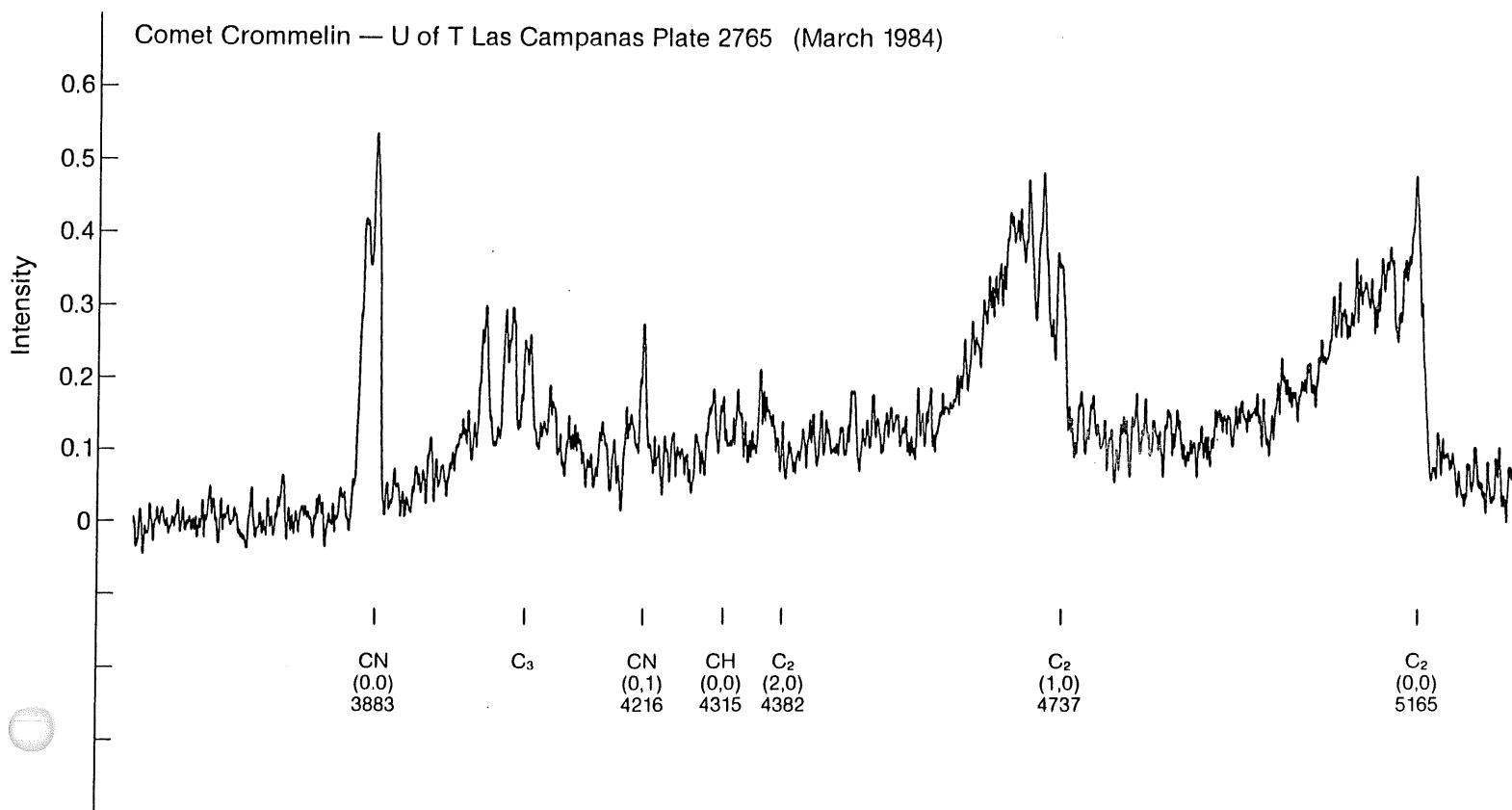


# THE <sup>DAVID</sup> DUNLAP DOINGS

Vol. 18, No. 2

March 18, 1985



Congratulations to ...

