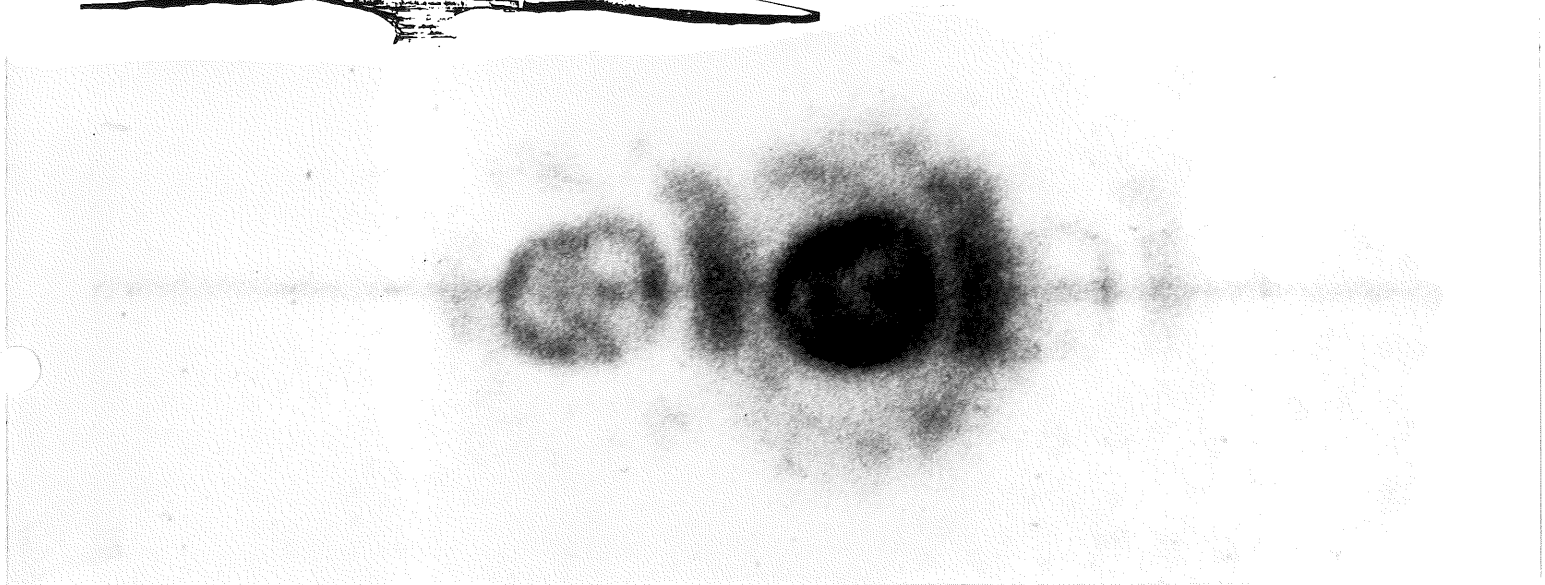


THE ^{DAVID}_{DUNLAP} DOINGS

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Slitless image-tube spectrogram of the planetary NGC 2392, obtained with the 74-inch telescope by Karl Kamper. North and blue are to the right. Scale about 1 arc sec and 0.5 Å per mm. The strongest image, slightly to the right of centre, is in H-alpha. See Cover Story p.3.

