

NOVA NOTES



Halifax Centre



Nov-Dec 1986
Volume 17
Number 6

1986 Halifax Centre Executive

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Notice of Meetings

- Date: Friday, December 12th, 1986 : 8:00 P.M.
- Place: Nova Scotia Museum. Meeting to be held in the lower theatre. Access from the parking lot and side entrance.
- Topic: Randall Brooks will be back from England in time to give us a talk at this meeting. His talk will be entitled "Technology and the Advancement of Astronomy from the 17th to 19th Centuries". We will also be presenting Randall with the Service Award at this meeting.

NOTE THAT THIS IS THE **SECOND** FRIDAY IN DECEMBER INSTEAD OF THE THIRD!

AT THIS MEETING WE WILL BE STARTING SOMETHING NEW FOR A TRIAL PERIOD. WE WILL BE SHOWING VIDEO TAPES OR FILMS RELATED TO ASTRONOMY FROM 7:00 - 8:00 (DURING THE EXECUTIVE MEETING) FOR THOSE OF YOU WHO WISH TO ARRIVE EARLY. THE FIRST SUCH PRESENTATION WILL BE AT THE DECEMBER MEETING AND WILL BE THE EPISODE "INFINITELY REASONABLE" FROM JAMES BURKE'S NEW SERIES **THE DAY THE UNIVERSE CHANGED**. IN THIS EPISODE, THE HISTORICAL CONCEPT OF GRAVITY IS FOLLOWED FROM COPERNICUS TO NEWTON.

Note: The above list is tentative and subject to change.

About the cover: The cover this issue shows a depiction of the supernova of 1572 from **Stella Peregrinæ** which was written by Cornelius Gemma and published in 1573.

Editor's Report

Patrick Kelly

I must apologize for the delay in getting out this issue of **Nova Notes**, however, there were some unexpected delays in transferring material onto the Macintosh and I also had some problems trying to get the wordprocessor to handle our page size. You will probably notice several format changes which I hope will prove useful. The biggest is the use of a laserwriter for producing the master copy which is sent to the printers. I hope it will make your reading easier as well as make for a more varied format (I'll try some different fonts next issue; don't run before you can walk). The calendar of events has been "enlarged" by reducing the number of months displayed to four. Authors names will now appear directly below the title of each article. Lastly, this issue has been increased from 28 pages to 32 due to the unusually high number of articles (especially Gawker's reports) being submitted. I would like to thank all of you who contributed to this issue, especially those for whom it was their first time. (I wasn't even able to include **Gazer** this issue, but he'll be back in the next one!)

Much has happened since the last issue, including the large number of members who have shown their commitment to the Centre by converting to life membership before the price increase in September. Our newest "lifers" are: David Chapman, Don Clark, Gary Collins, myself, Len Larkin, Hugh Thompson, Joe Yurchesyn and Walter Zukauskas. We have also had many

new members join since September and on behalf of the executive, I would like to welcome you all. Feel free to contact any of us if you have questions.

Two major changes directly affecting members were instituted by the executive at the November meeting. For those who wish to arrive early, we will be presenting video tapes related to astronomy starting at **7:00**. If you arrive after that time, feel free to come in and pick things up where they are. This will start with the December meeting (see the Notice of Meetings). Also, due to the terrible time we have had getting good weather for observing sessions as well as the confusion over whether the alternate would be held, it was decided to **eliminate the regularly scheduled alternate observing session**. Instead, if the regular session is clouded out, the Observing Chairman will decide the time of the alternate based on weather conditions. Those who are interested in attending can have their name placed on a list by contacting Glenn Roberts at 479-0056 or writing the centre and you will be called on the night of the observing session. This policy will come into effect for the observing session at the end of December (see the Calendar).

Starting with this issue, **Nova Notes** is going out to several new institutions so that all universities in the Maritimes will be getting a copy. We hope that this will both inform more people about astronomy in the region, but also act as an invitation to those who may not have been aware of us to consider membership in the R.A.S.C. See the Treasurer's Report for information on becoming a member. Lastly, for those of you who travel to Saint John, I shall be including dates and times of meetings of the Saint John Astronomy Club, once they have settled on a regular schedule.

Election Results

Once again this year, our Nominating Committee was only able to find one nominee / volunteer for each of the positions on the executive. Thus the 1987 executive was declared elected by acclamation at the October meeting. The following list shows each executive position along with the name of the person who will be holding that position for the upcoming year.

