R E G U L U S

THE NEWSLETTER OF THE

ROYAL ASTRONOMICAL SOCIETY OF CANADA - KINGSTON CENTRE

MAY, JUNE, 1983

AN EDITORIAL: ON ENTHUSIASM

Here are a few words about why I am happy to be a member of the Kingston Centre of the R.A.S.C. Recently there have been several events which have made me realize that our group is one of the most enthusiastic in the country.

There was tremendous cooperation and effort shown by many of our members during the Mall Display, the Star Night, and the various activities of Astronomy Day on April 23rd. At the General Assembly in Quebec City in May, our centre members attended and participated with an enthusiasm that rivalled that of any centre in the country.

Recently several individuals have shown enormous dedication to the ideals of our Society and our centre. First on the list, I must mention Hugh Thompson who, at eleven years of age, participated with tremendous enthusiasm in the events of the General Assembly, is preparing to present a paper at our next centre meeting, and for Astronomy Day assisted Karen Gventer in the preparation of a handout for the public on his favorite subject, Astronomy. It was of such quality that I have decided to reprint part of it here in our newsletter. Hugh's enthusiasm was the kind that would not let him miss our last centre meeting, even though he had been in the hospital for surgery just twenty-four hours before. The enthusiasm of our centre's members was also shown on Sunday evening at the General Assembly when excellent papers were presented by David Stokes and David Levy. The latter of the Davids has had his recent Messier Marathon recognized in the Kingston newspaper. Mr. Gus Johnson's Messier observations have been recognized by a Messier Certificate, and his accomplishments go well beyond observing.

The list of names could go on to include several others but the important thing in this consideration is something that is impossible to list or quantify precisely; it is something that is hinted at by words like "co-operation", "dedication", "zeal", and "enthusiasm".

A PLEASANTLY SUCCESSFUL ASTRONOMY DAY 1983

Astronomy Day 1983, observed on Saturday, April 23rd was a fine success for the members of our centre. The Mall Display at Frontenac Mall and the Public Star Night at MacDonald Park gave us a chance to talk to the public about astronomy and to display and even use our telescopes.

It was very heartening to see such a wide public interest in astronomy for many of us were kept busy for hours explaining our Society, and talking about our displays, photographs, projects, and equipment. Dozens, maybe hundreds, of people, many perhaps for the first time, had a chance to look through an 8-inch telescope or see photographs taken by local amateur astronomers.

Even though the weather was not perfect, the evening observing session brought a large crowd of people to the park to get a glimpse of lunar craters or one of the planets as seen through some of the eight or nine telescopes which were set up. It was indeed pleasant to hear many people being surprized at what could be seen with amateur telescopes -- "That's amazing"; "Those craters are so clear and distinct!", "I never knew you could see the rings of Saturn like this!"

The planning and work for a successful Astronomy Day 1983 was one of the best recent examples I have witnessed of splendid cooperation among many members of the centre. It seems that almost everyone helped, but special mention must go to Hugh Thompson and Karen Gventer who had a display for the younger members of the public, to Matthew Gventer who brought some much-needed equipment, and to David Stokes who, as usual, brought his telescope, the largest one on display. All those who helped in this year's "Astronomy Day" should feel justly proud of their cooperative effort, and should know that sharing our enthusiasm for the night sky with people just beginning to develop an interest in astronomy should continue to be a very rewarding experience.

A SPECIAL HANDOUT FOR ASTRONOMY DAY 1983

To recognize the work done for Astronomy Day 1983, I wish to reprint the first part of a handout prepared and distributed by Karen Gventer and Hugh Thompson. Many younger members of the public went home with five pages of useful, clearly stated information that could serve as an introduction to practical astronomy. Other topics covered in the handout were: The Solar System, Radio Astronomy, Asteroids and Comets, Interstellar Objects, and A Summary of Equipment.

WHAT IS ASTRONOMY?

Astronomy is not astrology!!! We don't tell horoscopes! Astronomy is stars, planets, and galaxies.

As you probably know astronomy is the science of the stars, planets, and space. But that isn't all, it's everything. You may think "how dull", but when you see beautiful clouds of glowing gas or even our near neighbours, the planets, and the furthest galaxies, you will likely be hooked.

For others it means the thinking of the vastness of space, the composition of stars, the discovery of new things. Whatever the case is, except for a very few, all would likely be interested in astronomy, if they had a chance to see its wonders.

Believe us; the following is all true; and we were not told to do it. This whole handout is done by the joint effort of Hugh Thompson and Karen Gventer, (ages 11 and 10 respectively).

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START AT THE BEGINNING

When you first become acquainted with astronomy, you should start by learning the different areas of the sky with a good but simple star chart.

What I am trying to emphasize is that no matter how much money you have, you simply should not go out and buy a gigantic telescope. Because you can see more without a gigantic telescope in your beginning experience than with one.

Step 2 would be to join a society such as R.A.S.C. which meets on the 2nd and 4th Fridays of each month in Ellis Hall at 8:00 p.m. and find out more about astronomy from other astronomy fans.

Talk to your group; think about a telescope; do your book learnin'.

NAKED EYE ASTRONOMY

Even without a telescope or a pair of binoculars you can see a lot and do a lot.

Although constellations (star groups, e.g., the Big Dipper) and learning about the sky constitute the major part of naked eye astronomy, there are also occasional meteor showers, rare comets and novae, and other things to be seen. There are many books on these subjects.

Understanding the sky is also a prerequisite for binoculars and telescopes. So don't shun it; come on and sun it!

There is a lot to do, you will soon be proud to look up and say, "Hey, there's Orion, and there's the Big Dipper!!"

BINOCULAR ASTRONOMY

For real astronomy it is essential to have some sort of optical aid. Binoculars are a best buy, because of their cheapness, portability, richness of field, low magnification, and multiuse stereoscopic viewing.

A pair of binoculars is far more worthwhile than a telescope considering the fact that in your first year of observation, everything you'll want to see you'll be able to see with binoculars. The nicest thing about them is their simplicity of operation. For a beginner the best buy, we reckon, would be a tested pair of 7x50mm's.

TELESCOPES

The main thing about telescopes which may be your next step is to think carefully before buying. By this time you should seriously consider joining our society anyway, so you can talk to us about them. (This is not an advertisement).

There are two main types of telescopes, namely reflectors and refractors. All telescopes bring light to a focus to be magnified.