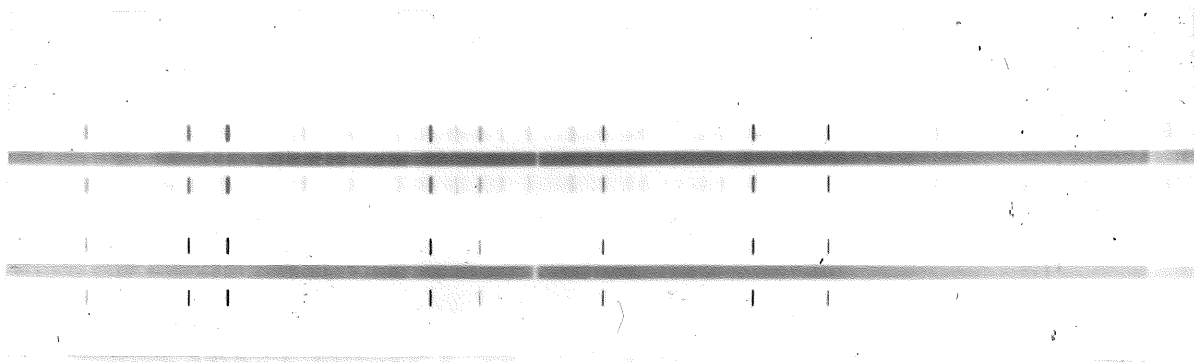


Image-tube slit spectrograms (Plates 46051/2) of an F- and a K-type star obtained with the 74-inch by Bill Weller. The spectral region is centered near H-alpha; red is to the right and the comparison lines are neon. The original dispersion was 16 Å per mm and the enlargement here is 4.7 times. See Cover Story p.3.

09607-12652

1 NEG S/A TO M/C

C O N G R A T U L A T I O N S

To *Tom Clarke* of the Planetarium on the birth of his and Cathy's daughter *Caroline Joy Clarke*, on August 27 - a sister for Christopher, aged 2.

To *Nebojsa Duric*, to *Wendy Freedman*, and to *Leif Schioler* all three of whom recently passed their Ph.D. general examinations.

To *Lale Akatli*, who completed her M.Sc. degree requirements in June.

Cover Story

INSTRUMENTATION ADVANCES AT DDO

Bill Weller

During the past year, work has been underway on a solid-state detector system for the radial velocity spectrograph on the 1.88 m DDO telescope. This instrument will utilize a Reticon linear photodiode array as the detector. In addition we have undertaken the task of modifying the existing Reticon system on the 60 cm telescope; it will soon be available on a regular basis. We have been joined recently in this work by Raymond Rusk. As an adjunct to the 1.88 m Reticon project, we have installed an image tube at the focus of the long camera of the RV spectrograph, allowing an increase in speed over conventional photographic recording of a factor of 10 at $H\alpha$, and a factor of >15 at $\lambda 8500 \text{ \AA}$.

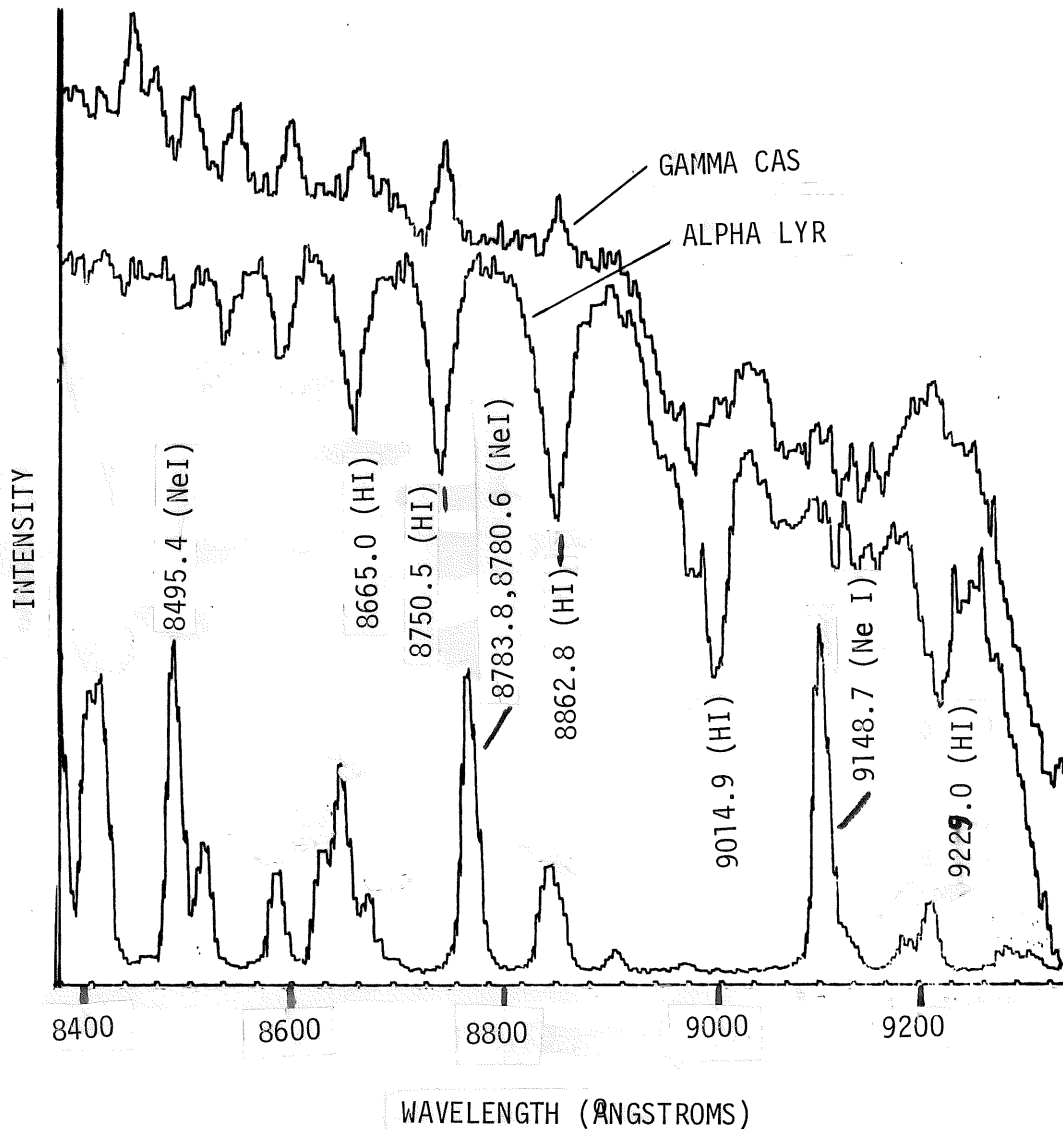
The Image Tube The project closest to completion is the image tube system. It is built around a Varo single stage electrostatically-focussed image tube, kindly loaned to us for the purpose by Bob Garrison. The recording of the spectra is done on Types IIa-D or IIIa-F plates, or on Type 2415 film, pressed into contact with the output fibre optics of the tube. The response of the tube extends from the photographic UV redward to about 9000 \AA . The greatest gains over normal photographic techniques are realized in the red to IR regions. In terms of speed of recording only, the system is about a factor of 10 faster than normal photographic techniques at $H\alpha$, and more than a factor of 15 faster than IV N plates at $\lambda 8500 \text{ \AA}$. A field flattener lens has been installed to extend the region of good focus to cover nearly the entire 40 mm cathode. At 16 \AA per mm about 640 \AA are recorded at one time. For bright stars up to five exposures can be made on one plate. A microscope is provided at the telescope for real-time focussing of the plates.

