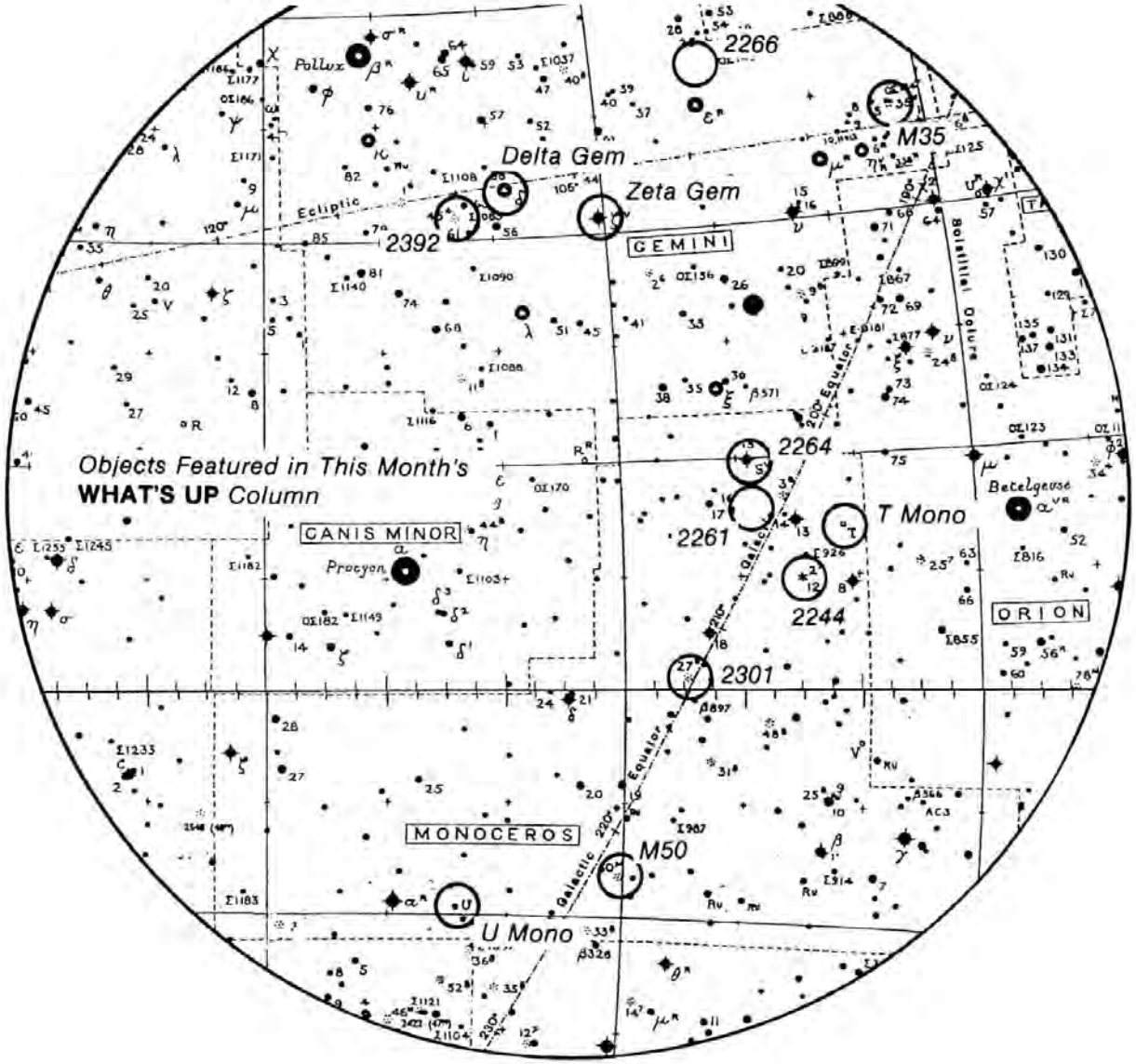
STARDUST

A JOINT PUBLICATION OF
Queen Elizabeth Planetarium & Edmonton Centre RASC

Vol 25 **MARCH 1980** **No 05**

35¢ per copy **$3.50 per year**



STARDUST
March 1980
Volume 25, Number 06

Editor:	*Paul Deans*	
Assistance:	*Joey Mix*	
Contributions:	*Dave Belcher*	*Rod McConnell*
	Alan Dyer	*Lori Walton*
	Dave Holmgren	*Anthony Whyte*
	Mark Leenders	
Cover:	*Dave Holmgren*	

CONTENTS

STARDUST *is published 11 times a year. It is available to all R.A.S.C. members as well as by subscription ($3.50 per year) and at the Planetarium Bookstore ($0.35 per issue). Make all subscriptions payable to:* Queen Elizabeth Planetarium *and send them to:* The Editor, Queen Elizabeth Planetarium, Coronation Park, Edmonton, Alberta. *Articles dealing with all aspects of astronomy are wlecome, and may be sent to the Editor at the Planetarium.*

DEADLINE FOR THE APRIL ISSUE IS MARCH 10, 1980

PRINTED BY THE CITY OF EDMONTON

EDITOR'S MESSAGE

If this issue of ***STARDUST*** looks just a little strange...looks like something is not quite proper...you're right! Alas, the speed with which time flies by has obviously caught a few regular contributors by surprise. This is naturally most regretable, but I must again emphasize that most, if not all contributions for ***STARDUST*** must be brought in during the regular meetings. As this issue is finished off, it is almost two weeks since the last meeting, and just over two weeks to the next one. Allowing 1 week for printing, and a few days for the issue to wind its merry way through Her Majesty's Royal Maze leaves very little time for the issue to be actually put together. As a result, I will emphasize again what I said at the last meeting -- each issue will be worked on beginning usually no later than one week after the meeting. If you cannot get your item in to me at the meeting, then please try and drop it off at the Planetarium no later than 1 week **after** the meeting. This should result in your article being printed in the next issue.