*Peter Leonard*, who completed the requirements for the M.Sc. degree.  
The abstract appears on page 12.

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COMINGS AND GOINGS

The Toronto contingent to the January 1985 AAS meeting in Tucson included Martin Duncan, Bob Garrison, Judith Irwin, Barry Madore, Raymond Rusk and Ed Zukowski, as well as several members of CITA. Raymond and Ed combined their trip with observing runs at the VLA, Martin also attended the pre-AAS meeting on "The Solar System and the Galaxy" and Bob visited the National Observatory in Mexico (along with Richard Gray) where they continued their ongoing spectroscopy projects in collaboration with Armando Arellano (Ph.D., 1983).

Doug Welch was in Hawaii over reading week, conferring with his supervisor Bob McLaren and enjoying a well-deserved vacation with his wife Carol.

Dale Frail was living in the fast lane, as described elsewhere in this issue.

Mike Bietenholz has left the department for a few months of travel in Europe and Africa before he returns to the department as a Ph.D. student in the fall.

Karl Kamper and Shenton Chew spent Feb. 22-27 at the University of British Columbia, investigating the UBC Reticon System and its possible application to the "Chant" and "Lester" Reticon systems at DDO.

Ernie Seaquist was coming and going throughout much of January and February in connection with his duties as chairman of the NSERC Grant Selection Committee (Space and Astronomy).

John Percy was an invited speaker (on "Extraterrestrial Life: What are the Odds?") at the Edmonton Space Sciences Centre on Feb. 18. He spent Feb. 19 visiting the University of Alberta where alumni Doug Hube (Ph.D. 1968) and Austin Gulliver (Ph.D. 1976) are about to put a two-star, one-telescope photometer into operation. Austin was recently married; his wife Gloria is originally from Peru, and Austin has become quite proficient in Spanish. Joan Hube (B.Sc. 1961) has completed a second degree, in Computer Science, and is now a programmer in the geophysics group.

## MISCELLANY

Don Fernie has accepted an invitation to become a regular contributor to the Marginalia column of The American Scientist.

Don Fernie has also accepted a two-year appointment to the Warner/Pierce Prize Committee of the AAS.

Neb Duric (Ph.D., 1984) recently spent some time in the department working with Ernie Seaquist on a follow-up project to his thesis work.

Christine Wilson (B.Sc., 1984) has also returned to the department temporarily, after spending some months in Africa. She is presently working as a research and teaching assistant before embarking on postgraduate work.

Christine Clement, Bob Garrison and John Percy were actively involved in the November 1984 biennial conference of the Science Teachers' Association of Ontario, Bob and John as speakers, and Christine as counsellor at the Faculty of Arts & Science information booth.

Members of the department were actively involved in the 1985 American Association of Physics Teachers/American Physical Society joint winter meeting January 21-24. Helen Hogg spoke on "Reflections of an Astronomer" at a special session in her honour, followed by a reception and coffee. John Percy organized and chaired a plenary session on "Frontiers of Astronomy", including Bob Garrison speaking on "The Search for Extraterrestrial Life" and Martin Duncan speaking on "Galaxies in Collision". John Percy gave a review on "Education in Astronomy", and Ernie Seaquist spoke on "The Canadian Long Baseline Array".

Christine Clement, Alex Fullerton, John Percy and Doug Welch conducted a tour of the DA and the campus observatory.

On March 6 Helen Hogg was one of ten persons to receive the Award of Merit from Mayor Art Eggleton on behalf of the Council of the Corporation of the City of Toronto. This award, established in 1956, is the highest given by the City at an annual ceremony. It consists of an inscribed statuette with the medal encased in plastic and a gold pin with the seal of the City. A scroll was also presented by the Province of Ontario. In February Helen Hogg passed the 50-year mark in her work at this Observatory.

Helen Hogg also receives the 1985 Sandford Fleming Medal of the Royal Canadian Institute (for outstanding contributions to the public understanding of science) on April 27, and an honorary degree from the University of Lethbridge on May 25. On May 28, the Canadian Astronomical Society will sponsor the first annual Helen Sawyer Hogg Public Lecture. It will be held in the Medical Sciences Auditorium at 8:00 p.m.; the speaker will be Professor Owen Gingerich of Harvard University, on the topic "The Mysterious Nebulae: 1610-1924".