There are, of course, some penalties to be paid for photographic speed, and these include a slight loss of resolution, and an increased background, over normal plates. Both of these effects degrade the signal-to-noise properties. So far we have insufficient plate material to give a quantitative estimate of either the real gain in signal to noise, or the radial velocity quality of the plates. The system will most likely be used to extend the range of observational programs to faint limits, something which would be prohibitively costly in telescope time by using normal photographic techniques.

To give an idea of the image quality we reproduce on the cover of this issue of THE DOINGS a slitless spectrogram of the double-shell planetary nebula NGC 2392. The inner shell is clearly seen in the light of [N II] 6583 A as two greatly Doppler-shifted rings and the outer shell is seen as a faint larger nearly stationary ring with a marked brightening between 2 and 4 o'clock. This same pattern is reproduced in the stronger images due to H-alpha, and again, further to the blue, very faintly in [N II] 6548 A. The continuous spectrum of the central star is also seen.

Also reproduced on the cover are two image-tube slit spectrograms. The objects are the radial velocity standard stars HD 222368, F7V, $M_V=4.6$ (top) and HD 212943, K0 III-IV, $M_V=5.9$ (bottom). Exposure times were 5 and 8^V minutes respectively in excellent seeing and transparency.

The Campbell Reticon For the past several months we have been engaged in refurbishing the Campbell Reticon system, for use on the 60 cm telescope. This entails slight modification to the spectrograph-cold box interface, for ease of finding and centering spectra, and some changes in the electronics, to eliminate sources of noise pick-up. It appears that the system is now ready for general use; representative spectra obtained with the 60 cm telescope at DDO are illustrated in the accompanying figure.



Vega and γ Cas with the Campbell Reticon system

The lower spectrum is of a neon/argon comparison lamp. In the upper spectra, the prominent absorption lines in Vega, and the emission lines in γ Cas are the Paschen series of H I, from 8400 A to 9400 A. The original dispersion was 112 A/mm. The stellar spectra have been offset in intensity for display purposes. Exposure times were 80 seconds and 10 minutes for Vega and γ Cas, respectively.