President: **Kathy Oakley**, who has previous experience in this position, will take over from **Norman Scrimger** who has completed the maximum allowable term of two years.

Vice-President: **Darrin Parker** continues in his second year as vice-president.

Secretary: After completing the maximum three year term, **Ralph Fraser** steps down as secretary to be replaced by **Doug Pitcairn**, our former National Representative

Treasurer: Continuing for a second year in charge of our financial affairs will be **David Tindall**.

Nova Notes Editor: For yet another year, **Patrick Kelly** will be our newsletter's editor.

Librarian: Our new librarian is **Mary Lou Whitehorne**, who has already taken over from **David Chapman** (see note below)

Observing Chairman: Our new observing chairman is **Glenn Roberts** who takes over the position from **Gordon Hawkins**.

I think that we owe all of the outgoing (and continuing) members of the 1986 executive a vote of thanks for their efforts over the past year; they have set a good example for the incoming executive. As much as David Chapman would have liked to continue to serve on the executive, his job has required him to temporarily leave us to go to Southampton, England. In his written report to the Executive, David states "I have enjoyed serving on the executive of the Halifax Centre over the past two years, and associating with all the members of the centre, whom I now regard as friends. During my absence, I shall remain a member (a Life Member of the Halifax Centre) and hope to keep in touch (I will be expecting my copies of Nova Notes!)"

The Montagnais Impact Structure

Roy Bishop

In 1970, seismic records taken in connection with the exploration for oil and gas off the coast of Nova Scotia revealed a strange structure in the floor of the Scotian Shelf. It is centered at 42° 53' N, 64° 13' W, about 210 km from Halifax at a bearing of 194° true. The closest community is Lockeport, 120 km from the center. A single drill hole was run into the center of the structure in 1974. However, it was not until recently, when the information came to the attention of planetary geologists, that the structure was confirmed as an impact crater. Dr. L. Jansa of the Atlantic Geoscience Centre and Dr. G. Pe-Piper of the Department of Geology at Saint Mary's University were the first to realize the nature and significance of the structure, and additional studies have been made by Dr. Blyth Robertson of Energy, Mines and Resources in Ottawa. I first became aware of it while attending the annual meeting of the Associate Committee on Meteorites of the National Research Council in Ottawa.

The crater lies under 115 metres of water and another 540 metres of undisturbed sediments. Thus there is no hint of it from the sea-bottom topography. Below the sediments, the drill core revealed about 500 metres of mixed breccia, and below this shocked and uplifted "basement" rock of Cambrian-Ordovician age. Abundant evidence for shock metamorphism has been found. Potassium-argon dating indicates an age of 50 to 55 million years for the impact event, consistent with the biostratigraphic age. Away from the structure, the sedimentary record is essentially continuous from Mid-

Jurassic (about 140 million years old) to the present; thus the impact apparently occurred in an environment similar to where the structure is located today i.e. under 100 to 200 metres of water. If so, this is the first discovery of a submarine impact crater.

The crater is large - at least 30 km in diameter (about the size of Minas Basin), and there are indications that additional data may prove it to be somewhat larger. Assuming that the impacting body had a diameter of about 6% of this figure, a 2 km diameter object would have been involved. Thus a few hundred metres of sea water would have been of little consequence to the impact itself. The incoming body, probably either a cometary nucleus or a small asteroid, would have been melted and vaporized by the extreme pressures and temperatures associated with the collision. A rough estimate of the violence of the collision is possible: assuming a typical impact speed of 20 km/s and a density of 1000 kg/m³ (for a comet-like object), the kinetic energy involved would have been some 8×10^{20} J, or the equivalent of some 200 000 megatons of TNT, many times greater than the world's entire stockpile of nuclear weapons! The date of the impact appears to be a bit too late for the "Cretaceous-Tertiary boundary event" associated with the extinction of much of the life on Earth, including the dinosaurs, but this unimaginable impact off of our coast may have completed the job!

The State of Astronomy in Saint John

Leonard Larkin

The first public meeting of an astronomy club in Saint John was held September 26th at 8:00 P.M. at the New Brunswick Museum. Eleven people were in attendance; that includes all five R.A.S.C. members in the area (thanks for the great turnout, gentlemen) and six other astronomy enthusiasts. As the main organizer, I spoke about future activities and other subjects.

The important question of affiliation with the Halifax Centre was raised and presently Darrin Parker and myself are corresponding with each other concerning this subject. Hopefully the details can be straightened out in the next month or so. After the business, each person filled out a questionnaire to indicate their astronomical background and present interests. The film "Universe" was shown and refreshments were made available afterwards.

