



EDITOR'S MESSAGE

It seems again, that we have a successful issue of Stardust, and I would like to thank all the people who sent me something for our December issue.

Winter has finally set in, and except for a few hardier souls, observing will all but stop, until the spring, so we can all devote more of our time to writing something for Stardust.

Two of the articles in the November issue of Stardust received publicity in "Stan Williams' Notebook", in the Edmonton Journal, and we would like to thank the Edmonton Journal for the publicity that we received.

Speaking of group pictures of the 1970 Edmonton General Assembly, some people have not picked up and/or payed for their pictures. They will be available this month, at the regular meeting of the unbelievable, low, special price of only \$1.75 ( 1 dollar and 75 cents) each. To get yours, please see Mr. Smith.

There has been a new astronomy club formed in Canada and their calling card reads as follows:-

WINDSOR ASTRONOMICAL KLUB

W.A.K.

W.A.K.'s our name,  
Astronomy's our game.

They write, asking if there is any member in our center that would be interested in corresponding with them. If any one is interested, would you send your name to me, or write directly to them;

P. Price,  
2849 Skyline Dr.,  
Windsor, Ont. N1

Anyone building a telescope can contact Bob Elaxley, who will be able to refer you to someone if you need help.

To those people who would like to include drawings with their articles, try and send these drawings to me at least a month before the printing of Stardust. We are not yet able to print photographs, and if you wish to include a photograph(s), try to get them duplicated yourself.

Again, I would like to thank the contributors and also those people who helped run and print Stardust.

This month, as usual, contributions should be sent to Brian Dowling at 9265-Strathearn Drive, Edmonton, Canada.

Brian Dowling,

THE PRESIDENT'S COLUMN

Originally scheduled for our December meeting was Mr. A.T. Blackwell of the University of Saskatchewan at Saskatoon who had intended to deliver a talk on Project MOPR (Meteorite Observation and Recovery Project), an interesting research into meteorite recovery and analysis. Unfortunately due to pressure of astronomical business on him it was necessary to postpone the presentation to the New Year.

As a replacement, an audio-visual program which should prove most interesting will be shown featuring two colour films one of spectacular footage of Mars, Jupiter and Saturn in close-up motion and the other dealing with the detailed construction of the Sir Isaac Newton Telescope in England. Rounding off the program we hope to have video-tape of the moon's surface taken through the University of Alberta's cassagrain by Gary Finlay. A special video-tape recorder and television monitor will be brought to the meeting to demonstrate this very promising technique of showing astronomical objects.

A NOTE FROM THE SECRETARY

Our Annual Banquet was again a very enjoyable event and, judging from the fact that almost the total membership participated, gaining in popularity.

The excellent facilities of the Faculty Club and the delicious food certainly contributed to the success of the evening, as did the lively account Dr. Hodgson presented of his contribution in analysing the lunar samples.

We thank Prof. Keeping for making the arrangements for this banquet.

Congratulations are due to Brian Martin from Penhold who, for the second time in a row, won the McBain Trophy for Astrophotography. We appreciated to have Mr. Miller from McBain Camera Specialty Ltd. at the banquet to present the trophy.

Other worthwhile contributions for this contest were submitted by Robert Paul and Brendan Veilleux.

We also like to congratulate Bob Blaxley for winning the President's Award for outstanding observational work during the past year. He had a strong competitor in Robert Paul.

It was nice to see the various contributions displayed after the banquet, which proves there is quite a bit of activity going in this field.

December seems to be traditionally the month to spend money, and our Treasurer, Mr. Mike Dostal expects therefore to be swamped with payments of membership dues during the December meeting. (\$11.00 for Adults and \$6.00 for Students).

May I remind everyone of the R.A.S.C. Bylaw #1, Section 4e, which reads in part: "A member who has not paid his annual fee on or before the 31st day of December shall cease to receive publications of the Society until the fee is paid".

The December regular meeting is also the deadline for renewing or joining the group subscription to "Sky and Telescope". Randy Moore, 9749 - 89 Ave., phone 433-6050, is taking care of the financial arrangements. The group subscription price in Canada \$6.00. And if someone is looking for a Xmas gift suggestion, isn't such a subscription a good idea?

Wishing you all an astronomically good December month,

Mrs. Jenny Rusch.