Don Fernie's lecture to the Royal Canadian Institute on February 24 on "The DDO: Origins, Accomplishments and Future" drew a large and interested audience including such old friends of the observatory as Margaret Heard, Gerry Longworth and the MacRae's, as well as a smattering of students, faculty and alumni. It was an appropriate start for our 50th anniversary celebrations.

The Erindale Campus will be celebrating International Astronomy Day (one day early) with a special program on Friday, April 26 at 7:30 p.m. in the South Building, Erindale Campus. The program includes a short talk on the DDO, films, question periods, and telescope viewing if clear. See John Percy for more information.

John Percy spoke on current and future developments in astronomy at a symposium on "Science after 1984" at York Mills Collegiate, and conducted a workshop on "Outdoor Astronomy" on Feb. 25 at Erindale College for the Council of Outdoor Educators of Ontario. He has recently become an Associate Editor and columnist in the bi-monthly Journal of the Science Teachers Association of Ontario.

Jack Winger (Ph.D., 1974) has returned to Ontario after a decade in Edmonton on the staff of the University of Alberta and subsequently the Northern Alberta Institute of Technology. He now teaches in the Electronics Department at Georgian College of Applied Arts and Technology, in Barrie. He continues to operate an optics shop on the side, supplying materials and finished products for amateur and professional scientists.

Donald Morton (B.Sc., 1956), now director of the Anglo-Australian Observatory, was recently elected a Fellow of the Australian Academy of Science.

#### CITA NEWS

*Seung-Urn Choe has left to take up an assistant professorship at Seoul National University in Korea.*

*Mike Fitchett (from Cambridge) and John Lattanzio (from Mt. Stromlo) have arrived to take up CITA postdoctoral fellowships.*

*Papers Submitted*

*Radio Studies of the Ionized Gas in the Nucleus of M82*

Seaquist  
Bell  
Bignell

*The Application of Visual Observations to the Study of  
a Small-Amplitude Variable Star: Rho Cassiopeiae*

Percy  
Bro  
With

COLLOQUIA

All are on Wednesday at 3:10 p.m. in Room 137 unless indicated

ch 6

Dr. Joseph Veverka, Cornell University,  
"Voyager and the Exploration of Uranus and Neptune"

ch 13

Dr. Roger Chevalier, University of Virginia,  
"Supernovae and Circumstellar Matter"

ch 27

Dr. Jeremy Tatum, University of Victoria,  
"The Return of Halley's Comet"

il 3

Dr. David Gilden, Princeton University,  
"Dark Matter Near the Sun: Simulated Star Counts and  
the Oort Limit"

il 10

Dr. Sidney van den Bergh, Dominion Astrophysical Observatory,  
"Globular Clusters and Galaxy Formation"

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*R.C. Bignell*

*J.R. Percy*                      *The Application of Visual Observations to the Study of*  
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*D. Keith*

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"Dark Matter Near the Sun: Simulated Star Counts and  
the Oort Limit"
- April 10                      Dr. Sidney van den Bergh, Dominion Astrophysical Observatory,  
"Globular Clusters and Galaxy Formation"

FORTHCOMING MEETINGS

*It is now almost two decades since we inaugurated our annual June Institute, to provide a stimulating week of visiting speakers for our students and staff. Now, there is no shortage of visitors, and in 1985 we have not one but four meetings during the late spring and early summer.*

*The CAS Annual Meeting and DDO 50th Anniversary Week will take place from May 27 to 31, beginning with a Welcome Party in West Hall UC, and culminating with the 50th Anniversary celebration at DDO on the evening of May 31. Further information will arrive through regular CAS channels, as well as through John Percy, Chairman of the LOC.*

*CITA will sponsor two meetings in June: on "Galaxy Formation" from June 19-21, and on "Jets" from June 24-27. Write to CITA (or look for the colourful posters) for more information.*

*A meeting on "The Study of Variable Stars with Small Telescopes" will be held from July 11-14 under the auspices of the AAVSO, IAPPP and RASC. All members of the department are invited to attend. For more information, see John Percy.*