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Contrary to the popular belief, magnification is of little importance, especially at the beginning.

The difference between reflectors and refractor is the way they bring the object to a focus, one by a mirror, the other via lens, respectively.

If you are seriously interested in acquiring a telescope by making or buying one, it is an absolute necessity to read up on the subject. There are many fine books on this topic in the Kingston Public Library.

THE 1983 QUEBEC GENERAL ASSEMBLY

The 1983 General Assembly of the R.A.S.C. held in Quebec City on the campus of Laval University from May 20th to May 23rd was a landmark occasion. The annual gathering of the "Clans Astronomical" brought together not only our amateur and professional astronomers representing their centres from coast to coast, but also for the first time it was a joint meeting of three groups -- the R.A.S.C., the A.A.V.S.O., and the A.G.A.A.

Quebec City provided a beautiful setting for the various meetings and for a well-organized program prepared for us by the Quebec Centre. Only a tremendous amount of planning made possible all the smoothly-run events that were part of G.A.-'83". Laval University was a very good host providing us with facilities, accommodations, and food for hundreds of hungry astronomers.

Partaking in the program were no fewer than twelve members of our centre: Terry and Ruth Hicks, Mark and Sue Sorensen, Jocelyn Boily, David Levy, David Stokes, Marty McConnell, Jim O'Donovan, Hugh Thompson, Gerald Schieven and Leo Enright! What a tremendous increase over the other General Assemblies of recent years: for in 1980 in Halifax there were only two of us present, and in 1981 in Victoria there were only four. It was especially encouraging to see two of our members (David Stokes and David Levy) presenting papers which were very well received and to see a good number attending the Annual Meeting and being present as observers at the National Council Meeting.

From all of us who attended, a most sincere "Thank you!" should be passed along to Mr. Damien Lemay and the Organizing Committee for "G.A.'83". For us in Kingston, we can remember it as the General Assembly in which a large number of our group enthusiastically shared our interest with one of the largest number of astronomers ever to meet in this country.

A REPORT OF THE MAY 1983 NATIONAL COUNCIL MEETING

(I have been asked to prepare the following report for the National Newsletter of the R.A.S.C.).

The National Council of the R.A.S.C. met on Friday, May 20th, 1983 in Room 1271 of Pavillon DeKoninck on the campus of Université Laval in Quebec City. Our National President, Mr. Franklin Loehde, presided and fourteen centres of the Society were represented by those who attended.

The agenda included reports from the officers and standing committees as well as a number of important announcements and decisions.

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Mr. Loehde announced that the Financial Strategies Committee, which was formed at the January Council Meeting, had held a meeting to consider the complex financial structure of the Society and would continue to report to Council at the forthcoming September and January meetings. The Treasurer's and Auditor's Reports for 1982 were received as printed in the Annual Report, but Council members expressed considerable concern about the delay in its publication, caused by the lateness of the Auditor's Report, and about the fact that it could not, therefore, be mailed to members at least twenty-one days before the Annual Meeting. A grant of $300.00 was approved from the Ruth Northcott Fund to assist the Quebec Centre in the expenses of having a special guest lecturer for the 1983 General Assembly.

Dr. Batten, the editor of the Journal, presented a proposed redesign of the Journal's cover which was approved by Council. Our Handbook editor, Dr. Bishop offered proposals for a number of changes to that publication including more detailed information about eclipses. Mr. Damien Lemay of the Quebec Centre presented a suggestion for a French-language supplement to the Observer's Handbook and the matter will receive further consideration at subsequent Council Meetings.

Mr. Broughton, the chairman of the Property Committee, submitted his group's report, one that contained news of considerable importance for the Society. After several years of searching the Committee has acquired a property at 136 Dupont Street in Toronto as the new home of the Society. Photographs of the house were seen by Council members and the full report was read by Mr. Broughton who received a vote of thanks for the enormous effort made by him and his committee.

At 17:40 hours the business of the meeting was suspended and it was completed on Sunday, May 22, following the Annual Meeting of the Society.

At that time Council appointed its standing Committees for the year 1983-1984. They were the Executive, Editing, Finance, Property, Library, Historical, Budget, National Newsletter, and Awards Committees. Proposals to host the General Assembly in 1985 were received from the Edmonton and Toronto Centres. By a vote Council decided to accept the Edmonton proposal.

A committee was formed to plan "house warming" ceremonies for the opening of the new Society headquarters at 136 Dupont Street, where Council members look forward to attending their next meeting on September 24th.

Details of all of the items discussed at the meeting may be found in the minutes of the meeting, which were mailed to all Centre Presidents and National Council representatives. The full reports of all of the committees referred to above may also be found as appendices to those minutes. Minutes of the Annual Meeting will be published later this year in the Journal of the R.A.S.C.

Members of Council appreciate the interest shown in the business they transact on behalf of the Society--as shown by the number of members who attended as observers.

THE KINGSTON CENTRE'S 1983 NOVA AND COMET SEARCH PROGRAM

At the centre meeting of April 8th, I presented to our members a proposal for what was called a Nova and Comet Search Program but what is actually intended to be a program whereby a large percentage of our members may become more familiar with certain areas of the sky. If as many of us as possible can become quite well acquainted with a special part of the sky that we can call our own, then we can improve our observing techniques and be more aware of the many objects that are "there in the heavens just waiting to be observed."

Here, in more specific detail, is what members who participate should try to do. They should remember that the aim of the program is to have each participant become very familiar with a 10° by 15° area of the sky, so that (just possibly) he or she could detect a nova or comet in that area. (In some ways the program is intended to revive the Nova Search Program to which David Levy introduced us four years ago.)

Those who join the program should become well acquainted with the positions and magitudes of all stars in the designated area--down to the limiting magnitude, if possible, of the instruments they use. No one is excluded because of the size of the optical aid he owns.

Reports of anything unusual in the selected area should be given at each meeting and there should be certain parts of some meetings designated for "Search Program Reports". These should include any suspected novae or comets (!!! Eureka!!!), changes in magnitudes of the variable stars in the area, asteroids in the area, even artificial satellites detected moving in the area, and the reports should reflect a gradual degree of increasing familiarization with the region of the sky. Members at first may become familiar with stars to 7th or 8th magnitude. Later they may even become knowledgeable regarding the many stars to 12th or 13th magnitude, to such an extent that they could detect an asteroid within the area.

