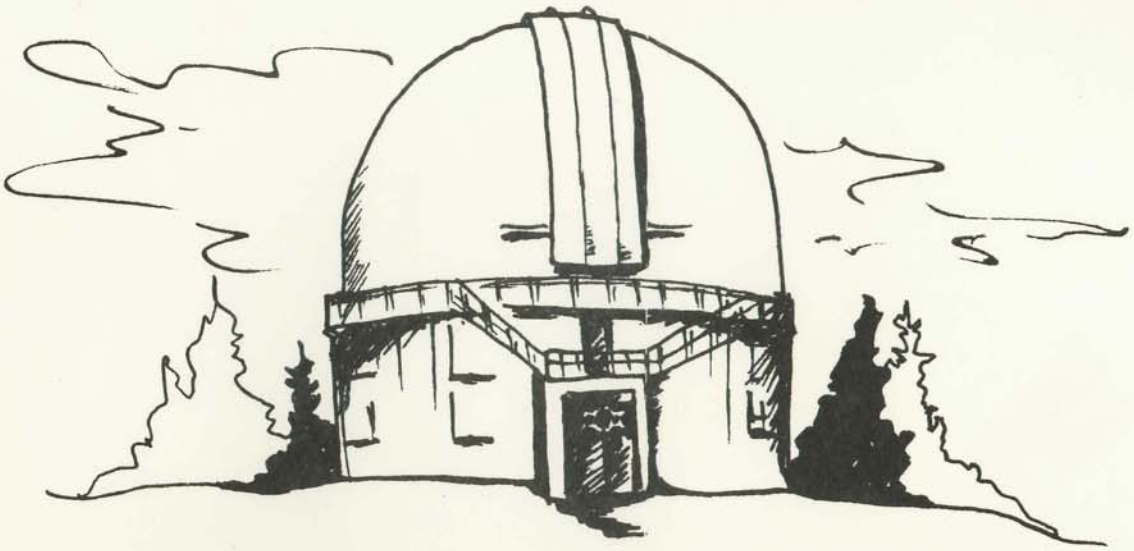
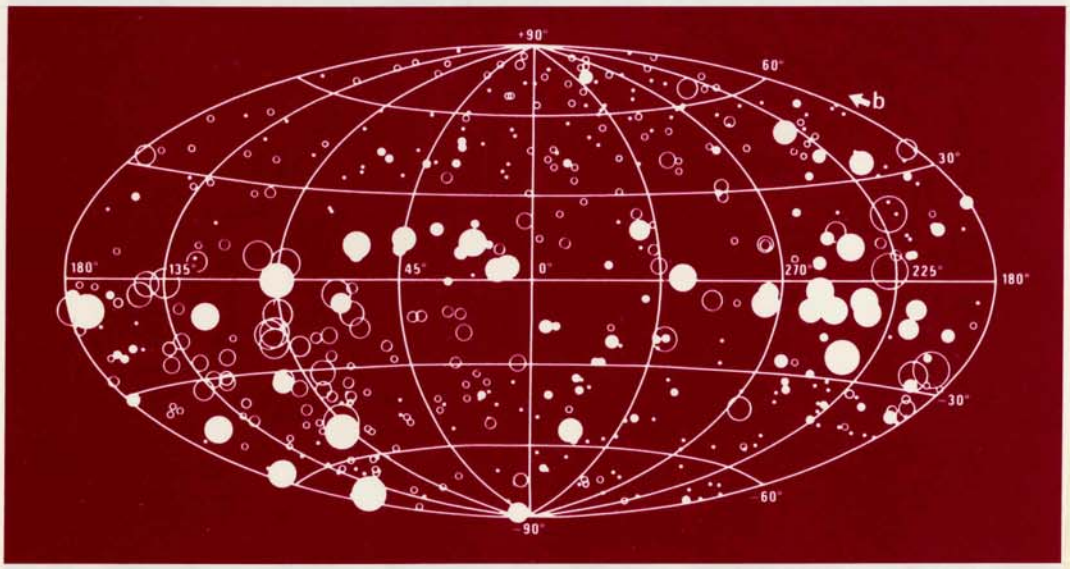
I.A.U.
SYMP.
No. 84

THE LARGE-SCALE CHARACTERISTICS OF THE GALAXY



DAVID DUNLAP DOINGS

VOL. 12, No. 8 DECEMBER 12, 1979



INTERNATIONAL ASTRONOMICAL UNION
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THE MAGNETIC MILKY WAY

THE RM SKY

Our cover is the dust jacket for the proceedings of IAU Symposium No. 84 held at College Park, Maryland, 12-17 June, 1978. What makes it newsworthy is the figure appearing on the jacket. It shows Phil Kronberg's and Martine Normandin's rotation measures (RM's) of 475 extragalactic sources, after "cleaning out" the extragalactic effects to the first order.

