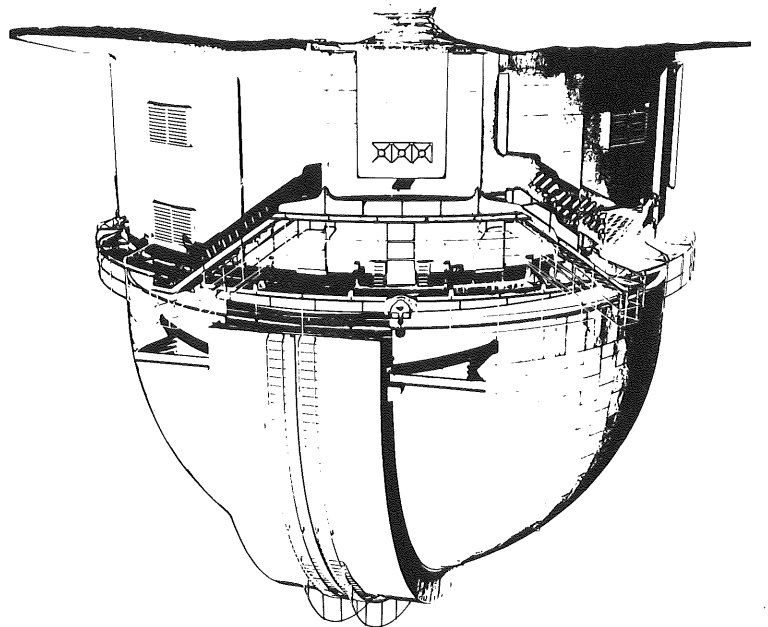


THE DUNLAP DOINGS

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ANOTHER MILESTONE

After 31 years with the observatory and department, first as secretary and then as business officer, Joan Trygve has decided to take a very well-earned early retirement. She will be leaving the department at the end of August after a farewell party at Elms Lea on June 25. It is hotly denied that her decision was precipitated by the contemplation of an 11th year of Don Fernie in the chair!

For those of us who have known Joan over those 31 years it is difficult to imagine DDO and the department without her. There is scarcely a nook or cranny of observatory/departmental affairs that has not known her touch, and no matter how good her replacement, none of these things will ever be quite the same again. On behalf of four directors/chairs, past and present, the current staff and students, and all those many, many people who knew her in years gone by, we wish Joan long years of happy retirement. May your gardening be as fruitful as were your years among us.

-JDF

Jeff Bezaire
Jason Harlow
Katherine Hayhoe
Inese Ivans
Tal Kenet
Sara Seager
Sarah Thompson
Tracy Webb

We welcome the following summer students working at DA, DDO and Erindale:

NSERC SUMMER STUDENTS, 1993

Don Fernie

This issue of the Doings marks not only the end of issues for this academic year, but the end of my term as editor. As of July 1 I will become acting chair of the department and observational director for a year while Ernie Seagist is away. Not only does this mean a changed workload, but in my view one shouldn't have the chief honcho editing the newsletter. (Would you want Brian Mulroney editing your daily newspaper?)

At the moment it isn't clear who will be the next editor, but it is our present intention to as far as possible distribute future issues of the Doings by e-mail. The University is currently in a fearful financial crisis, and it is necessary to cut all expenses, including printing and mailing costs, to the bare minimum. To this end we shall comb our mailing list for readers who have e-mail and send them future issues that way. I urge all such readers to confirm their e-mail addresses in a short message to Brian Beattie (beattie@ddo.astro.utoronto.ca) in case we have an outdated address for you. A small number of paper copies will still be produced for libraries, persons not on e-mail, etc, and for archival purposes.

