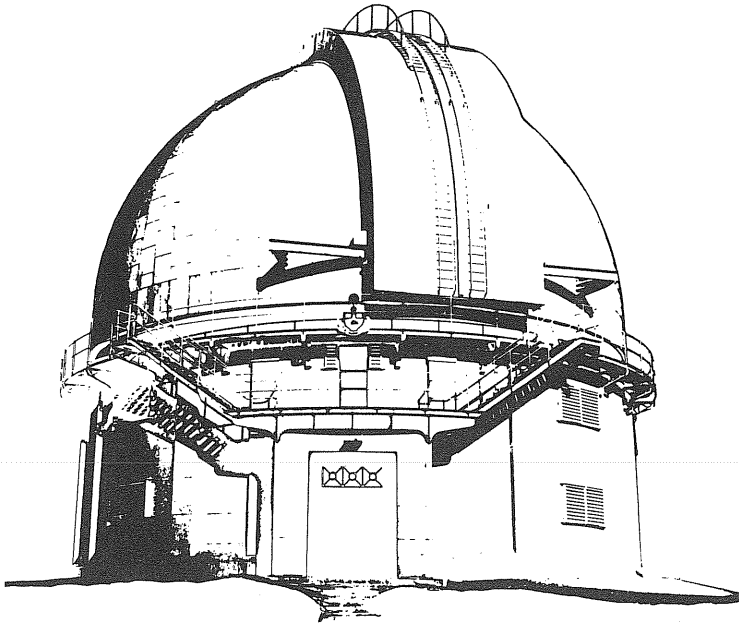


LAS CAMPANAS ISSUE

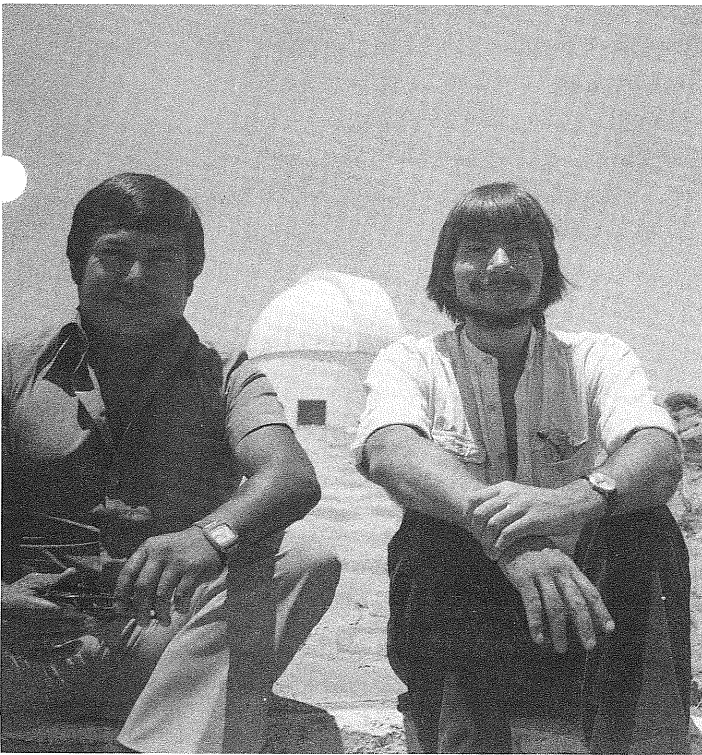
THE ^{DAVID} DUNLAP DOINGS

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Mar. 1, 1982



LAS CAMPANAS TO-DAY:



Leonardo Peralta, Carnegie's driver, who is someone well-known to U. of T. astronomers (left) with Resident Astronomer Ian Shelton, seated on the steps leading from Canada House to the 24-inch dome.



Above: The 24-inch dome on the crest of the ridge, seen looking north in the late afternoon.

Below: Canada House and the Westacott Stairway to the road below. This is the western slope of the ridge.

Photos: Bob Garrison, January 1982

C O N G R A T U L A T I O N S

To *Bob McLaren* on his appointment to the Scientific Advisory Committee (SAC) of the CFHT for a 5 year term. Bob Garrison went off the committee last December 31.