To initiate the program, I preselected and numbered twenty areas of the sky 10° by 15° (or 10 degrees in Declination by 1 hour in Right Ascension) making sure that the areas were easily visible in the evening sky at that time and for the following couple of months. Those who chose to participate selected an area by number and then located it on a star map. It is intended that as each one's area becomes more difficult to observe in the evening sky (and this will happen for all the southernmost of the areas, but not so quickly for the northernmost regions) he will choose another area and over the course of a year have about three areas to observe, but as seasonal observing allows, he is to return to his areas of first choice. It is hoped that, at least for the first few years, each person will have only about three areas in total to observe. This should be possible since some of the regions are well within the Circumpolar Constellations.

The area should be monitored every clear night, if possible. Here are the things that should be recorded in each of the regions: the number of stars of each observable magnitude, the variable stars (names, type, magnitude range if known, and magnitude at which observed), the double and multiple stars, planets, asteroids, comets, special named stars, historically important stars, and Messier, Hershel, and N.G.C. objects, if any, in the area.

Following is the list of the twenty designated areas in the first round of selection, their positions and constellations in which they are found, and the name(s) of the members who chose to join in the program.

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Designated Area Number	Area R.A.	Area Dec.	Constellation	Name of Participant
1	X^{hr}-XI^{hr}	0°- 10°	(Leo and Sextans)	
2	XI -XII^{hr}	0 - 10	(Leo and Virgo)	
3	XII-XIII	0 - 10	(Virgo)	Tim Gladwin
4	XIII-XIV	0 - 10	(Virgo and Bootes)	
5	X - XI	10 - 20	(Leo)	Karen Gventer
6	XI - XII	10 - 20	(Leo and Virgo)	
7	XIII-XIV	10 - 20	(Virgo, Coma B. & Bootes)	
8	X - XI	20 - 30	(Leo, Leo Minor)	James OtDonavan
9	XI - XII	20 - 30	(Leo, Ursa Major)	Mark Sorensen
10	XIII-XIV	20 - 30	(Coma B., Bootes)	Hugh Thompson
11	X - XI	30 - 40	(Leo Minor, Ursa Major)	John Hansen
12	XI - XII	30 - 40	(Ursa Major)	Ruth and Terry Hicks
13	XII-XIII	30 - 40	(Canes Venatici)	Martyn McConnell
14	XIII-XIV	30 - 40	(Canes Venatici)	
15	X - XI	40 - 50	(Ursa Major)	Sue Sorensen
16	XI - XII	40 - 50	(Ursa Major)	
17	XII-XIII	40 - 50	(Canes Venatici)	Leo Enright
18	XIII-XIV	40 - 50	(Canes Venatici)	
19	X - XI	50 - 60	(Ursa Major)	David Stokes
20	XI - XII	50 - 60	(Ursa Major)	Terry and Ruth Hicks

It may be noted that some of the sky areas include small sections of constellations not listed in the "Constellations" column. That column is simply intended to mention one or two of the constellations in the selected area of the sky.

When one chooses a certain area of the sky, no matter how small, for an intensive study, he immediately realizes how very rapidly the number of stars increases depending on the faintness of the limiting magnitude. The following article will illustrate this point very well.

It is sincerely hoped that this program will enable our members to become more acquainted with an area of the nighttime sky and, by leaning about the stars and the deep-sky objects in that area, to become better amateur astronomers.

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A REPORT ON OBJECTS TO BE FOUND IN A SAMPLE AREA OF OUR SEARCH PROGRAM

Almost every young amateur astronomer is astonished, if not astounded, by the same fact after his first look at a dark night sky through binoculars or some simple optical aid. The fact that invariably seems so amazing is that with the smallest optical aid he can see so very many more stars than he thought he could. That is why we often hear youngsters say, "When I first used by binoculars I could see a hundred times more stars than I thought I could." or "Even these little binoculars show me more stars than I thought anyone could see with the great, large telescopes," or " I could see about five hundred times the number of stars shown in my little star atlas."

To the non-astronomer, such statements might seem to be childish exaggeration. To the astronomer, they are recognized as no exaggeration at all; if anything most of them may be understatements. For the astronomer knows that for every increase in the faintness of stars that one can detect, there is a relatively enormous increase in the number of stars that will be seen. This becomes even more a reality as one proceeds to the very faint levels where an increase by one magnitude in the faintest stars seen brings simply an incredible increase in the number of stars. The youngster who says his telescope shows him five hundred times as many stars as he has marked in his introductory atlas is probably making a good estimate of what he is seeing; this is illustrated by the following study which I did.

After I selected my area (Number 17) of the sky in our Sky Search Program, I decided to compare the number of stars marked in that 10° by 15° area, using ten different atlases. I recorded the number of stars, variable stars, Messier and N.G.C. objects, and Radio Sources in that area of the sky. In fact, the area, in the constellation Canes Venatici, appears to be a relatively uninteresting one with no very bright stars and the brightest star being Beta Canum Venaticorum at magnitude 4.3. This is the only star marked in the area, in the elementary atlases. Of the two Messier objects in the area, it can be seen that some atlases marked only one, the brighter one. Only one of ten atlases had a policy of recording radio sources. It is instructive that as we move from "stars brighter than 5th magnitude" in the two elementary atlases to "stars brighter than magnitude 9.5" the number of stars increases from "1" to "over 480".

A Survey Of One Part Of The Sky

AREA OF SKY: R.A.: XII^h - $XIII^h$ DEC.: 40° - 50° N

Atlas Used	Limiting Magnitude	Number of Stars	Messier Objects	Variable Stars	N.G.C. Objects	Radio Sources
1 Edmund Sky Guide	5	1	1	1	1	0
2 Edmund Mag 5	5	1	1	1	1	0
3 Popular Star Atlas	5.5	2	0	1	0	0
4 Star Atlas (Mitton)	6	6	1	0	0	0

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A Survey Of One Part Of The Sky - continued

AREA OF SKY: R.A.: XII^h - XIII^h DEC.: 40° - 50° N

Atlas Used	Limiting Magnitude	Number of Stars	Messier Objects	Variable Stars	N.G.C. Objects	Radio Sources
5 Edmund Mag 6	6	7	2	0	6	0
6 Norton's Star Atlas	6.35	12	1	1	8(H)*	0
7 Skalnate Pleso Atlas of the Heavens (Deluxe & Desk Ed.)	7.75	39[2]	2	2	21(G)*	2
8 Tirion Sky Atlas 2000 (Field Edition)	8.0	83[3]	2	3	20	0
9 Atlas Borealis	9.35[7]	44[1]	0	2	0	0
10 A.A.V.S.O. Variable Star Atlas	9.5	482[4]	2	3	21[6]	0

