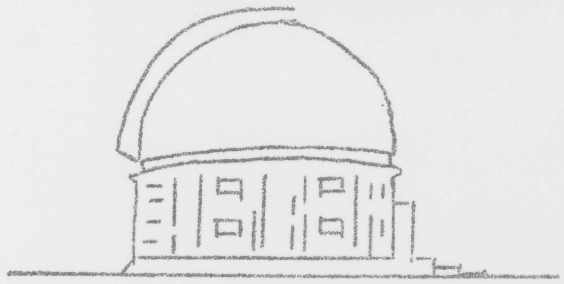
DAVID DUNLAP DOINGS

Vol. 1, No. 4

April 24, 1968



EDITORIAL

Mirror Coating - Past, Present and Future

With the imminence of the delivery of a new aluminizing tank for mirrors up to 30 inches, and with talk from time to time of a new large tank for the 74-inch mirror, my thoughts have turned to the early days of the Observatory and our problems with mirror coatings.

In the early 1930's Dr. John Strong, then at Cal. Tech., was experimenting with the application of vacuum metal-coating techniques to large telescope mirrors, but the process had not reached the point where it was feasible to consider the aluminizing of the 74-inch mirror. However, the secondaries were shipped en route to us to Cal. Tech., for aluminizing. At that time Strong favoured a base coat of chromium under the aluminium, the idea being that it provided better adhesion and would withstand the repeated chemical removals of the aluminium for re-coating. Our Cassegrain secondary was so treated but in the course of time the chromium began to come off and what remained seemed to affect the new aluminum coats. In 1961 we managed to remove most of the chromium, but there is still a little patchiness in the centre.

The process of silvering the 74-inch mirror was a messy business, to say the least. Dr. R. K. Young then the Director, was in charge of the operation, and all the other male members of the staff, namely Dr. Frank Hogg, Dr. Peter Millman, Gerry Longworth and myself, were his assistants. After cleaning the mirror we plugged the centre hole and wrapped a long strip of oil-cloth around the edge to form a dish about six inches deep which would hold the silvering solutions. One of these was a fearful mixture of caustic potash and silver nitrate which left black stains on anything it touched (hands included), and the other was a reducing solution of dextrose - which, when added to the silver nitrate solution, precipitated out pure silver. We carried bucket after bucket of the silver nitrate solution from the darkroom in the Administration Building where Dr. Young prepared it, and sloshed it into the mirror "dish". A stain on the floor at the north end of the upper corridor still marks the spot where Dr. Millman slipped and spilled half a bucket of silver nitrate solution.

When the silver nitrate was all in the dish Dr. Young added the reducing solution and carefully watched the dimming and bluing of the light from a bulb under the mirror as the silver deposited. When he judged that the light was just the right shade of dark blue he ordered the plug pulled. The next morning when the coat had dried we buffed it carefully and Dr. Young decided whether it was a good coat or whether we should start all over again. One such morning we came in and found that condensation from the piers had trickled down past the steel trap door and left a horrible rusty stain on our new coating. For years afterwards we maintained that the "great red spot" was still to be seen despite repeated resilverings in the meantime.

Silver coats were excellent for a few weeks or months, but the smoke from the C.N.R. steam engines soon tarnished them, and it was in 1941 that Dr. Young had the present aluminizing tank made. Its worst feature is its enormous height which makes it hard to get a good vacuum with our present marginally adequate diffusion pump. The reason for the height is that Dr. Young believed that, to get an acceptably uniform coating with the vaporizing coils beyond the edge of the mirror, these coils had to be three feet above the mirror surface. He did not dare position them within the edge of the mirror for fear of sputtering of liquid aluminum, and, although he recognized the virtue of a thinner tank mounted vertically, he could not design at a reasonable cost a system of up-ending the mirror which he would consider safe.

The three-foot path for the aluminum atoms turned out to be too much for the mean free path in the best vacuum which we could attain with the original pumping equipment, so in the early 50's we made two changes: we lowered the coils to 18 inches above the mirror surface and we fitted a larger diffusion pump. It helped, but in these more affluent days our mirror deserves an up-to-date aluminizing chamber. Let us hope that the new small-mirror chamber will pilot the way for this improvement.

J. F. H.

STRICTLY PROFESSIONAL

Radio Source = Variable Star

John Schmitt, through the kind of accident that, in the words of Newton, "has the habit of happening to great men", has been able to identify a known radio source with a known faint variable star. (Details have been sent in a letter to Nature). John has left for Kitt Peak where he has arranged to use an hour or so of David DuPuy's assigned telescope time to investigate spectrographically the nature of the "star".