REMARKS FROM THE CHAIR-MAN

*The words PLEASE DO NOT SIT FORWARD IN YOUR CHAIRS -- THEY TIP have undoubtedly accounted for more chalk usage at the blackboard of the DDO auditorium than all other topics combined. Even so, of course, there has been a crash from time to time. Now, however, that the University is under the Provincial Health and Safety Act it has become much more safety-conscious, and after an elderly lady took quite a nasty fall on one of the chairs recently we decided the time had finally come to replace them. An order has already been placed, so before long you can expect to see the new look in seating arrangements. I might add that when the chair salesman came round with samples I queried the sturdiness of the model we had chosen. "Long lasting?" boomed the salesman incredulously, "Good heavens, these chairs will last you a good five years or more!" I didn't tell him the present lot have done for fifty.*



NITRATE YOU SAY? PITY ....

With an eye to forthcoming functions connected with the Observatory's fiftieth anniversary, I have been rummaging around our walk-in vault to see what ancient goodies might be resurrected for the occasion. Among the finds was a small roll of 35mm movie film labelled "Paramount News footage of Observatory Opening." I couldn't recall ever having seen or even heard about it before, but clearly it was worth investigating.

The obvious first step was to see what was on the film, so I thought I'd find where on campus the nearest 35mm movie projector might be and arrange to have the film projected. (I guessed -- quite correctly -- that one didn't borrow such projectors; they turn out to be yards tall and hundreds of pounds in weight.) Five phone calls later I had established that the University of Toronto nowhere has a 35mm projector; all to whom I spoke were firm on that, but less so as to where else a projector might be found.

Bill Clarke, however, came to my rescue with the name of Mr. Gerald Pratley, Director of the Ontario Film Institute over at the Science Centre. Mr. Pratley proved very genial and arranged to stay late at his office one afternoon and to have a projectionist on hand to roll the film. So I trotted round to the Science Centre, and in due course the projectionist prepared to load the film onto a reel. To keep the conversation going I noted the film was quite historic. The projectionist paused. "But not nitrate stock, of course?" I had no idea. He snipped off a couple of millimetres from the film leader and put a match to the sample. Up it went in a short, merry blaze. He carefully -- very carefully -- put the film back in its original container. "Do you realize," he said severely, "that I could lose my licence for just having handled that stuff? Do you realize that the heat of a modern projector would almost certainly set it off, and that once it goes it goes with such intensity that the average fire extinguisher has little effect on it? Do you know that the nitrate fumes combine with moisture in one's lungs to form nitric acid?"

I had visions of the Science Centre burnt to the ground, bodies everywhere with nitric acid dripping from their lungs. We withdrew chastened. Mr. Pratley, with a face of thunder, intermingling apologies with imprecations against all projectionists, marched us back to his office. I said I thought that perhaps I'd better just have the film copied onto modern 16mm stock without a preview. Mr. Pratley agreed, and to make up for my wasted trip, called a good film lab in the city, established a reasonable price, and made other such arrangements.

So it was that a few days later, film in hand, I went along Adelaide Street to Film House and asked for Mr. Norris. Mr. Norris proved as genial as Mr. Pratley. No problem. They copied 35mm film onto 16mm all the time. He held a strip of the film up to the light. "Looks quite old," he noted cheerily. Yes, I said, just on fifty years. His cheeriness faded. "But not nitrate stock, of course??" "Well, as it happens..." I began. He carefully -- very carefully -- put the film back in its original container. "Do you realize," he said, casting around for a broomstick to take to me, "that as you walked in the door with that film, the fire insurance on this building flew out the window? Are you aware that you could be arrested for even having it in your possession?"

But we of the criminal class know when to stand our ground. I bitterly regretted ever having taken the damn thing from the vault, and announced my intention of returning it there. "Are you crazy?" whispered Mr. Norris incredulously. "Do

you know that stuff can spontaneously explode? It's blown doors off steel vaults in Ottawa!" I contemplated the horror of it all. Return it to the vault and blow up DDO, or throw in in the garbage and kill God knows how many public incinerator workers?