Footnotes:

(H)* - "N.G.C. objects" are listed as Herschel objects.
(G)* - These are galaxies in addition to the 2 Messier objects M94 and M106
(2) - 5 of them are double stars (-●)
(3) - 5 of them are double stars (-●)
(4) - Counting is difficult because lines in Dec. are at 4° intervals, not 10° intervals
(5) - Counting is difficult. 27 are double and 1 is a quadruple.
(6) - These galaxies are marked but not named in this atlas
(7) - The limiting magnitude for double, multiple and variable stars is about 10

SOME REFLECTIONS ON THE PERSONAL COMPUTER FOR THE AMATEUR ASTRONOMER

(Editor's Note: As we enter what many have called the Computer Age, I am amazed at the extreme reactions of many people to these new tools that are becoming more widely available. On the one extreme are those who refuse to see any positive use for the computer in many areas of our lives; equally unrealistic are those who think of the presently available personal computer as the answer for the millennium, the panacea for everything. For the astronomer, the currently available personal computer is, in fact, in some ways, far less accurate and less generally desirable than a good hand-held scientific calculator. This point is made very well in the following article submitted by David Stokes of our centre.)

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For several years now I have calculated astronomical events using a small programmable calculator, events like sunrise and sunset times, local noon, and lunar motion. Just lately I decided to move up to a full size computer system that would permit more extensive computational work, using the Basic language. In addition, today's personal computers offer exciting possibilities with graphic displays and word-processors to produce technical reports, tables of data, and articles like this one. All of these facilities greatly expand the horizons for the arm-chair astronomer house-bound in this alien Canadian climate. So I set off in quest of the ideal personal computer (PC) for scientific and astronomical work.

This world is full of surprises. I soon found that trigonometric functions which I could command at the touch of a button on the hand-held calculator were not so readily available in the Basic language of the computer. Most software seems to have been written for small business applications, with little regard for scientific niceties. One minor irritation is the very common requirement for all angles to be in Radians, and no concession to degree-mode. Another blow is the need to write complex algebraic formulae to get the invers trig. functions, so often required in astronomical work. True, one can get around these hurdles but we are not the slave of the soft-ware merchant; he should serve us!

Another surprise is the sudden loss in numerical accuracy that comes free with the expensive PC. One quickly takes for granted the calculator's 8 or 10 figure floating-point integer precision only to find the computer offers 5 or 7 figures, with a few offerring 9 figures accuracy. Again, the machine architecture and the soft-ware merchant have conspired to ruin the scientific potential of the hardware. Let's look at an example. The most common measure of time in computational work is the Julian Day (JD), and most work is carried to at least the nearest minute, or better. Thus, 1977 February 18 at 3h39.6m is JD 2443 192.6525. Notice there are 7 integers before the decimal-point to get the day and there are 4 more integers after the decimal to get the hours and minutes, as a fraction of a day. Thus, .6525 ÷ 24h = 15.6600h, and the .6600h ÷ 60min = 39.6m. (This 15h 39.6m is actually 3h 39.6m because of the Julian Day begins at noon!) Now, if your calculator can manage all of 10 significant figures, then your final accuracy may still be degraded by the loss of that final 5 ie: .0005 ÷ 24h ÷ 60min = 0.72m. In a long computation this sort of truncation-error may degrade the final result to +/ - 5 minutes. The situation is much worse than this with most personal computers. Few could keep track of Canada's national debt. (On second thoughts,is this possibly the source of the economic problem?)

Yet another unpleasant surprise (yes, Virginia, there is no end to them) is the inadequate internal precision of the PC compared to the pocket calculator. Internal precision refers to accuracy with which the machine does its arithmetic, which depends on how large or small a number it can manage before it cries "underflow" or "overflow", or quits altogether and screams "error". Read the machine specifications carefully for three items,viz. integer precision (usually 5 figures), floating-point precision (usually 8 or 10 integers for calculators and at best only 9, and more often only 5 or 7 figures for the PC, as discussed above), and lastly internal precision. This

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latter figure may be as high as 10 to the power of +/-39 in the PC. This probably explains why, for example, IBM doesn't even mention these numbers in their promotional blurb. Internal precision is important in scientific work where very large or small numbers, and their differences, are encountered. It also affects how well the machine can calculate functions, too! The problem doesn't stop there because truncation errors have a way of creeping in un-noticed and degrading the results of the unwary.
Let's take a look at an example or two. When you ask for 2 cubed, do you get 8 exactly, or is it 7.99999999? Much more revealing for the astronomer is the result of sin(30.0) degrees. Do you get 0.5 exactly or is it something less? If that looks good, try sin (360+30) and then sin(10 - 360 + 30) and then (100 - 360 + 30), etc. The IBM-PC returns progressively worse results, the error for large angles varying erratically, even in double-precision! The problem lies in the internal precision, and is the result of a trade-off to get faster computation for business purposes. Take a look at this comparison of some hand-held calculators and the IBM-PC using Microsoft Basic A.

the HP-55 gives sin (360 000 030)	= 0.499 481 3556
TI-52	= 0.499 998 1862
Casio fx 2200	"error"
HP-67 (programmable calculator)	= 0.500 000 0000
IBM-PC + Microsoft Basic A	= 0.498 552 6

The first three results are quoted from Jean Meeus's new book "Astronomical Formulae for Calculators", and the last two are personal test results. Notice the IBM computer returns only 7 figures, at best, and they are all wrong! (The spacing in the above table is just for ease of reading).