I must also say that I am very pleased with the quality of the February ***STARDUST***. The clean copy looks very nice, and should always be consistent. (That was my major complaint against the Xerox method of reproducing ***STARDUST*** -- there was no guarantee that the results would be consistent, whether month by month or sometimes even page by page). I also hope to run a 'test' photo or two in one of the upcoming issues just to see how they turn out.

Please remember that the deadline for the next issue is the meeting of Monday March 10. All astronomy-type articles are welcome, especially since I have now run out of all the serial articles that have been appearing during the past few months.

Paul Deans

PLANETARIUM NEWS

EXPLORATIONS: A New View of the Solar System continues throughout the month of March. The programme deals with the exploration of five planets (Mercury, Venus, Mars, Jupiter and Saturn) by spacecraft, most of which were equipped with cameras. The last half of the show concentrates on Jupiter and Saturn, with lots of the visuals sent back from those worlds by the Voyager and Pioneer craft respectively. The next programme, *Relatively Far*, opens in mid-April.

If you have not been to the Planetarium for the past few months (or ever since the monthly meetings were moved), then you should be aware that the Bookstore is alive and well and continuing to grow. Yes, there are more books, more telescopes, more everything that's astronomical. You might be interested in picking up a copy of ***Star and Sky*** which is now carried on a monthly basis by the Bookstore. At the other end of the scale, I'm sure that the Bookstore manager (Fast Freddie Krysko) would be more

than happy to sell you the Meade 12.5" (32 cm) f/6 reflector. It comes loaded with all sorts of goodies, and is a real steal at $3100! Naturally, there are lots of items inbetween these two extremes, so feel free to drop down and have a look around during the day or in the evening.

Paul Deans

MINUTES OF FEB. 11 MEETING

The meeting was held in the Edmonton Public Library beginning at 8:00 pm. The President, Ted Cadien, called the meeting to order.

Paul Deans, ***STARDUST*** editor, explained that there had been changes in how the newsletter was being reproduced. He outlined the effects of these changes on the newsletter, the Planetarium and Edmonton Centre members.

Dave Holmgren announced that there would be an observing session at the Ellerslie Observatory on Friday February 22nd.

The Treasurer, Mel Rankin, moved that Robert McDonald be accepted and welcomed as a new member. He also announced that Fred Winter of Buck Lake had donated $100 to the Observing Site Fund.

The Secretary read the minutes of the January 11th meeting -- accepted as read. Ted Cadien announced that the Annual Banquet would be held at the Chateau Lacombe on Friday, March 21st.

Paul Deans then presented the evening's talk: *The Golden Age of Planetary Exploration.*

Anthony Whyte

MERTON STREET NEWS

(A semi-regular column dealing with news from the National Office of the R.A.S.C.)

Representatives at the December 9 National Council meeting held in Edmonton reviewed the estimated R.A.S.C. budget for 1980. All told, the Budget Committee expects that in 1980 the R.A.S.C. will receive $112,800 in total income. The largest single portion of this comes from the sale of the ***Observer's Handbook*** ($38,500). Through subscriptions, sale of offprints, and page charges, the R.A.S.C. ***Journal*** is expected to earn $21,900. Membership fees are expected to bring in a total of $27,800, while bank interest should account for another $11,000 of income. Finally, $9,500 will be received in 1980 in the form of provincial and federal grants.

On the other side of the books, it's expected that expenditures in 1980 will amount to $111,285, leaving a surplus of $1,515. The single major expenditure is the ***Journal*** at $35,000. Printing of the ***Observer's Handbook*** should cost about $20,000, while the

National Newsletter should be $9,900. Two remaining major expenses are: salaries (at $17,500) and rent on the Merton Street National Office (at $8,000).

As a footnote to these figures, Dr. Lloyd Higgs, editor of the ***Journal***, reported that in 1980 about $9.50 of each member's fee will go towards financing the ***Journal*** and ***Newsletter***. Since printing costs are rising at more than 10% per year, Dr. Higgs suggested that the Society consider raising its membership fees in 1980/81. No action was taken by Council on this suggestion at this time.

A final item of news recorded in the minutes of the December 9 meeting was that the Grand Valley Astronomical Society in Kitchener, Ontario, has elected to seek affiliation in the R.A.S.C. as the Kitchener Centre.

The next National Council meeting is scheduled for April 5 in Toronto.

Alan Dyer
National Council Rep.

SOL III

The prospects of launching the Space Shuttle **Columbia** by mid-1980 have improved with the first successful full-length firing of its main engine cluster. The troublesome heat-resistant tiles on **Columbia** are now less of a problem too. Last December a three-engine cluster, similar to the one already installed in **Columbia**, was run for 550 seconds (30 seconds longer than will be needed to launch the Shuttle into orbit). The principle trouble with the heat resistant tiles was that they were cracking when pressure was applied to determine if they would stick during the Shuttle's launch, orbital flight, and re-entry. NASA laboratories found a method of strengthing the tiles by treating them with a silica-boron compound. It was expected that all 31,000 tiles plus any replacements would be installed by the end of February.
(***New Scientist***, Vol. 85, No. 1188, p. 4)

