R E G U L U S

THE NEWSLETTER OF THE

ROYAL ASTRONOMICAL SOCIETY OF CANADA - KINGSTON CENTRE

OCTOBER, NOVEMBER 1982

Editor's Note: At the very beginning of this newsletter I want to acknowledge receipt of a two-page report from our Tucson Branch and to say that I am delighted to hear from our members In Arizona. The secretary and correspondent for the group, Judy Stowell, has given us an excellent account of the activities of our many friends in the South-west. It should be both encouraging and inspirational for us to learn that they are involved as a group both in their observational sessions and in educational endeavours with the public. We only wish we were closer so that the two branches of our centre could share more closely in such activities.

THREE MEMORABLE NIGHTS OF OBSERVING

It is not often that one has a chance to have a very special guest at his place and to share with him a night of good observing under clear skies. However, I was fortunate enough to have it happen to me not once but three times in the last two months. David Levy was my guest at Oso Observatory and we had a very enjoyable observing session in late August and two more in mid-September.

On the night of August 27th-28th, after he spoke to our Centre on the topic, "Practising Astronomy in the Shadow of Kitt Peak", David shared with me an observing session marked by the viewing of Comet Austin and a number of deep-sky objects.

On the night of September 10th-11th, after again talking to us on "Personal Astronomical Experiences", David joined me in a memorable night of observing. Among other things, distant planetary nebulae received our attentIon on this occasion for we observed at least four of them (N.G.C. 7009, 7293, 6826, and M57) and their views were spectacular against the dark background sky.

The following night (September 11th-12th) was a very pleasant one. Again the skies were clear and moonless (a seemingly rare combination in recent months), the seeing good, and it was a fine night for comet-hunting in the west after sunset. David's 6" comet-hunter even provided a moment of excitement when an object in thc western part of Bootes seemed, at least for a while, to appear more nebulous than other stan in the region. However, we were not able to confirm it as anything other than a star. It was a most enjoyable evening of comet-hunting and deep-sky probing.

Along with another night in late August when I was able to observe from David's Jarnac Observatory in Quebec, I will remember these three nights for a long time. They were fortunate and rewarding observing sessions that I was able to share with a good friend.

A VERY BRIGHT FIREBALL

I have rarely if ever seen a meteor as bright or spectacular as the slow one which crossed the sky on the evening of Saturday, September 4th. While preparing to do some deep-sky observing and as I was looking up in the north-eastern part of the sky, my attention was suddenly drawn to an object that

appeared near Polaris. The object seemed to stand still for several seconds and I was held stunned and absolutely amazed at its increasing brilliance. It was a brilliant, almost blazing,white with perhaps a very slight hint of yellow by times, and it started to move slowly from its position just below Polaris. Slowly, steadily, and maintaining its dazzling brilliance, it moved southward, almost precisely through the zenith; it went through the western part of Cygnus and finally disappeared at a point near the star β Capricorni. The journey through the sky had lasted about fifteen seconds. My immediate estimate of its brightness was between -6 and -7 (and I have since heard from Ottawa of a brightness estimate of -8 for what very likely was the same object).

I checked the time and imediately made a telephone call. It was 8:48 p.m. E.D.T. (0^h 48^m U.T. on September 5, 1982).

There was an answer at the Jarnac Field Station near Ripon, Quebec,and the conversation went something like this:

"Hello, David! Did you see what I just saw?"

"Hello, Leo! Did you see what I just saw?"

"Yes!"

"Yes!"

"Wasn't that a bright fireball?!"

From his location a couple of hundred kilometers to the east, David Levy had been observing too. He had seen the same object starting near the star Arcturus in the north-western sky and moving slowly southward but for him it was against a western sky, still slightly lighted by evening twilight. Consequently, it appeared less bright and he estimated it at about -4th magnitude.

It was certainly a brilliant and interesting fireball, and memorable, too, for me because the one phone call I made as a result of seeing it was to someone else who had observed the very same meteor.

THE ANCIENT 'METEORITE' CRATER AT HOLLEFORD

Note: This is the second part of a paper which examines the research of various kings which has been done on the Holleford Crater located near Kingston. The first part of the paper is found in the previous issue of Regulus.

Gravity Studies

The third type of Geophysical Evidence to be examined was that found in the Gravity Studies.