#### LIBRARY NOTES

As you may know, the National Library of the R.A.S.C. has been opened to us by way of the postal services. Library Catalogues have been published, and these will be available on the table in V 107 before and after meetings. Please note the following borrowing regulations as set out in the catalogue:-

- 1) Books may be removed from the Library for up to 4 weeks.
- 2) Any titles in the catalogue marked with an asterisk (\*) - are NOT for circulation (due to large size, age, or fragile condition).
- 3) When requesting a book, please include the title, the Author's Name, and the book number. Also, please indicate, if possible, an alternative book choice in case the book you want is out.
- 4) The books will be sent with a post-paid return label.
- 5) When returning the books, packages must be tied with a string and left unsealed at one end to conform with mailing regulations.
- 6) The mailing address is

NATIONAL LIBRARY  
The Royal Astronomical Society of Canada  
252 COLLEGE STREET  
TORONTO 130, ONTARIO.

Now that you have staggered through all of the above, I shall tell you that you can write to the Executive Secretary, Mrs. Marie Fidler, 252 - College St. Toronto 2b, Ontario and get your own library catalogue. This way, you can ignore everything I have just said.

Hopefully, our own little library (presently residing in the Planetarium), will be present in V 107 for the meetings. Then you can borrow books from our own wonderful collection.

If any of you have borrowed books from this collection and have neglected to return them, please do so at the next meeting (we're only missing about 1/2 the number of books we should have).

\* \* \* \* \*

Research is something that tells you that a jackass has two ears.

\* \* \* \* \*

### ASTRONOMICAL QUIZ

Fill in the blanks .....

1. Uranus was discovered in 1871 by \_\_\_\_\_.
2. Rigel Kentaurus is the brightest star in the constellation of \_\_\_\_\_.
3. The faintest Messier object in the first 103 is \_\_\_\_\_.
4. \_\_\_\_\_ is the oldest open cluster known.
5. "La Licorn" is the French name for the constellation of \_\_\_\_\_.
6. During an occultation, the passage of a star behind the (a) \_\_\_\_\_ limb of the moon is called an immersion, and the reappearance from the (b) \_\_\_\_\_ limb is called an emersion.
7. For our sun, \_\_\_\_\_ is the visual magnitude.
8. Comet \_\_\_\_\_ is the comet with the shortest time between visits to earth.
9. A star of visual magnitude \_\_\_\_\_ is the faintest star visible in a 12-inch reflecting telescope.
10. When a star is said to have an absolute magnitude, it is being considered as if the star is at a distance of \_\_\_\_\_ from the earth.
11. In general, meteors disappear at about a height of \_\_\_\_\_ Kms.
12. Mars presents a distinctly gibbous phase when it is some way from \_\_\_\_\_.
13. \_\_\_\_\_ energy is the energy possessed by a moving body.
14. Kirkwood gaps are the perturbing forces of the asteroids and these forces are caused by \_\_\_\_\_.

### ANSWERS

- |                           |                |
|---------------------------|----------------|
| 1. Sir William Herschell. | 3. Enke        |
| 2. Centaurus              | 9. 15          |
| 3. M 76                   | 10. 10 parsecs |
| 4. N.G.C. 188             | 11. 70-120     |
| 5. Monocorus              | 12. opposition |
| 6. a. east b. west        | 13. Kinetic    |
| 7. -26.8                  | 14. Jupiter    |

\* \* \*

O Moon, when I gaze on they beautiful face,  
careering along through boundaries of space,  
The thought has often come into my mind,  
if I shall ever see thy glorious behind.

\* \* \* \* \*

Answer to Mathematical Question: 4,000,000,000,000 furlongs per fortnight.

\* \* \* \* \*

#### OBSERVATORIES IN EDMONTON PART II

In the last issue of "Star Dust" I concluded with the completion of the eight foot diameter rotating dome on Boxing Day of 1966. It was truly wonderful to observe while being protected from the weather and particularly with little outside light interference. For several months we did a good deal of observing the moon, the planets and just trying to find some Deep Sky Objects. Since I was still using the ordinary stand for the telescope we had to put up with a lot of vibration, caused by just someone moving around or by a passing vehicle. If this happened to be a truck or a bus, the whole observatory would shake and it would almost take a minute to settle down again.'

Sometime in March of 1967, I thought it was about time to clean and resilver the mirror. I took it to my place of work and as I was undoing some screws on the cell the screwdriver slipped and pushed the mirror off the bench onto the cement floor. A large chip came out of the good side of the mirror and it was fortunate that it was still mounted in the cell, otherwise the whole mirror would have been shattered. However, the damage was almost too much for me to bear. I must have sounded pretty bad when I called Angus Smith. The next morning he arrived at work, carrying his own six inch telescope, telling me that I could use it as long as I needed it. This act of friendship can only be found amongst people who share a common interest, such as we do.