A public observing session was held, after being rescheduled several times due to inclement weather, Tuesday October 7th at Seaside Park in West Saint John. A 200mm (8") Celestron, newtonians of 200mm f/6 and 110 mm (4 1/2") f/8 sizes and a 150 mm (6") f/12 refractor were available for the 25-30 people in attendance (a good turnout considering the lack of publicity due to last minute rescheduling). For many it was their first "close-up" view of a planet. When the seeing settled, Jupiter provided good viewing, with the Great Red Spot and the shadow transit of Europa readily visible.

Special thanks goes to Dave Driscoll, a non-R.A.S.C. member whose ideas and efforts were instrumental in the realization of both the meeting and public observing session.

Some members attended a last-minute club observing session recently and more are planned for this fall. Due to the media's interest in the partial solar eclipse, the upcoming October meeting has been well publicized and hence the turnout should give a fair extent of interest in astronomy in Saint John. Any members of the Halifax Centre who are in the area on the dates of the meetings are invited to join us.

Treasurer's Observations

David Tindall

1) Membership hits an all-time high!

At the end of September our Centre's 1986 paid up membership stood at 121 (29 life, 84 regular, and 8 youth). The previous high was 112 in 1984, which fell to 97 in 1985 (and not to 78 as stated in the annual report of the R.A.S.C.!). Perhaps, as stated in **Astronomy London**, we have captured people suffering from "Halley' tosis" - the challenge for this year will be to keep them!

I am pleased to report that renewals for the '87 year are moving along beautifully*: As of November 26th, our membership paid up for 1987 is already 106 (29 life, 69 regular and 8 youth plus 5 associate members) At the same time last year only 9 regular and youth members (i.e. excluding life members) had been renewed and this figure was only 3 the year before. Prompt renewals help the Centre's financial position considerably and I hope those of you who have not renewed yet will do so soon. (\$25.00 regular, \$15.00 youth (under 18), \$500.00 life) Remember your publications will cease on January 1st if you have not renewed and back issues may not be available for those who renew in the New Year.

While on the subject of fees, I should like to apologize once again for the "disinformation" (a new and rapidly gaining in popularity term these days) which we spread about the possibility of renewal at the old rates until the end of September. I should

* This may be due to the "disinformation" referred to later.

also like to thank those who responded to my appeal to send along the extra fee so promptly and remind those who have yet to send it in to do so soon.

2) Where does my membership fee go?

In view of the rather hefty fee increase this year (but remember there hadn't been one for at least four years), I thought it might be appropriate to try and answer this question - especially for those who are new members (or old ones hesitating to send in their renewals). The accompanying chart shows an approximate breakdown of the amounts per member.

NOTE:

1) For each life member (at December 31st) we receive \$10.00 from National Office early in the New Year.

2) For youth members the percentages are the same but the amounts are different: National Office gets \$9.00, the Halifax Centre gets \$6.00

3) Many centres (the majority I'm told) add a supplement to the basic fee (e.g. Montreal now adds \$8.00 to make a total of \$33.00). A centre keeps any supplementary fee and associate member fees. We are able to do without a supplementary fee for two main reasons: **a)** Handbook income (see elsewhere in this issue) and **b)** provision of services by the Nova Scotia Museum for free or at nominal cost. The chart clearly shows how important Handbook income is. The services provided by the museum do not, unfortunately, show but we should not forget them!

4) The figures quoted for the publications from National Office are the prices for a single copy of

The Observer's Handbook or a subscription to the **Journal**.

5) The expenditure figures are the figures from the 1985 treasurer's report divided by the January 31st paid up membership total (105) - they would be about 15% lower, of course, if we divided by 121 - however 105 is more realistic as being the number of members who contributed financially to the **1985** fiscal year.