This new look at the galactic magnetic field is derived from hundreds of new linear polarization measurements made over the past 5 years on many, often weak, extragalactic sources. Observations were made by Martine and Phil at 6 different radio wavelengths between 2 and 19 cm using the NRAO Interferometer, the 100 m telescope at Bonn and the ARO 46 m telescope. In addition colleagues from other radio observatories donated unpublished polarization data.

Martine, in her Ph.D. thesis, was able to show for the first time that the Milky Way has large scale magnetic fields. This first reliable look at the magnetic structure of our Galaxy is an important step in understanding the overall dynamics of the interstellar medium and the past history of the Milky Way.

The art work was done at Scarborough College by Tony Westbrook and David Harford. In the figure, open circles represent negative RM's and the others represent positive RM's, with values ranging from 0 to over 300 rad m^{-2}.

The total number of RM's is currently 552 but Phil, Martine, Jim Clarke, Stuart Button and Louis Noreau will be sharing observing duties around-the-clock on the 46 m telescope at ARO from December 16 to 24. This will provide the next instalment of polarization measurements - and hence even more new RM's.

COMINGS AND GOINGS

Dr. Wojtek Krzeminski has arrived from Poland to spend six months working with Bob Garrison followed by six months with John Landstreet. His first two months will be spent in Chile observing with the U. of T. 24" at Las Campanas and at ESO and CARSO.

Dr. Krzeminski is on leave from the Nicholas Copernicus Astronomical Centre in Warsaw. His primary research interest is the photometry of close binary systems, and he has also worked on photometry of variable stars, including x-ray source identifications.

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Editors: Donald A. MacRae and Robert A. McLaren

PHYSICAL SCIENCE SATURDAY

Physical Science Saturday was held on November 10th. This is the annual occasion when high school students have an opportunity to visit the 7 physical science departments of the Faculty of Arts and Science, and about 600 people attended this year. The event began with two lectures in Convocation Hall. One of these, entitled "The Lost Astronomies", was given by our own Don Fernie. After the lectures, the individual departments held tours or open houses. On hand to greet the visitors to the Astronomy department were Christine Clement, Barry Madore, Dominique Barceloux, Dennis Crabtree, Wendy Freedman, Douglas Gies, Rick McGonegal, Chris Rogers and undergraduates Petrusia Bojetchko, Tom Box, Vince Karlewicz, Margot Loren, Fred Schmidt, Chris Vaughn and Doug Welch.

The activities included a demonstration of our telescopes, a tour of the infrared lab, a slide show of galaxy photographs and some computer games. It was a beautiful day, and the (approximately) 250 people who visited our department had a good view of the "active" sun with some of our telescopes.

C^3

LAS CAMPANAS NEWS

During the past two months, Chris Corbally and Chris McAlary from U. of T. both had successful observing runs at Las Campanas. Furthermore, Hugo Levato from Argentina was so impressed with the quality of the image-tube spectra he obtained that he will try to pass them off to his colleagues as direct spectra. Hugo is working on multiple star systems, some of which are faint and closely spaced, so the good seeing and fast equipment are definitely assets. He has applied for and received time in February to continue this interesting research.

Condors and buzzards have been putting on a great show and Alan Boyce has some impressive photographs. Just for fun, I took an old 8-mm Brownie movie camera along on my run in November, just to see what could be done. If the results look good, it may be possible to rent a 16-mm camera and put together a movie of our southern hemisphere operation. I was able to get one shot of a condor in the distance, but of course when one came in close a few days later, I didn't have the camera with me - that must be someone's "law"!

One sad note is that Maarten Schmidt has resigned as director of Hale Observatories effective July 1, 1980.

rG

CFHT NEWS

At the moment the prime focus upper end has been replaced by the Cassegrain upper end and control system trials are proceeding. Meanwhile, down on the observing floor, recabling and relocation of some components in the prime focus cage is going on in order to make life easier for the astronomer when regular scheduling begins, probably with the dark of the Moon in mid-March, 1980.

The precision of pointing the telescope is good, even without corrections programmed into the controls. Measurements of 50-odd stars over the sky will soon provide the information necessary for this refinement. Meanwhile the error of setting is less than about 30" and so also is the deviation of the polar axis from the true pole. Refraction, misalignment and flexure of this magnitude can easily be programmed out, leaving field rotation as the major residual effect. The polar axis will be adjusted to make this a minimum over a selected area of the sky.