After examining the damage we found that the only thing left to do was to grind the other side. So right away I started walking around the barrel again, and after approximately another 60 hours I had my second mirror ground and polished, this time to an F8. At the same time, while grinding the mirror I did something to elliminate the vibration problem. I cut a large portion out of the centre of the floor to accommodate a 14 inch cement pillar to act as a telescope stand. The total length of the pillar is 15 feet, 6 of which are under ground. By choosing such a large size stand I was already planning ahead for a bigger telescope. The cement stand certainly got rid of the vibration and gave a total steadiness to the telescope. So everything was ready now and we could settle down to do some serious viewing. Having had a larger telescope in mind anyway, I decided to grind a 12-1/2 inch mirror over a longer period of time. It was more a challenge then anything else and I really thought that I was taking on more than I could handle. However, there was Angus once more, ready to help and both of us started going again. It was a lot harder than we had anticipated and it took us an estimated 2200 hours to complete the mirror to an F5.2. This is the focal length it had to be in order to fit into my 8 foot dome. With our own homemade testing devices and our amateur knowledge in the field we felt that the mirror should give us fairly satisfactory results. We found after testing the 12-1/2 inch mirror that this procedure becomes far more difficult as the size of the mirror gets larger and

of course it is more difficult yet with a shorter focal length. This explains the fact that a finished mirror costs so much more than a mere mirror blank and this gap in price increases with the size.

The same friend who had made the steel structure of my dome offered his help again to build an equatorial mount according to our specifications. He came up with a very beautiful job, weighing about 150 pounds. A finder telescope as well as a 3 inch diagonal mirror were obtained from Cave Optical Company in Long Beach, California. The silvering was done by a local firm that was doing ordinary mirrors and with a bit of advise from us they did come up with a fairly good silvering job on optical mirrors. However, since the silver coating comes off very easily and gets dirty very quickly it is necessary to resilver about two to three times a year in order to obtain good viewing results.

Just a short time ago this firm did go out of business and this prompted me to decide to ask Cave Optical Co. to refigure and alluminize the mirror. The cost for this is \$175.00, but I think it will be worth it in the long run as I will have a perfect mirror. I have just received a letter from Mr. Cave that the mirror had been refigured and alluminized and is on its way back to Canada. I can hardly wait to try it out.

<u>Size in inches</u>	<u>Grinding kit Price</u>	<u>Mirror Kit Price</u>	<u>Approx. Cost for (extra) Building telescope</u>	<u>Factory made telescope price</u>
3	not available	\$13.00	\$15.00	\$30.00
4-1/4	\$13.00	\$27.00	\$20.00	\$94.00
6	\$19.00	\$77.00	\$35.00	\$240.00
8	\$27.00	\$116.00	\$65.00	\$440.00
10	\$45.00	\$235.00	\$100 to \$200	\$1025.00
12-1/2	\$85.00	\$360.00	\$100 to \$200	\$1250.00

The estimated cost to complete a telescope depends much on a person's own ability to make things and of what type of material is being used. The estimates are therefore very general and are based on my own experience.

My own advise to prospective telescope makers would be to examine very carefully whether they have the time and the patience to undertake the job. If its just a cheap telescope you want, forget about it. You are better off buying one, because you likely will never get it done. It is indeed very unfortunate that our centre has no space available to conduct classes in telescope making and this makes it very difficult to even act in an advisory way. We have, in the past, helped quite a number of people to make their own telescopes and some have come up with very good instruments. A good many, however, that I know of have ordered their kit and probably have never even taken it out of the box.

I have made up a chart of the sizes which are most popular with amateur astronomers and you can make your own choice as to whether you want to grind or assemble your own telescope or if you want to purchase a ready made instrument.

### OBSERVING COMET BENNETT WITH BINOCULARS

Comet Bennett, discovered December 28, 1969, by John C. Bennett is said to be among the most spectacular comets of the century. The planetarium received many phone calls from oldtimers who readily compared it to Halley's comet. Easily seen with the naked eye in early mornings during the middle of April, it had a tail of  $10^{\circ}$  and a magnitude of about 2. And to think it was much brighter about a month before when it was only visible in the southern hemisphere!

My observations of this great comet started April 17, 1970 at 19<sup>h</sup> 30<sup>m</sup> M.S.T. I had only seen one comet before, (Comet Tago-Sato-Kasaka), but it was much dimmer and it had no tail.