At this year's meeting of the American Association for the Advancement of Science, a group of researchers from the University of California at Berkley presented a paper outlining a new theory explaining the sudden extinction of a large number of plant and animal species (including dinosaurs) at the end of the Cretaceous Period about 65 million years ago. The scientists analyzed the constituent elements in a thin layer of hardened clay found in several locations around the world dating to 65 million years ago. They found a 25-fold enrichment of the element iridium in the clay relative to that in limestone rocks immediately above and below. To explain this iridium as being formed by a supernova would require that it have occurred a mere 0.1 light years away -- much too close for comfort. However, since iridium is more abundant in extraterrestrial material like meteorites, the workers propose that the clay layer represents a global fallout of dust from the impact of a 7 to 10 kilometre diameter asteroid. Before the dust settled from this, the sky would have been sufficiently darkened for long enough to disrupt photosynthesis and destroy vital food chains

which then led to mass extinction of an estimated 3% of freshwater and 19% of land species, as well as 50% of marine species.
(***New Scientist***, Vol. 85, No. 1189, p. 59)

Anthony Whyte

50 & 100 YEARS AGO

March, 1930

"At the annual meeting of the Royal Astronomical Society on February 14, the president, Dr. A.C.D. Crommelin, delivered an address on the work of Dr. J.S. Plaskett, director of the Dominion Astrophysical Observatory, Victoria, B.C., to whom the Gold Medal of the Society has this year been awarded for "his valuable observations of stellar radial velocities and the important conclusions derived from them". Dr. Plaskett's astronomical career began in 1905 at the Dominion Observatory where he was placed in charge of the Department of Astrophysics. His early work included the determination of stellar radial velocities for various purposes, but the instruments at his disposal would not permit an extension of the work beyond stars of the 5th magnitude. It soon became clear to him that the greatest need in this work was the examination of fainter stars, and the possibility of obtaining a telescope of larger aperture...began to occupy his thoughts. Mainly through Dr. Plaskett's efforts, the 72inch telescope -- the largest in the British Empire and the second-largest in the world -was erected at Victoria. Of the large amount of important work which has been done by Dr. Plaskett...particular interest attaches to 'Plaskett's star', a binary the components of which are respectively at least 86 and 72 times as massive as the sun. These are easily the largest figures for stellar masses so far found."

March, 1880

"The idea of collecting different accounts of the same eclipse, and breaking them up so that all descriptions of one and the same phenomenon should be found side by side, first originated with the Astronomer-Royal, who began to collect all accounts he could procure of the eclipse of 1860. As pressure of work prevented him from carrying out his idea, Mr. Cowper Ranyard took it up at his suggestion.... This enormous work has now been published in a volume of nearly 800 pages, and there cannot be two opinions as to its usefulness and value. The first chapters contain accounts of phenomena of minor importance, yet of considerable interest. Most of these can also be observed in partial eclipses. Chapter IX contains an account of the remarkable shadow-bands which have been observed just before and after totality."
Edited From ***Nature***

Anthony Whyte

From the **Life Can Be Rough** Department: Brian May had to give up work on his PhD thesis on the zodiacal light at the Imperial College, London. His job as lead guitarist in the rock group **QUEEN** required too much of his time. *(ORBIT, Hamilton Centre)*

SHOPPING CENTRE DISPLAYS

Stage One is now complete. The Edmonton Centre, R.A.S.C. is now the owner of an 18 panel display on astronomy. To those of us who worked on the display, it is hard to believe. Although some comments were made in the last ***STARDUST***, I would like to thank my parents who bravely withstood not only various members of the group trooping over on weekends and weeknights, but they also endured the inevitable messes that had to be created in the garage, living room, and the basement. Oh well - anything for the advancement of public education and astronomy...Right Mom?...Right Dad??

Also, I think Alan Dyer deserves a very honorable mention. Many centuries ago when we had the first meetings, he stated that he would not be able to do much, if any, work on the displays. Ahhh -- history showed otherwise.

Dave Belcher, Dave Beale, Ted Cadien, Andrew Lowe (stick to physics Andrew, never consider English), Dave Holmgren, Keith Montgomery (I still say the Moon is boring), and Mark Leenders all contributed -- the only person I will **not** thank is Kevin Berglund (count me out when you have another bright idea, Kevin).

At present we are making up an information package on the displays to send out to Shopping Centres, conventions and any other place we could be in. This will take some time, and then the actual bookings will start.

The amount of money we budgeted for the display is very close to the actual amount we spent (Ivan R. take note). Some areas of saving were the plywood boards, hinges (Dave Beale contributed these) and printing of colour photographs, since only one set of Cibachrome supplies was needed. Charts and posters cost more than we thought, and so did graphics and art supplies (although Dave Belcher helped out a lot in this area). There is also a $50 maintenance figure to add on to the $638 cost.

Lori Walton

THE EARLIER YEARS OF THE EDMONTON CENTRE

Part 5: 1960 - 1962

But if we have no observatory we have at least a Planetarium. In 1958, Earl Milton was president of our Centre and Dr. Crosby was Secretary. The Edmonton Council was considering suggestions for commemorating the forthcoming visit of her majesty Queen Elizabeth in 1959. Among the suggestions were a tower or pylon, a fountain, and an observatory, but it was pointed out by Mr. Frank Page that the lights around Coronation Park made it an unsuitable location for an observatory but that a planetarium would be a valuable tourist attraction as well as a splendid educational

project. A small committee headed by myself was formed to press this idea. During the early part of 1959 we were busy enlisting support. Milton and I spoke to civic groups, and Professor Gads and I attended a meeting of City Council and urged the adoption of the idea. I managed to convince the Mayor, Mr. Hawrelak, and although some councillors were still opposed, we finally carried the day and the city architect was instructed to draw up plans for housing a Spitz projector.

The day of the royal visit was beautiful and although the planetarium was still in the future and Coronation Park itself looked rather bare, the ceremony of turning the sod was one to remember. At a subsequent garden party in the Legislative grounds, Mr. Page represented the Centre.