Changing the upper end is done with the telescope in a vertical position, the rings being manipulated by a crane at the top of the dome. The process is analogous to the docking of two spacecraft, and fine-motion in X and Y is not all that easy. Modifications to the "docking" mechanism necessitate postponement of the beginning of outsiders'use of the telescope, scheduled at first for January and then for February.

In the summer only temporary cables were installed for the essential functions of the telescope. But now, some of the permanent cabling is already installed and some (Cassegrain upper ends, the condé train, and instrument connections) is in progress.

At DAO the secondary mirror is being aspherized to become the conjugate hyperboloid of the primary. However the availability of the Cassegrain focus is at least a year away. The primary will probably be realuminized in February. The cooling of the dome floor has been found to be very effective in maintaining excellent seeing.

Major changes are to take place in the upper echelons of CFHT in 1980, beginning on January 1. There will be 5 new members of the Board and 5 new members of SAC; the Canadians are to be van den Bergh and Wehlan replacing Locke and MacRae on the Board and Hartwick and Landstreet replacing Walker and Wehlau on the SAC. A new Director and a new Associate Director will be appointed before the summer.

MR

OBSERVING TRIPS

Ernie Seaquist accompanied *Lindsey Davis* on an observing run at the Arecibo Ionospheric Observatory, Puerto Rico between November 19 and December 3. Lindsey continued her Ph.D. thesis observations there, and Ernie carried out further observations on SS 433. Ernie also gave a colloquium on SS 433 at the observatory. Lindsey remained at Arecibo until December 9 to reduce her data.

Chris McAlary returned on November 6 from a 3-week observing trip to Chile during which he had 3 clear nights (out of 5) of infrared photometry on the 1.5 m at CTIO and 8 clear nights (out of 11) of UBVRI photometry on the U. of T. 60 cm at Las Campanas. Chris is studying the nuclei of active galaxies for his thesis. Chris also gave a talk on "Infrared Spectrophotometry of SS 433" at the University of Chile.

Phil Kronberg and *Peter Biermann* were at the VLA November 3-9, observing and reducing data.

Peter Martin was at Steward Observatory November 20-25 making polarimetric observations of QSO's.

Bob McLaren was at Kitt Peak November 3-10 doing infrared heterodyne spectroscopy of circumstellar shells.

Bob Garrison had an observing run on the U. of T. 60-cm telescope at Las Campanas November 9-18. See Las Campanas News.

P O T P O U R R I

We are pleased to learn that *Dr. John Kormendy* (RASC Gold Medal 7TO) has accepted a permanent appointment to the staff of the DAO effective December 27, 1979. John obtained his Ph.D. from Caltech and subsequently held postdoctoral positions at Berkeley and KPNO.

Congratulations to *Maureen Clarke* (whose husband is Jim) on receiving her Ph.D. in English (Byron's plays) at the November 30 Convocation. Maureen will be teaching an English course at Scarborough next term.

Helen Hogg and *John Percy* attended the recent AAVSO meeting in Cambridge Mass. Speaking of Helen Hogg, we were pleased to hear that her book *The Stars Belong to Everyone* has been chosen by the Canadian Booksellers' Association for inclusion in their catalogue *Booksellers' Choice*.

Pierre Demarque paid a brief visit to the department on November 23 and gave a talk entitled "Current Work on the Galactic Halo".

Dave Turner was at McMaster on November 1 to address the Hamilton Centre of the RASC. His topic was "Recent Research on the Galactic Distance Scale and Star Formation".

Don Fernie attended the wrap-up meeting of the National Organizing Committee for the IAU in Vancouver on November 2. The purpose was to receive the Financial statement on the almost half-million dollar budget needed to run the Montreal General Assembly. Happily, no red ink was needed!

Phil Kronberg visited the Astronomy Group at the Université de Montréal on November 16 and gave two graduate lectures in radio astronomy.

Don MacRae was at University of Victoria for the CFHT Board, December 6 and 7. *Bob Garrison* was there too on December 8, for a meeting of a SAC-CSC subcommittee to consider time allocation, January - June 1980.

We hear from the people at University of Victoria that *Roel Hurkens* has accepted a position as co-ordinator of their Co-op Programme for the Physics Department. Roel is an alumnus of the parallel programme at Waterloo. Also *Michael De Robertis* (B.Sc. 7T7 and RASC Gold Medal winner in the same year) is currently enrolled at University of Victoria and doing well.