Nova Vulpeculae

The new nova in Vulpecula discovered by Alcock on the night

of April 14-15 was observed photometrically on the following night by Dr. Fernie and Joan Hube, and on the same night spectrographically by Anson Moorhouse and Archie Ridder. As of April 19th these were the only photometric and spectrographic observations reported to the I.A.U. Central Bureau of Astronomical telegrams which were made before maximum light - which appears to have happened about Apr. 17.24 U.T. Dr. Fernie's and Joan's results on Apr. 16.24 UT showed the nova to have V = 4.97, B-V = 0.76, U-B = 0.07, whereas the next night it had brightened and reddened to V = 4.5, B-V = 0.9 and U-B = 0.6. Our spectrograms of April 16.41 showed many broad absorption lines of H and the ionized metals with little or no emission (perhaps a hint at Hβ) and a velocity of -734 km/sec. On another spectrogram taken by Fred Hickok and Bill Dodd on April 20.40 the spectrum shows marked changes: strong emission bands have appeared, and some of the absorption lines have become double, the new component showing about a 25 per cent greater blueshift than the original.

Radio Astronomy

A University of Toronto 60-foot paraboloidal telescope is under construction at the Algonquin Radio Observatory by Casey Berlanda and an assistant. The dish itself is completed and the gun-mount which will serve as an altazimuth mounting is on the tower. There remain the wiring (which will be done by George Watson) and the choice of a computer which will be used to control the telescope and for limited data acquisition.

The program to observe Haro galaxies has been completed by Dr. Seaquist and Carl Bignell. Of the 40 galaxies attempted, signals were detected for five, these being the brightest of the 40.

Dr. Roberts and Donald Buchanan, Orest Dubas, Greg Fahlman David Fort, Hugh Ross and Colin Banton visited ARO and had a training session on the 150 foot telescope.

The Waterloo Meeting of the National Committee for the I.A.U.

Nearly all teaching staff members and a number of students attended the I.A.U. National Committee sessions for papers at the University of Waterloo on April 8-9. The arrangements at Waterloo made by Dr. Bakos and Dr. FitzGerald were excellent, including a reception at Dr. Bakos' house, and complimentary lunch and dinner provided by the University. A formal dedication of the 12-inch reflector took place on April 8 - congratulations to the Physics Department for this beginning in observational astronomy. Dr. Bidelman's invited paper on "High Dispersion Stellar Spectroscopy" provided inspiring examples of what riches remain to be tapped in stellar spectra. The sessions of 28 papers included the following by our personnel:

Radial Velocity Determinations with a Grating Spectrograph at 12 A/mm., Walter Gorza, J.F. Heard and Joan Hube.

Comments on the Space Distribution of Quasi-Stellar Sources, R. C. Roeder.

The Mass-Radius Relation for Rapidly Rotating White Dwarfs, Orest V. Dubas and S.P.S. Anand.

Long Baseline Interferometer Observations of Quasars, Canadian LBL Group (Presented by J.L. Yen)

Models for Beta Cephei Stars, John R. Percy

Remarks concerning HD 209813, J.D. Fernie

April Seminars

Although none was scheduled for April, the following informal seminars took place:

April 4 Special Seminar	Dr. S.P.S. Anand,	"Highlights of International Symposium on Low Luminosity Stars".
April 17 Special "Countdown"	Dr. S. van den Bergh on "West-Coast news of Pulsars". Dr. John Schmitt on "Identity of a Radio Source and a Variable Star".	

On April 16 some of us attended a seminar on B-type stars given at York University by Dr. Anne Underhill of Utrecht.

On April 23 there was a Physics Seminar of particular astronomical interest: Prof. S. Mandelstam of Lebedev Institute Moscow, "X-Rays from the Sun and Moon".

May Seminars

Regular Wednesday "Countdowns" involving staff and students will be resumed on May 15.

Other Coming Events

On Friday, May 10, Dr. Roeder will speak to the Toronto Centre of the R.A.S.C. on "The Present Status of Quasi-Stellar Objects" at 8:00 p.m. in room 1035 of the Wallberg Building.