The official opening of the Planetarium took place in September 1960. A message from the Queen was read by Chief Justice J.C. Ford. Our president Mr. Harrington, extended greetings to those present and I made a presentation of a large lump of the Bruderheim meteorite, to be placed on exhibit as a permanent loan. The mayor, Dr. Elmer Roper, declared the building officially open, and the director Ian McLennan put on a show.

The year 1960 was quite an important one for our Centre. Mr. Earl Milton was awarded the Chant medal for his outstanding contributions to amateur astronomy. Since his arrival from Montreal he had been very active in observer's groups and in the special projects for International Geophysical Year. He was chairman of the National Observing Committee of the R.A.S.C., had taken part in variable star and lunar observations, and was President of our Centre in 1958 - 59.

In 1960 the 84 foot diameter radio telescope at Pentiction was opened and I was there for the ceremony along with the Dominion Astronomer and many others from across Canada. The Minister of Mines and Technical Surveys pressed a button and set the great parabolic dish sweeping across the constellation of Cassiopeia. As it crossed the intense radio source in Cassiopeia the receiver picked up the signals, transmuted them into sound and sent out a loud musical note.

Also in 1960, on March 4, a brillilant fireball was seen over Edmonton by those who were outside at 1:00 a.m. Reports soon came in of a six-pound fragment of a meteorite having been picked up near Bruderheim. Within 24 hours another 150 pounds of material belonging to the meteorite had been collected, mainly due to the efforts of two men from Fort Saskatchewan. A snow cover mad e the fragments easy to identify although they were spread over four sections. Altogether the Geology Department collected finally close to 300 pounds of stony meteorite, oxidized black in the surface. The find was particularly valuable because it was so fresh, and portions of it went all over North America for analysis and particularly for detection of fairly short lived radioactive products. The piece in the Queen Elizabeth Planetarium weighs 67 pounds.

In 1960, the Centre began meeting in the Planetarium with Franklin Loehde as President. In 1961, he along with Ian McLennan and Earl Milton went to the annual general meeting in Toronto where they put on an impressive display of the Centre's observing activities. They each gave papers, Loehde on the Role of the Astronomical Society in the Modern Neighbourhood, McLennan on the use of the Planetarium and Milton on the scientific findings regarding the Bruderheim meteorite. Also they carried out an invitation for the 1962 meeting of the National Council to be held in Edmonton.

Dr. R.M. Petrie, Director of the Observatory at Victoria, visited Edmonton in May accompanied by his wife, the former Jean McDonald, of Edmonton. He spoke of the difficulties in estimating astronomical distances, especially to the further galaxies, and he also congratulated Edmonton on having the first public planetarium in Canada.

In May also the first Star Night was put on in Queen Elizabeth Park. Many of our members put in weeks of hard work preparing shows or exhibits. The weather man co-operated wonderfully and hundreds of people turned out to see the planetarium show, to look at the moon through telescopes or to watch the open-air films and the slide-viewer set up outside. Franklin Loehde nearly had a model of the solar system ready in time, but he did manage to count the money that came in and cleared nearly $200 above expenses.

The great event of 1962 was the meeting here of the general assembly, May 18-21. On Friday, May 18th, the City of Edmonton tendered a banquet in the Macdonald Hotel at which I was chairman. Afterwards Dr. Millman, the retiring President, gave his address on *The Frontiers of Space*, the R.S.A.C. Service awards were presented, and Dr. Millman himself was presented with a tie-pin containing a fragment of the Bruderheim meteorite.

On Saturday morning a session for contributed papers was held in the Mathematics-Physics auditorium. Seventeen papers of high quality were given and various displays of observational work were arranged in the rotunda near by. In the afternoon the National Council met in Edmonton House (Molson Brewery) for a business session, and that evening a banquet was tendered by the Province of Alberta, represented by Hon. R.D. Jorgenson. Mr. McLennan was chairman, and the appreciation of the Society was expressed by Dr. K.O. Wright of Victoria, Vice-President. After dinner the party went long to the Planetarium for a demonstration.

On Sunday most of the delegates enjoyed a trip to the Meanook Meteor Observatory, 90 miles north of Edmonton, where they saw the super-Schmidt camera. the all-sky auroral camera and various other pieces of equipment demonstrated by Mr. Jack Grant. This completed the Edmonton programme, but many of the visitors went on to Calgary and Banff to see the Cosmic Ray Observatory on Sulphur Mountain and other Banff attractions.

In the general opinion the 1962 assembly was an unqualified success, and on this happy note we may leave the history of the Centre. Many of you are familiar with our more recent activities which scarcely yet belong to history. By 1962 we had completed thirty years of activity and I believe had done a creditable job in keeping alilve an interest in astronomy in the neighbourhood of Edmonton. It is a job that still needs to be done.

Prof. E.S. Keeping

This concludes our 5-part series on the history of the Edmonton Centre, a series we trust everyone enjoyed. Dr. Keeping's account covered the first 30 years of the Centre's life, the period from 1932 to 1962. In only two years from now the Centre will be celebrating its 50th Anniversary, as good a time as any to prepare a new accounting of the new activities and accomplishments of the Edmonton Centre.

IF THIS IS TUESDAY, IT MUST BE TUCSON

(Part 2)

Fifty miles southeast of Tucson, just after crossing a railroad track, the motor home stalled. Numerous attempts, curses and threats did not coerce the motor to start. Three hours later, after several telephone calls, a tow truck arrived from Tucson and the motor home was quickly towed into an RV centre for repairs.

We now had the option of "holing up" in Tucson for the weekend or attempting to travel to Kitt Peak as originally planned. The decision was made to rent a car. After spending a night in the luxury of a motel, we drove 65 kilometres to the west and up the wide paved highway to "telescope city".