These are a few of the less pleasant surprises when shopping for a personal computer, but there are some pleasant surprises, too. For example, in a careful survey of most machines on the market, I found the Atari 800 with Basic could provide 9 integer precision, a choice of radian or degree modes, and they have promised with a new advanced Basic to have 16 integer precision. And Atari is among the least expensive and best supported machines available (mainly because of the Games!). The lesson is clear. Before shopping, write up a list of features you must have, and make another list of features you would like to have but would consider dropping, unless the price is right. Shop around and look first at the supporting software available for your choice of machine, most particularly at the Basic language available to see how powerful it is, and whether you could live with it. Look at integer precision, floating-point, integer precision and test the machine with a few simple programs (don't expect the sales clerk to know anything about your needs, when it comes to science; they are mostly at a complete loss). Avoid the smart business machines; they cannot function in a scientific climate. Then examine very closely the instruction manual to see how well it teaches the use of the machine

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and its peripherals, or whether you are expected to invest in some books on that system to get acquainted with it! Lastly, decide whether you can live with monochrome (white, green or orange on black are all currently available) or whether you simply must have glorious technicolor and the extra cost that it entails. Next, decide whether you want to play games on cloudy evenings or test your skills in composing music. Then look at the software available for manipulating files and for word processing. Speed of action goes to the 16-bit machines just coming on the market, but look out! They may be swift but in gross error, as we have seen. First and last, consider price; these things are just becoming available and the price is falling, particularly now the Japanese are entering the market, but they are by no means inexpensive, especially if the system is fully configured.

One last thought. It may be helpful at first to follow a book of ready-made programs written especially for astronomy, like "Astronomy Basic", particularly if you are new to the field. Eventually though, the real value of this numerical approach to astronomy is the insight it gives to the way the Earth, Sun, Moon and Stars weave their way across the night sky. It gives a deeper perception of the infinite beauty of inter-relations, mutual and reciprocal reactions tied together by gravity, and the fascinating precision of it all, determined by laws that are unchanging for all time. To discover these things for yourself will mean learning and applying the univeral language of mathematics. You will learn a lot of Astronomy along the way. There is plenty of material available today and a new era is opening for those who are intrigued by celestial mechanics, or want to use the computer on the end of the telescope. Look before you leap, and then join in the fun.

P.S.: What did I buy---oh! that's another story of many precautionary tales. I'll tell you next month, if my word processor doesn't break down.

TWO LETTERS FROM MARYLAND

It has been over a year now since we have failed to reprint part of a letter from our very dedicated member in Swanton, Maryland, Mr. Gus Johnson. Since our last newsletter, I have received two very informative letters from Mr. Johnson, parts of which I will reprint below. (What a disappointment that Mr. Johnson could not attend the G.A. in Quebec City! Maybe 1984 in Hamilton, or 1985 in Edmonton) We were very pleased to receive from him a box of cards recording his hundreds of his observations of nebulae and other deep sky objects. As usual, the precision with which he had recorded his observations are as much an inspiration to us as the observations themselves.

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RD 2 Box 67
Swanton, MD 21561
April 20, 1983

Dear Mr. Enright:

Those of the Kingston Centre hoping I would keep that 32mm König eyepiece, take hope again. The company was so courteous that I favored them with another purchase, this time of the 24mm König, which they told me had a field of about 60°. It soon arrived and on my telescopes of f/8 and slower may soon be my favorite eyepiece, displacing the former 20mm Erfle. Like the two Erfles there is a little coma at the edges of the field, but this is masked by the Newtonians' mirrors. On the short 2.4-in. it gives 21x and almost a 3° field. The chrome plating, however, is flaking off, but this matters little.

Congratulations to David Levy on his 109 object Messier Marathon. Our AAAP leading observer, Tom Reiland, got, I believe, 107. Last Saturday was to be the date of a M.M. at a dark site in S.W. Pennsylvania, but I forgot about it. It was a freezing night, but at least clear. I got to go through much of the Coma-Virgo galaxies in search of SN. I forgot also to check a reported SN in NGC 4753 of mag. 13 on April 5, 1983, located 40" S.E. of the nucleus. This galaxy is of mag. 10.6 and is about 3° east of Gamma Virginis.

Except for that one clear night there is little else to report astronomically. That night I tried my long 2.4-in. Unitron on the closer components of Zeta Cancri (m. 5.6-5.9 0.8"). Last month, on a rare steady night, I got a clear elongation with my 6-in, at 196x. I wondered if a 2.4-in. could try it, for had not S.W. Burnham detected 0.2" with a 6-in.? Scaling it upward that would come out 0.5" for a good 2.4-in. I thought I saw an elongation with the 2.4-in. at 150x not evident in the 5" away third component and made an estimate of position angle and was 5° in error. With very close nearly equal pairs it is hard to tell which component is the primary, so I rely on a position line-up in both directions, like a 90° - 270°. I hope that is not cheating.

Gus.

May 17, 1983.

Dear Mr. Enright:

I'm pleased that my box of note cards will prove of some use. The new file cards that replace that one will be neater, and if I can find time to re-type a few, all will be typed on only the front side. Hundreds of double star observations I have not copied anew. The latter would prove dull reading. As I have replaced the double star cards I have sent them to Glen Chaple, the double star man who writes for "Deep Sky", and to Paul Brown, of Goderich. My recording of observations was with the idea of publishing an observation book, originating over 25 years ago. I modified my plan a few years ago, but find with so few really good nights for observations and with so many variable stars to watch that the book may never be completed, but reading one's own observations can be a nice rainy night activity.

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Every observer should record his observations, preferably by catagory rather than by date, but any is better than none.

The second week of May offered many nights with clear skies so I could study the galaxies and the bright fast-moving comet Alcock-Araki-IRAS. It almost showed motion as I watched with 58x. The unaided eye could easily see motion in a 1/2 hour. I viewed it with nine instruments and found my wide-field 7 x 35's did the nicest. Seeing it in the same wide field with the Beehive was very fine and will have made many memorable photos. I would not likely have known of the comet had Tom Reiland, of Allegheny Observatory, not called me, also asking if I would study M 90 for a possible supernova that he noted close WNW of the nucleus. I had made a sketch of the galaxy, but had failed to note the bright round nucleus, concentrating on nearby field stars. 96x on my 8-in, showed no star near the nucleus and on another night I tried 145x with poorer seeing and at times suspected a very dim star, while Tom said mag. 10. He saw a star with the Allegheny 13-in. refractor at 175x and a friend with a 10-in. seemed to confirm it. I couldn't give him any reliable confirmation. I don't trust objects at the limit of vision, for they are so many. Comet Tempel in the vicinity of M 89 and M 90 added interest. I suggested to Tom an asteroid. (I think he originally used his 8-in. reflector.) Considering how they can dash one's hopes of a discovery, I can see how their abundance has gained them an unsavoury reputation among some astronomers.