In order to make the system a bit easier to use on an occasional basis, the software is being re-written. The new software is written in the language FORTH, and will be considerably more conversational and forgiving than the current version. Provision has also been made for the logging of data on diskette, and for doing at least some data reduction at the telescope. The new software is expected to be ready by October 1981.

The Chant Reticon Work on the Chant Reticon system for the 1.88 m is proceeding well. The focussing mount and beam-folding mirror have been fitted to an auxilliary optical plate and mounted in the spectrograph. This converts the 20" camera into a Schmidt-Newtonian, bringing the optical focus outside of the collimated beam and thus allowing access to the focus by a variety of detectors.

The cold box for the detector and its thermoelectric coolers have undergone preliminary tests and operate satisfactorily. The readout electronics are in the final stages of construction, and will be installed shortly. The data acquisition computer has been interfaced to the system peripherals, which comprise a thermal printer-plotter, a colour video data monitor, and a CRT terminal. Some engineering at the telescope will commence in October 1981 and should be completed by the end of the year. Once tests and calibration at the telescope are completed, a further report will be given, outlining the capabilities of the system. In the interim, questions regarding any of these systems can be directed to W.G. Weller at DDO.

MASTHEAD CHANGE

Since July, 1978, Bob McLaren has been one of the co-editors of the Doings. But Bob has taken over Ernie Seaquist's duties as Associate Chairman. Would he therefore find it less easy to be objective in the fine tradition of this widely-read publication of impeccable reputation? We think not, but nevertheless THE DOINGS has a new name on its masthead and a new hand on the tiller: *Peter Martin*. The impact of this change begins in this issue. Surely we are all very pleased that Peter has accepted the assignment. The undersigned is delighted.

MR

NEW SPECTROPHOTOMETRIC REDUCTION PROGRAMME

The *RETICENT* command language for reducing digital spectrophotometric data has been implemented on the Physics/Astronomy VAX. This version was developed at the DAO by Stefan Mochnecki, based on an earlier version (for MODCOMP computers) written by Chris Pritchett. It incorporates an interactive graphics subroutine originally written by Phil Massey of the DAO. A version for IBM-style computers under MTS has also been developed by Stephenson Yang of UBC, while Chris Pritchett has also completed a version on the CFHT computer at Mauna Kea.

RETICENT at present can handle one-dimensional arrays of up to 8192 elements. A wide range of arithmetic and spectroscopic operations can be performed, and user-written commands can easily be linked in. Language features include macros, Do-loops, etc., in a FORTRAN-like environment. The programme itself is written in FORTRAN. Data from different detectors can be handled simultaneously.

Extensive documentation is available, both as a booklet and on-line. Interested persons should contact Stefan Mochnecki (Mki) at the DDO or downtown.

Mki

LIBRARY NEWS BRIEFS

Lynda Colbeck

I have prepared a Guide to the DDO Library and DA Reference Room, and a Bibliographic guide to astronomical literature for graduate students. Both faculty members and students will receive a copy within the next three weeks.

The Astrophysical Journal will be published in 12 volumes per year instead of 8 beginning October 1, 1981.

The Ohio State Palomar Sky Survey plastic overlays were received in July 1981. 1037 overlays were sorted according to celestial coordinates and filed with each Palomar print. An instruction booklet stored in the Catalogue Room outlines the history of the project and provides a key to the overlays.

The mail strike delayed the delivery of new books ordered during the spring months. Not surprisingly, over 25 recently arrived in a 1 week period at the DDO Library. Titles can be found in the Library Acquisition List of September 4.

THE INFRARED BREAKTHROUGH

2.3 Mpc or Bust

An update by Barry Madore

A little over a year ago, *Bob McLaren, Rick McGonegal, Chris McAlary*, and I embarked on a programme to calibrate the Cepheid Period-Luminosity Relation in the near infrared. The feasibility of the programme was demonstrated last January when Rick and Bob obtained JHK photometry of 40 LMC Cepheids with the CTIO 4-metre. These observations showed that random-phase H-band magnitudes could serve as distance indicators which were at least as precise as mean V magnitudes and about 10 times less sensitive to extinction.