To fully appreciate the size and diversity of the Kitt Peak facility, one must visit the site. Telescopes of every size and description jut vertically from every small knoll near the mountain top. Prominent, of course, are the McMath Solar Telescope, the largest in the world, and the 4-meter Mayall telescope. Other domes of various sizes and shapes dot the surrounding landscape.

First stop upon arrival was the visitor's centre, a small low building which houses displays on general astronomy and the instruments on Kitt Peak. At specific times the movie "Journey into Light" is shown and visitors are then treated to a lecture and a guided tour of the 80-inch (2-metre) and McMath telescopes. The visitor is then free to wander on his own around the facility. After the tour we opted for a few hours of photography around the peak, with a visit to the 4-meter instrument as the final highlight. This instrument is reached by taking a walk up the mountain to the building itself, then taking an elevator up to the visitor's gallery. The glassed-in room affords a good view of the instrument and one is definitely left with an impression of its size. We then ascended the next flight of stairs up to the observation deck which surrounds the tower. From here an excellent view of the surrounding countryside can be obtained.

Judging by the number of visitors and the programs initiated for visitors at the site, a large number of people tour the facility every year. it is truly one of the astronomical "musts" for the amateur astronomer.

The following morning found us waiting patiently in the lobby of the RV centre watching "Another World" as the mechanics repaired the vehicle. Little did we realize that only one problem had been corrected. The vehicle would continue to stall for up to an hour at a time at various stops throughout the trip. Needless to say this aggravation was the cause of much colorful language and wasted time. By noon the tour was underway again, as the motor home streaked westward across the Sonoran Desert towards California. As we drove into the night we could see the lights of San Diego and Los Angeles reflected off the clouds near the horizon. Although our goal was Mount Palomar, we decided to stop 80 kilometres short and spend the night in a

small desert campsite. By the time this destination was reached, the clouds had disappeared and the sky was perfect for observing.

Winding its way through the high, steep hills, the motor home made its way northward. Suddenly Dave Belcher pointed out the faint patch of white rising above the surrounding trees on the horizon. Palomar! Even at this distance it was impressive. The motor home lurched onward up the final few kilometres past the sheer cliffs and through the tall forests to the parking lot. Although it was noon and we were all hungry, it was decided without hesitation to take the long walk past the small museum to the dome of the 200-inch (5-metre) itself.

No one is ever prepared for the immense size of the observatory. It stands 13 stories tall, dwarfing all that stands about it, its gleaming white color granting it an overpowering presence. After gaping at the dome we slowly climbed the huge granite stairs and entered a small portico containing a bronze bust of Hale and a plaque of contributors. Individually we turned left and climbed the stairs leading upward past the washrooms and the telephone to the visitor's gallery. All that was visible initially was the spartan gallery itself, enclosed in glass and illuminated by incandescent bulbs. But there, gleaming ever so softly in the dark cavern of the dome was THE telescope!

Only by pressing my nose against the glass could I make out the finer details of the instrument. The lights in the gallery hid all but the most obvious features. The telescope was incredible, its sheer size and massiveness overwhelming the most disinterested visitor.

The visitor's gallery is always hushed, as if everyone suddenly finds himself confronted by a sight so incredible that words pale and are lost in the vast expanses of the dome. I eventually withdrew from the pane and slowly made my way past the ancient displays illustrating the telescope and its parts. In the far corner I discovered a life-size model of Newton's first reflecting telescope, lost in the glow and the glory of its great grandson in the background.

After taking time exposures through the glass, we reluctantly departed down the curving staircase to the outside of the building and worked our way around it, taking photos from various angles, and trying without success to capture the immensity of the structure. A brief visit to the "museum" completed this part of the tour. Later, after a long hike up the mountain through the forest, Dave Belcher and I would stand quietly again in the gallery as technicians readied the giant for the night's work.

Returning to the campsite we readied for the night's observing as well. Our telescopes were set up in an adjacent open lot and we patiently watched the crescent moon thread its way through patchy clouds to set slowly in the west.

High flying clouds were a nuisance for the first part of the evening but disappeared later in the night. After arising from warm beds about 1:30 A.M. we dressed quickly and made our way out into the cold. In the darkened sky the winter stars blazed in their glory. This was an experience I had longed for over many years - the chance to observe from Mount Palomar. I was not to be disappointed!

As the stars wheeled brilliantly overhead a distant owl hooted quietly in the forest and a coyote howled forlornly in the valley below. We carefully checked our instruments and noticed Sirius rising in the east. Peace reigned supreme and our thoughts occasionally turned to the larger instrument further up the mountain. Aloud we wondered what faint celestial object its huge eye beheld. It was truly a night amateur astronomers dream of, at the most astronomically revered mountain on earth. However, one can only fight fatigue for so long, and so with great reluctance we returned to the warmth of our beds.

By late morning we were fighting our way through the swirling smog and traffic snarls as we approached Los Angeles, on our way to the Celestron factory in Torrence. With Dave Beale driving, Dave Belcher in the navigator's seat and myself in the back hanging on for dear life, we weaved our way through the miles of freeways. It took some searching to locate the building, but when found, it did look just like the pictures! After a brief introduction, the tour began. Our guide took us through the various stages of manufacture of the famous Celestron telescopes and accessories, right from the initial grinding through to the warehouse where several C-8's and an 8-inch Schmidt camera were awaiting shipment to Germany.

The next stop on the schedule was in Riverside, a suburb of Los Angeles. Here we were to meet Cliff Holmes, the co-ordinator of the Riverside astronomical convention. So on again we drove through the pollution, traffic and debris eastward, often hitting speeds in excess of 100 kilometres per hour! The brief but very enjoyable visit led to an exchange of information on local observing habits and idiosyncracies over a welcome cup of coffee. However, all too soon it was time to leave and head north to locate a campsite for the night.