LAS CAMPANAS - AN APPRECIATION

by Bob Garrison

The southern skies are incredibly rich and beautiful. We at the University of Toronto are very fortunate to have in the southern hemisphere our own telescope available for good, solid, long-term programs. That never ceases to amaze me. I'd like to indulge myself for a few paragraphs by writing an appreciation of what we have. I don't mean to run down larger telescopes at all, but sometimes I feel a desire to counter some of the lofty remarks that large telescope users make about how we're wasting our time on a mere 24-inch.

We have put a lot of time and energy into our operation in Chile, but I submit that it is well worth it. Observing seems so easy these days! I wonder if people coming for the first time really know what they are missing. The first book of the diary should be required reading for everyone so they can put their problems in perspective. Whoever dreamed, back in 1971, of the days when we would even take notice of such problems as backlash and worm gear error, much less give them high priority. Anyway, thanks to Tony and the various residents for getting us this far. It hasn't always been easy or fun, but most of us appreciate the effort. The data we are getting are quantitatively and qualitatively competitive with anyone else's anywhere, especially in any comparison which includes aperture and data points per dollar.

Las Campanas is a very good place to learn the skills of observing because of one's total immersion for weeks at a time. In general, observers can't just call in an engineer or technician to solve a problem, or leave a note for the shift next day; they have to rely on themselves. That, combined of course with the chance to get great amounts of good data, makes it a really valuable experience for students. The resulting self-confidence and the solitude to reflect on it help to make good astronomers - I believe. Our former resident astronomers are invaluable resources for other, larger observatories. Our students who have observed on Las Campanas show a maturity that is unmatched, in my experience, by those at other institutions.

For faculty as well as students, our 24-inch provides a source of data that is difficult to match elsewhere. For me, the opportunity of doing long term programs and getting spectrograms that are stable enough for classification purposes is invaluable. Big telescopes are fun, and at least the CFHT will reflect some of my tastes in instrumentation and philosophy, but it is simply not possible to get weeks or months of time over a period extending for years. With big telescopes, programs must, of necessity, be glamorous, fly-by-night projects that can be done quickly, and with certainty of publication. Some people get enough time on large telescopes to be able to sneak in a few observations on their long term projects, but they can't do it reliably and not always do they use the same equipment.

Besides, with good equipment, who needs such large telescopes? We can reach 14th magnitude with the image tube spectrograph (I recorded SS 433 a couple of years ago at $B=16.5$ - of course, it was untrailed and push-developed, but I got it!) and we can reach 11th magnitude on baked IIA-O. There are awesome numbers of fascinating stars brighter than those limits. Why do people believe that the only interesting stars are at the faint limits of large telescopes? It is a good myth to propagate when one is pushing for a larger telescope, but in reality, one can achieve a great deal with a little more imagination and a 24-inch. When John Lester brings down his echelle spectrograph, we'll be able to do some impressive atmospheres work on bright stars. There will be little competition because no one bothers with bright stars when they have a big telescope.

Ours is surely the best equipped 24-inch anywhere and I believe, with René Racine, that it is also the most productive 24-inch anywhere. It has averaged 14 papers per year (and a peak of 20). There are lots of big telescopes that are less productive than that. If one includes the fact that many of our papers involve massive amounts of data (compared to 1 paper per star as sometimes with big telescopes), we can argue that it is as productive as any telescope in terms of the amount and quality of data (obviously ignoring brightness of objects). We use it efficiently and we have good observers (as well as great residents), and that is more than can be said about some other telescopes. Well, I guess I'm getting a bit carried away, but I love that small foothold we have on the southern skies and I feel good about what use we have made of the opportunity to have such a "wonder-full" place to observe.

Now, lets talk about a 1.5 or 2 meter telescope for Chile

VIVA LAS CAMPANAS

Neb Duric writes about his run in January

I have nothing but good things to say about Las Campanas as an observing site. I had a perfect run of 14 very transparent nights on the U. of T. 61 cm telescope. The seeing was never worse than $1\frac{1}{2}$ arc seconds and at one point I had 3 straight nights of subarcsecond seeing. This contrasted sharply with the weather around and below the mountain where it was at best hazy, and at worst, stormy. In fact, one could see occasional thunderstorms over the Andes to the east and it wasn't unusual for lightning to light up the sky.