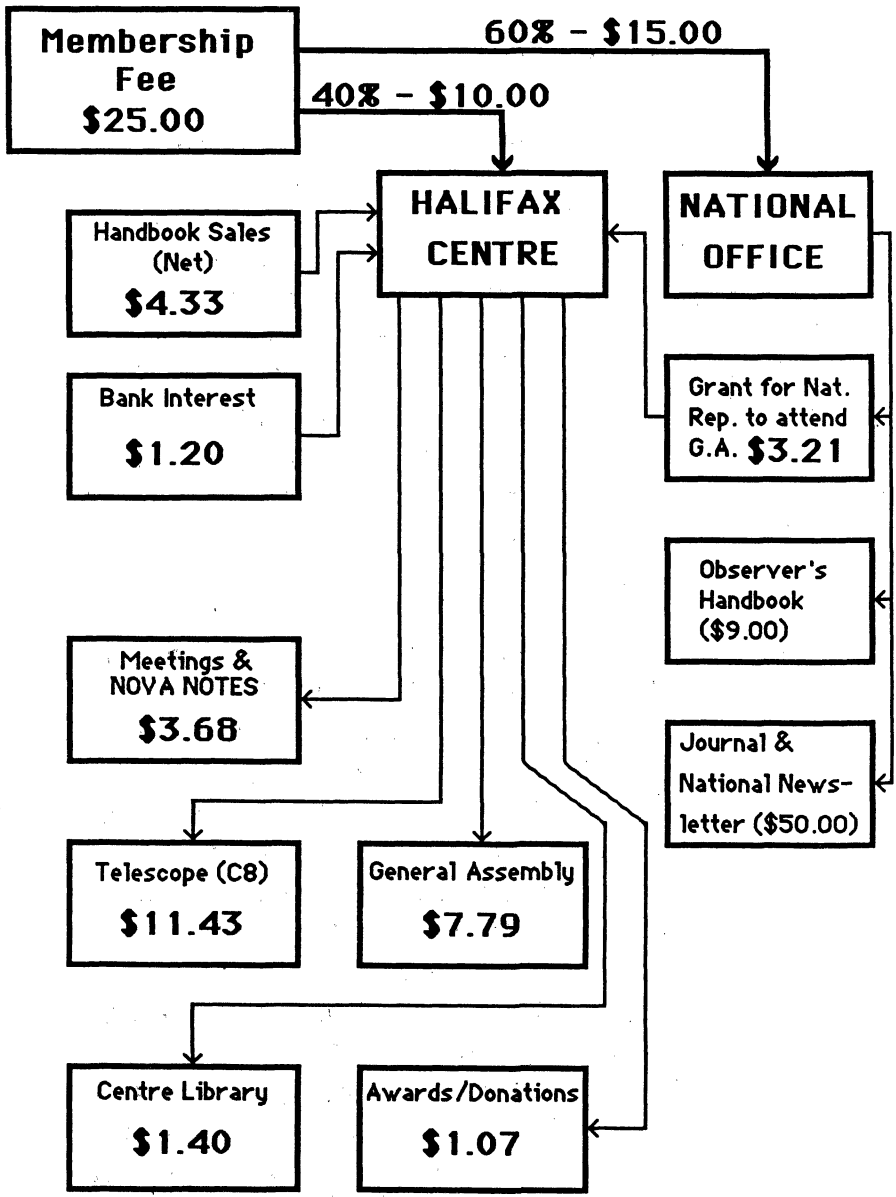
6) In 1985 we only kept \$8.00 per regular member and \$5.00 per youth member.

7) Being remote from most G.A.'s we receive more than average from National Office for our representative to attend the G.A. - however as the cost of transportation is split 50/50 it also costs us more to send our rep.

8) Unattached members pay the same fee, but 100% goes to National Office

I hope that this issue of "Treasurer's Observations" helps to clarify any questions which have lingered at the back of your mind about the financial state of the Centre. If you have any questions, suggestions or comments, I'd be happy to expand upon them.





Auriga Through Binoculars

Doug Pitcairn

This article is for those of you people who do little or no gazing through telescopes but own a pair of binoculars. More experienced observers must forgive my approximations and lettering scheme, but I wanted to keep this as simple as possible. Please refer to the maps located on the next pages. The left chart has been photo-reduced from Wil Tirion's **Sky Atlas 2000.0**, while the right hand chart is the same area, to the same scale, but with the star patterns simplified and with the brightest stars lettered. To avoid confusion, only the objects referred to in the article are plotted in the simplified chart.