As for the new Comet Catcher, I saw one at the AAAP meeting and tried it, held-in-arms on Venus and the Beehive, at about 19x. The diagonal is large and its rectangular plate extends beyond the elliptical diagonal, so if high power could be used, this would introduce diffraction. I noted an apparent mis-alignment, but sometimes when aligned on a star a reflector evinces a mis-alignment when the observer looks down the empty ocular aperture. Only at the edge of the field did the definition fall off, maybe due to the eyepiece. The overall field of good definition was much larger than the equivalent Newtonian and much larger than f/6 field. The photographic tripod that Celestron shows with it is not adequate, however.

Clear Skies,
Gus Johnson.

ASTRONOMICAL POETRY

Along with the first of the above letters, Mr. Johnson submitted two poems which are reprinted below. The first one captures the thrill of the boundless vistas to which the astronomer can venture; the second one comes as a prayer to the stars above. Astronomical poetry of such high quality is a most welcome addition to these pages. (Mr. Johnson said he had written other poems but could not find them at the time his letter was written. If they can be located, I am sure that they too would be a welcome part of our newsletter.)

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F R E E

Enveloped in fire am I
As I paddle into the sun.
Few thoughts encroach upon
The over-powering fire-glow.
But then as the celestial torch
Departs to more westerly vistas
Scarlet sheets still tell its glory.
Then ember-like, red-tinged gray
Darkening sky devours its clouds
And a greater reality begins to show.
Doors and windows of our earthy room
Fling open to the heavenly realms
Of far-off, light-attenuated star-cities
And suns uncountable. No longer
Is the mind earth-bound but at the
Speed of thought ventures out to
New Earths, new Suns, new lives to live!
The soul must await kind death's release
To follow trails Star-mind has blazed.

Gus.

NOCTURNE

Misty stars of Appalachian night
Come to bless with far-off light.
Rinse our minds and lift our spirits;
Tug upwards at our lonely dreams
From out the wastes of man-made scenes
Of city-dirt, busy confusion,
Waste and crime, happiness--an illusion.

Come walk with me a quiet shore
Of ferny bank and mirror waters
'Tween stars above and stars below, we sons and daughters
Find peace to live with lightened care,
True gifts to give, heaven to share.

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Come ever oftener to this chapel

Ceiled with boughs, lighted by stars,

Walled with woodland pillers, with shrubby altars.

Gently speak, or better, listen.

GOD is near: find cosmic visions.

Gus Johnson, May 1976

A LETTER FROM ALBERTA

We are always very pleased to hear from our past president, Angelika Hackett, who now resides in Edmonton. Along with her recent letter, she sent several slides of places she and Bob had visited in Hawaii. Those beautiful scenes with their mountain-top observatories were a special treat for us at a recent centre meeting. Here is part of her latest letter:

Edmonton, Alta.,
May 5, 1983

Dear Leo:

Congratulations on another fantastic newsletter! They are getting longer and longer, and look so nice with the new duplicating process. David sent me a copy of his records for the Messier Marathon--quite an amazing accomplishment! I'm always amazed at how he manages to stay up all night!

At our last astronomy meeting we had a guest speaker from the Calgary Centre, Neil Laffra, telling us about their new observatory south of Calgary, and showing slides of how it was built. Quite an impressive structure. I have not yet been to the Edmonton Centre's observatory. How did your Astronomy Day '83 go? Did many people show up at star night? There were hundreds of people at the planetarium here in the city, where 2 star nights were held. Guess what the most common complaint is among amateurs here, aside from city lights. Not haze; there is not much of that stuff here, not the full moon; that is quite predictable, and not the short hours of darkness at this time. It's the Northern Lights! They are unpredictable and often so bright that there is no hope of any deep sky observing! It seems to me that the local amateurs have seen enough of the aurora. Meanwhile we jump up and down with excitement if we see any!

Your meetings promise to be very interesting and informative with all the talks you have scheduled. I wish I could just hop over for one or two of them!

Still no job, but I keep looking. In June we'll be off to Vancouver where Bob has a conference, and then by ferry up the Inside Passage to Prince Rupert, as we did in 1980. This time we plan to visit the Queen Charlotte Islands as well, and then come by train via Prince George back to Edmonton. We're also expecting lots of company from Ontario which should be much fun during the summer.

Many greetings to everyone! All the best from Angelika, and Bob.

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DAVID LEVY'S AMAZING OBSERVING SESSION NUMBER 6207

The column entitled "An Amazing Messier Marathon" in our last newsletter reported the fantastic accomplishment of our centre member, David Levy, during what he recorded in his Observations Log Book as Session Number 6207. In that session on the night of March 15th-16th, 1983, David carefully observed 109 of the 110 Messier objects currently listed in the Observer's Handbook edition of the Messier Catalogue.

In spite of the recognition that he has received for this outstanding achievement, David, with his characteristic modesty, is quick to point out that several other noted observers have seen large numbers of Messier Objects during a single long night of "Marathoning"--several have seen over a hundred. However, as astronomy writer, Terence Dickinson has commented (and part of his comments on Session 6207 appeared in the Kingston newspaper) David's feat was accomplished by himself, involved the "long list" of Messier Objects--with no duplications or omissions of doubtful objects--and was a session in which all the objects were carefully observed, not merely glanced at, and a report of each one was written immediately after the observation. The nine-page report from David, which is a copy of his original observing notes and which our centre has gratefully received from him, is proof of the care with which he documents his observations and an inspiration for all of us when we realize we should be thorough in reporting the details of what we see.

For those who may be interested in the order in which the objects were seen, it is given here. (David wants to give credit for the order to an article by Don Machholz and John Kerns in the March 1982 issue Of Deep Sky Monthly.)
It was: 33, 77, 74, 31, 32, 110, 76, 34, 45, 79, 42, 43, 78, 41, 93, 47, 46, 50, 48, 1, 35, 38, 36, 37, 44, 67, 95, 96, 105, 65, 66, 81, 82, 40, 108, 97, 109, 106, 94, 63, 51, 101, 102, 3, 64, 53, 85, 100, 98, 99, 88, 91, 84, 86, 87, 89, 90, 58, 59, 60, 49, 61, 104, 68, 83, 5, 12, 10, 107, 9, 80, 4, 19, 62, 6, 7, 13, 92, 57, 56, 27, 71, 14, 11, 26, 16, 16, 17, 18, 24, 25, 23, 21, 20, 8, 28, 22, 29, 39, 52, 103, 69, 70, 54, 55, 75, 15, 2, 72, 73.