To find comet Bennett, I took my binoculars out of the case and started scanning in the area just south of Cassiopeia where it was supposed to be. After a minute of searching, I came upon a sight which I had never seen before: a comet with a tail.

It was like a star with a subtle glow and radiating outward from it, just about out of my field of view, was a stream of light. After about five minutes of staring, I went over to a friend's house and showed him the comet. He too, was amazed, for he had never seen a comet at all. At this time it was of mag. 4 and had a tail of about  $3^{\circ}$ . I estimated its position to be R.A. 23<sup>h</sup> 31.5<sup>m</sup> Decl. 50.5<sup>°</sup>, and plotted it in a star atlas.

Its tail pointed in an E.N.E. direction but I found as I continued observations that the comet travelled in a W.N.W. DIRECTION.

The following day, April 18, at 21 hrs. 30 min. M.S.T. I again observed the comet. I noticed no change in the tail but the comet had moved to the estimated position 23<sup>h</sup> 35<sup>m</sup>, 51.4<sup>°</sup>. About this time a display of polar aurora started, making the comet more difficult to see but adding an interesting effect.

For April 19 & 21 I continued regular observations and position estimates.

April 19: (20<sup>h</sup> 45<sup>m</sup>) R.A. 23<sup>h</sup> 40<sup>m</sup> Decl. 52<sup>°</sup>  
 April 21: (21<sup>h</sup> 40<sup>m</sup>) R.A. 23<sup>h</sup> 50<sup>m</sup> Decl. 54<sup>°</sup>

On April 22 (21 hrs. 30 min. M.S.T.), the sky was so clear and dark in comparison to the past few days that I decided to draw a large detailed diagram of Comet Bennett to estimate the size of the head and tail. In any field of view were two bright stars that were in Burton's star atlas but were not named. These two stars appeared to be about  $1/2^{\circ}$  apart. The diagram was  $1/2^{\circ} = 30$  mm or approximately  $1' = 1$  mm. The comet, now  $1^{\circ}$  from one half degree from the two stars was easy to measure. The central part of the head I found to be about 5 mm in diameter or  $1/2^{\circ}$  or  $5'$ . The outer head was about  $10'$  in diameter and the tail at a distance of  $1^{\circ}$  from the head, had a width of  $25'$ . In estimating such small angles with binoculars takes a great deal of luck.

On the morning of April 23, at 4 o'clock, I observed and drew another large diagram of Comet Bennett. In the past 6 hours, it had moved  $22'$  of arc so

I guessed that in another 18 hours it will have moved another 66' of arc. This falls on a position of  $0^{\text{h}} 02^{\text{m}}$ ,  $55.5^{\circ}$ . The current position was  $23^{\text{h}} 55^{\text{m}}$ ,  $54.75^{\circ}$ . That night, exactly 18 hours later, I pointed my binoculars up to the sky. I found the comet very close to my predicted position. It was at a position of 0 hrs. 02 min.,  $55 - 2/3^{\circ}$  which accounts for the curved movement around the sun and across the celestial sphere.

My observations then continued in the regular fashion for the following days.

April 26	(21 hrs. 30 min.)	- R.A. $0^{\text{h}} 10^{\text{m}}$ , $58^{\circ}$
April 27	(21 hrs. 30 min.)	- R.A. $0^{\text{h}} 20^{\text{m}}$ , $58.5^{\circ}$ mag. 5.3
April 28	(22 hrs. 00 min.)	- R.A. $0^{\text{h}} 24^{\text{m}}$ , $59^{\circ}$
May 3	(21 hrs. 45 min.)	- R.A. $0^{\text{h}} 50^{\text{m}}$ , $61^{\circ}$ mag. 6.1
May 5	(22 hrs. 00 min.)	- R.A. $0^{\text{h}} 55^{\text{m}}$ , $61.6^{\circ}$
May 8	(22 hrs. 45 min.)	- R.A. $1^{\text{h}} 10^{\text{m}}$ , $62.5^{\circ}$ mag. 6.6
May 15	(22 hrs. 30 min.)	- R.A. $1^{\text{h}} 45^{\text{m}}$ , $65^{\circ}$ Mag. 7.2

My last observation of the beautiful comet was made May 16 (23hrs. 15 min.). By now, it had greatly faded, out of sight for the naked eye but still readily visible in binoculars. It had started off low along the horizon, but now, about 1 month later it was well up in the northern sky, faint and forgotten by mostly everyone except the few astronomers.