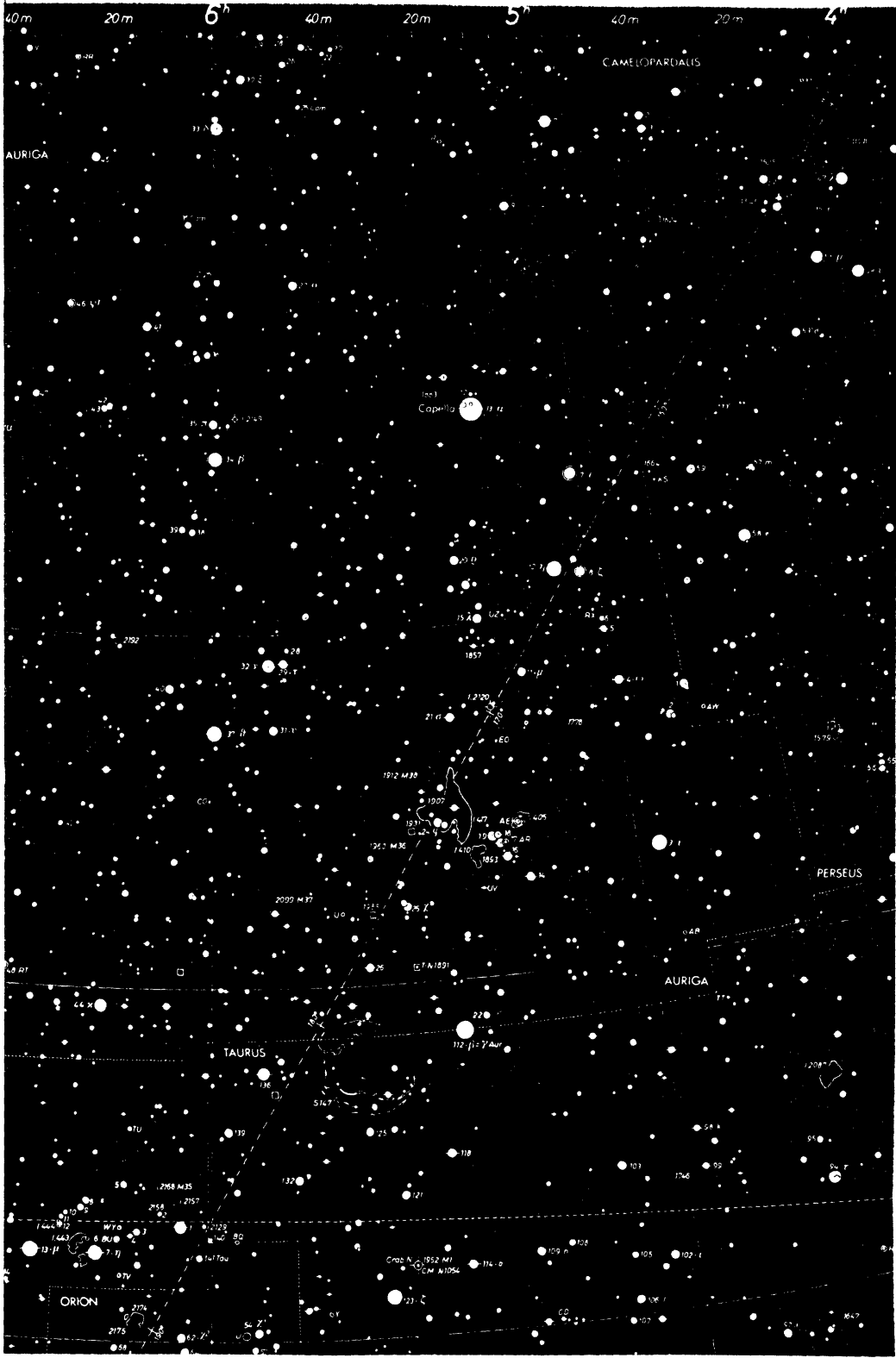
Late in the evening rising in the east (and all during the winter high overhead), you will see the bright yellow star **Capella**. It is hard to miss being one of the brightest stars in the sky. Look for the small triangle nearby to be sure that you have found the right star. Once you have found Capella, it should be easy to see the rest of Auriga. Start with Capella and trace out the shape indicated by the lines.