Times were given precisely for each observation. The times of the last one was 05 22 and the next line says that M30 "just didn't rise in time" to be seen clearly in the morning twilight. The N.G.C. Objects were: 2071, 2482, 1931, 1907, 3384, 3389, 3628, 3593, 3077, 2976, 4290, 4217, 5907, 5879, 5053, 4293, 4394, 4565, 4595, 4571, 4540, 4438, 4435, 4567, 4568, 4638, 4647, 6207, 6603, 6445, 6440; and also 2438, the planetary nebula inside M46; a distinct brightening, though no defined shape, for NGC 2037 which is called Barnard's Loop; and also Omega Centauri. The precise time and careful description of the appearance of each of these 34 NGC Objects were also given. The observing conditions were very good at Corona de Tucson: it was the time of new moon and the gegenschein was "distinctly visible". Four of David's many telescopes were used, ranging from a 3-inch to his 16" f/5 which is appropriately called Jupiter, the king of the lot.

(Such a splendid event should have an element of humour somewhere, and so I have a story to tell David about a report of the Messier Marathon article in our last newsletter. Maybe instead of a story it should be a rhetorical question: would you believe that another definitely unnamed newsletter, in making a very short summary of the event, added the word "alleged" -- "the alleged observation

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of 109 objects"?) Need we be reminded that David, in the course of over six thousand, two hundred observing sessions of careful comet hunting and precise study of deep-sky objects over many years has gained a knowledge of the night sky quite similar to most people's knowledge of how to get to their front door? Referring to Terence Dickinson's comments on this Messier Marathon, editorial writer Mary Lasovich wrote the following in the Kingston Whig Standard in a recent Saturday editorial:

> CHEERS, for former Kingston resident David Levy, who last month set what is believed to be a world record for a single evening of star-gazing. On the night of March 15-16, he observed 109 of the 110 celestial objects in the Messier catalogue, a standard reference list of cosmic delights visible in backyard telescopes. Science journalist Terence Dickinson notes that because the Messier objects--star clusters, nebulas, galaxies, and the like--are spread all over the sky, they've never been seen in a single night. Levy, who now lives outside Tucson, Arizona, came closer than anyone in history to that astronomical feat.

Again, congratulations to David for a rare accomplishment.

FOR YOUR COMPENDIUM OF ESOTERIC FACTS

Do you know that if collisions of automobiles occurred at the same rate as collisions of stars, our auto insurance premiums would be very low?

Astronomers who have studied the stars in the relatively densely packed core of our galaxy suggest that in that area of the galaxy there may be as many as one collision every thousand years. At that rate several million stars would have collided since the beginning or birth of the galaxy. (This is a good example of an event which seems virtually impossible in a human lifetime, but is extremely common in terms of a longer timescale.)

If our automobile collisions were calculated to occur at exactly the same rate (of course, taking into account the number of stars in the central region of the galaxy and the number of automobiles on earth), we would see that we would not have had a single auto collision since the invention of the horseless carriage and we would still have to wait 2 million years for the first one to occur! How about that for bargains in auto insurance!

COMET REPORTS

The past two months have been very exciting times for comet observers. We have been favoured with at least three bright ones and one of them is still visible in the night sky as a naked-eye object.

A good deal could be written about the excitement in the astronomical world during the first week of May, generated largely over the discovery of the brightest comet in years and one that approached the earth closer than any other in recorded history except Comet Lexell of 1770. This comet, called Comet Iras-Araki-Alcock (1983d), was the first one discovered by the Infra-Red

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Astronomical Satellite, and though the observation was originally interpreted as an asteroid, the discovery was made on April 26th, fully a week before any humans had noticed it. On May 3rd it was discovered by Genichi Araki in Japan and George Alcock in England. My first word of it came on May 5th in the form of a phone call from David Levy at 9:40 p.m. By persistently waiting until the clouds cleared about 2:00 a.m., I was able to see, naked-eye, the slightly diffuse, 4th magnitude object not far from the star 46 Draconis. I also realized that just the night before I had carefully scanned an area of the sky only about 15 degrees away.

A series of cloudy nights followed in this area and all attempts to observe both the comet and a possible meteor shower associated with the orbit of the comet proved most frustrating. When I next had a chance to observe and photograph it, on the night of May 10th-11th, the comet was near the star Kappa Ursae Majoris and was considerably brighter and larger in the sky.

The following night was the most interesting of all. For a couple of hours before midnight the comet completely dominated the western sky as a most beautiful object. To the naked eye, it was very bright--about second magnitude--and appeared over half as large as a full moon. Under observation in a telescope it was moving southward through the constellation Cancer so rapidly that it was difficult to guide a large telescope with the accuracy needed to photograph it. However, I managed to obtain photographs of this interesting object on all three of the above-mentioned nights. The amazing speed of this object had carried it so far south that by the following evening (May 12th) it was low in the south-west in the constellation Hydra and binoculars were needed just to locate it in the evening twilight. The brightness and speed of the Comet-Iras-Araki-Alcock is something we will remember for a long time.

Another comet currently visible in telescopes is the periodic Comet Kopff which can be seen in the constellation Libra at about magnitude 9.5. Currently it is near the star Epsilon Librae and by July 15th will have slowly moved to a position just north of Gamma Librae.

The third comet is one which is reaching naked-eye visibility and is moving rapidly south-westward through the sky. Discovered on May 8th by three Japanese amateurs, it is known as Comet Sugano-Saigusa-Fujikama, and though fainter than the comet described above, it is a very interesting object to watch as it traverses the sky. Following is an ephemeris until July 13th. Though based on I.A.U. Circulars and computations by Dr. Marsden, it has been stated that these figures may be in error by a degree or two.

Date	R.A. (1950)	Dec. (1950)	Magnitude
June 15.0	16h 46.6m	-31° 07'	4.8
18.0	15 13.0	-39 16	6.3
23.0	14 22.7	-41 18	7.9
28.0	14 05.3	-41 41	9.1
July 3.0	13 57.9	-41 51	9.9
8.0	13 59.0	-41 57	10.7
13.0	13 54.6	-42 05	11.3

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If any local observer missed the first of the above comets, perhaps he will have a chance to observe the other two. Seeing them may be a very rewarding experience.