CONGRATULATIONS

On Saturday evening, 1 May, Bob Garrison was installed as President of the Royal Canadian Institute. His term of office is one year. The RCI is an endowed institute formed in 1849 by Sir Sanford Fleming for the promotion and advancement of science. At the present time, it exercises this mandate through a series of fifteen free, Sunday afternoon, public lectures, as well as a Youth Science Academy and a new Outreach program (similar to the AAS Shapley Lecture Tours. If anyone has suggestions for a public lecture, or would like to join the RCI, please see Bob Garrison or John Percy (who is a past president of the RCI and is still very active in the organization). The cost of a membership is very low, and you would be supporting communication of science to the public, which benefits us all in the long run.

COMINGS AND GOINGS

Rick Perley, a Deputy Director of the VLA, is spending April to August in the department, working with Phil Kronberg.

Richard Gray (PhD 1986) spent a week at the end of May using the departmental library.

In March, Bob Garrison went on an AAS Shapley Lecture Tour to Grand Rapids Michigan, where in two days, he gave 5 public lectures and 2 local TV interviews.

In April, Bob Garrison was in Chile observing at UTSO with the Helen Sawyer Hogg Telescope (HSHT: the third letter of the acronym is important to distinguish it from a very famous or infamous - 2m telescope in orbit).

John Percy visited two universities in April, as part of the American Astronomical Society's Harlow Shapley Lecturers Program: Moorhead State University, in Moorhead, Minnesota, and Sangamon State University, in Springfield, Illinois. At each, he gave a public lecture on "The Search for Extraterrestrial Life", a seminar on "Variable Stars, Photoelectric Photometry, and the AAVSO", and a workshop for astronomy for local school teachers. These visits can be very inspiring for the visitor: at Sangamon State University, there is a sequence of 13 astronomy courses, an on-campus observatory with an active public liaison program, and an off-campus observatory with a 16" telescope used for undergraduate research - all given by 0.33 faculty member! (He also teaches environmental studies, and English!) The quality of the astronomy program was surprisingly good; it is a real pleasure to be able to help dedicated individuals like these.

Professor Hai-Shou Yang, Jackson State University, Mississippi, is spending May 15 to June 12 in the department, learning about undergraduate research in photoelectric photometry with John Percy. Professor Yang hosted a Shapley visit by John Percy last year; his visit to Toronto is a follow-up. Jackson State is a primarily black institution with a strong emphasis on undergraduate teaching and undergraduate research. Thanks to the education division of the US National Science Foundation, there are generous grants programs to support these activities.

John Percy addressed the Toronto Centre of the RASC on April 16 on the topic "New Developments in Astronomy Education Worldwide".

POTPOURRI

The University of Toronto Mentorship Program (which enables outstanding senior high school students to work on research projects with university faculty) had its annual "Show and Tell" poster session on May 18. Two students working with John Percy presented posters: Najam Khaja on "Extrinsic and Intrinsic Light Variations in the Supergiant Binary System HR 7551" and Shormila Roy Choudhury on "Short-Term Light Variations in 25 Cygni".

Been grumbling about those pesky ApJ referees again? Maybe you didn't see the paper in ApJ 408, 600, 1993 by John Faulkner (with the typical Faulknerian title of 'Unstable Degenerates Revisited'). Under the byline it says
Received 1981 November 20; accepted 1992 November 9.

LETTERS

Don,

I was on Bloor Street near St. George when someone stopped me. It was, of all people, Walter Gorza [MSc 1970], whom I had securely tucked away in New Zealand ever since he and his family emigrated there right after he received his M. Sc. He did his thesis with Jack Heard. Walter introduced me to his son (in his twenties, I guess) and his daughter (-in-law?) who live in Toronto, he said. He is here en route to his native Italy and his son is going with him to visit the place the family came from.

I am sorry I was ill equipped as a reporter for the Doings, not having a pad and pencil handy. Walter looked well and flashed his old deferential smile. He said all was going well with him in New Zealand. I urged him to make a visit to the Observatory to see you folks and Frank Hawker and others. He implied that he intended to do that if only to show it to his family. I guess he didn't have time. It was nice of him to stop me on the street.

This was about mid April. Someone please mention it to Frank and Jim.

Don (MacRae)

REVISIONIST'S CORNER

The first of Kepler's Laws says the sun has two foci each an equal distance from each other. - AST 210 student.

LAS CAMPANAS NEWS

Bob Garrison

A new control system for the Helen Sawyer Hogg Telescope was installed by John Pimentel in early December, replacing the aged and troublesome console. All motions of the telescope and dome are now accessible to computer control. I hope that within a few years, we will be operating remotely from Casa Canadiense. It is only a matter of money and priorities for shop time.

With the new encoders and a proper ground, the readout is now very reliable. It is a great improvement over what we had before! During a run in April, I calibrated the position of the telescope at the beginning of the run and did not have to reset it for the entire two-week run. Even though we haven't yet put in corrections for flexure and refraction, the star was never more than an arcminute or two off the Almanac position, a welcome improvement!

By early June, Photometrics will ship a new computer for CCD control, to replace the aging Heurikon. The new controller consists of a board in an IBM Valuetype 486DX33, and will run under OS/2. The main advantages of the new system will be speed and flexibility. The main problem with the Heurikon is that it cannot communicate with anything but a 9-track tape drive, which is a real nuisance. We now have an Ethernet hookup between the dome and house, so we can record the night's observations directly from the IBM's hard disk to the WORM in the house. The Heurikon still will serve as backup, the frequency of crashes having been reduced to a normal level by the replacement of several connectors at the back.

Good progress is being made with the new combination camera head filter holder and automatic guider. The main body construction is finished and the optical and electronics parts are being integrated. We hope to install it by September. That should improve matters considerably! One problem for which we still haven't found a good solution is the backlash in declination, but a promising new preload design is under consideration.

Pablo Prado has agreed to continue as Resident Astronomer for one more year, until July 1994. He already holds the record (three years) for continuous service and will have worked four continuous years by 1994. Ian Shelton also served a total of four years, but with a two-year break in the middle.

Eric Opazo has served for two years as part-time observer and will be replaced in July by Gerald Valladares. The function of part-time observer is to relieve the Resident at times when there is too much Service Observing to be carried out. The position is paid for by service-observing fees. Gerald spent two years on Cerro Pachon doing seeing tests for the Gemini site and is now part time "night-assistant-in-training" at CTIO. His other assets are that he has been an English teacher (so his English is impeccable) and a computer applications instructor (WordPerfect, dBase, etc., all in the DOS world). He will be working at CTIO for ten nights a month and at UTSO for ten nights a month.

After a good, clear summer in Chile, it looks as though we may be in for a rough winter. A series of severe storms in Santiago during April sent cirrus clouds up as far as Las Campanas, resulting in an unusually cloudy month. Usually the transition period is in May. All in all, the telescope is running smoothly and the operation is in better shape than it has ever been.

While I was observing in April, Cabinet Minister Michael Wilson visited Chile in his capacity as Minister of Trade. (Canada is the biggest investor in Chile and LAC Minerals is the biggest private investor.) He is also Minister for Science and Technology, so it was important that he be informed of the Canadian scientific presence in Chile. I didn't know about his trip ahead of time, and didn't want to give up telescope time to see him. He obviously didn't have time in his busy schedule to come to the mountain either. However, the "little engine that could" (the HSHT) enjoys a good reputation in Chile, in spite of its size, and Ambassador Michael Mace is very familiar with our telescope, so he informed the Minister. Our lawyer, Antonio Urrutia-Aninat, was invited to a reception for Mr. Wilson, and had an opportunity to inform him about our Chile observatory and some of its accomplishments. Mr. Wilson seemed to be very interested, even to the point of ignoring other people at the reception for 15 minutes. It is said that every little bit of public relations helps, though I seldom see any DIRECT results of it.

LAS CAMPANAS NOW ON INTERNET

Stefan Mochacki

On May 21, a SLIP connection between Cerro Tololo and Las Campanas came into operation, in a collaboration between CTIO, Carnegie and DDO. The U of T involvement is manifold, since Rayan Zachariassen of Computing and Communications wrote the software.