Since then, we have received generous allocations of time on a number of telescopes with the result that our manpower is sometimes stretched to the very limit. Fortunately, *Doug Welch* has joined the ranks, and members of other institutions are collaborating as well. After a talk that I gave at the Mount Wilson and Las Campanas Observatories, in Pasadena, *Gerry Neugebauer* invited us to share two of his nights on the 5-metre to see just how far the calibration could be pushed. The Palomar run was in August and was very successful. The Cepheids in M31 and M33 are easy to do at the 5-metre, and we are already planning to go back for an extended run next fall. Not only should we now be able to calibrate the relation accurately and apply it to all of the late-type galaxies in The Local Group, but it now appears possible to go directly to the M81 group and the galaxy NGC 2403, in which Cepheids have been detected. The distance to this group has been controversial, estimates ranging from 2 to 3.5 Mpc. The discrepancies arise primarily because of values used for estimates of reddening. Since our H-band photometry virtually eliminates the reddening problem, we are confident that all we need is clear skies to do "cosmology with stars".

This month, while Doug is at Mont Megantic working on the galactic calibration in collaboration with *Daniel Nadeau* and *Daniel Roussin* (Univ. de Montreal), Rick and I are off to CTIO to work hard on the SMC and provide second-epoch data for the LMC using the 4-metre. Bob and Chris have already been out to Hawaii once on this project to use the NASA Infrared Telescope Facility, and we hope to use the CFHT to observe Cepheids in NGC 6822 next summer. Chris will soon be taking up his post-doc at Steward Observatory and has his eye on the MMT. It appears that we have our work cut out for us for the next little while.

POTPOURRI

Wendy Freedman undertook her first observing session with our 24-inch telescope on Las Campanas during June, and experienced fourteen hour nights with monotonously clear skies (14 of 15 nights!). Quoting Leonard Searle, she radioed "This site is just too damn good".

Gerry Grieve and *Barry Madore* spent a strenuous week in June reducing data at the Santa Barbara St. facilities of the Mount Wilson and Las Campanas Observatories. They report that during their stay in Pasadena the Mount Wilson 100" was dedicated as a national monument; simultaneously unconfirmed rumours were in the air that due to fiscal restraints the entire operation on Mt. Wilson might be severely cut back!

Lale Akatli spent the summer abroad. Her itinerary is enough to make even our best travelled astronomer envious: Brussels, Austria, Germany, Yugoslavia, Bulgaria, Turkey, the Aegean Coast (for a month) and Switzerland. Now back home, she continues as a tour guide at the Observatory on Saturday evenings while she casts about for a job in the computer science field in Toronto.

Bev Oke, a faculty member here in the 1950s and now at Cal Tech, called in at both the Department and Observatory during the first week of September to say hello and see how things are going.

Stefan Mochnacki arrived near the end of August after a long U-Haul truck drive from Victoria. Wife Kathleen and son Alexander came by train. The family are staying with relatives in Acton until they move into their new home in Richmond Hill near DDO. Stefan has taken over the DDO office recently vacated by Helen Hogg (who is now sharing Don MacRae's office).

This summer the Pure and Applied Sciences Committee of the University of Toronto held a small grants competition. *Barry Madore* was successful in the competition, receiving an award of \$2400 to defray travel costs (see Infrared Breakthrough).

Dianne Grazioli, a former secretary in our departmental office, recently appeared on television in a National Film Board documentary of an archaeological expedition. Dianne left us in 1978 to work as an artist for Prof. Redford of the Dept. of Near Eastern Studies. In 1979, she took part in one of his expeditions to a site in Egypt.

Karl Kamper spent a week at the US Naval Observatory in July using their semi-automatic measuring engine on a long series of astrometric plates of β CBr. His itinerary included a stop at the Allegheny Observatory in Pittsburgh to view their new astrometric photometer, now in the shakedown stage.

Helen Hogg attended the General Assembly of the RASC in Victoria in June.

The June meeting of the AAS in Calgary, though small in absolute size, was well attended by Canadians, including *Chris Corbally, Don Fernie, Helen Hogg, Phil Kronberg, Barry Madore, Peter Martin, Stefan Mochnacki* and *Rob Roeder* from our midst. The meeting was successful scientifically and socially and for some provided their first visit to the Stampede!

Peter Jackson, M.Sc. Toronto, 1968, has accepted the position at York University resulting from *Chris Purton's* move to DRAO. Peter received his Ph.D. at the University of Maryland and has spent most of the time since then working with *Frank Kerr* in that institution's radio astronomy program. Welcome back to Canada, Peter, and to Toronto.