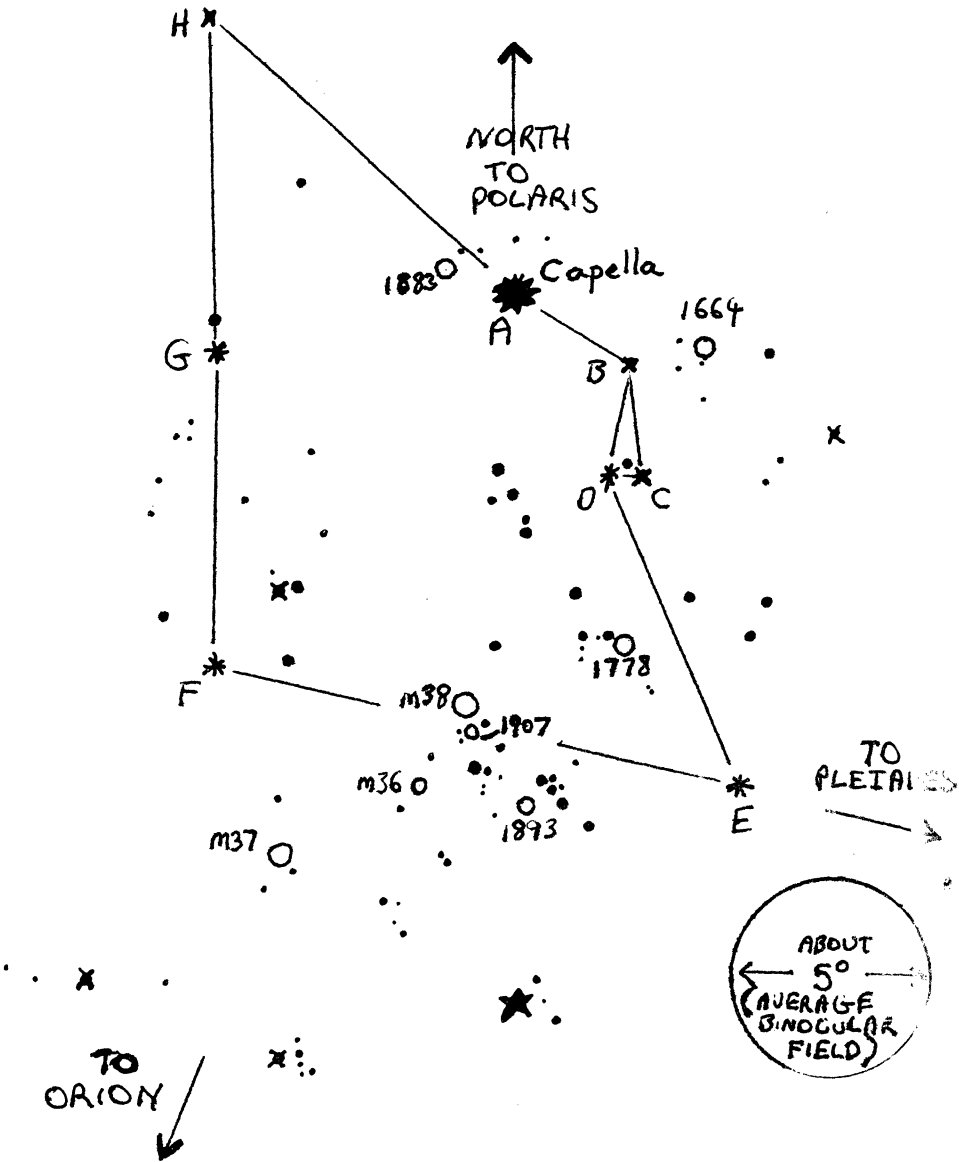
Through binoculars there are some interesting features which I might be able to help you locate. Midway between stars "E" and "F", the bright open cluster **M38** should be very obvious as it is an easy naked eye object. With M38 centered in the field (of view of your binoculars)*, look for a smaller but still bright cluster at about the 7 o'clock position near the edge of the field. That's **M36**! If you now move M36 to the 2 o'clock position, you will see at the 8 o'clock position another cluster, **M37**! These

three clusters are the brightest in Auriga and were the only ones included in Charles Messier's famous list. Practice finding them until it is easy and you are familiar with the use of a clock face as a means of indicating direction.

Now it is time to try some more challenging objects, ones that were too faint to be included in Messier's list. Put M38 in the center of the field. Look carefully just below M38, and you should see framed in a small triangle of 7th magnitude stars a small cluster. CONGRATULATIONS! You have just found your first NGC object. **NGC 1907** to be exact. Now place M38 at 12 o'clock and M36 at 9 o'clock and you should see a large but faint cluster around 4 o'clock. This is **NGC 1893**. Now, back to centered on M38. Move M38 to 8 o'clock and look carefully at or just beyond 3 o'clock. See the small "L"-shaped group of stars? Beside the end of the "L" look for a small cluster that is very faint. That's **NGC 1778**. Now go up and center on the star labelled "B" and look for a thin cluster at 3 o'clock. This is **NGC 1664** and although it is quite spread out, should be visible with 50 mm binoculars. Now for the greatest challenge of them all. Center on Capella and look at about 10 o'clock. I failed to see this cluster, **NGC 1883** in my 10x50's but it was visible in Pat's 20x80's. It is quite faint. Try averted vision. If you can see it you are a First Class Observer!