No observing was possible as smog filled the air, burning our eyes and lungs. A very welcome supper completed the day.

Los Angeles again! This time our destination was the famous Griffith Planetarium in downtown L.A., next to the hills of Hollywood. Mr. Ron Oriti became our guide for an excellent tour and demonstration of the facility's instruments. One of the astronomical landmarks of Los Angeles, the planetarium is truly distinguished architecturally, embodying a style which gives it a sense of permanence and beauty.

Just in time for the famous L.A. traffic rush, we made our way north to our next destination, Pinos Mountain. Clouds and fog alternately hid the stars and so again no observing was attempted. However, the next morning promised a beautiful day as the sun rose over the hills in a clear blue sky and fog blanketed the valleys below.

A short drive brought us to the San Luis Recreaction Area. Situated in a valley between large rolling hills, the campsite is a small oasis in the bleakness of the surrounding countryside. On this day we were able to set our telescopes up in the afternoon and get ready for the night's observing and photography. As the moon was now reaching first quarter, it was of course the most observed object with several lunar occulations occuring throughout the night. After moonset a few Messier objects were observed and later we were able to see Saturn devoid of its rings as it rose just before the sun.

Lick Observatory was next on the itinerary. After threading our way through San Jose we proceeded up the torturous winding road build in the 1890's for horse and wagon. The narrowness and the general road condition really became apparent when we met head on with a tanker truck on a blind corner. With heads spinning from multiple hairpin curves and sheer drop-offs we reached the old observatory. Here is housed a 36-inch (0.9-metre) refractor and a 40-inch (1-metre) reflector, along with many large transparencies and photos of various astronomical phenomena. We then visited the 120-inch (3-metre) Shane reflector, housed in a separate observatory to the east. A relatively long reflector, it takes up much of the space inside the compact dome, with the remainder of the floor space being occupied by numerous observer's cages. Predictably, a glasswalled observer's gallery separates the curious from the instrument itself.

Leaving Lick we now journeyed northwest to and through San Francisco after another nerve wracking ride back to San Jose. The sun had just set as we reached the Golden Gate Bridge. With an ear shattering scream of tires we charged through a toll gate onto the bridge and prayed that the tires would hold out until we could get to the other end. In our hast we had taken the wrong lane onto the bridge and caught our tires between two concrete pylons designed to keep large vehicles from entering that lane. It was probably only our excessive speed which saved us from being caught and held tightly. As night came on we wound our way north to a beautiful campsite in the hills.

The next day was gorgeous. The road took us through northern California and into Oregon. A huge collapsed caldera, appropriately called Crater Lake, was next on the list. However, the weather was becoming ominous and snow now gilded the mountain tops. As we approached the summit the weather became increasingly oppressive.

Drifts began to appear alongside the road and as our altitude increased, so did the amount of snow. The campsite was finally reached, but it was rocked by blasts of icy wind and flurries. Drifts over 1 metre in depth could be found everywhere. The far shores of the lake and the haunting cinder cone island could be glimpsed periodically through the fog and snow. We hurriedly took a few photos and climbed back aboard to begin our descent. Our destination was a campsite where we would hopefully find water and electricity. However, before the evening was through we would have to endure being lost on the mountain and glass-like roads as icy rain fell on cold pavement. After an eternity we reached sanctuary and settled in for the night.

We could see large cinder cones dotting the landscape right to the horizon as we drove north the next morning. We knew only too well what the conditions were like on those treacherous slopes!

Our next stop was the Goldendale Observatory in Goldendale, Washington. Situated on a high hill overlooking the town to the south, it is a unique facility serving the astronomical needs of the local community. Mr. Gary Fouts, the new director was our gracious host and guide during our afternoon visit. Early in the evening we settled

into a campsite at Wenatchee, Washington. The following day we began the last lap of our trip through the U.S. and crossed into Canada at Trail, B.C. in the afternoon.

A campsite just east of Kamloops was our home for the night. As the sun rose through the peaks the next morning we cautiously drove the motor home through the dense fog and began the final leg of our journey. It felt good to be home in Canada again, and it would be even better to be back in Alberta. We crossed the provincial boundary in the afternoon and continued eastward at the maximum speed possible. A brilliant moon lit up the night sky as we bumped along. Everyone was tired but quiet as the last few kilometres flew by. At 8:31 p.m. we crossed the city limits and slowed to what seemed a snail's pace as the traffic surrounded us.

During our trip we had covered all types of geography: mountains, hills, deserts, plains and sea shores. We had the opportunity to observe from some of the best sites in the western hemisphere and make the acquaintance of many kind people who were helpful in so many ways. The tour was certainly worth the time and effort involved. I believe it provided us with the opportunity to get to know one another better and create an enhanced and deepened awareness of each other as unique human beings. Could anyone ask for more?

Rod McConnell

FOR SALE

Tasco Reflector, 4.5" (11 cm) diameter mirror, coated optics. Equatorial mount and carrying case. Comes with 6 mm, 12.5 mm and 20 mm lenses, Barlow lens, filters, and a 5x spotting scope. $350. Call Dave at

Astroscan 2001. Asking $200 for the telescope itself. Accessories include 1 standard eyepiece, 1 zoom eyepiece and 1 14 mm eyepiece. All 3 eyepieces are selling for $25. Regular price of the entire system is $350. Total asking price is $225. Phone Dr. Shaun M. Robinson at

NAME THE STARS

In order to better understand the sky at night, one should familiarize oneself with the names of the brighter stars rather than their Greek letter designations. As most of the stars were named by the ancient Arabs, I'm sure you shouldn't have much of a problem, unless of course your Arabic needs brushing up. To make this quiz even more challenging, five extra names which are similar but have no relation to star names have been included. NOTE: some stars have more than one name.

