



THE ^{DAVID} DUNLAP DOINGS

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Spider Webs

Spider webs should be harvested in the summer months, for their quality is better at that time; several species of spider can furnish usable webs. Pieces of web can even be chosen from almost all spider's webs, keeping it in mind that the suspension threads which go from the centre to the support are better than the webs which are stretched in circles. But when good threads are required the following procedure is used.

A large spider with short legs, brown in colour and very hairy, carrying on its back white marks in the form of a fleur-de-lys is sought. A fly is thrown into its web to draw it to the middle and the whole web, with the animal, is rapidly taken up with a stick. If the stick is tapped with small blows the spider wishes to make off and pays out its web in order to reach the ground. At this instant the thread it pays out is wound up on a wooden or cardboard frame; it is necessary to work quickly enough for the animal not to have time to get to the ground. In this way a great length of web can be drawn from a single spider. In winding up the thread care must be taken to leave a small interval between successive turns, for the elements of thread used should be kept protected from any contact. For the same reason, the frame on which the thread is wound is of such a size that its inner space, is a little larger than the largest reticules to be made (4 to 5 cm. for instance). The thickness of the frame is such that opposing strands cannot touch.

*Optical Workshop Principals
by Colonel Charles Deve, pp.272-3, 1945.*

What they don't teach you in graduate school: how to harvest spider webs.

CONGRATULATIONS TO ...

Neb Duric, who was married on October 20 to Marcia Story Mahood. The newlyweds left immediately afterward for a honeymoon in the West Indies.

Alex Fullerton, who passed his Ph.D. General Examination on September 28. Alex can now concentrate on his thesis work (with Tom Bolton).

Lee Oattes, who passed his Ph.D. General Examination on October 23.

WELCOME TO ...

Our three new graduate students: Daniel Blanchard, from Royal Military College in Kingston, who is working with Charles Dyer; Josephine Chan, from Concordia University in Montreal, who is working with Don Fernie; David Holdsworth, from the Physics Department of the University of Toronto, who is working with Stefan Mochnacki.

NEWS FROM OUR GRADUATES

Dorothy Fraquelli (Ph.D., 1981) has accepted a position at the Space Telescope Science Institute.

Nancy Remage Evans (former M.Sc. and Ph.D. student, PDF, research associate and faculty member) continues at Computer Sciences Corporation, where she has been promoted to a position as a Resident Astronomer at the IUE.

CITA News

CITA is growing by leaps and bounds. The personnel of the Institute now includes, in addition to Dick Henriksen and Peter Martin, the following visitors: Seung Choe (most recently from U. Minnesota), Jerzy Madej (from Warsaw U.) and Ray McLenaghan (from U. Waterloo). Ray Carlberg (York U.), Martin Duncan, Charles Dyer and Peter Sutherland (McMaster U.) have been appointed as "Regular Visitors" to the Institute. Molly O'Reilly serves as secretary to the Institute. Fortunately, CITA is about to gain some much-needed new space - on the 12th floor of the McLennan Physical Laboratories.

CITA sponsored a very successful "Kingston Meeting" in October, hosted by Laval U. and held at the Laval U. Forestry Station, 70 km north of the Laval campus. Attending from Toronto were Seung Choe, Martin Duncan, Charles Dyer, Dick Henriksen, Peter Martin and Ray McLenaghan. The Institute also sponsors a regular seminar series (see elsewhere in this issue) and will sponsor a major conference on "Galaxy Formation" from June 19 to 21, 1985.

P O T P O U R R I

Helen Hogg officially opened the Edmonton Space Sciences Centre (ESSC) on July 1. The Treasurer of the ESSC Foundation, which provides both initial and ongoing financial support for the Centre, is U. of Toronto graduate Douglas Hube, now a member of the faculty of the U. of Alberta.

Barry Madore has been appointed to the Space Telescope Science Institute's working group on galaxies and clusters. The working groups will be meeting frequently to suggest the key long-range projects to be carried out by the Space Telescope.

John Percy spoke to the Toronto Centre of the RASC on September 26 on the topic of "The Bicentennial of the Cepheid Variables".

ERRATUM: Summer student Gordon Drukier worked this summer with Martin Duncan, not with John Percy as reported in the preceding issue of the DOINGS.

Bob Garrison Returns - and Reports

I have just returned to teaching duties after a year of research leave. Most of the year was spent editing a book on the June 1983 Toronto workshop: The MK Process and Stellar Classification. The book is in press and will be available for distribution in December. I stayed in Toronto for most of the year, but worked at home with an IBM computer in order to avoid being too available for thesis exams and administrative duties. The freedom from classes was used to make longer and more frequent observing trips than are usually possible.

