



THE ^{DAVID} DUNLAP DOINGS

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Cover Story P. 3

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

To Gerry Grieve who successfully defended his doctoral thesis entitled "UBVRI Observations of Magellanic Supergiants and Cepheids". Gerry's thesis was supervised by Barry Madore; Hugh Harris from McMaster acted as external appraiser.

To Chris Corbally who also completed his doctoral programme in defending his thesis entitled "Southern Close Visual Binaries: MK Spectral Classification and Evolutionary Status". Bob Garrison supervised and Helmut Abt from KPNO acted as the external appraiser.

To Zane Sterns who was married to Gary Stuggins on May 28, 1983 in Toronto. The Stuggins are now living in Niagara Falls.

To David and Gloria Earlam on the birth of their daughter, Charlene Ivy Rosalind, 6 lbs. 1 oz, 18½" long, born April 17, 1983, a sister for Karen.

COVER STORY

We are delighted to extend our heartiest congratulations to Dr. Helen Hogg on receiving the Dorothea Klumpke-Roberts Award for 1983. In making the award the Astronomical Society of the Pacific gave the following citation:

"As you may know, this Award has been established to recognize outstanding contributors to the public's understanding and appreciation of astronomy. In awarding it to you we wish to pay tribute to your lifelong contributions to public education, and your very valuable newspaper column. Previous awardees include Fred Hoyle, Walter Sullivan, Isaac Asimov, Bart Bok, Carl Sagan."

We agree that is well deserved as Dr. Hogg's column in the Star did so much to preserve accurate but still exciting information about current developments in astronomy to the general public. In Toronto, we astronomers have had special benefits from her column. Who has not had a conversation with a "man on the street" and suddenly been able to make clear the value/usefulness of the observatory/department/astronomy/scientific research with the magic sentence: "You know, the Observatory where Dr. Hogg who writes the column for the Star works."

Dr. Hogg supplied us with a few details about the business of producing weekly columns. One of her best sources of material she said was meetings where she often got material for half a dozen columns. However her material was probably as carefully checked as that in many refereed articles. Even with plenty of practice, she said it would take from a couple of hours to most of a day to produce a column, largely because of the time involved in making them accurate and detailed. She tried to keep one column in reserve but said she was never able to write them far in advance because "there was always a comet which came along".

She also told us a little about what she is currently working on since we see too little of her, especially on the St. George campus these days. She has finished a series of 4 articles on the growth of astronomy in Toronto which have appeared recently in the Journal of the Royal Astronomical Society of Canada. She has also finished writing the history of variable stars for the Cambridge series edited by Hoskin and Gingerich - and will soon be confronted with the proofs. She has also written the IAU report on Variable Stars in Globular Clusters and hopes to complete the Fourth Catalogue of Variable Stars in Globular Clusters this summer. Finally, she and Amelia Wehlau and Christine Clement are working on their long series of observational papers on variable stars in globular clusters. She and Amelia are planning to complete work on variable stars in M28 this year, using photographs to be obtained by Ian Shelton in Chile in June.

Added to this are numerous trips, including one this summer to Hawaii to receive the Klumpke-Roberts Award. Our best wishes go with her.

Nancy Evans

P.S. Who is Dorothea Klumpke-Roberts who endowed the award? She began and ended her life in San Francisco (1861-1942), hence her connection with the Astronomical Society of the Pacific. She was the first woman to receive the degree of Doctor of Science from the Sorbonne (1893) for a dissertation on the rings of Saturn. She then worked at the Paris Observatory, particularly on the Carte de Ciel, for which she headed the department to prepare the catalogue of positions of stars down to 11^m. Other aspects of her work, however, had a more adventurous component, such as a balloon trip in 1899 to observe the Leonid meteors. In later life she married Isaac Roberts, a pioneer in astronomical photography. Her career was capped in 1934 with the election as Chevalier of the Legion of Honour in France.

P O T P O U R R I

Chip Arp was in the Department May 16-18 to consult with Barry Madore on the final stages of the "Catalogue of Southern Peculiar Galaxies and Associations". Despite his busy schedule en route to Europe he did take the time to give an informal talk to the Galaxy Discussion Group about recent evidence for non-velocity redshifts.

Barry Madore visited the Space Telescope Science Institute at John Hopkins University, Baltimore just before their move to a brand new building across the campus. While there he was warmly hosted by Mike Shara a Toronto graduate now on staff at STScI. A few weeks earlier Barry also went to the University of Minnesota where he talked on the Distance Scale to Near-by Galaxies which was also the topic of his talk at Baltimore.

Stefan Mochnecki and Bill Weller travelled to Cambridge, Mass., on the 12th of April to spend three days at the Centre for Astrophysics learning about photon-counting spectrometers from Dave Latham and John Geary. We are very grateful to the CFA people for their help and advice, without which we would not be able to build our PCS for the DDO.