The Annual General Assembly of the R.A.S.C. will take place on May 17-20 in Calgary. Features will include the dedication of the DEMR PZT at Priddis near Calgary , an address on "The Chase of UFO's - A Scientific Paradox of Our Times" by Dr. William Markowitz of the University of Wisconsin, sessions for papers by members, a

visit to the new Calgary Centennial Planetarium and an excursion to Banff and the Sulphur Mountain Cosmic Ray Laboratory.

Attention is again drawn to the June Institute 1968 at the University on June 11 to 14. Details are set out in a mimeogram available from the Department of Astronomy. Visitors are welcome, and some funds are available to visiting graduate students for lodging and sustenance. Write to Dr. S.P.S. Anand.

COMINGS AND GOINGS

Dr. van den Bergh gave a series of nine lectures on the "Galaxies of the Local Group" to 26 enrolled graduate students and 10 auditors at the University of California at Berkeley on April 1 to 10. He also gave colloquia on "Intermediate Band Photometry of Star Clusters and Galaxies" both at Berkeley and at Cal. Tech.

David DuPuy is at Kitt Peak to do UBV photometry and image-tube spectroscopy of Seyfert galaxies. Dr. Schmitt is there too to use a small part of David's time.

VISITORS

Dr. K. O. Wright, Director of the D.A.O. visited the Observatory on April 7 and both he and Dr. Alan Batten visited the Department and the McLaughlin Planetarium on April 11.

Mr. James Godkin of the Publications and Employee Relations Department of Automatic Electric of Canada at Brockville visited the Observatory on April 11 to gather information and to take photographs for an article on the Observatory for the Company's journal.

Dr. and Mrs. J.F.R. Gower, both radio astronomers at UBC, visited the Observatory on April 11.

OBITUARY

It is with sadness that we record the death on April 7 of Dr. A.F. Stevenson, an old friend of some of us and a frequent visitor at our recent seminars and colloquia. Dr. Stevenson some years ago was Professor of Applied Mathematics at the University; he left to join the staff of the Dublin Institute of Advanced Studies, returned to this continent to become Professor of Physics at Wayne University, and, on his retirement three years ago, came back to Toronto to live. Dr. Stevenson had a particular interest in celestial mechanics, but rarely missed a lecture or talk on any branch of astronomy.

APPOINTMENT

Dr. Roeder was elected at the Waterloo meeting of the National Committee for the I.A.U. to be Canada's appointee to I.A.U. Commission 46 on the Teaching of Astronomy.

AWARDS

Doug Hube has been awarded a Post-doctorate Fellowship by the National Research Council and hopes to hold it at Kitt Peak commencing in the fall.

University of Toronto Open Fellowships have been awarded to Tom Barnes and David DuPuy, and a special scholarship for graduates of the General Science Course has been awarded to Walter Gorza.

NRC Awards have been made as follows:

Studentships to Bob Chambers and Peter Martin

Renewals to Lorne Braun, Orest Dubas, Greg Fahlman, Peter Hagen and Raymonde Verrault.

ALUMNUS

Richard Larson (M.Sc. 1964) has received his Ph.D. from Cal. Tech. this month, and in the fall will go to Yale University as Assistant Professor. Dr. Larson was a former student of Dr. Demarque and has been a frequent collaborator with him.

RESIGNATION

We are sorry that Mrs. Jenny Grasty will be leaving her computing position in the Department on April 26. She will be joining her husband who is taking up a new post in Ottawa. Our best wishes to them both.

MISCELLANEOUS AND PERSONAL

Mr. and Mrs. R. Remage announce the engagement of their daughter, Nancy, to Mr. Martin Evans, the marriage to take place at Nancy's home town in Delaware on August 5th. Mr. Evans is on the University teaching staff in the School of Business, expects to obtain his Ph.D. in Industrial Psychology from Yale this summer and to continue on the U. of T. staff. Nancy will be continuing her graduate studies in Astronomy.

Little Sabine van den Bergh (seven months old) is making remarkably good progress in Sick Children's Hospital after undergoing a serious spinal operation last Friday.

Mrs. Fernie and Kim and Robyn have returned from their summer (sic) holiday in South Africa.

John Percy has been doing some praiseworthy proselytizing in the Public Libraries of Toronto. He has organized a display of models, books, photos and meteorites which has been shown at several libraries, and he has given talks to groups of children at library branches.

A new shipment of Palomar Atlas glass prints have been received - none broken.

Dr. Heard has been appointed to the Board of Governors of the York Regional School of Nursing.

Doug Hube passed his German.