Doug Gies and *Tom Bolton* were in Hawaii from July 3-15 for a six night observing run on the CFHT coudé. This time was shared with *Gordon Walker, Greg Fahlman,* and *Stephenson Yang* of UBC. They had four photometric nights and two with light cirrus, and the seeing was $\approx 1''$ every night. Unfortunately, they encountered equipment problems which made it impossible to carry out their program on Cygnus X-1. The other groups did succeed in observing some bright stars.

Following their observing run Doug and Tom spent a couple of days touring the Big Island and hiking in Hawaii Volcanoes National Park. Doug came home through Victoria, where he had a successful 7 nights observing run on the 72-inch telescope. He obtained a number of spectrograms of runaway OB stars for his thesis. Tom also spent a couple of days in Victoria consulting with colleagues. While there he gave a DAO colloquium, "Starspots and Flares: Recent Work on RS CVn stars at DDO", and enjoyed an evening with Alan (Ph.D. '78) and Barbara Irwin.

Nancy Evans delivered a paper entitled "A Search for Light-Time Effects in Binary Cepheids: AW Persei" at the CAS Meeting in Quebec City in May. In June she spoke at the University of Northern Iowa, on "Recent Results on Binary Cepheids" and at Oshawa to the University Women's Club on "Stars: Their Time and Space".

HARVEY LISZT HERE FOR FALL TERM

The Department welcomes *Harvey Liszt* and his wife *Mehrak* and sons *Jeffrey*, 7, and *Greg*, 4, to Toronto. Harvey is giving the graduate course on radio astronomy this fall.

Harvey graduated from the University of Massachusetts in 1967 and took his A.M. and Ph.D. at Princeton. In 1975-76 he was briefly Assistant Professor at the University of Pittsburgh, having spent the two previous years as a Research Associate at NRAO. He then returned to NRAO and is now a permanent member of the staff in Charlottesville.

Harvey's research interests are radio astronomical spectroscopy at mm and cm wavelengths, galactic structure, and interstellar chemistry. We understand he has substantial skill at flamenco-style guitar playing as well.

Harvey and family will soon move into a town house at 34 Palmerston Square, a short distance north west of the university campus.

THAT'S INCREDIBLE !!

Among those great burning questions of all time that you've always wanted to know the answer to but were afraid to ask, is that oldie about the azimuth of the DA as seen from DDO. The McLennan building is a good few blocks west of Yonge, right? And as anyone who has hiked it on a winter's morning can tell you, the DDO is a significant way east of Yonge, right? And therefore, the McLennan is well to the west of the DDO, not so? Well, phooey on you! The McLennan is decidedly east of DDO.

Although we've all doubtlessly lain awake at night worrying about this, it wasn't until the problem of a high-speed data link between DA and DDO arose that I ever got around to looking into it. Ordinary phone lines transmit data between computers at a rather less than spectacular rate, and dedicated lines cost about one arm and half a leg, so the question arose as to whether one could actually see DDO from DA and therefore use a microwave link (about one arm and a third of a leg). On a recent sunny summer's afternoon, teetering atop the McLennan building, 10 x 50 binoculars in hand, I put this to the test. Sadly, no amount of anxious scanning revealed even a single gleaming distant dome.

That raised the question of whether I was actually looking in the right direction, and that was what made me get out the maps and do a little plotting. And there it was: standing on the McLennan building one has to look four or five degrees west of north for the direction of DDO. Put another way, you'd have to walk along College to somewhere between Bathurst and Dufferin streets to reach the DDO meridian.

All this because our vague impression that the downtown grid of streets is north-south, east-west, is decidedly off. Downtown Yonge Street actually heads away nearly seventeen degrees west of north, although above St. Clair this moderates to about ten degrees.

And the answer to the line-of-sight question is that you cannot see DDO from McLennan. The latter just isn't tall enough; its northern horizon, even from the very rooftop, is set by the east-west ridge that runs above St. Clair, not to mention some sizable highrises that stick up beyond it.

However, the data link may yet be accomplished by UHF.

Coincidentally, Las Campanas, with its vista of the Pacific, is in very nearly the same direction from DDO as DA, both a few degrees east of south (although a trifle more than the 13.8 miles between DDO and DA).

Just thought I'd mention it so you can sleep more easily.