* In all cases, when looking through your binoculars, the position in your field of view which is north towards Polaris is taken to be 12 o'clock in the locating system used. The charts are oriented so that north (12 o'clock) is at the top. However, 12 o'clock will only appear at the top of the field of view if you twist your head to place the direction towards Polaris in this position or if you wait until Capella is overhead in which case the 12 o'clock position will be at the top of your field by facing south and then looking up.





- | | | | |
|---|--------------|------|--------------------------------------|
| ★ | CAPELLA | 0 | MAGNITUDE (VERY BRIGHT) |
| ★ | 2ND. | MAG. | } EASILY VISIBLE ON ANY CLEAR NIGHT! |
| * | 3RD. | MAG. | |
| x | 4th. | MAG. | |
| • | 5th. | MAG | } REQUIRE GOOD SEEING CONDITIONS. |
| • | 6th. | MAG | |
| • | 7th. | MAG. | VISIBLE IN BINOCULARS ONLY |
| | (OR FAINTER) | | |

I Came, I Saw, I Foundered

Diane Brooks

In the early evening of August 26, 55 B.C., Julius Caesar and the 7th Legion invaded a new world which would become known to the Roman Empire as Britannia. This first expedition was a reconnaissance mission to become acquainted with the harbours, possible landing places and topographical characteristics, and to obtain an insight into the native people. All went well with the Emperor's plans until the fourth day after landing. Then an unseen enemy struck -- the tide. Caesar and his officers were apparently unaware of the connection between tide and Moon. However, the fleet, sailing from Ambleteuse, France, approximately seven Roman miles away, had a favourable tide and wind. It was vital to land on a rising tide to ensure retreat if the opposition proved too strong. Sunset occurred about 7:00 P.M. on August 26th and by 9:00 it would be dark. The army needed the two hours of twilight to land successfully, resist any opposition and make camp. According to Fotheringham's calculations of tides at Dover for the 26th to 30th of August, 55 B.C., based on harmonic tidal constants of 1883-84 and 1910-11, the time of high water was 7:43 P.M. on the day of the landing. They would seem to have landed to coincide with high tide. But on August 30th the sea breaking on the beach reached the drawn-up galleys, causing them to collide and fill with water. They were hastily launched but the panic-stricken soldiers neglected to resecure cables; the vessels were blown offshore where they fouled the anchored infantry transports. Several ships sank and others were blown out to sea.

Since no provision had been made for such a disaster, supplies and tools needed for repairs were left on the other side of the English Channel. To make matters worse, the British chiefs saw the coincidence of the shipwreck with the Full Moon as a good omen. They planned a strategy to prevent the Romans from getting supplies and to harass them by irregular warfare, with the intention of starving them or at least detaining them from leaving until winter weather arrived.

In Caesar's defence, there was a gale that day, known by the fact that the cavalry transports, prevented by a storm from sailing with the rest of the fleet on August 26th, were again turned back to Ambleteuse by south winds, indicating a south-west gale. High water was at 10:24 A.M., so they could have sailed between 8:00 A.M. and 2:00 P.M. The next high water occurred at 10:48 P.M. While the prevailing winds over Britain are westerly, land changes the wind's direction, and the prevailing wind becomes south-westerly in the Straits of Dover. In the Strait, about 75% of the winds are southwest or northeast and 35 years of observations for August and September have shown 22 southwest gales and 1 northeast gale. Southwest winds increase the height of sea level and in turn, both high and low water in the English Channel.

The relative heights of sea level in the southern part of the North Sea and English Channel determine to a large extent the currents in the Straits of Dover. If the North Sea level is raised and the Channel level lowered by weather conditions, the southwest current in the Straits will have greater velocity and duration. The gale on the night of August 30th raised the height of sea level so that high water, which should have risen only about 10 cm higher than the

day's, rose 45-60 cm higher. However, so as not to put too much blame on the weather, it should be mentioned that the height of high water had increased each day from August 26th and the high water mark of spring tides is always visible on a beach. The Emperor claimed that the disaster was due "to lack of knowledge of tidal laws". This claim may at first glance have some validity since the Romans and Greeks lived on the shores of the nearly tideless Mediterranean, and classical writings contain few references to tides. However, if Caesar had read the writings of Pytheas or Posidonius, he would have known what to expect. Pytheas made a voyage in the mid 320's B.C. with the purpose of furthering knowledge in geography and astronomy, and to trade in British tin. Circumnavigating Britain, he made important solar observations and his writings were found to be indispensable by Hipparchus. Pytheas' record in 324 B.C. of his voyage included the first account of ocean tides. Furthermore, Caesar's pilots were from Gaul (or France as we know it) and they must have known that spring tides are higher than neap tides.