Mr. Norris took pity. There exists in Ottawa, he explained, the National Film Archives, and they are the only people in Canada who can legally own nitrate stock film. (They also maintain a philosophical attitude to blown up vaults, evidently.) In fact, they are eager to acquire historic film footage, and will without charge return modern copies to donors. Mr. Norris provided names and phone numbers.

Mr. O'Farrell at the National Archives was enthusiastic. They would indeed like to have the film; they only had four snippets of Canadian Paramount News footage in their collection, so this would be quite valuable. Did we have anything else? As it happens, we do -- several early 16mm reels of the building of the telescope, an eclipse expedition to Quebec in 1932 (attended by Mrs. Dunlap and family), and others. Ottawa would take the lot and establish the David Dunlap Observatory Collection in the National Archives. We'd get free copies on safety stock.

I explained to Mr. O'Farrell that I had to give a public lecture in a few weeks and would like to use the Paramount News film. How best to rush it to him in Ottawa? Ah yes -- well! Nitrate, eh? It would be illegal to mail it, no courier service would touch it, but fortunately Mr. O'Farrell was driving to Toronto in a few days and would pick it up. (I'm glad he wasn't flying; no doubt attempting to board an aircraft with nitrate film appears in the law books somewhere ahead of attempted hijacking.) Mr. O'Farrell duly appeared and, literally with white cotton gloves, removed the films. I suppose he was driving something borrowed from the bomb squad.

His group was most helpful and worked hard to get the film I wanted back to me in time. He called just a few days before my talk to say they were sending it. "Great," I said, "I've slotted it into my talk to show the Observatory's Official Opening." "Opening?" he replied. "There's nothing about the Opening on it! It's before the Opening. Mostly an interview with some old chap."

A bit of a disappointment, since I was relying on that Opening footage, but the old chap of course was Dr. Chant, and for nearly all of us the film allows us for the first time to hear his voice describing the fulfilment of his dreams. I'm glad we have it.

And if the National Film Archives should be blown to smithereens some time, I shall of course feel sorry for Mr. O'Farrell et al, but I shall also consider that there, but for the grace of God, goes the DDO.

Don Fernie

LIFE IN THE FAST LANE

Well here I go again. Off to Penticton for another two week workathon. I'm surprised they would invite me back after my last visit. For two weeks the DRAO staff answered my silly questions and let me push their computing resources to the limit. How much more can they take?

I've been working on extracting a low frequency "light curve" for the periodic radio variable LSI +61<sup>o</sup>303 from my DRAO interferometry data. The name of the game here is image processing and lots of it.

I decided to live at the Observatory, reasoning that I would get more done. I didn't take into account the hypnotic effects induced by staring at a terminal for 16 hours a day. Only once did I manage to break free to get a bit of fresh air. A diet of fish sticks and chocolate chip cookies didn't help my sanity much either.

The first sign that something had come loose upstairs was my refusal to go skiing on the first day of the season when lift tickets are free. "Too much work to do", I said. KT offered to lend me his car, and Chris Purton gave me his ski boots but I declined their kind offers and logged on to another terminal. By the time I started singing Twisted Sister songs it was too late. I must say in my defence that Jiggs, the observatory cat, never talked to me once. Our conversations were very one-sided.

As my imminent departure grew near I panicked. On Thursday morning I led a surprise attack on the VAX, taking it and all its peripheral devices hostage for 10 hours. The CPU, array processor, mag tape drive, Versatec printer and four or five terminals strained to their limits under my unrelenting grip. If I did this sort of thing at Toronto Wch et al. would tie me to a chair and wax philosophical on non-raidal pulsators, magnitude scales, cepheids and other such unmentionables.

Oddly enough there was no shortage of people willing to take me to the airport. I hopped on to a flight leaving to Vancouver via Kamloops, magnetic tapes in one hand and contour plots in the other. From Vancouver I caught the midnight flight to Toronto, known for good reason as the Red Eye Special. At this point I tried to get some sleep but was woken up every 10 minutes by a hostess who wanted my flight to be "a safe and comfortable one".