My run was very productive. I obtained 60 direct plates and 40 image tube plates of various galaxies for the purpose of doing UBVR (simulated Johnson passbands) photographic photometry. I was pleased with the results and my only reservation concerns the amount of data I now have to reduce (I foresee a lot of midnight shifts on the PDS). Ian Shelton, the resident astronomer, provided invaluable advice and help for everything, from estimating exposures and voltages for the spot calibrator to baking of plates and proper developing techniques. Without his competence and enthusiasm my run would not have been as productive.

This was actually my first trip south of the equator and it took me a while to orient myself in the nighttime sky. It was so unusual to see Orion upside down and close to the zenith. On the other hand, I had no trouble at all adapting to the summer temperatures!

All in all, I enjoyed my stay at Canada House. It is a very comfortable and convenient place. I also enjoyed being in Chile, a country which I found to be very beautiful and whose people were very friendly. We made the right decision in putting a telescope there.

A SPELL ON LAS CAMPANAS

Las Campanas by day! When you wake up a little after noon and fling aside the opaque drapes of the southwest bedroom, the brilliance outside seems unbearable. Down the long slope that begins right at Canada House, over the nearby lower hills, on to the flat plateau even further below, and on again as far as the hazy western horizon, the sandy soil and dry rocks are drenched in sunshine. Nothing moves over the wide expanse, but the landscape seems to quiver in response to the sun. Outside, on the ridge itself, the shadows of the boulders are crisp and blue. No second-hand sunlight reflected from clouds or things nearby dilutes the molecular blue light from the sky. As one walks about, the energy bath is intense and in a short time natural wisdom suggests one should seek a bit of shelter. A touch of panic may come with the realization that, apart from Canada House in the distance, there is no shelter here under the Las Campanas sun.

Las Campanas by night! Schedule a break in your observing and step away from the dome a piece. The ridge is remarkably sharp, the terrain falls away abruptly on both sides into absolute bottomless darkness, fearful in its undefinable closeness. If you lie down now on your back you will somehow feel safer; the world and all it stands for is out of sight. Out of your mind as well, because before you is the magnificent expanse of the starry sky, 180 degrees wide in both dimensions, and blazed by the incomparably rich southern Milky Way. Not a thing is visible, nothing but the rest of the universe. Then, a truly magical feeling takes over. At first gently and then with great force your inner consciousness expands to match the scale of what you see, and you become a living member of the Galaxy, belonging to it, freely suspended in its midst, yourself uniquely a part of that great reality.

MR

OH YES, RE BOB'S TARANTULA

As the promised addendum to last month's Las Campanas News, p.11 of The Doings, Bob Garrison tells more about tarantulas and in particular about Toronto Tarantula I which he found on the wall inside Canada House door at midnight.

Bob noticed it while preparing midnight lunch and admits that it gave him a bit of a start, for it was at least as big as his hand - no exaggeration. The adrenaline rush was better than coffee, so he had no trouble staying awake that night. Grabbing a large empty coffee tin, he captured the amazing arachnid, cutting off parts of two of its legs in the process because it didn't quite fit. After observing it for a day, he turned it loose well beyond the forty inch dome.

No tarantula had ever been found inside before, anywhere on the mountain*. Never fear; they look sinister but actually they are not poisonous and are slow to anger. They do bite, and the bite can get infected, but there is no venom. The workers on the mountain have actually been seen playing with them, holding them on their hands. Of course, some astronomers could be frightened to death!

*Neb reports finding another and different one, Toronto Tarantula II, in the dark room. He and Ian handled it in the by then standard fashion.

COMINGS AND GOINGS

Peter Wizinowich has accepted a position as Telescope Operator and Instrument Technician at the CFHT. Peter was Resident Astronomer on Las Campanas from July 1980 to June 1981. He left for Hawaii early in February.

Dennis Crabtree will be leaving Toronto to return to Vancouver about the middle of March. He has a research appointment at the University of British Columbia, working in part with Harvey Richer, and "doing whatever they want me to do". Dennis' thesis abstract is reprinted in this issue of *The Doings*.