Robert Paul

#### THE STAR OF BETHLEHEM (was it a modern UFO ?)

There were many and still are speculations what a star of Bethlehem was. From conjunction of two planets to Nova, and Super-Nova,s, to comets, Most probably Haley's comet, which was about 2,000 years ago at 31 degrees and 42 min. north of celestial equator. The latitude of Betlehem is 32 degrees and 42 min. At this time Haley's comet was in the constellation of Gemini, which passed through the zenith of Betlehem, or directly over head, (where the child was born).

I am sure many of you heard different ideas, but many of you have not heard this one:-

But first let me quote some passages from the Old Testament, the New Testament and The Book of Numbers:

I am coming to you in a thick cloud  
"The Lord descended in a cloud"  
"The pillar of Cloud"

Exodus 19:9 16  
Exodus 34:5  
Exodus 23:24

There is much more in Exodus and especially Ezekiel

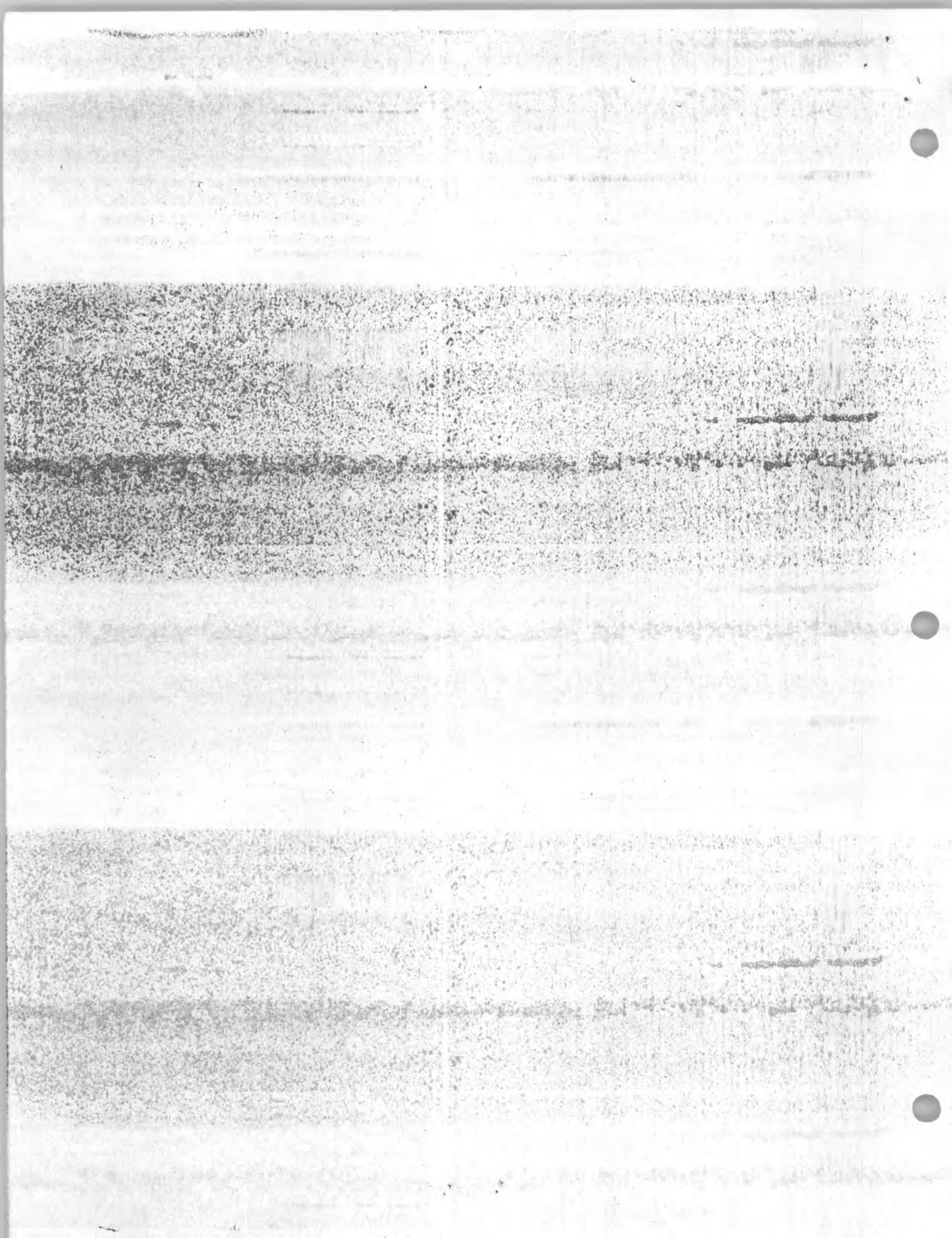
'and where the cloud settled down, there people of  
Israel encamped: Numbers 9:17

'The Lord descended in the cloud to meet  
Moses' Numbers 34:5

'When the being in the cloud wanted to  
talk to Moses, it seemed to descent from the  
position above the tent'. Numbers 11:25

'when the cloud rested, Israel made camp.'