Modern tidal knowledge was founded by Isaac Newton in the **Principia** of 1687 when he applied his theory of gravitation to the phenomenon. Pierre LaPlace began the study of tidal movements of an ocean in 1773. In 1848 and 1851, F.W. Beechey published survey results of tidal currents in the North Sea and English Channel. Finally, the narrow sea theory was developed from 1913 to 1920 by R. Sterneck and A. Defant, the latter of whom applied it to the English Channel.

Returning to Caesar's dilemma, 12 ships were so badly damaged that they could not be made seaworthy even for the voyage back to France. Their

timber and bronze were used to repair the remainder after a galley was sent to Gaul to retrieve the necessary tools. In addition, the Britons' plans for irregular harassment were defeated by their own greed, impatience and disorganization. Attacking the Roman camp wildly, they were subdued by the army, thereby permitting Caesar's departure with something to his credit. He was unable to stay long enough to consolidate his success as the autumnal equinox was near. Because of the precarious condition of his ships, he needed fine weather for the return voyage. With regard to his almost ignominious defeat by nature, it is to be questioned whether he did not know more about tidal laws than he cared to admit.

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1986 Observer's Handbook Sales Report

Darrin Parker

Over the past year, handbook sales have continued to be our most important source of revenue next to membership fees themselves. It is important to keep in mind that the Halifax Centre has been either first or second nationwide in handbook sales over the past number of years. It is this healthy inflow of funds (\$3.00 for every handbook sold through the Halifax Centre) which enables us to maintain a relatively good financial position and avoid the surcharges on the regular membership fee that many centres are imposing on their members.

Beginning what David Tindall had begun when he was vice-president in 1981, I have approached several organizations in hopes of maintaining and if possible increasing the sales of handbooks. This includes efforts to increase awareness among science teachers and other markets that may have a use for the handbook. Here then is the 1986 sales report for **The Observer's Handbook**.

The total number of handbooks sold in 1986 by members of the Halifax Centre was 148. The following is a breakdown of handbook sales. I apologize for any errors or omissions.

Nova Scotia Museum	56
Wilf Morley (Parkview School)	25
John MacNeil (Cole Harbour School)	20
N.S. Government Bookstore	20
Mail Order	12
Pair of Trindles Bookstore	7
David Tindall	5

David Chapman	2
Norman Scrimger	1
TOTAL	148

Sales Recap

Sales	\$1,332.00
Less cost of handbooks	\$888.00
Less Commission	\$47.25
Net Handbook Income:	<u>\$396.75</u>

Cost Analysis of Selling Handbooks

Net Sales	\$396.75
Less Postage for Mail Orders*	\$4.68
Less Postage for Notices	\$3.42
Less Direct Mail Promotion	\$9.04
Actual Income:	<u>\$379.61</u>

* This figure also includes envelopes.

As you can see, healthy **Observer's Handbook** sales are essential to our centre's well being. If you would like to try selling one or more, simply let me know or pick up a couple of handbooks from me at a meeting and return either the money or the unsold handbooks at a later date. Also, if you have any suggestions on increasing handbook awareness or if you know of somebody or group that may have a use for one, please let me know.

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NOVA NOTES is published bi-monthly by the Halifax Centre of the Royal Astronomical Society of Canada in January, March, May, July, September and November. Articles for the next issue should reach the editor by December 19th, 1986. Articles on any aspect of astronomy will be considered for publication. The editor is:

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NOVA NOTES is printed courtesy of the Nova Scotia
Museum

HALIFAX CENTRE - R. A. S. C. 1986 CALENDAR OF EVENTS

December 1986

S	M	T	W	Th	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	<u>27</u>
28	29	30	31			

February 1987

S	M	T	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	<u>28</u>

January 1987

S	M	T	W	Th	F	S
					1	2
					3	
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	<u>24</u>
25	26	27	28	29	30	31

March 1987

S	M	T	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	<u>28</u>
29	30	31				

Key to calendars:

Meetings: outlined

Special days: shadowed

Observing sessions:

bold and underlined

Special Days: December 19th - Jupiter and Mars 0.5° apart
January 4th - Quadrantids Meteor Shower

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