01. Acamar	a. k1 Puppis
02. Azimech	b. omega Herculis
03. Kosmos	c. beta Tauri
04. Lesotho	d. theta Eridani
05. Zosma	e. alpha Piscis Austrinis
06. Electra	f. zeta Ceti
07. Canopus	g. nu Scorpii
08. Diadem	h. beta Geminorum
09. Rotanev	i. gamma Librae
10. Namath	j. alpha Carinae
11. Gianfar	k. 17 Tauri
12. Fomalhaut	l. alpha Lyrae
13. Nath	m. lambda Draconis
14. Zuben Metah	o. beta Delphini
15. Pollux	p. beta Aquarii
16. Lesath	q. delta Leonis
17. Sadalsud	r. alpha Virginis
18. Markeb	s. alpha Coma Berinices
19. Kajam	
20. Sheraton	
21. Vega	
22. Baten Kaitos	
23. Zuben Elakrab	

That's it. Now just match the names. In next month's ***STARDUST*** you will find the list of any that are left over plus the correct answers and another exciting quiz.

Dave Belcher

OBSERVING NOTES

Mercury: remains invisible throughout most of March, but it may be glimpsed very low in the east before sunrise on the last day or two of the month.

Venus: sets about 4 hours after the sun, and is visible in the southwest during the evening. Venus is very bright (magnitude -3.8) and has a waning gibbous phase.

Mars: is the reddish object passing north of Jupiter and Regulus this month. The apparent diameter of Mars decreases from 13.8 to 11.9 seconds of arc during the month.

Jupiter: is near Mars in Leo and is well up in the east at sunset.

Saturn: continues to present its "no ring" aspect in March. The shadow cast by the rings on the planet is still visible, but the rings themselves require a very large

telescope to be seen. Saturn is about 1st magnitude, and is just east of Mars and Jupiter.

For more information on events in the sky for March, please consult the ***Observer's Handbook***.

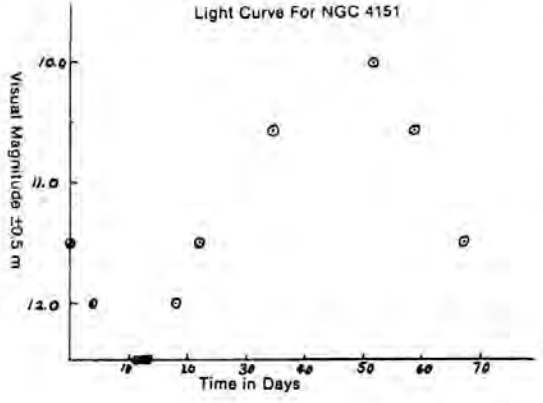
Mark Leenders

OBSERVATIONS OF A VARIABLE GALAXY

Over this past summer, I was able to make some observations of the Seyfert galaxy NGC 4151, in the constellation of Canes Venatici. This galaxy is the most well-known member of a class of galaxies known as variable galaxies -- so-called because they seem to flash on and off like variable stars. From a set of observations, an observer can deduce some interesting facts about these objects.

I observed NGC 4151 over a period of 70 days, although for nearly half of that period the object was very low in the north, with the summer twilight also interfering. The observations are listed beside the graph.

The magnitudes were estimated by comparing the brightness of the galaxy to that of non-varying stars. Knowing that the brightness of the galaxy varies over a number of days allows us to actually calculate the size (diameter) of the central part or nucleus of this galaxy. Two or more such calculations show us how the nucleus changes in size over some period of time. The first calculation produced a result of 0.0355 light years, making it roughly 57 times the size of our solar system, but still very small when compared with the distance to the nearest star. Another calculation produced 0.0200 light years. Thus, a small object is generating a very large amount of energy.



Day	Time	Magnitude
May 27	00:00	11.5
May 30	23:45	12.0
June 7	00:15	12.5?
June 8	00:20	12.5 - 13.0
June 9	00:20	12.0 - 12.5
June 15	00:30	12.0
June 18	01:00	11.5 - 12.0
August 2	00:05	11.5

Obviously, the center of NGC 4151 has changed size (in this case by 0.0155 light years over a period of 57 days). As to why this occurs, there are many theories but nobody can pin down any concrete reasons for this behavior. To support the previous statements on the size of the center of the galaxy, I have sketched a light curve that represents the change in brightness over a corresponding change in time.

Many conclusions could be drawn about the nature of NGC 4151 and other similar galaxies, but since they are indeed numerous, I shall only state a few. The most obvious is that the nucleus changes size and brightness correspondingly, which leads us to the fact that this object at the center of NGC 4151 (whatever it is) must be very small indeed. To realize that this small object is generating enormous amounts of energy makes NGC 4151 truly unique.

Dave Holmgren

OBSERVER'S CORNER

The March meeting of the Observer's Corner will feature a talk by Bob King and Andrew Lowe, entitled *Observations at 6563*, or in other words, observing the sun in the light of hydrogen alpha. Those who attended the January meeting saw some of the earlier results of Bob King's work in this area. Once again, this meeting will be held in Room 445, University of Alberta Physics Building. The date is March 24 and the time is 8:00 pm.

Once again, if you do not know how to get to the Observer's Corner, give me a call. A meeting in the Physics Building may sound a little intimidating, but the Observer's Corner is for everyone interested in observational astronomy.

There will be a March observing session out at Ellerslie. The date is March 14 (a Friday night) or March 15 if the 14th proves to be cloudy. It is a dark of the moon weekend, so observing can begin early in the evening. Meet at the Ellerslie Observatory between 6:30 pm and 7:00 pm for a night of viewing.