Among my travels were three observing trips to Chile and one to Mexico's National Observatory in Baja California, where Richard Gray and I worked with former Toronto student Armando Arellano Ferro taking spectra of stars too faint to observe safely through the Toronto city lights.

I attended the AAS meeting in Las Vegas, but immediately afterwards escaped the perils of the wicked city by travelling to the nearby Grand Canyon, where I "walked through time" for two billion years in three days. The bottom of the canyon was warm and the Phantom Ranch was comfortable, but the next day's rain turned to snow during the hike out. It is an impressive experience and I highly recommend it to anyone travelling in the area.

The highlight of the year's travels was Spring in Denmark, where for five weeks I lectured and worked on a review paper for the IAU Symposium on Calibration of Fundamental Quantities, which was held in late May at Como, Italy. The weather was clear in Denmark for the entire visit, which is some kind of record! The beech forests near the observatory were beautifully tranquil and the friendliness of the Danish astronomers is unequalled.

THE RETURN OF 'ELMS LEA'

I suppose for about as long as it has belonged to the University the Director's residence has been known as Observatory House. I'm not sure who chose this, but I suppose it was done in imitation of such historical precedents as are to be found at places like Greenwich. Certainly it is not unique. Nor does it seem to be official. All blueprints and documents in the hands of Physical Plant refer to it by the quaint term 'The Astronomer's Residence', which (emphasizing the first word) may be pleasing to the incumbent but has little else to recommend it.

Anyway, when the family who originally owned the house took renewed interest in it a few years ago, they expressed a certain polite regret at the passing of the original name: Elms Lea. On reflection Yvonne and I came to like this name, finding in it a pleasing lilt and uniqueness lacking from Observatory House. So when it came time last summer to have the driveway sign repainted we opted for Elms Lea, and now that elms are making a comeback we intend exploring the possibility of replanting some around the house. The impact of this name change on Physical Plant will, like so much else, probably be nil, but at least it restores a little history.

COMINGS AND GOINGS

Raymond Rusk spent a few days at Caltech, reducing VLBI data, and a few days at the U. of California at Santa Cruz, establishing a collaboration with Joe Miller on polarization properties of radio sources.

Ernie Seaquist has been busy promoting the welfare of the Canadian Long Baseline Array project. In September, he presented the "4-antenna option" to a meeting of the NRC in Ottawa, and in October, he met again with the president of NRC to discuss the next steps in the CLBA project. The NRC has now approved the CLBA as a two-phase project: the first phase being the 4-antenna array, and the second phase being the addition of 5 more antennas. Ernie also gave a seminar on the CLBA at the Department of Physics, University of Guelph.

Doug Welch, in an unprecedented burst of large-telescope astronomy, observed at the CFHT from August 3 to 8, the MMT from September 4 to 13 the 2.5m DuPont Telescope at Las Campanas from October 8 to 12, and the 4m Cerro Tololo Telescope from October 15 to 18. The runs were to gather infrared observations of Cepheids in nearby galaxies, for Doug's thesis.

Richard Gray was also at Las Campanas, where he spent three weeks observing with the 0.6m U. of Toronto telescope, as part of his thesis work.

John Percy attended a meeting on Infrared and Solid State Photometry, in Lowell, Michigan in August. He presented papers on "Small-Amplitude Red Variables" and on "The AAVSO Photoelectric Photometry Program".

Dale Frail returned from a summer of fun and sun (and thesis research) at the Dominion Radio Astrophysical Observatory in Penticton, leaving behind Kwang-Tae Kim, who is carrying out a long-term observing program there as part of his thesis work.

Stefan Mochnacki travelled to Pasadena on October 20 to represent Canadian astronomers at a meeting to discuss the future of the Mount Wilson Observatory.

Bob Garrison after discussing "Observing in Mexico's National Observatory" at G2000 on October 17, left to do so on October 18.

COLLOQUIA*

- November 7 *Dr. Bruce Balick, University of Washington,
"The Shaping of Planetary Nebulae"*
- November 14 *Dr. Charles Dyer, University of Toronto,
"Some Astrophysical Applications of Microcomputers"*
- +November 19 *Dr. Richard Bond, Stanford University,
"Dark Matter and Anisotropies in the Cosmic Microwave
Background"*
- November 21 *Dr. Myron Smith, National Optical Astronomy Observatory,
"Non-Radial Oddities, Jet Streams and Spikes in Spica and
Friends"*
- +November 26 *Dr. Richard Bond, Stanford University,
"Lyman-Alpha Clouds"*
- November 28 *Dr. Jaap Baars, Max-Planck-Institut fur Radio Astronomie,
"Millimeter Radio Astronomy and the IRAM Project"*
- December 4 *Russ Taylor, University of Toronto,
"Symbiotic Stars"*
- +CITA Seminar (Monday)
*Wednesdays at 3:10 p.m. in Room MP 137 with TEA in Room 1505, following the talk.

PAPERS SUBMITTED

- M.F. Bietenholz
P.P. Kronberg *Is there Really Evidence for Universal Rotation?*
- A. Arellano-Ferro *Periodicity and Pulsational Modes of Five Bright Yellow
Supergiants*
- J.R. Percy
M. Bietenholz
A. Fullerton *The Photometric Variability of Epsilon Persei*
- J.R. Percy *Five Suspected Beta Cephei Stars Revisited*
- R. Rusk
E.R. Seaquist *Alignment of Radio and Optical Polarization with VLBI Structure*
- C.M. Clement
P. Ip
N. Robert *A New Investigation of the Variable Stars in the Globular
Cluster Messier 9*

D.L. Welch	An Improved Calibration of the Near-Infrared Period-Luminosity Relation for Cepheids
C.W. McAlary	
B.F. Madore	
R.A. McLaren	
G. Neugebauer	
J.R. Percy	A Note on Two RS Canum Venaticorum Stars: LX Per and SZ Psc
P.P. Kronberg	Discovery of an Entire Population of Variable Radio Sources in the Nucleus of M82

THE TWIN PHOTOMETERS: REPORT FROM THE TRENCHES

As many of you will know, last spring we put into operation at the DDO a system of two photometers on two telescopes (the 0.6m and 0.5m) which work together under the control of one computer. The idea is that while one telescope is set on the star of interest the other monitors a nearby comparison star, so that their difference in output is largely independent of intervening cloud and haze which is common to both. Thus one can do differential photometry on 'non-photometric' nights, which in this climate means roughly doubling the available nights.

A qualm one always has over any such system is how stable it will be. If either or both of the photometers drift in sensitivity you could be in big trouble. Any drifting can be measured by setting both telescopes on the same star, and this we do at least several times a night. The relative stability of the overall system, measured in this way, has been almost unbelievably good. For example, in the V passband the relative sensitivity averaged -0.012 mag in April, -0.016 mag in June, and -0.013 mag in August. For a while I thought that even the telescope mirrors must all be tarnishing at exactly the same rate, but over months there has been discernible a very slow drift in the ultraviolet and violet passbands.

A few of you who were involved in the early days will recall with a good deal of vividness that the stepper motor driving the filter wheel in the one photometer would all-too-readily pick up the start-integration pulse on some settings and send the filter wheel skittering round just when it shouldn't. Herculean efforts by Frank Hawker have now largely eliminated this, and software improvements allow one to save data already accumulated in a cycle during which a filter does fail.

The weakest link in the system is the telescope drive of the 0.5m (aka the 19-inch). At times rock steady, it is more usually erratic to a degree that necessitates checking the setting every few minutes. This is almost certainly due to a lack of lubrication in the main bearings of the telescope -- something we shall have to tackle soon, although it means taking the entire (and very heavy) mounting apart. On the other hand, I'm happy to report to old 19-inch hands that the coordinate readout system, long thought to be one of the great random number generators of our times, has finally yielded to reason. It is now possible to model the errors, and a few simple computer algorithms permit one to set the telescope quite satisfactorily (aided, I might add, by a much better wide-angle eyepiece for the finder provided by Karl).

All in all, the system works very well and is in steady use. It was easy to verify Armando's finding that the amplitude of Polaris is down to a few hundredths of a magnitude (done, as it happens, entirely on non-photometric nights). Alex was able to determine the 0.01 mag amplitude, eight day variability of V986 Oph, and even on a ninth magnitude star like UU Her it is easy to get differential magnitudes in eight filters to within thousandths of a magnitude in a few minutes.

The twin photometers are not, of course, a complete panacea. They do well under thick haze or high thin clouds, but if there is significant cloud structure on a scale of 14m (the separation of the two telescopes) or if the clouds are low, sharp-edged and fast-moving, then the results are poor. Still, as a rough indication I've observed on over thirty nights since mid-June with useful results, and that by no means used every possible night.

Well, now that we've got everything working so well, we are, in the best of traditions, going to tear it all down! This is because we are going to switch the controlling computer from the 0.5m dome to the 0.6m dome with much consequent rearranging. For years we have suffered from having no warm, dust-free room in which to run computers and peripherals for these smaller telescopes. Dave Earlam and Archie have now constructed such a room in the west side of the 0.6m dome (as well as cleaning up and repainting the domes), and by the time you read this the switch over should be complete. This will open phase two of the project with the addition of disk drives and a full-width printer to improve data acquisition.

Most of the shop team have helped to make this project a success, but I should particularly like to thank Dave Blyth for building the photometers, Frank Hawker for developing the electronics, and Dave Earlam for the tedious work on the domes and warm room. As for the rest of you -- why not come and try it all out?

Don Fernie

LAS CAMPANAS NEWS

The McLaren infrared photometer, which has been languishing unused in Toronto for some years, was shipped to Chile and put on the U. of T. 60-cm telescope at Las Campanas during August. After solving some initial problems caused by the rough shipping (such as 2 mirrors falling out), Peter Brogden, Bob Slawson, and I managed to get several nights of what looks like good data at JHK wavelengths. Doug Welch will check it for part of a night during one of his upcoming runs on the Carnegie telescopes and then we will consider it ready for visitors. Any adventurous soul who wants to try his/her hand at infrared photometry is invited to apply for time (bright time, of course!).

For the first time, one of our librarians visited Las Campanas. For as long as I can remember, we have kidded around about sending one down to check out our "extensive collection" there, but it finally happened. (Lynda Colbeck resides in nearby La Serena with Bill Weller; she spent all of 2 minutes looking at the library!) Lynda and Bill (now Instrument Astronomer at Cerro Tololo) arrived in mid-afternoon and stayed overnight on 1/2 September. It was great to see them there. Both seem to be in good spirits.

The sky was what shall henceforth be called "Lynda-metric"; i.e., it was cloudy enough that normal work couldn't be done easily and yet clear enough to have fun looking around the sky at all the well-known sights. The seeing was excellent and we did the grand tour, including the "Jewel Box", Omega Cen, 47 Tuc, 30 Doradus, and

several other clusters, as well as Jupiter and the good old Moon. The latter two were really impressive with such tranquil conditions. Even those of us who have seen them time and again were impressed with the way they seemed to be "etched" on the sky.

The Canadian Ambassador to Chile, Clayton Bulles, visited the mountain on 6 September. He and his wife Jacqueline arrived in time for lunch and were shown around the mountain during the afternoon. After dinner, they only had time for a brief tour of the sky before they had to leave for a dinner-meeting of the Rotary Club in La Serena. He was clearly impressed by the facility and was very excited by the view through the telescope. Ambassadors rarely get the opportunity to do something fun; most of their contacts are commercial and political. Reluctantly, they left the mountain shortly after 8 pm and I'm sure they didn't get to the meeting before 10:30 pm. Formal dinners often start in Chile around 11 or 12! Such is the life of an ambassador. It is almost as difficult as an astronomer's life!

The only unwelcome visitor during my run was a tarantula, which I found in the inverter house. This one was small; it fit into one of the large coffee cans. After watching it for a while, I turned it loose about a mile down the road. They really are interesting creatures and are not nearly so scary when observed either in captivity or outdoors.

Bob Garrison

THESIS ABSTRACT

The Young Stellar Content of Nearby Resolved Galaxies Wendy Laurel Freedman

Prime focus ultraviolet, blue, and visual plates have been obtained at the Canada-France-Hawaii 3.6m telescope (CFHT) for a sample of five nearby spiral galaxies. In addition, several CCD frames for a number of galaxies were obtained at the CFHT and at the Kitt Peak 4m telescope. The high-mass end of the luminosity function has been investigated to determine whether differences exist from one galaxy to another, or within a galaxy, for example, as a function of radius, or on smaller spatial scales from association to association.

The CFHT photographic data were reduced using the Automatic Plate Measuring (APM) machine in Cambridge, England, a fast-scanning laser spot device. Parameters for several thousand images were measured in each of the galaxies, including x and y positions, magnitudes, and image profile shape information. The CCD data were reduced using the Kitt Peak program RICHFLD for crowded field photometry. The photographic and CCD data are in excellent agreement in the cases where both types of data were acquired.

Colour-magnitude (CM) diagrams for each of the galaxies have been constructed and main-sequence luminosity functions derived using the information available from the CM diagrams. The slope of the upper end of the main-sequence luminosity function appears to be universal for the galaxies in this sample. Due to its large angular size and proximity, the galaxy M33 has been studied in the most detail. The blue-to-red super-giant ratio does not vary with radius in M33, a result contrary to previous studies. The correlation between the OB star distribution and that of neutral hydrogen is shown to have considerable intrinsic scatter, and it is argued that the observations do not support a Schmidt-type law for the rate of star formation.

