



EDITORIAL

The Six-Inch Cooke

Writing in July about the Hogg two-star sextant, I mentioned the World Inventory of Historic Scientific Instruments. Another candidate for this inventory might be the six-inch refractor by Thos. Cooke and Sons which is now located in our north dome.

The first reference I have found to this telescope is in the Transactions of the R.A.S.C. for 1890 which reports the fifth meeting of the newly-formed Society (then the Toronto Physical and Astronomical Society) which was held on April 22 of that year at the Toronto Magnetical and Meteorological Observatory by invitation of the Director, Mr. Charles Carpmael, F.R.S.C., who was also President of the Society. Mr. Carpmael demonstrated the Cooke refractor and explained that it had been purchased by the Dominion Government (at a cost of £400) to be used at Toronto during the transit of Venus of December 6, 1882. The report does not state that it was, in fact, used for the transit observations, and I have been unable to find a reference to such an observation. Perhaps it was cloudy, but we know that it was clear in Markham for the event, for Dr. Chant refers in his memoirs to observations attempted there by his teacher, Mr. Sullivan.

The transit of Venus observations involved the timing of the duration of the transit as seen from various locations on the earth with a view to determining the solar parallax. The method had been hinted at by Kepler, more definitely discussed by Gregory in 1663, and elaborated by Halley in 1677. Halley estimated that timing of the transit duration to within two seconds accuracy could yield the sun's distance to within about one part in 500 of its true value. However, observations at the transits of 1761 and 1769 led to values of the solar parallax ranging from 8".571 (which long remained classical) to 8".9. The discordances have usually been blamed on the uncertainties of timing resulting from the so-called "black drop", but Dr. Fernie tells me that a recent re-discussion indicates that they were as much due to the

uncertainty of the terrestrial positions. Be that as it may, elaborate preparations were made for observations of the 1874 and 1882 transits. I have always understood that a number of Cooke six-inch refractors of the same pattern as ours were set up in various locations at that time for that express purpose. (I know that there is, or was in 1934, an identical instrument at Imperial College in South Kensington). In the Monthly Notices for 1883 there is a round-up of a number of observations of the 1882 transit. Toronto is not mentioned.

The Toronto Observatory, built first of 12-inch logs, was opened in September 1840 and included, as well as magnetic and meteorological instruments, a transit theodolite for time determination. The site was where the old McLennan Laboratory now is. The log building was replaced by one of stone in 1856-57 and the dome was added in 1882. This building was taken down in 1908 and re-erected on its present site (in front of Hart House). At the same time the meteorological Observatory was moved to the location on Bloor Street which it occupied until very recently.

The old observatory became a part of the University after the move and was used primarily by the School of Practical Science, though the Astronomy Department later had the use of the Cooke telescope for student observing. Ruth Northcott in particular supervised observations by the third year M and P students.

In 1951 Professor Melson who taught surveying put pressure on us to turn over to him the dome of the old observatory so that some graduate students could set up a zenith telescope for the so-called Ball observation (Sir Robert Ball's method of position determination). Somewhat reluctantly we moved the Cooke to the David Dunlap Observatory and so had no telescope on the campus for the next 13 years.

A few years after the Cooke was moved out I went into the old observatory to see how the Ball observation was going. Not only had the zenith telescope never been installed, but the pier had been ripped out and the tower and dome converted into little S.A.C. offices. I thought, if Mr. Carpmael had been alive he'd have been rolling over in his grave!

J.F.H.

OBSERVING

The Radio Outburst

Just after DDD went to press in August and during a period of observing at Algonquin which, was being shared by Toronto and Queen's radio astronomers, Dr. Philip Gregory made an almost accidental discovery of a remarkable radio outburst of Cygnus X-3. Thanks to his prompt

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alerting of so many other observatories, the phenomenon has been kept under almost constant surveillance at many frequencies. Despite so much observational material the nature of the event, or events, remains puzzling. Dr. Gregory gave DDD the following account on September 23.

Great Radio Outburst from Cygnus X-3
or Serendipity Rains (sic) again

It was, in fact, the rain which forced me to abandon a search for new radio stars and go back to a source we knew to be there, albeit weak! Fortunately Bob Hjellming had observed Cyg X-3 two days earlier at its usual low level, so we had an excellent idea of the time scale of the outburst. Compared to its lowest flux density of 0.015 flux units the peak of the outburst which we observed at 22 flux units represents an increase of three orders of magnitude. During the following week the flux density decayed smoothly to its earlier low level, but on Mon. Sept. 18 it popped back up again, reaching a maximum of about 13 flux units. It is now undergoing a third major outburst, and we are beginning to wonder if we have so far only observed the tip of an iceberg.

The evidence strongly points to a very unusual galactic object at a distance of about 10 kpc which is ejecting, according to some rules yet to be worked out, clouds of relativistic particles radiating by the synchrotron mechanism. Perhaps we have detected a new source of cosmic rays for our galaxy. We estimate the peak brightness temperature to be about 10^{11} °K and a magnetic field of about 20 gauss. Nothing has yet been detected either optically or in the X-ray region -- which is not inconsistent with the nature of the source suggested by the radio data. We hope to keep tabs on Cyg X-3 and other radio sources on a regular basis using the new U. of T. 60-foot telescope.

Visual Region, Anyone?