Dave Holmgren
(436-2398)

WHAT'S UP?

As the year progresses, so does the winter sky. As Orion moves over toward the western horizon, the constellations Gemini and Monoceros reach their highest altitude above the horizon, making them prime hunting grounds for amateur astronomers. Actually, there isn't a great deal to look at in either constellation, but there are a few objects worth looking for. The Class I objects are the easy ones, observable in a pair of binoculars. Class II objects are slightly harder to see (a larger telescope being necessary to observe them). Class III denotes the objects that are

only observable at dark locations or with a nebula filter. I have provided a section of ***Norton's Star Atlas*** to act as a guide, and it would be best to consult a Skalnate Pleso ***Atlas of the Heavens*** for further details.

Dave H-lmgren

CLASS I

Name	mag.	size	type
2264	4.7	30'	OC
2244	6.2	40'	OC
2301	6.0	15'	OC
M35	5.5	30'	OC
2392	8.0	40"	PN

CLASS II

Name	mag.	size	type
M50	6.0	10'	OC
2261	10.0	02'	DN (a)
2158	11.0	04'	OC (b)

CLASS III

Name	mag.	size	type
2237	--	80' x 60'	DN (c)
2264	4.7	60' x 30'	DN (d)
2266	9.8	5'	OC
2266	9.8	05'	OC
2355	12.2	09'	OC

OC: Open Cluster

PN: Planetary Nebula

DN: Diffuse Nebula

(a): Hubble's Variable Nebula
(b): On the edge of M35
(c): Rosette Nebula
(d): Cone Nebula

Variable/Double Stars

Monoceros:

Name	mag.	period	type
U	5.8 - 7.7	92.3 days	RV Tauri
T	5.6 - 6.6	27 days	Cepheid

Gemini:

zeta	3.7 - 4.1	10.2 days	Cepheid
delta	3.5, 8.0	--	double star

* * * * * * **R.A.S.C.** * * * * * *

Edmonton Centre

Annual Banquet

Friday, March 21, 1980
Chateau Lacombe Hotel
Bar Opens -- 18:30
Dinner -- 19:30

Guest Speaker: Dr. Werner Israel

Dr. Israel is one of the world's leading theorists and authority on Black Holes. His talk to us on this fascinating subject will be an event that should not be missed.

Tickets: $10.00 each, available from Treasurer Mel Rankin at the March 10 meeting or by phoning Mel (469-3066 evenings) before March 18. Reserved tickets may be purchased at the door. Please reserve before the 18th as we cannot guarantee a place after that date!

* * * * * * * * * * * * * * * * * * * *

QUEEN ELIZABETH PLANETARIUM

The Queen Elizabeth Planetarium was built by the citizens of Edmonton to commemorate the 1959 royal visit of Her Majesty Queen Elizabeth and Prince Philip. Officially opened in October 1960, the Planetarium became the first such facility in Canada devoted to the popularization of astronomy.

The planetarium offers a wide range of astronomically-oriented programming. Within the Star Theatre, hour-long shows dealing with all aspects of astronomy are presented using a battery of slide projectors, special effects projectors and the Goto Star Projector itself. By projecting some 2,800 stars through thirty-two optical trains, the Star Projector can be used to transport the audience to any point on the surface of the Earth while passing through any time sequence from a minute to an eon.

In addition, the Planetarium offers Astronomy courses on a regular basis throughout the year. The Bookstore, located in the Planetarium's front lobby, specializes in a wide range of telescopes, books and publications on Astronomy and related sciences.

For further information about any of the programmes offered by the Queen Elizabeth Planetarium, please call 455-0119. Office hours are 8:30 am to 4:30 pm Monday through Friday. Showtimes are Tuesday through Friday evening at 8:00 pm, and Saturdays, Sundays and Holidays at 3:00 pm and 8:00 pm. Admission is charged.

EDMONTON CENTRE, ROYAL ASTRONOMICAL SOCIETY OF CANADA

Anyone with an interest in the many facets of astronomy can find opportunities for sharing and increasing those interests by becoming associated with the Edmonton Centre of the R.A.S.C. General meetings are held in the Music Room of the Edmonton Public Library on the **second Monday** of each month (except July & August). These meetings feature guest speakers whose topics cover all aspects of amateur and professional astronomy. The Observer's Group of the Edmonton Centre meets on the **fourth Monday** of each month at the University of Alberta Physics Building (room 445) starting at 8:00 pm. Anyone interested in observational astronomy or astrophotography is invited to attend.

Enquiries regarding membership in the Edmonton Centre may be directed toward the President (Ted Cadien,), or come to one of the regular monthly meetings and enquire at that time (the Treasurer is Mel Rankin Sr.). Guests are always welcome! Currently, annual membership fees for the Edmonton Centre are: **$20.00** for adults, **$12.00** for those age 17 and under.

STARDUST
EDMONTON CENTRE, Royal Astronomical Society of Canada
c/o Queen Elizabeth Planetarium
10th Floor, C.N. Tower
Edmonton Alberta

GENERAL MEETING

Monday March 10, 1980 at 8:00 pm
Music Room, Edmonton Public Library

SPEAKER AND TOPIC
Dr. Alan Clark, University of Calgary
Solar eclipses and infrared solar astronomy

OBSERVER'S CORNER

Monday March 24 at 8:00 pm
Room 445, Physics Building, U. of A.

SPEAKER AND TOPIC
Bob King and Andrew Lowe
Observations at 6563 (Observing the Sun in Hydrogen Alpha)

OBSERVING SESSION

Friday March 14 at 7:00 pm
Ellerslie Observatory
(March 15 if the 14th is cloudy)

ANNUAL BANQUET

March 21, 1980 (See Inside For Details)

TO: