound leaden ball from the top of the Tower of Pisa. The two balls, of course, struck the earth at about the same time, refuting Aristotle's theory that the speed of falling objects was proportional to their weight. It was here also that, using an inclined plane apparatus, Galileo formulate theories concerning the relationships between time, distance, speed, and acceleration and developed the modern concepts of friction and inertia.

Galileo believed that one should learn about nature by observing and experimenting rather than by seeking answers in the works of Aristotle and the ancients. In his own lectures at Pisa, he presented his own observations and vigourously criticized the orthodox works when he found them to be false. For these convictions, and for refusing to wear the academic robes worn by his colleagues, Galileo was eventually dismissed from the facul

Galileo's departure from the University of Pisa turned out to be fortunate, for he obtained a better paying position (at about $200 per year) at the University of Padua, where he also found greater freedom of discussion. Here he set up a workshop to manufactu magnetic compasses (and later thermometers and telescopes), and became an expert on the construction of military fortifications. His reputation became so great that students fro all ranks and places now came to attend his classes. At one time as many as 2 dozen of his students were actually living with him as was the custom of the time.

Early in the 1600's, Galileo heard that a Dutch optician had put together some lenses in such a way as to make distant objects seem nearer. Using this idea, he invented a telescope that magnified objects 30 times, and in 1609 gave a public demonstration of its use. The ambassador to the Grand Duke of Florence, who was one of those attending the demonstration, reported his amazement to the Duke. Looking out to sea through the telescope, he had been able to discern ships that would not be visible to the unaided eye for some three hours. Galileo presented the telescope to the Duke and, in gratitude, the latter made him a lifetime professor at the University of Padua at a salary of about $500C a year!

 When Galileo turned his telescope towards the heavens at night, he opened up new vistas of knowledge which he discribed in his book, "Sidereus Nuncius" (Messenger of the Stars). In it he says: "I give thanks to God, who has been pleased to make me the first observer of marvelous things unrevealed to bygone ages. I have ascertained that the moon is a body similar to the earth ... I have beheld a multitude of fixed stars never before seen ... But the greatest marvel of all is the discovery of four new planets (the four Galilean satellites of Jupiter) ... I have observed that they move around the sun." He ascertained that the Milky Way consisted of a myriad of stars; that the planets were not self-luminous, but reflected the light of the sun; that the universe was not, as his contemporaries believed, fixed and unchangeable, for new stars appeared in his view and then disappeared; that the planets Venus and Mercury also moved around the sun; and that the sun itself revolved on an axis.

Galileo, who had been eager to return to the land of his birth, at this time sought and received an appointment to the University of Pisa. This was a tragic blunder, as it turned out, for Pisa was subject to the Inquisition, whereas Padua, in Venetian territory, had much greater independence.

In Pisa, his book, instead of being acclaimed as indisputable establishing the truth of the Copernican theory, stirred the deep animosity of the reactionary groups in power. In 1616, he was summoned by the Inquisition. However, the friendship of Pope Paul V and the influence of other highly placed friends enabled him to get off with a warning, on his agreement not to "hold, teach or defend" the Copernican theory.

For many years thereafter Galileo devoted himself to meditation and research in astronomy and mechanics, but in 1632 he broke his silence. He published another book, "Dialogue Concerning the Two Principal Systems of the World", a brilliant satire showing the flaws in the geocentric Ptolemaic system as opposed to the Copernican sun-centred system.

Once more he was called before the Inquisition, but this time it was decided that Galileo must publicly swear that his beliefs were false, must abandon further work in science, and must suffer confinement. Because he was in poor health and was aged, he was permitted to remain under guard in a small house he had secured in the area.

Even now the great scientist was not fully silenced. He prepared his last book, "Dialogues Concerning Two New Sciences", summarizing all his research in the fields of motion and mechanics and smuggled it to Holland where it was published in 1638. When he died in 1642, venerated by the citizenry and many civic and church leaders, the Inquisition refused to permit a public funeral for him.

Galileo need not have feared that his efforts were in vain, for the world soon recognized his achievements in astronomy and physics. In addition, his method of relying upon experimentation and firsthand observation rather than upon prior authority, was one of the cornerstones of modern science. Perhaps of paramount importance is the lesson that should have been learned from his experience by future generations: human progress requires that the minds of men be kept free to challenge ideas and seek for truth without fear of repression or reprisal.

TIDBIT:

Frequent auroral displays may cause enough current flow between the atmosphere and the ground to speed up the corrosion process and cause breaks in water main pipes!

(University of Saskatchewan, Dept. of Physics)

NEXT ISSUE PRODUCT REPORT "THE CHEAP ALTERNATIVE TO THE H-ALPHA DAYSTAR"