The new 16 A/mm grating for the H β - H α region has been tested on some stars, and it appears that we will be able to get 7th magnitude Be-star spectra in about two hours and 7th magnitude M-stars in less than an hour. The iron arc comparison will be satisfactory.

COMINGS AND GOINGS

Barry Madore is at Las Campanas now, and our Dr. Sanyal and Dr. Weller of York will be going down in October.

Drs. Garrison and van den Bergh attended IAU Symposium No. 54 on "The Calibration of Absolute Magnitudes and Effective Temperatures of Stars" in Geneva, Switzerland, September 11-15. Dr. Garrison gave a paper on "The Cluster Fitting Method Using MK Classifications of the Hyades, α Persei and Upper Scorpius Moving Clusters. Dr. van den Bergh reported how, on a night of exceptional seeing at the Palomar 200-inch, he was able to resolve into stars one of his recently discovered dwarf elliptical companions to M31.

Dr. van den Bergh also attended IAU Colloquium No. 17 at l'Observatoire de Paris Sept. 17-23, and spoke at the Bohr Institute in Copenhagen on Sept. 25.

Dr. Walborn has been observing with the 84-inch and 36-inch telescopes at the Kitt Peak National Observatory Sept. 14-30.

Dr. Bolton attended IAU Symposium No. 51 on "Extended Atmospheres and Circumstellar Matter in Spectroscopic Binary Systems" at Parksville, B. C. Sept. 6-12. Tom brought back a glowing report of the success and value of the symposium.

Dr. Hogg has returned after two weeks away, one in Massachusetts and one in Switzerland.

SEMINARS

September

On the 12th Dr. Gregory on "The Radio Outburst of Cygnus X-3".

On the 13th, Dr. Biermann of Columbia University on "Density Waves and Star Formation" at the U. of T. Campus.

OCTOBER

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| Tues. 10
DDO | Dr. S. van den Bergh "Report on the IAU Coll. #17, Paris"; and "Resolution of And III". |
| Thurs. 12
Campus | Prof. T. Oka, N.R.C. "Interstellar Molecules" |
| Tues. 17
DDO | Dr. David Crampton, D.A.O. "Recent Result on HZ Her" |
| Tues. 24
DDO | Dr. R. F. Garrison, "The Geneva Symp. on Calibration of Absolute Magnitudes and Effective Temperatures". |
| Tues. 31 | Charles Dyer, "M, Z Relation for Inhomogeneous Cosmologies". |

PAPERS SUBMITTED FOR PUBLICATION

J. F. Heard and Ch. Fehrenbach "The Establishment of 21 New IAU 9th Magnitude Standard Velocity Stars".

IAU COLLOQUIUM NO. 21

Since we went to press last, the Colloquium on "Variable Stars in Globular Clusters and in Related Systems" of August 29-31 has passed into history, and we believe very successfully. Besides the six review papers which were listed earlier, there were 35 contributed papers on many phases of this important topic. Among the last-minute participants were Dr. L. Woltjer of Yale and Dr. Martin Schwarzschild of Princeton whose lively and thought-provoking comments were most valuable.

The wine-and-cheese party, the Observatory visit and party given by Dr. and Mrs. MacRae, and the dinner at the York Club were well attended. At the dinner tributes were paid by Dr. MacRae, Chancellor McGibbon, Dr. Heard and Dr. Michael Feast to Dr. Helen Hogg for her pioneering and continuing work in the field. Most heartwarming to her colleagues was the spontaneous standing ovation accorded her by the delegates. Dr. Hogg accepted the gift of a silver serving spoon as a memento of the occasion and made a gracious and entertaining response to the tributes.

Particular thanks are owing to Dr. Feast, Chairman of the Scientific Organizing Committee, to Dr. Fernie, Chairman of the Local Committee and Editor, to Alice Kato and the other secretaries, to Gretchen Hagen and other students who helped in many ways and to Mesdames MacRae, Fernie, Heard and Garrison who carried through a program for the ladies and children.

MISCELLANEOUS

Librarians

Sheila Smolkin, Observatory Librarian for the past two years, has resigned effective October 13 to accept a position in the University Science and Medicine Library. We regret this but thank her for her excellent services and wish her well in her new post. Miss Priscilla Wagner, M.L.S., now Librarian-in-charge at St. Michael's Hospital has accepted Sheila's position here. WE WELCOME HER.

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P.D.F.

Dr. Frank Ahern, recently of the University of Maryland, has arrived with his wife Doyne, to be a post-doctoral fellow with Dr. van den Bergh. He is bringing from Maryland soon a Fourier spectrometer for visible and near-infra red observations with the 74-inch. Chris Pritchett will be working with him.

New Graduate Students

Recently arrived are: Bjarne ("Barney") Everson from Yale, Gordon Falconer from U.N.B., Mark McCutcheon, U. of T. and Lars Rogers, U. of T.

Born

To Bobbe and Tom (Ph.D. 1970) Barnes, of the University of Texas, a son, Jeffrey Franklin, on Sept. 11, 1972.

Passed

Al Irwin was successful in his Ph.D. general oral examination on September 22.

Fence

A long-contemplated project, the fencing of the Observatory property along Hillsvew Drive, has just been completed.

Appointed

Dr. Heard has been appointed to the N.R.C. Copernicus Quinquecentennial Committee.

Visitor

Dr. Jack Locke, Associate Director, R. & E.E. Division, N.R.C., visited the Observatory Sept. 15 to bring us up to date on the Franco-Canadian Telescope Proposal.