I arrived in the big T.O. at 7:00 am, Friday morning whereupon I dragged my jet-lagged body down to the baggage area and argued with some businessman over the question of suitcase ownership. We opened it up and he agreed, only a student would wear such clothes.

I must thank the taxi driver who drove me to York University for Wayne Canon's VLBI lecture. He has instilled in me an appreciation of the fragile nature of life and the speed at which it can be taken away.

I managed to stay awake during the entire lecture and take what I thought at the time were coherent notes. After the lecture we all piled into VGER and headed to DA with Captain Rusk at the helm. It was there that they convinced me to see the movie "2010". The magic words were "GASA is paying for half".

Common sense dictated that I should get some sleep but at this point I was too tired to listen to common sense. After the movie I went shopping to buy a present for a Christmas party that night. By this time I was on a roll and picking up

momentum. From the party it was off to the Brunswick, a popular drinking establishment for students with stronger stomachs than pocket-books. I won't go into the details here, it's all too sordid and besides I don't remember everything. In any event I ended up at my apartment at 4:30 am, Saturday morning, just in time to have a quick shower and catch the first bus out of town to visit a friend.

In total I went 47 hours straight without sleep. It might not be a record but I don't recommend trying to break it. Who said astronomy is dull...life in the fast lane.

Dale Frail

Ph.D. Thesis Abstract

THE BINARY FREQUENCY OF THE OB RUNAWAY STARS  
by Douglas Russell Gies

A radial velocity survey of the bright, northern OB runaway stars has been undertaken to determine the frequency of binary stars in this high velocity group. A total of 634 high dispersion spectrograms of 36 proposed runaway stars were obtained over a two year period. Approximately half of the stars are velocity variable; these include 7 spectroscopic binaries, 1 possible  $\beta$  Cep variable, and 10 stars with emission lines in their spectra. The latter group contains 7 of the 8 Be stars observed, and 3 luminous O stars, and we argue that their variability is caused by nonradial pulsation. Fifteen of the program stars have a peculiar radial velocity (*i.e.* heliocentric radial velocity corrected for solar motion and differential galactic rotation) greater than  $30 \text{ km s}^{-1}$ ; 5 others are probable runaways on the basis of distance from the galactic plane and proper motion. Only 2 of the confirmed and probable runaways, HD 3950 and HD 198846 (V Cyg), are binaries and both are double-lined systems. New orbital elements are presented for HD 3950 and the 5 new binary systems found among the low velocity stars.

The stellar wind characteristics, interstellar features, and cluster or association membership of many runaways, and the masses derived from the two runaway binaries, suggest that only a small proportion of the group could be evolved, low mass stars. If the runaways were accelerated by a supernova explosion in a close binary system, they would probably have neutron star companions, and would eventually become massive X-ray binaries (MXRB). However, the MXRBs have moderate velocities, and the observed runaway star radial velocity limits and available X-ray data rule out collapsed companions if their orbits are similar to those of the MXRBs. The kinematical ages indicate that the runaways were ejected from young associations soon after their birth. The higher fractional abundance of runaways among more massive stars, their binary frequency, and the properties of the runaway binaries suggest that they obtained their high velocities through single-binary, binary-binary, or small n-body close encounters during the early, dynamical evolution of associations.

M.Sc. Thesis Abstract

STAR COUNTS IN OPEN CLUSTERS  
by Peter J.T. Leonard

High quality star counts have been obtained for the open cluster NGC 2420 for the purpose of studying its dynamics. These counts were done using data obtained by scanning a Palomar Sky Survey plate with a PDS microdensitometer and were analyzed entirely by computer. It is found that the angular extent of the cluster is 18 arc minutes which corresponds to a radius of 10 parsecs at an assumed cluster distance of 1900 parsecs. The principal result is that there is no evidence of a corona. Other conclusions are (i) the luminosity function begins to level off at the completeness limit of the data, but does not turn over, (ii) there is strong evidence of mass segregation in the cluster, and (iii) the total mass of the cluster is approximately 1600 solar masses.

An effort has been made to outline the error analysis and the pitfalls of counting stars in open clusters as well as the advantages of carrying out the entire procedure by computer. Also, an attempt has been made to clarify the notion of cluster coronae.