'When the cloud moved Israel moved'. Numbers 9:15 23



### #3 Disquieting Thoughts ?

In a parallel to the once controversial but now widely accepted theory of the continental drift, Dr. Simon Weinglass of the Gould-Fiske Foundation has advanced the concept of geopolitical drift, according to the Doctor, is another matter entirely. Look at an old map of Europe, sometime", says Weinglass. "Where are Estonia and Latvia? What titanic force crushed Austria to the size of Delaware? What happened to Montenegro?" The answer to these troubling questions, according to the noted scientist, is a series of cataclysmic natural catastrophes that may have been occurring with some regularity since ancient times. Weinglass has no idea which continent may be affected next but new hopes that improved cartographical techniques and space photography may give some clue to the fate of the missing regions. (Again, reprinted from the "National Lampoon", August 1970).

### Comet Enke

Comet Enke, which revolves around the sun every 3.3 years is back.

During November, this comet will pass southwestward through Pegasus, and then through Aquila in December. At perihelion, it will be unfavourably placed in Sagittarius.

Enke's comet, which has the shortest period known, furnished the second instance of the return of a comet. Enke was a pupil of Gauss, who had devised a new method for computing elliptical orbits, and in 1818, Enke computed the orbit of a new comet discovered by Pons. Not only did it prove to have the short period of 3.3 years, but it was also found to be identical with comets Machain 1786, Caroline Herschel 1795, and Pons 1805. Enke rounded off this notable piece of work by predicting the return of the comet in 1822, when it was duly recovered. This comet appears to be associated with the Taurid meteor shower.

The positions and magnitudes, taken from "Sky and Telescope", are as follows:-

October 31, magnitude 12.5,  $23^{\text{h}} 14^{\text{m}}$ ,  $28^{\circ} 35'$

November, magnitude rises to 9.8 by the 20th.

5,  $23^{\text{h}} 14^{\text{m}}$ ,  $25^{\circ} 50'$ , November 10,  $22^{\text{h}} 45^{\text{m}}$ ,  $24^{\circ} 28'$ , November 15,  $22^{\text{h}} 18^{\text{m}}$ ,  $21^{\circ} 35'$ , November 20,  $21^{\text{h}} 51^{\text{m}}$ ,  $20'$ , November 25,  $21^{\text{h}} 26^{\text{m}}$ ,  $14^{\circ} 51'$ , November 30,  $21^{\text{h}} 02^{\text{m}}$ ,  $11^{\circ} 11'$ .

December; Magnitude rises to 7.8 by December 10, and 6.7 by December 30th.

December 5,  $20^{\text{h}} 38^{\text{m}}$ ,  $7^{\circ} 22'$ , December 10,  $20^{\text{h}} 14^{\text{m}}$ ,  $3^{\circ} 22'$ , December 15,  $19^{\text{h}} 49^{\text{m}}$ ,  $0^{\circ} 56'$ , December 20,  $19^{\text{h}} 21^{\text{m}}$ ,  $-5^{\circ} 34'$ , December 25,  $18^{\text{h}} 52^{\text{m}}$ ,  $-10^{\circ} 27'$ , December 30,  $18^{\text{h}} 25^{\text{m}}$ ,  $-15^{\circ} 20'$ , January 4,  $18^{\text{h}} 05^{\text{m}}$ ,  $-19^{\circ} 46'$ .

### Mathematical Question

If a spaceship leaves Earth, journeys to Proxima Centauri, and comes back to Earth all in a total of 4.7 years, what is the spaceships average speed in furlongs per fortnight? (Hint: 1 year = 365 days, and Proxima Centauri is in the constellation of Fentaurus).

STARDUST  
ROYAL ASTRONOMICAL SOCIETY OF CANADA  
EDMONTON CENTRE

Meeting: December, Monday 14, 1970

Time: 8:00 p.m.

Topic: A number of films (Described in President's Column.)

Place U. of A. Rm V107