Six undergraduate students have received NSERC Summer Awards and will be joining us for four months beginning in May. Their names, followed by their current academic status and the persons they will be working for, are as follows:

Parmjit Panchhi	(Erindale Ast. Spec.; Fe and KK)
Christine Wilson	(2nd year; Mki)
Robert Spalding	(3rd year; Py)
Pierre Gauthier	(2nd year; Yen)
Peter Manson	(3rd year; C ³)
Andrew Platzter	(2nd year; Yen)

DEPARTMENT ENROLMENT FIGURES

Undergraduate Secretary Christine Clement has supplied the Feb. 1, 1982 enrolment figures for undergraduates at the three campuses. Comparable courses are listed on the same line.

St. George		Erindale		Scarborough	
AST 100Y	161	AST 100Y	49	AST A03Y	128
AST 120Y	89	AST 120Y	13	AST A02Y	25
AST 200S	159	AST 200S	72	AST B03S	62
AST 210S	325				
AST 220Y	11				
AST 225H	10			AST B02H	6
AST 323S	24				
AST 420Y	6			AST C01H	1
AST 425H	7				
TOTALS	792		134		222

(Y: full course throughout the year; H=Y/2; S: Spring term course)

P O T P O U R R I

In the first week of February Barry Madore gave talks to the optical astronomers of the University of Chicago at Yerkes Observatory and also to the Department of Astronomy at the University of Pittsburgh. The topic was the cepheid distance scale with emphasis on the recent studies being carried out in collaboration with Bob McLaren, Rick McGonegal and Chris McAlary.

The Observatory now has for sale a new and beautiful post-card. It shows the 74-inch dome and Administration Building from the air, looking like a country estate with lush green grass and shrubbery, and trees just beginning to turn. The photograph was taken by aeronauts Don Fernie (camera man) and Frank Hawker (pilot) about a year and a half ago.

Many years ago Jack Heard prepared a pamphlet entitled "Astronomer" as part of a series on occupational information put out by the U. of T. Faculty of Education Guidance Centre (1000 Yonge St. Toronto, M4W 2K8). This document has now been rewritten and brought up to date by Don MacRae. In addition to the text (which generally follows the scheme laid out for all monographs in the series) there are photographs of the CFHT with its cloudless sky and Barry Madore and Wendy Freedman discussing her CFHT photograph of NGC 1232. Copies are unfortunately rather expensive, and can only be obtained from the G.C.

Tom Bolton has received considerable exposure in the newspapers recently. A very human portrait appeared, under the title "The informal Tom Bolton", the day after Valentine's Day in the Globe and Mail. Written by Joanne Strong, it is one in a series; last November "The informal James Ham" appeared, so you are in good company Tom. The accompanying photograph does you justice too. Less than two weeks later came a purposely humorous article in the Star about a tour of DDO by two reporters, escorted by Tom. One quote from their story is sufficient. Referring to the 74-inch they say "This giant behemoth stands 50 feet from the floor to the ceiling, weighs 25 tons and resembles a cow". Now why would they say that?

Stefan Mochnacki was at U. Vic and UBC during the last week in February for a meeting of the Joint Scientific Working Group for Starlab. He will serve as Project Scientist for telescope design studies in this joint Canada-U.S.-Australian astronomical satellite.

The local community fought the winter "blahs" successfully at two recent functions. Immediately following the Countdown in December, GASA sponsored a "Christmas Revel" at Doug Gies' home complete with a bountiful pot luck dinner and seasonal song. More recently in February the Rusks opened their home for an informal night of food and fun (which included a comparison of Newfie jokes from around the globe).

Geoff Clayton has called for his pipe, bowl and fiddlers at a party to celebrate the Vernal Equinox. It is scheduled for Saturday March 20, beginning at 22:56 UT, at the GASA Presidential Palace, 30 Costain Street.

LIBRARY NEWS

Computer Literature Searching

On Wednesday February 24th, I gave a workshop on computer literature searching to interested students and faculty members. Advantages of computer searching versus manual searching, costs of using information retrieval services, and limitations of computer searching were discussed. Via satellite, we talked to the DIALOG computer in Palo Alto, California. DIALOG, a subsidiary of Lockheed Missiles & Space Co. contains over 130 databases with wide-ranging subject areas. Of interest to astronomers are INSPEC (Physics Abstracts), SCISEARCH (Science Citation Index), and SPIN (Searchable Physics Information Notices). To date, the following topics have been searched on-line:

MK spectral classification (for Bob Garrison)
Mira variables (for Rick Crowe)
Reddening and extinction in the LMC (for Geoff Clayton)
Small-amplitude yellow supergiants (for Armando Arellano-Ferro)
OB runaway stars (for Doug Gies)
Cygnus X-1 (for Tom Bolton)

Lynda Colbeck (LaC)

Lynda reports that there seems to be general satisfaction with the results of the above searches. A manual search which she carried out among the journals on our shelves took her 7 hours, whereas the corresponding on-line search required about 3 minutes! Typical costs run about \$4 per search for connect time plus 25¢ per abstract printed offline.