REPORTS AND OTHER ITEMS

1. Many of our observing reports of the last two months had to do with rain and clouds. It surely seemed to be the cloudiest, rainest spring in memory. A few of us had observations of Comet Iras-Araki-Alcock and I observed an Aurora on June 10th, but the predominent mood of the reports was one of frustration.

2. Your editor apologizes for an error in line two on page three of the last issue of Regulus. The name of the constellation should be Capricornus, not Cassiopeia.

3. A number of events make it an interesting summer for the observer and the following especially should be noted in the coming months:

   (1) We are currently in the middle of the first eclipse season of 1983, the second one occurring in December. This season has brought us the total solar eclipse which was seen by a good number of people in Indonesia on June 11th, and it will bring us the partial lunar eclipse which may be seen in this area very early in the morning of Saturday, June 25th. At midpoint of the eclipse about one-third of the moon's disk (the northern part of the moon) will be within the earth's umbra. The full impact of the final stages of the eclipse will be lost perhaps as a result of the moon's being low in the western sky and the imminence of sunrise. Here are the times of the observable stages of the event.

First contact (Moon touches umbra):	$-3^h\ 14^m\ 24^s$ E.D.T.
Mid-eclipse:	$-4^h\ 22^m\ 18^s$ E.D.T.
Second contact (Moon leaves umbra):	$-5^h\ 30^m\ 6^s$ E.D.T.

   (2) Venus will continue to dominate the evening sky reaching greatest brilliancy at magnitude -4.2 on July 19th. Around that date try to spot this brilliant planet before sunset. It has been done.

   (3) Observers should continue to record the movement of the planets Uranus and Jupiter in the constellation Scorpius. The movement of Uranus will be very noticeable over the next month.

   (4) On July 12th and 13th, Venus, Regulus, and the young moon form a very interesting configuration low in the western evening sky just a short while after sunset. It should make for a few interesting photographs. On the evening of January 9th Venus and Regulus are, in fact, less than one degree apart.

   (5) Looking ahead to August, we can foresee a good weekend for Perseid observations, if the weather co-operates. The four day old moon sets quite early and a very good shower is a real possibility.

4. FOR SALE: Klaus Brasch has informed me that his issues of Sky and Telescope from 1960 to 1980 are for sale. If you are interested, mention it at the next meeting.

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5. Perhaps some other people have noticed a dramatic improvement in the delivery dates of Astronomy magazines. Now, if only the other magazines were delivered as quickly! Or, is the current delivery only an example, in one extreme, of how erratic it can be? Here are the cases to which I refer. My June issue was at the post office on May 12th and my July issue was there on June 3rd! If only it continues!

6. Here is a schedule of upcoming meetings with a list of the talks to be presented. Some changes may have to be made to some of the presentations.

June 10 - Hugh Thompson: Calculating the Speed of Light.
- Klaus Brasch: Astrophotography with a C-10.
June 24 - Gerald Schieven: The Moon and The Tides.
- Summer Plans: Outings and Observing Sessions.
July 8 - Lunar Eclipse Reports.
- Sky Search Program Report.
July 22 - Leo: Sidereal Time.
- Sky Search Program Reports.
Aug. 12 - Plans For The Perseid Meteor Shower.
26 - David Levy: My Comet Hunting Program.
Sept. 9 - Sky Search Program for the Fall.
23 - Mr. Franklin Loehde, National President of the R.A.S.C. (guest speaker)

Remember all meetings take place at 8:00 p.m. in Room 222 in Ellis Hall on University Avenue.

7. Your editor wishes to acknowledge the help he has received in producing "Regulus" with its improved format. Special thanks go to Mrs. Elsie Fazackerley for the typing, and to Mark Sorensen and Ruth Hicks.

8. I would be very happy to receive material for these pages. Our address is:

R.A.S.C. - Kingston Centre,

Box 141, Station A,

Kingston, Ontario.

K7M 6R1

CLEAR SKIES!

GOOD OBSERVING!

Leo Enright.

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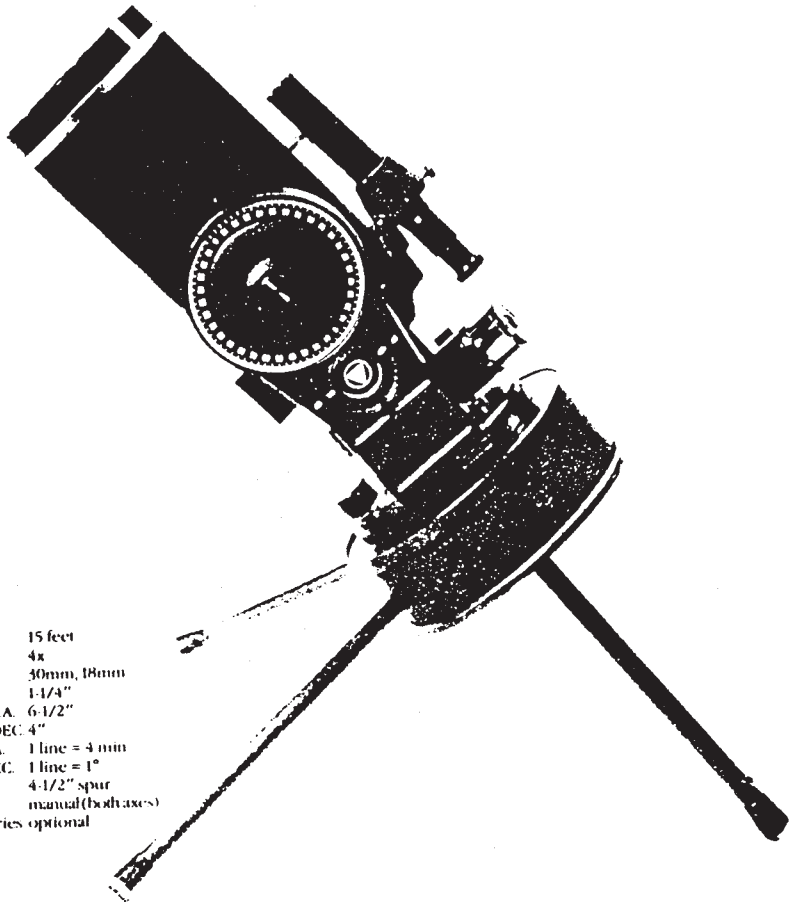

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Data: Eyepiece projection, 356^{mm} Schmidt-Cassegrain Telescope,
4-second exposure, Feb.21,1983, EFL: 44,956mm., f/126.