SU Cygni with IUE

Nancy Evans reports

On August 14 to 17 *Tom Bolton* and I had the first of our three runs of the IUE for the program "Ultraviolet Spectroscopy of the Binary Cepheid SU Cygni". The primary purpose of this run was to obtain high dispersion long wavelength spectra of SU Cyg at descending node (minimum radial velocity). We will use these to measure the radial velocity of the blue companion of SU Cyg by cross-correlating with HD 21071, a B7V star. This will enable us to measure the mass ratio of the pair and will increase the observed lower limit to the mass of SU Cyg, which is already 77% of the evolutionary mass.

The IUE run consisted of two low noise shifts and one high noise shift. The 6 hour exposures necessary for SU Cyg were possible only on the two low noise shifts due to the high background. In fact, although the particle radiation had recently been fairly low, and there was some hope that it would remain low through the end of our first low noise shift and into the beginning of the high noise shift, this was not the case. The radiation count began to climb at the end of the shift and the exposure was terminated.

In order to have maximum accuracy for the radial velocities (differential accuracy of 1-2 km/sec for the radial velocity amplitude of the secondary corresponds to an accuracy of 3-7% in the mass ratio) we took wavelength calibrations after both high dispersion spectra. This will also provide an interesting check on new IUE reduction techniques which now correct the dispersion constants for variations as a function of temperature and time (Thompson, Turnose, and Bohlin 1981, preprint). These corrections enable radial velocities to be determined routinely from high dispersion long wavelength data with a one-sigma accuracy of 2.7 km/sec. Unfortunately the calibration procedure on our run caused problems with the gyros, resulting in a jump in the pointing of the telescope and an underexposed spectrum of one of the standards. However, we were able to repeat the exposure with a minimum of time and data lost. Even when you are remote from the telescope and you are very aware of how many hands your instructions are passed through, there are quick decisions to be made. Other problems have some similarity to situations which develop as you actually look through a telescope. The first star to be set on with the IUE was nowhere in the field! (This was quickly cleared up with the aid of the resident astronomers, who were very helpful throughout the run.)

The only serious problem with the run was the loss of an hour due to a computer crash--"very infrequent", we were told, but it had happened the day before. Altogether we had a successful run and obtained two high dispersion spectra of SU Cyg, high dispersion spectra of stars to be used for the cross-correlation, and several low dispersion spectra of SU Cyg and standard stars to be used for spectral classification.

COMINGS AND GOINGS

We welcome 5 new students into our graduate program: *Tom Box* (from U of T), *Allan Busch* (U. of Victoria), *Michael Swift* (St. Marys), *Doug Welch* (U of T) and *Ed Zukowski* (U of T).

We bid farewell to an almost equal number. *Dennis Crabtree* has taken a position as a Software Specialist on the VAX computer operated by Dataplotting Services Inc. of Toronto but continues writing up his Ph.D. dissertation. *Raied Nasser* has enrolled at the University of Colorado. *Leif Schioler* after successfully completing his Ph.D. general examination, went off and accepted a position with IBM in Denmark. *Donna Zubrod-Grieve* has also joined IBM, as a Systems Engineer in Toronto.

THE CHEMICALLY PECULIAR STARS OF THE UPPER MAIN SEQUENCE

John Lester reports

I was in Liege, Belgium during 23-26 June to attend the 23rd Liege International Astrophysical Symposium, on the chemically peculiar stars of the upper main-sequence. The symposium was truly international with more than 100 astronomers coming from as far as Japan to take part. There was a sizeable Canadian contingent with Georges Michaud, John Rice, and Bill and Amelia Wehlau also being there. Other familiar faces were Doug Brown (a post-doc a few years ago with John Landstreet), Chuck Cowley, Andy Odell, and Steve Shore. Most of the symposium was devoted to traditional Ap stars, but there were discussions of the helium peculiar stars and most of the last day was devoted to the metallic-line stars. During the latter session I presented a paper with Mary Lane entitled "The Abundances of the Light Elements in Am Stars".