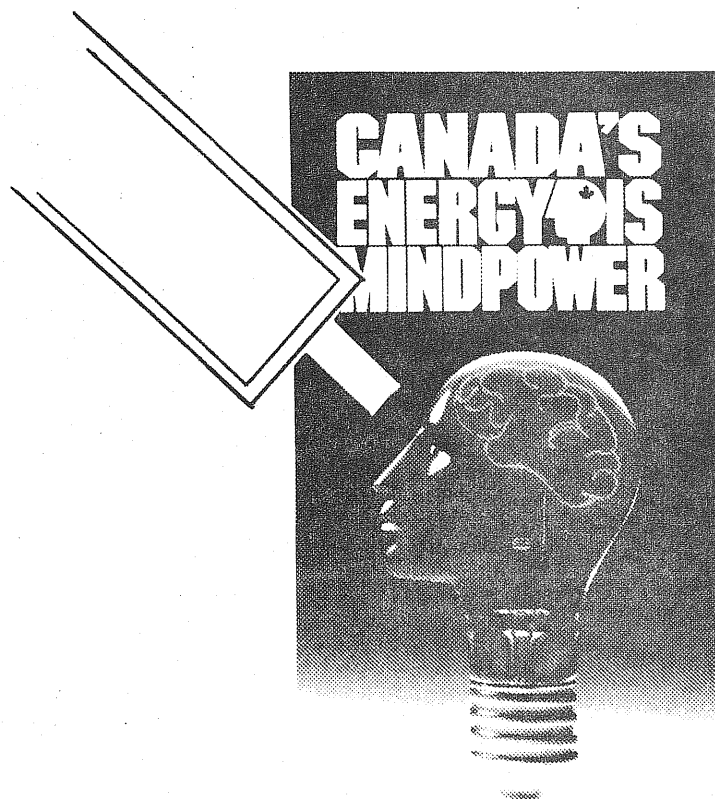
Anyone interested in receiving more information about computer literature searching should contact Lynda at the observatory or by phone at 884-2112.

WORKING GROUP ON HELIUM-RICH STARS ORGANIZED

Tom Bolton was at UWO on Saturday, Feb. 21 for the organizing meeting of a new Working Group on Helium-Rich Stars. The meeting was attended by John Landstreet and Paul Barker (UWO), Doug Brown (U. Mich. Dearborn), and Steve Shore (CWRU). Mike Marlborough (UWO) was in attendance for part of the meeting. This group is planning a 2-3 year collaborative study of the properties of He-rich stars on the upper main sequence and other related objects (e.g. a Cen, He-weak spectrum variables). The group agreed on the procedures to be followed in analyzing the large body of data already in hand, and laid out an observing program for the coming year.

THEATRE SYMPOSIUM

"Shakespeare to Star Wars: Theatrical History Explored Through Common Patterns in Drama." Lectures, films. A University of Toronto MINDPOWER EVENT. Free. George Ignatieff Theatre, 15 Devonshire Place, University of Toronto, 10:00 a.m. - Noon, Monday March 15, 1982. Public welcome. For information call: (416) 284-3243