It was very exciting to be able to telnet directly from DDO to LCO, with success on the first attempt. Although the link is too slow for transferring much data, it will certainly replace the short wave radio as the primary means of communication with our Resident Observer and with visiting astronomers. The sense of isolation on Las Campanas will be greatly reduced, no doubt to the dismay of some. Computer maintenance and software updates at UTSO can now be done from DDO, and detailed instructions will no longer have to be shouted via a noisy radio. The next supernova discovery can just be E-mailed to Cambridge, Mass., without the rigmarole experienced by Ian Shelton in 1987, as described by Bob Garrison:

"Therein lies a complex tale... Ian tried using the radiophone on Las Campanas, but it wasn't working, so one of the night assistants carried down a hand written note to La Serena (180km distant) and it was telephoned to Cambridge, almost 6 hours after the discovery, but luckily an hour or so before Albert Jones in NZ".

The quick implementation of the link was aided by the four years of experience we have acquired in running a SLIP link between DDO and the St. George campus. As a result, Anand Sivaramakrishnan and Miguel Roth of Carnegie were able to bring the link up with little fuss. (SLIP stands for Serial Line Internet Protocol, a way of transferring TCP/IP packets using phone lines rather than Ethernet).

Coordinated observing will certainly be possible, particularly simultaneous photometry and spectroscopy. Such programmes have to be flexible to allow for changing conditions at each site, and the Internet link, with hundreds of bytes per second bandwidth, will allow such coordination in real time.

AN ENCOUNTER WITH A RATTLESNAKE AT THE VLA

Ernie Seagust

Every now and then something happens to remind us of the fragility of life. In a large city like Toronto, there are plenty of reminders in the daily news. At the VLA it is rattlesnakes.

During an observing run in early May, Rob Ivison and I were strolling along the sidewalk to our living quarters after some observing at the VLA control room. It was late at night, and we had not yet checked in to our rooms, having just arrived at the site early that evening. We were discussing the chances of seeing a rattlesnake, since it was the time of year when they emerged to warm themselves on rocks and pavement. I remarked - no worry, I had lived in New Mexico for a whole year without seeing a single one. As we approached our quarters, the area was very dimly lit, and we had a slight argument about who was in room #2, since we couldn't see our keys very well. I insisted that I had the key to room #2, and Rob had #3. As I rushed to insert my key to show that I was right, there emerged suddenly a vigorous rattling sound from the doorstep where I had placed my foot. I lunged backward, uttering some foul curse. In the dim light we could clearly see a young rattler on the doorstep. It continued to rattle for a minute or two while we both stared at it, all three of us somewhat stunned. "Did he get you?" says Rob. "No", says I, but it was mighty close".

After coming to my senses, I suggested that I go back for keys to another block of rooms. Rob stayed to watch the snake, so we wouldn't lose track of it. We would have to walk past this area again to get to the next block. When I returned I found Rob still staring at the spot, but the snake was no longer on the step. "I saw its head poking around, but then it seemed to disappear", says Rob. We moved closer to the step, and could see no evidence of the snake on the step. "He must have either escaped or moved inside somehow - are you sure you didn't see him crawl away?" I said. Rob exclaimed "It couldn't have - I was watching the whole time". Faced with the prospect that it could now be anywhere about, we decided that Rob should go back to the control room for a flashlight, while I stay and watch this time. Rob returned with a light, and we searched the area - no snake! We made our way cautiously to rooms 5 and 6, and hit the sack.