JBL

COLLOQUIA*

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|----------------------------|--|
| September 23 | <i>Martin Duncan, Cornell University</i>
"M87, Massive Black Holes and Dense Star Clusters"
(at Scarborough) |
| October 5 (Monday)
3 PM | <i>Katy Pilachowski, KPNO</i>
"The Elemental Truth about Globular Clusters" |
| October 14 | <i>L. Davis</i>
"21-cm Line Studies of Interacting and Isolated Galaxies"
(Ph.D. Thesis) |
| October 21 | <i>Leon Lucy, Columbia University</i>
"Non-Stationary Winds" |

October 28

C. McAlary
"Multi-aperture Broadband Photometry of X-ray Galaxies
and Related Objects"
(Ph.D. Thesis)

November 4

Fred Walter, JILA
"Cool Stars with Hot Coronae: Late-Type Stellar
Coronae from T Tauri's to RS CVn's and Beyond"

*Unless otherwise noted, colloquia are held on Wednesdays at 4:00 P.M. in Room MP 137
with TEA at 3:45 in the Reference Room, MP 1404.

LAS CAMPANAS NEWS

The summer saw some advances in our situation regarding financing the Las Campanas operation. In early August Bob Garrison and Don Fernie appeared before the University's Private Support Project Review Committee to make a case for help through private funding. As a result the University has granted permission for us, with help from the Department of Private Funding, to seek \$20,000 a year for two years in operating funds as well as \$20,000 in capital funds. Additionally, the Committee will take our case to The Associates of the University of Toronto, Inc., of New York City, who substantially helped our Chile project in its earliest stages.

Later, on August 20/21, Bob and Don were in Pasadena to hold discussions with George Preston, now Director of the Mt. Wilson and Las Campanas Observatories. Results of the discussions have yet to be confirmed by Carnegie officials in Washington, but our team came away pleased with the way the talks had gone. Coupled with the news that inflation in Chile is now down to roughly Canadian levels, all this means that the situation is probably a good deal brighter than it was a year ago.

Meanwhile, back from the telescope, Chris Corbally reports an "absurd" observing run on the 24" in August. It was "absurd" because the weather and the seeing would have been excellent even in Chilean summer: a total of 19 clear, long, warm nights out of 21, and seeing usually 1 1/2 arc seconds with one night displaying the Airy disks. Needless to say, his double star programme was completed and his faith in Las Campanas weather was restored. Elsewhere Wendy Freedman reports in the same vein.

PAPERS SUBMITTED

E.R. Seaquist W.S. Gilmore	Radio and X-ray Observations of Compact Sources in or near Supernova Remnants
G.C. Clayton P.G. Martin	On the Intrinsic Polarization of Red Dwarfs
C.C. Dyer R.C. Roeder	A Method for Determining the Masses of Some Quasars

J.R. Percy D.L. Welch	Photometric Observations of RS Canum Venaticorum Stars
J.D. Fernie	R Coronae Borealis Near Maximum Light
P.P. Kronberg T.W. Jones	A Suggested Classification and Explanation for Hotspots in some Powerful Radio Sources
R.A. Crowe R. Mitalas	Semiconvection in Low-mass Main Sequence Stars
J.B. Lester M.C. Lane R.L. Kurucz	Convective Model Stellar Atmospheres for Stars Hotter than the Sun

THE DDO SPRINKLER SYSTEM

The Associate Director reports

The sprinkler and fire alarm installation at the Observatory (see the May 31 issue of THE DOINGS) continues to drag along. By the time you read this, we will have passed three completion dates without the project being finished - a record surpassed only by Argo quarterbacks. At the moment I am writing this, there has been little sign of activity by the contractor for several days. There is a lot of electrical work left to complete, and this will have to be followed by much painting and cleaning.

All the signs indicate that the job will not satisfy us when it is completed. I am compiling a list of complaints to have checked when the final inspection is done. If you see anything you think is not right, please write me a note about it. I will have all reasonable complaints checked and fixed if at all possible.

Once all of the work is done, there is supposed to be money available to pay for a thorough cleaning of the entire building. I will put out a memo on the end of the job and details of the clean up as soon and I have information from Physical Plant that I can believe. So far there hasn't been a lot of that going around. In the meantime, I can only plead for patience. We are doing our best to build a fire under Physical Plant.

Bln

YOUNGSTER GETS TASTE OF ASTRONOMY

One warm summer evening during the planet-gazing session with the 8-inch refractor it finally came the turn of young (then 5 months) Nicholas Martin. Swinging precariously in the arms of his father perched atop the tall stepladder he awaited his first glimpse of Saturn. When all was readied he moved into position and, with a squeal of delight not heard since the days of Galileo, grasped the eye-piece in his mouth. I suppose he'll be a theoretician.

Mn