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COLLOQUIA*

- February 10 Dr. George Lake, Bell Laboratories, New Jersey
"Dynamical Basis for the Hubble Sequence"
- February 24 Mercedes Richards and Michael Swift
G2000 - Current Literature Seminar
- March 3 Dr. Dennis Crabtree, University of Toronto
"A Model of the IR Continuum and NH₃ Absorption -
Line Spectrum of IRC +10 216"
- March 10 Dr. John Faulkner, Lick Observatory,
"The Dwarf Nova Outburst Mechanism" and
"Does the Chandrasekhar Limit Imply a New Standard
Candle for Cosmology?"
- March 17 Dr. George V. Coyne, Vatican Observatory
"Massive Dark Clouds as Ambients of Star Formation"
- March 24 Dr. John S. Gallagher, III, University of Illinois
TBA
- March 26⁺ Dr. A. Dalgarno, Center for Astrophysics
Friday "Molecular Diagnostics of the Interstellar Medium"
- March 31 Dr. Lee Anne Willson, Erwin W. Fick Observatory
"Is Mira Variability a Terminal Disease?"
- April 7 Rick McGonegal, University of Toronto
"The Infrared Period-Luminosity Relation"
(Thesis presentation)

*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.

⁺Joint with the Department of Chemistry; at 3:30 P.M. in Room 158, Chemistry Building, University of Toronto.

PAPERS SUBMITTED

Nancy R. Evans

A Search for Radial Velocity Variations in ϵ Leonis
(HD 84441)

THESIS ABSTRACT

"A Model for the Infrared Continuum and NH_3 Absorption
Line Spectrum of IRC +10 216"

Dennis Crabtree

I have modelled the infrared continuum and NH_3 absorption line spectrum of the luminous infrared source IRC +10 216. The model consists of a cool central star surrounded by an extensive, spherically symmetric circumstellar envelope. The model is used to investigate the structure, physical conditions and kinematics of the circumstellar envelope surrounding the central star.

The infrared brightness distribution of IRC +10 216 has been studied by a number of investigators using both lunar occultation and interferometric techniques, and the resulting eclipse light curves and fringe visibilities are available in the literature. Comparison of these observations with the model predictions demonstrates that the infrared brightness distribution of IRC +10 216 is well explained by a $1/r^2$ density distribution for the dust in the envelope. This is the distribution expected for uniform outflow velocity. The mass-loss rate for the model is approximately $10^{-5} M_{\odot}/\text{yr}$ assuming a gas/dust ratio of 100.

Several absorption lines in the ν_2 vibrational band of NH_3 have recently been observed in IRC +10 216 at high velocity resolution (≈ 0.2 km/sec). These lines cover a wide range of excitation and thus provide a sensitive probe of the physical conditions within the circumstellar envelope. A detailed non-LTE model for the excitation of 123 rotational levels of NH_3 has been calculated. The model is based on earlier work for plane-parallel geometry but incorporates several modifications which make it more suitable for the geometry of IRC +10 216. The results indicate that it is pumping by infrared photons from the inner regions of the envelope which is largely responsible for the excitation of NH_3 . The excitation model is then used to calculate the radial distribution of NH_3 for each of the 123 rotational levels. These results are incorporated into the infrared continuum model to obtain synthetic line profiles. The calculated profiles agree very well with the observations, thus confirming that the excitation of NH_3 is radiatively controlled and providing further support for the continuum model.

Employment Opportunity

RESIDENT ASTRONOMER

Location: University of Toronto Observatory on Cerro Las Campanas in the Atacama Desert of North-Central Chile.

Start: 1 June, 1982, at the David Dunlap Observatory for experience in observational techniques, electronics, and photography. Residence in Chile to begin after July 1, 1982.

Duration: Through August 1983, renewable for subsequent years if work is satisfactory.

Qualifications:

Preference will be given to applicants with experience in observational astronomy. Experience in electronic and mechanical trouble shooting and repair will be an important consideration. Facility with Spanish will be taken into account, but is not at all essential. Maturity and ability to get along with people are especially important at a remote site.

Description: The Resident Astronomer is responsible for maintenance and repair of the U. of T. 24 inch telescope and associated facility. In addition he will be required to help new observers to use the telescope. There will be times when he will be required to carry out the observations of an astronomer not present. Some time will be available for his own observing programme.

Salary: Approximately \$15,000, depending on the experience and background of the applicant. Room and board on the mountain are free, but expenses are not paid during time off.

Application: Send with two references to:

Dr. Robert F. Garrison
David Dunlap Observatory
Box 360
Richmond Hill, Ontario
Canada L4C 4Y6
(416)-884-9562

Deadline: April 1, 1982.

An interview will be required sometime before April 7 for those on the short list and the announcement will be made shortly thereafter.