The next morning Rob noted that there was a small hole in the brickwork surrounding the step to room #2, just large enough for a snake to crawl in. The mystery of the disappearing snake was solved - but was it now inside? While we were having breakfast, the administrative officer Allison Patrick - one tough lady of the desert - went into room #2 searching for the snake. (We had the foresight, you see, to officially check the snake in to room #2 on the board in the main office). The snake was not to be found, though we were not sure whether or not it might still be in the hole. Allison seized the occasion to entertain us with snake lore for a while. Her stories mainly concerned her own many encounters with rattlesnakes, and her penchant for beating them or shooting them (I can't remember which) for their skins and their delicacy. I recall thinking that Allison was much deadlier than the snake - at least the snake gave me ample warning!

We didn't see the snake again, but returned later to see the hole patched up with mortar. I still wonder whether the snake was in there when the hole was sealed, and whether there perhaps is an exit through room #2. Anyway, I write this mainly for the protection of you VLA denizens out there. It might be advisable to avoid room #2 at least for a little while.

We take pleasure in introducing what is the first of a series of regular columns for the Doings to be written by Dan Hudon – The Editor

TARGET PRACTICE WITH THE ARROW OF TIME

Dan Hudon

Not long ago I was watching an episode of Imprint, a books and literature program on the local public cable channel. The host of the program, Mr. Messy Hair himself, Daniel Richler, was interviewing the English author Martin Amis. Naturally, they were talking about the books that Amis had written, in particular, one called Time's Arrow. In the book, a character lives his life entirely backwards. Amis went on to say that the origins of his idea came from hearing that when the Universe has expanded to its largest size and then begins to recollapse with the galaxies and all the matter coming back together again, the arrow of time reverses from forwards to backwards. Henceforth, time and motion are in reverse. Or so he's heard.

Shortly thereafter, I donned my elbow pads and cycling helmet and went to the Annual GSU Book Sale and Scrumfest in the GSU gym. One of the books that I happened to escape with (along with my life) was the same Time's Arrow.

So I bought it and read it. I had to stop every paragraph or two to think about whether the preceding backwards actions made sense. And they did. People went out to the trash to pick up the morning paper, then they read it from back to front and bottom to top, summarizing what they just read by reading the big, bold headline last. They regurgitated their coffee every morning, becoming much more tired as they did so, before getting bleary-eyed into bed where they shut off the alarm and went to sleep. Children stopped crying once they were spanked. Tennis players hit the ball forth and back over the net till one of them arbitrarily bounces it and sticks it in his or her pocket.

The main character is a doctor and much to his chagrin makes people feel a lot worse after they come to see him. After reading this, I became curious about how other professions fared under such a time reversal. Some fare rather well and others do not. Plumbers, for instance, would cruelly show up in people's homes on holidays or weekends or when company is over and stop up their toilets and plug their pipes. Lawyers, on the other hand, give exorbitant amounts of money to their clients after doing the smallest tasks. Insurance agents kindly reduce your rates after you've had an accident. Janitors spread dirt and garbage wherever they go. Artists painstakingly dab their canvasses until they have picked up all the paint and put it back into its tubes. Sculptors deviously embed their masterpieces in rock.

Astronomers, interestingly enough, fare rather well under such a time reversal. The Astro-physical Journal sends us three copies of our manuscript. We unseal it, take the much-needed check from the page charges and carefully load the manuscript into the printer. Figures, tables, acknowledgements, references, text, abstract, the works. We go to our computers and dismantle the tables, decompose the figures. We un-type the text and un-catalog the data, making sure that every x, y and magnitude finds its way onto the image. We patch up the data: installing sky, installing defects, installing fringe and bias. We put our images onto magnetic tape and take them to the highest and most accessible peaks that we know of, the ones closest to the sky - Mauna Kea, Las Campanas, La Palma. Once there, we open the dome and unload the tape into

the detector. From there it goes, with all our painstaking work and knowledge, out into the night sky. The light is carefully put into its place, into the cores of stars and the hearts of galaxies. Each photon is put where it belongs, in spiral arms, in ejected shells of gas, into thick clouds of primordial elements. From our blueprints, the galaxies are moulded into clusters, the helium is hammered out, quasars are erected bright as lighthouses. Remarkably, we are the Universe Builders.