Observations of gravity within and near the crater were made by individuals from the Gravity Division of the Dominion Observatory. A network of 109 gravity stations was set up in and near the crater and readings were taken. A.M. Bancroft examined the data. The Bouguer Gravity Map of the area, which was drawn from the data recorded, indicated a negative gravity anomaly following circular contour lines centred about the mid-point of the crater. At the very centre of the crater the gravity anomaly was two to three milligals and it was lower than the surrounding area. This suggested the presence within the crater of material of lower density than that of the surrounding Precambrian rocks. Since limestone which is almost as dense as Precambrian rock was near the surface, it was evident that considerably 1ess dense material must be at a greater depth. This less dense material could have been low-density sedimentary material, or breccia, or both. Bancroft estimated that it would be at most 300' to the top of the low density material which could be from 400' to 1300' thick. He concluded that 700' to 1600' of drilling would be needed to be sure of reaching the Precambrian bedrock.

From all of the studies to this point, the situatIon "looked promising"; it was, therefore, decided to penetrate through the sedimentary covering.

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THE DIAMOND DRILLING PROGRAM

The experience from the drilling done at the crater near Brent, Ontario was useful in the drilling program to be carried out at Holleford. To avoid some of the problems previously encountered, it was evident that casing should be used In the drillholes, and heavy equipment would be used for the operation. Drilling would not be done at the precise centre of the Crater.

Drill hole Number One was to be 0.37 of the distance from the centre of the crater to the rim, or 1400' from the centre. It was decided that it would be in a south-easterly direction from the centre. The estimate was that at this point the sedimentary rock would be 800' deep.

The drilling rig was set up on solid limestone 492' above sea level and the drilling began on November 28, 1956. A 3" I.D. casing was used down to a depth of 20', and 2 3/8" casing down to 174'.

At 174' water at high pressure was forced out by gas pressure. At the 205' level, gas was encountered which partially filled the drilling hut that had been erected; the gas was ignited by a lantern, and there was a great explosion and fire. The drilling equipment was seriously damaged.

Those days in late 1956 were an interesting chapter in the history of life on the Babcock farm. Mr. Babcock's 100' well, which had supplied his barn and was necessary to the operation of the farm and which was located 946' from the hole, immediately went dry. To remedy the situation, a well 220' deep was drilled but it was extremely salty and useless. Eventually another well was drilled 700' from the first one.

Drilling began again on January 5, 1957 but the operation for the next while was erratic and confused and fraught with many difficulties. Core samples were eventually obtained down to a depth of 1128'. At that point a diamond drill rod became stuck and the hole had to be abandoned. The core samples showed sedimentary rock down to 750' and breccia (broken, fragmented, and pulverized rock) thereafter.

A decision was made to drill further out in a south-easterly direction from the centre. Drill hole Number Two would be 2500' from the centre. Here from a point 537' above sea level it was estimated that sedimentary rock would be 400' deep. The site would also be on Mr. Babcock's land hut very near the north-south road which crosses the crater. At this location, 1 5/8" core was recovered to 630' and 1 1/2" core was recovered down to 1486'. This large amount of core sampling showed sedimentary layers down to 440', breccia to 600', and solid rock thereafter.

Drill hole Number Three at 582' above sea level was to be 3750' from the centre and still further in a south-easterly direction from the centre. It was in a hayfield and east of the north-south Holleford Road. The drilling there revealed that the overburden of soil was 9' deep. Sedimentary layers went down to 64'. There was 1' of breccia. The hole went down to 443'. From 65' on, the core samples showed Precambrian rock of various types.

The drilling had revealed something about the sedimentary rock. Its depth in and near the crater was very close to the estimates made prior to the drilling. A profile of the crater could now be drawn based on the discoveries made in the drilling operation. Except for the rim area of the crater, the profile appeared very close to the mean profile of the New Quebec Crater and the Barringer Crater. Erosion in the area of the rim had taken place over a long period, perhaps for as much as 100 million years or even more. The wearing down of the rim was probably done by Paleozoic seas whose waves washed against it for those many years.

Mr. Robert Baldwin, now an honorary member of the R.A.S.C. and an authority on both terrestrial and lunar craters, has established that there is a relation-

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ship between depth and diameter of impact craters. At the Holleford site, however, the rim does not appear to be as high as would be expected from the predictions but this is because of the long period of erosion to which the rim has been subjected. It should be pointed out that there may well be parts of the rim west of the centre and south of the centre where it is higher than at the spot where Drill Hole Number Three was dug, but even at those places the rim does not appear to be as high as the one about the New Quebec or Barringer Craters or others, none of which were subject to the long period of erosion which took place at Holleford.

(This paper is to be continued and concluded In the next issue of Regulus.)