*COLLOQUIA**

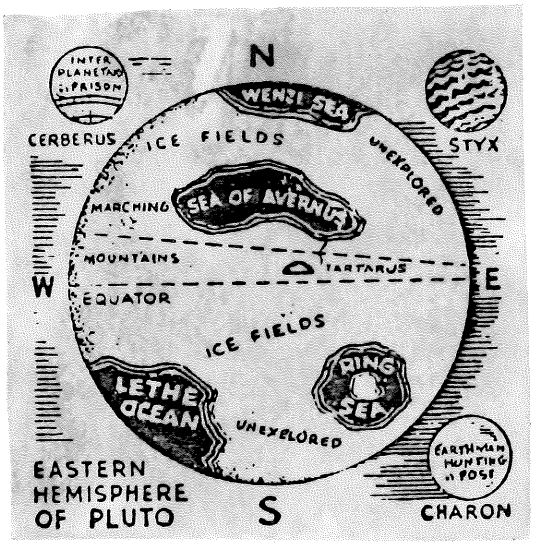
December 12	*Armando Arellano Ferro and Chris Rogers, University of Toronto* *G-2000 Current Literature Seminar*
December 19	*Colin Keay, University of Newcastle, New South Wales, Australia* *"The Riddle of the Sounds - A Solution to the Mystery of Noises from Bright Fireball Meteors"*
January 9	*Gerry Grieve and Mario Pedreros, University of Toronto* *G-2000 Current Literature Seminar*
January 23	*D.W. Weedman, Pennsylvania State University* *Topic T.B.A.*
January 30	*R.W. Nicholls, Centre for Research in Experimental Space Science, York University* *Topic T.B.A.*
February 7 (Thurs.)	*Cyril Ponnamperuma, University of Maryland* *"Chemical Origin of Life"* *(Joint Astronomy-Physics, Room MP 102, 4:10 p.m.)*

* *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.*

PAPERS SUBMITTED

K.E. Hill	The View of Science in the Magazine "Omni"
D.G. Turner	The Reddening of Beta Doradus
D.G. Turner	The Distance of Ruprecht 44
B.F. Madore	Companions to Near-By Spirals
E.R. Seaquist et al	Radio Observations and Analysis of Nova V1500 Cygni

CHARON ANTICIPATED?



From "An Atlas of Fantasy" by J.B. Post

The attached map of Pluto is the fantasy work of Edmond Hamilton, and was drawn by him in 1940 to illustrate an article for a "Captain Future" magazine. Rather surprisingly, Hamilton included 3 satellites to the planet, with names obviously taken from mythology. It is interesting to note that "Charon" was predicted 38 years prior to its actual discovery. Could there be 2 additional satellites to Pluto that are as yet undetected?

Dave Turner

GASA's OWN CAR RALLYE

The GASA - sponsored car rallye, held on October 21, saw a total of 13 cars entered with participants comprising students, faculty, support staff and a number of friends.

The starting point was DDO, and by 10:45 the parking lot was crowded. Dr. Hogg remarked that she had never seen so many cars in the lot on a Sunday. The teams left at one-minute intervals beginning shortly after 11:00. An added feature of this rallye was a mobile scavenger hunt. Besides being asked to

decipher the route instructions and answer obscure questions, all entrants were required to return with an odd assortment of things. These ranged from apples to lily-pads to the phone number of the Richmond Inn. One car pulled to a stop beside a phone booth only to discover that that page was mysteriously missing from the book.

In the end, the car driven by "U-Turn" Sterns and navigated by "Hot-Rod" Zubrod was the winner. Second place went to Peter Martin and navigator Camie Geary.

GASA thanks Gerry Grieve and Dennis Crabtree for setting up the rallye and also thanks Ron and Linda Lyons for their assistance.

Keep your eyes open for another rallye in the Spring.

GASA

REVISIONISTS' CORNER

With the arrival of the exam season, our Revisionists' Corner file is now filled beyond capacity. We'll try to relieve some of the pressure by publishing the following words (and pictures) of wisdom culled from assorted undergraduate efforts.

- From the AST 100 Term Test:

  "Half life is the time it takes for half the population to decay into daughters" (No libber, this one!)

  "Polaris is the present North Star, located in the constellation of Ulcer Minor"

- From last spring's AST 100 and 210 final exams:

  "A black hole is so massive that a medium-sized English-made silver teaspoon (not a tablespoon) would weigh on the order of a billion tons."

  "... Grote Reber used a radio telescope (a diabolic dish) and ..."

  We are advised that "Decan" are ancient Egyptian asterisms used for calendrical and timekeeping purposes. A Student's definition: Brooklyn slang for 'the washroom.'

- The following question appeared on the AST 120 term test. Four of the more imaginative responses are reproduced.

> Consider a blackbody which is observed through an intervening layer of gas (the situation used to demonstrate Kirchoff's Laws). Suppose the blackbody is at a temperature of 6000 K and the gas is in thermal equilibrium at 4000 K. Further suppose that the only appreciable opacity in the gas is a narrow line centred at 8000 Å. Sketch below the spectrum which would be observed.