Now if only the Astrophysical Journal would send me another paper.

THE HISTORY OF THE TEA MESSAGE

Dan Hudson

So far as I know, the Tea Message was initiated in 1990 by Keith Ashman (currently at CITA), at Space Telescope Science Institute in Baltimore, as an advertisement for Science Tea on Monday afternoons. Rather than send out a banal message (via e-mail on the computer) announcing that tea would be served in the Board Room at 3:30pm, Keith created stories that were loosely connected to having a cup of tea. From the merits of tea to feeding pet fish to episodes of Eastenders to various differences between life on both sides of the pond, there wasn't much that escaped his English wit. As the weeks passed, the message evolved so that it's connection to tea was at best tenuous.

That's where I picked it up. When our department asked me to organize a social/scientific event for the new graduate student lounge I decided that, since it was so successful at STScI, a weekly afternoon tea was the way to go. Following Keith's example that half the fun of tea was in receiving 'the tea message' on your computer beforehand, I set out to entice astronomers within e-mail distance to gather for half an hour on Tuesday afternoons over a cup of tea. Whatever happened (or didn't happen) during that half hour, once they got there, was entirely their fault. What follows are a selection of my efforts at enticing the department to come together for a cup of tea and some conversation on Tuesdays.

Enjoy, The Tea-Meister

(ps. As for the Tea itself, it falls on a day when the whole department cannot be together, something which cannot be helped due to other timetables. However, there is a core group of regular attendees who have assured its success. There have even been occasions where faculty have scheduled their class breaks to coincide with it. In gratitude, I offer them all another cup of tea.)

It's 1992! According to the Chinese, it's the year of the Monkey. But, according to a little-known sect in Bali, 1992 is the year of Umaloom-Engali Interaction. Anthropologists report that: "When the sun is high in the sky the two tribes gather in confused circles and mutter about the goings on and on-goings of their lives. Usually, they have not seen each other for the entire week. A coconut shell is heated and filled with water and medicinal leaves. No one drinks from the shell, they only inhale the pungent vapours. Some become dizzy and start rambling incoherently about what they've seen in the heavens. Oddly, it appears to be a beneficial and enjoyable occasion. This week marks their 333,333,332nd gathering."

Come and be a part of the new tradition: Tea served in the astronomy lounge (Rm 1422) at 3:30pm Cookies also available, free this week, as is the astronomy discussion.

** You Can't Have Too Much Tee **

Mired in the surreality of the dawn, Higgins rolled out of bed with great difficulty. After listening to half an hour of the jocular radio, he realized that it was absurdity and stupidity in actuality ("Mr. Goo-Head' is a pinhead", he muttered); despite his propensity for sloth, his levity bested his gravity and he arose. The shower, having gained notoriety for its irregularity was again spewing water with great mediocrity. In all sincerity, he tried to show his maturity, succumbed to the causality and got wet anyway. Good thing it was only a temporality. He breakfasted with variety, purity and disparity, savouring a little of each. It was too early to be persnickety. He arrived at the office, took a coffee into his confidentiality - it had the audacity to be full of flaccidity and lacking in vivacity, so he had another. He sat like royalty in front of his computer, determined to combine its ability with his specialty (and vice-versatility). Recent programs had displayed their morbidity instead of their longevity according to their technicality. Today would be different.

Plenty of tea is being served in the astronomy lounge (Rm 1422) at 3:30pm. Cookies are available, discussion is by association and clustering.