CORRESPONDENCE FROM OUR MEMBER IN MARYLAND

This is the fourth newsletter in a row in which I am pleased to say that I have received a very informative and interesting letter from Mr. Gus Johnson and that I wish to publish part of it.

As you can easily see, he continues to be a very active observer. I hope and am very confident that,by early next year, he can be the next member of our centre to receive the Messier Certificate of the R.A.S.C.

RD 2 Box 67
Swanton, MD 21561
September 3, 1982

Dear Mr. Enright:

I received "Regulus" yesterday and got to it and found it interesting, as usual. Congratulation on finishing your Messier observations. Coincidentally last month I felt with all my observing I should have my Messier Certificate, so went through my file cards to see what was lacking. Having observed over 300 galaxies, I found only M 106 CVn and M 61 VIR missing; the former was readily found then with my short 2.4-in.,but the latter is lost in the sunset for a few months. My observations of clusters is much less conplete; so I had to get busy with OPH., SGR., AND SER. I found that some familiar objects had never been "written up" on my cards and some objects had the barest of data-just date, telescope and magnification; so these too needed attention. August was a dry month and a fair number of nights were clear so that my Messier list is close to completion. Even the asterism M 73 and M 40's mistaken double star and the dim background galaxy NGC 4290 of mag. 12.7 that Messier almost certainly couldn't have seen are "In the bag". But sone say M 102 is really M 101 and others feel it Is NGC 5866 DRA.; so while it's up I'd better bag that one too, to be on the safe side, leaving, hopefully, a little more data on M 53 COM. and then M 61. Maybe ere Christmas I'll have the certificate.

After having enjoyed my South Park star party of late July so much, I took my 6-in. to Pittsburgh for the star party and meteor watch at Boyce Nature Center, but as had happenzd before, I tarried too long at the supper table at my relatives' home and it sterted to get dark. After departing I realized that I would likely get lost, as also happened before, by my not getting to the site while it was still light. The site was in an unfamiliar part of the city; so I turned around and went home. I was hoping to re-observe the companion of Antares.

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The next scheduled star party will be at Allegheny Observatory on Sept. 24th. Antares, even now, is too far davn to bear high magnifications. A.O. is having open house, and the area amateurs normally set up their telescopes on the grounds since the number of objects to be seen "upstairs" is very limited with the crowd of people.

I mentioned having ordered a 4 mm. Crown (Meade) orthoscopic in my last letter. It has arrived and does give an improvement in the image quality of my smaller telescopes. I think I have seen the companion of Delta CYG. with the 4 l/4-in. now, at 190x, but it was difficult, and not as clear as I recall in my former 4-in. Unitron at 188x. The 4mm. on the 5-in. f/4.7 reflector even detected the companion of S1932 CrB. (close to Alpha) of mag. 5E-6, separation between 1.0" and 1.4", at 150x, and elongated Zeta Boo (1.1").

Some of the murky skies of summer were caused by smoke from extensive forest fires in Canada, from one report. I did not learn where they were or how bad. I pray they are out. I hate to think of those beautiful forests laid waste by fire. Comet Austin, that you wrote about in "Regulus" was seen by me in late August with my short 2.4-in. at 25x. I had to carry the telescope up the road from my usual observing areas, so as to clear the northern woods. It was fairly bright, visible in the 5 x 25 finder. It had a raindrop shape and the tail extended at least half way across the 3! field. Strangely with passing haze and/or clouds the comet would fade out of view while the field stars seemed unaffected, which puzzled me. The southern sky was very clear; the little 2.4-in. gave delightful views. Just east of the ScorpionÆs sting is the tiny globular 6441 like a minute fuzzhall. A faint field star is near its edge looking like a nova, which I have seen before. Then heavy clouds rolled in;the whole sky was lost.

Good observing,
Gus.

FOR YOUR COMPENDIUM OF ESOTERIC FACTS

Did you know that occasionally meteor showers become meteor storms but two of the showers occurring in the month of November have been known to produce the greatest storms of meteors ever recorded? These showers are the Andromedids which currently peak about Nov. 14th and the Leonids which peak about Nov. 17th .

Meteor storms have been known to occur near or after the time of perihelion passage of the comet with which they are associated. The Andromedids, associated with Comet Biela whose period is 6.6 years, produced so many meteors on Dec. 6, 1798 that they were described as stars which "flew like snow". The shower of Nov. 27, 1885 produced a storm of meteors estimated at 13,000 per hour.