Bill and The Xerox Machine

Bill brought in his handful of sheets of paper and placed them on the feeder of the Xerox machine. He was going to make one hundred and fifty copies. The LED display flashed PLEASE ENTER USER CODE. Bill was pleased, so he entered his user code. Apparently satisfied, the display now said: MAKE SURE COPIES ARE FACE UP AND IN ORDER. So Bill made sure his copies were face up and in order. Bill's finger hovered over the START button as he anticipated the WHEN READY PRESS START message. The message appeared almost immediately and Bill pressed the START button. The Xerox machine whirred into action: lights flashing, motors running and siphoning through the small stack of papers on the feeder. Bill rubbed his hands together anxiously as he waited for the copies to be pooped out. One copy appeared in the output tray. Bill inspected it to make sure that it was indeed a copy. Suddenly the noise and activity of the machine ground to a halt. Bill was sure it was a paper jam and frowned as he read the display: OPEN THE FRONT DOOR THEN READ THE NEXT MESSAGE. Bill opened the front door and read the next message. It said TURN AROUND THREE TIMES. With his one copy in his hand, Bill stepped back and started turning around on the spot. He got half way around and suddenly raised one eyebrow in wonder at what he was doing. He stared at the display again. Now it said: CLOSE THE FRONT DOOR. So Bill closed the front door. Apparently satisfied, the Xerox machine whirred into action again, once more swallowing papers from the feeder and pooping out copies. Bill, meanwhile, stared at the display with eyebrows furrowed....

Tea and cookies in the Lounge at 3:30pm. Leave the machines behind.

LIBRARY NEWS

Marlene Cummins

I recently attended an interesting lecture on citation analysis focussing on Canadian science. Such citation analysis indicates that the impact of Canadian science (as measured by number of citations per paper) has increased modestly over the last decade or so.

The impact of the US, which is quite high to start with, remained steady while that of the UK (also high to start with) has declined (because of underfunding, migration?). Japan's impact has increased dramatically. The half dozen or so countries with the most impact have a small absolute output (except the US which ranks no. 2). Switzerland, for example, has the highest impact but a small absolute output as measured by number of papers. Canada's absolute output is much higher but it ranks 10th in impact.

Within the sciences, the field of life sciences has the highest impact. In the period 1981-92 the most cited paper was one by DeBold and Sonnenberg (the latter is from U of T) - it had something to do with rats. This superstar of Canadian science had about 1700 citations.

In the physical sciences and engineering, two astronomy papers made the top ten Canadian papers list:

Publications of the Astronomical Society of Japan, 99, 191-222 (1987) [sic] - cited 259 times
Astrophysical Journal, supplement series, V. 51, p. 29-65 (1983) - cited 284 times

The lecture was given at the Faculty of Library and Information Science by the chair of the Institute for Scientific Information (the publisher of the Citations Indexes).

Citation analysis of institutions or individuals is fraught with danger - but it can be fun, and useful if undertaken with care.

PAPERS SUBMITTED

PREPRINTS BY FACULTY AND STUDENTS

March 31 to May 25, 1993

Eales, S.A.; Hill, G.J.; Rawlings, S., *A Ly alpha survey of a possible Zeldovich pancake* David Dunlap Observatory, University of Toronto, 93-0642 21-Apr-1993.
Femie, J.D.; Seager, S., *V441 Herculis and V814 Herculis in 1991 and 1992* David Dunlap Observatory, University of Toronto, 93-0643 21-Apr-1993.

Ivson, R.J.; et al, *A multi-frequency study of symbiotic stars - III. Simultaneous ultraviolet and optical observations of AX Persei* David Dunlap Observatory, University of Toronto, 93-0648 22-Apr-1993.

Ivson, R.J.; Munari, U.; Marang, F., *On the symbiotic star V919 Sagittarii* David Dunlap Observatory, University of Toronto, 93-0732 10-May-1993.

Li, J.G.; Seagust, E.R.; Sage, L.J., *Molecular gas in the early-type starburst galaxy NGC 3928* David Dunlap Observatory, University of Toronto, 93-0710 6-May-1993.
Rucinski, S.M.; Lu, W.-X.; Shi, J., *Spectral-line broadening functions of W Uma-type binaries.* III. *W. Uma* ISTS York U, 93-0618 14-Apr-1993.

Rucinski, S.M., *A simple description of light curves of W Uma systems* ISTS York U, 93-0619 14-Apr-1993.