The Leonids, associated with Comet Tempel-Tuttle whose period is 33.17 years has produced even more spectacular numbers of meteors. In 1833 the storm produced about 14,000 per hour and on the night of November 16-17, 1966 on the west coast of North America the number of meteors in the shower was estimated at 150,000 par hour with numbers at times during the night

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reaching an almost unbelievable 140 per second or over 500,000 per hour! It is little wonder that the Leonids on such occasions have been described as "like snowflakes".

REPORTS OTHER ITEMS

1. In the past two months there have been a few nights that provided very good seeing and good weather for the serious observers and astro-photographers. Comet Austin has been one of the showpleces of the evening sky. Since August 25th, I have managed to observe it about ten times and I hope that the ephemeris for it given in the last newsletter helped many more people in the centre to see it also.

   Our last newsletter mentioned a spectacular Aurora of July 13th-14th. This time there is another one to report--that of September 21st-22nd. It was especially active in the evening between 9:20 and 9:50 p.m. E.D.T. with a very large and high arc, numerous spikes,and coronal activity near and south of the zenith.

   Though there have been occasional periods of good weather recently, there have not been many consecutive ones. However, I managed to get three days in a row in September when I was able to photograph sunspots in the late afternoon. The results make for an interesting study of their movement. It would certainly be interesting to photograph them for thirty or forty days in a row, if that could be possible!

2. Members of our centre who were fortunate enough to attend our meetings of August 27th and September 10th are very grateful to David Levy for excellent presentations. They need look no further than David for someone who exemplifies everything an amateur astronomer is supposed to be.

   I count myself especially lucky at being able to hear not only those talks but also the one he gave at the Ottawa Centre meeting of Oct. 1st. It was certainly worth the trip to the nation's capital.

3. I was pleased to have been invited to make a presentation to the Kingston Camera Club at their meeting of October 4th. The talk and slides concerned various kinds of astrophotography, and it was a pleasure to explain the "fun" of photographing the night sky to people who are quite experienced in many kinds of "daytime" photography.

4. On Wednesday, September 29th, Queen's University had its Clubs Night and three of our members set up displays and talked with many of the students. Gerald Schieven, Angelika Hackett, and I enjoyed the opportunity of "talking astronomy" with a great many people.

5. We congratulate David Levy, Vice-President of our centre, on having an article of his published in Astronomy Magazine. "Out of the Whirlwind" is the title of an excellent piece aboutthe landing of the Space Shuttle and It appears in the October issue on page 26.

6. David is to be commended, also, for a booklet of his which has just been published. Entitled "The Joy of Gazing - A Personal Guide For A New Observer", it should be very helpful for those who want to design an observing program for the first time. It should also greatly benefit those who may wish to move into types of observing that they have never done before.

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7. In the coming months there are a number of events that observers ought to plan to see or photograph.

(1) Mercury is in the morning sky for most of the month of October and its elongation at mid-month is a favourable one for our latitude. The fleeting planet is at magnitude -0.2 and greatest western elongation of 18° from the sun occurs on October 17th. Be sure to look for it around that time of the month about a half hour before sunrise.

(2) For those who have a very good eastern horizon, as well as the luck of very good weather on the appropriate date, Mercury may also be seen very close to Saturn and very low in the east before sunrise on the morning of November 1st.

(3) The old moon is in conjunction with Mercury on the morning of October 15th and the pair should make an interesting sight.

(4) For those who are interested in seeing a very old moon, the morning of October 16th just may provide an opportunity to see one but it will be only the extremely fortunate who will see it for it is less than 15 hours from new at the time of sunrise. However, the moon is considerably north of the ecliptic and the possibility exists of seeing it, if all conditions are perfect.

(5) Two well-known meteor showers should be mentioned. The Orionids peak on Oct. 21st and should be observed before dawn within a few days of that date. Because they are associated with Halley's Comet which is now nearing perihelion, there is a chance they way be more numerous than usual.

The Leonid shower peaks on November 17th. It is the shower that occasionally provides great storms of meteors. Though it has been weak in recent years it still bears watching.

8. For our forthcoming meetings a schedule has been drawn up fur presentations by our members. Talks given by members in the past have been well received and we look forward to them again. We hope that they will continue in 1983 and that then we may have a few talks by professionals as well. Here is our list of topics scheduled for the remainder of 1982.

Oct. 15	Slides of Aurora and Other Astrophotography - Leo Enright
Oct. 29	Mathematical Formulas To Help The Observer and Astrophotographer - Leo Enright
Nov. 12	A Review of the Book: Practical Astronomy With Your Calculator - Terry Hicks
Nov. 26	Our Centre's Annual Meeting
Dec. 12	The Algonquin Radio Observatory - Gerald Schieven

At the Annual Meeting on November 26th, we look forward to hearing the annual reports from our president, treasurer, and secretary.

Here is a reminder that any requests for constitutional amendments must be submitted in writing to the president 30 days before the annual meeting or before October 27th.

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The dates for our meetings In 1983 are January 14th and 28th, February 11th and 25th, March 11th and 25th, Apr11 8th and 22nd.

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

9. As usual, your editor would be happy to receive material for these pages.

Our centre's address is as follows:

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Box 141, Station A,

Kingston, Ontario K7M 6R1

CLEAR SKIES!

GOOD OBSERVING!

Leo Enright

R E G U L U S

Tucson Branch

Edited by: Judy Stowell

Hello, from stormy Tucson, Arizona. That's right. July through early September are when we get our monsoon rains.

Three years ago, when I moved here from the midwest, Kansas City, Missouri, and I heard the weather forecasters so concerned about the RAIN we were having, I laughed. I was used to RAIN. Rain sometimes continuing all day long, or perhaps, for several days at a time. Rain accompanied sometimes by heavy winds, not to mention the many tornado warnings and watches.

They seemed to be concerned about a little rain that usually came in the midafternoon and really, to me, didn't seem to amount to much. However, this summer I began to see why they are so cautious.

A few weeks ago we had a storm that was so bad that it did quite a bit of damage to Steward Observatory. In fact, Dr. Bart Bok said that many of the offices had books and papers ruined -- his managed to escape somehow.

During a recent electrical storm, the Flandrau planetarium had some damage done to a couple of its projectors and the shows had to be canceled and the film "Another Day" run instead.

Many of the streets were totally closed, sometimes for an hour or so because of flash flooding. Soon though, we will be back to our beautiful clear skies.

Some of our members attended the Riverside Telescope Makers Conference which was held at Camp Oaks, Big Bear Lake, California on May 28-31, 1982. Mike Magee, David Levy, Jim Cannon and Teresa Lappin seemed to enjoy themselves.

Jim Cannon was pleased to sell his 8-inch Dynamax. David Levy accomplished something that had never been done before in the history of the Conference -- in his enthusiastic delivery of his paper "Observatory Row: Sliding Roofs For Fun and Profit", he fell off the stage. Thankfully, he wasn't hurt!

The Tucson Branch of the RASC-Kingston Center held a Lunar Eclipse Party. In all, about 20 people attended. Some of our members who were there were as follows: Jim Cannon, Stewart Cramer, David Levy, Jim Scotti and Judy Stowell.

The eclipse was very exciting to watch! The moon turnsd a very nice bronze-copper color: we got an unobstructed view of lunar penumbral encounter to about 30 minutes into total eclipse and then the clouds obstructed our view for the rest of totality. However, it did clear in time to watch it come back after totality.

Jim Scotti took photos, one of them which showed the moon in full eclipse an the Sagittarius region of the Milky Way. Another, which he took with a 3-inch Alvin Clark refractor, showed the eclipse before full phase.

Dennis Kammana, Director of the Flandrau Planetarium, hosted a Perseid Meteor Watch on August 14-15. Some from our centre were able to attend. Mike Magee told me that during the first hour he saw about 12 meteors radiating from Perseus, a couple of which were quite spectacular fireballs. Cloudy skies inhibited the view before end after that time of the morning. On the night of August 12, Mike said he had counted 12 meteors radiating from Perseus in about 30 minutes.

We are quite proud to say that our own Mike Magee was quite possibly one of the first to see Comet Austin from Tucson. He saw it on August 22 1982, and it was at about 5th magnitude brightness--no tail was visible.

Our Centre will be hosting a Fall Sky Star Party, Tuesday, September 29 on the lawn in front of Flandrau Planetarium. Mike Magee will be in charge and Gary Rosenbaum, of the Tucson Amateur Astronomy Association, will be helping out. The purpose of this event will be to educate the public as to what is going on In the fall sky.

We are all anxiously awaiting Sunday. September 19. Why? You may ask. That is when our very own celebrity, David H. Levy, will appear on a nationwide TV show, KIDS WORLD. Mike Ferdie, son of Ron Ferdie of the TAAA, will be doing the interviewing. It should be great fun to watch!

David Levy has been visiting in Canada for the past five weeks, as I'm sure you all know. We will be looking forward to hearing a report on what has been happening there when he returns!

Good Observing!

Judy Stowell