Stefan Mochnecki has been active on the STARLAB project, which aims to place a one-metre telescope in orbit in the 1990's. He attended meetings at the NRC in Ottawa on April 18, and the 4th meeting of the Joint Scientific Working Group at Goddard Spaceflight Center in Greenbelt, Md., April 25-29, 1983.

Peter Martin visited the Center for Astrophysics 20-24 April to complete some work on radiative transfer with C. Rogers and G. Rybicki. While there he gave a talk entitled "Physical Conditions in the Envelopes of Novae".

Chris Corbally, on a visit to VORG, found the Tucson climate in April opposite to Toronto. There it rains during the week and is fine at weekends. During the rainy season he gave a lunchtime colloquium to KPNO on "Close Visual Binaries as Tracers of Stellar Evolution".

Drs. Helen Hogg and John Percy are attending the joint meeting of the RASC General Assembly and the A.A.V.S.O. in Quebec City the week of May 22.

Summer Students for 1983. New faces you may have seen working with computer terminals, telescopes, measuring machines or just paper and pencil are the summer students:

Barbara Long	Tom Bolton
John Harper	Charles Dyer
Gordon Drukier	John Percy
Peter Ip	Christine Clement
Chris Kelly	Karl Kamper and John Lester
Lian Zerafa	Stefan Mochnecki

The GASA Executive for 1983/84 includes:

Neb Duric	- President
Petrusia Kowalsky	- Chair Person
Louis Noreau	- GSU Representative
Rick Crowe	- Secretary - Treasurer
Doug Welch	- Staff Representative
Alex Fullerton	- Staff Representative

COMINGS AND GOINGS

Robert Roeder after 19 years on staff in the Department of Astronomy has resigned his position as full professor and as chairman of Scarborough's Division of Physical Sciences. The resignation is a result of pessimistic, public speculations by the University's central administration concerning the future of Scarborough College and over continuing budget cuts. Rob has accepted the Robert Sherman Lazenby Professorship and Chairmanship of the Department of Physics at Southwestern University, Georgetown, Texas.

Our very best wishes to Rob and his family in their new life as Canadian Texans.

GASA Gossip: Tahiti Syndrome

I open my eyes. The sky is almost too blue to believe and not a cloud in sight; just the bright tropical sun beating down on the golden sand. A gentle breeze wafts across the water barely disturbing the leaves of the palm trees overhead. My attractive companion flashes me a smile as she runs past and dives into the surf. I lie back with my eyes closed listening to the sound of the waves rolling onto the beach.

A sharp crash makes me sit up and look around. One of the palm trees has transformed itself into Louis Noreau staring down at the shattered remains of his coffee cup. I sigh. The ocean has become a sea of papers on my desk; the rolling surf replaced by the hiss of the air-conditioning. The closest thing to sand is a paper on interstellar silicate grains.

My pen is still in my hand. I dart a hopeful glance at the piece of paper in front of me but it is still blank except for the word, INTRODUCTION, in capitals across the top of the page. I sigh again. If I could concentrate for 30 seconds in a row, I might make some headway. Unfortunately, that is easier said than done. Spring is in the air. The exams are all marked. A new GASA executive has been sworn into office. The last G2000 has come and gone. The baseball gloves are out of mothballs. Even the Stanley Cup playoffs are over. But my thesis is not quite written yet.

All it needs is a little concentration. My gaze drifts out the window to where the sailboats sit bobbing in the harbour. I look back for Louis but all I can see are palm trees.

Ctn

Seven Year Itch

by Ron Lyons

Shortly after returning from an enjoyable vacation in (mostly) sunny Costa Rica, I journeyed to Rochester for a 4 day seminar titled "Practical Microdensitometry: Guidelines for Scientists and Engineers". Dick Swing, a photoscientist who worked on coherence problems in microdensitometers, and Jim Jakubowski, a photoscientist interested in microdensitometers, dealt with the theory behind the instruments and how they work. The course finished with an extensive presentation by Jim Horton, designer of the PDS, on the practical problems of constructing a microdensitometer. The notes for the course - copies of the viewgraphs used by the speakers - are contained in 4 looseleaf volumes (one for each day of the course). Please contact me if you would like to study these.

Several weeks later, about 70 astronomers and technicians gathered at the Goddard Space Flight Center near Washington to talk about microdensitometry as it applies to astronomy. During the first part of the conference, we discussed the effect of the hardware on the digital representation of the original image. A number of problems, particularly those concerned with PDS's, were discussed in some detail. (As far as the PDS is concerned, it was pointed out that astronomers are asking it to perform well beyond its specifications.) One of the highlights of this meeting was the talk by Jim Horton on the early history of the PDS. Jim revealed that, as designer, the main constraint that he faced was that the machine fit through a 30" doorway. A second, but lesser constraint, was that the scannable area be at least 10" x 10". This was required to handle aerial reconnaissance film. The third constraint referred to time. The bulk of the design and the entire construction of the first PDS were done in under 3 months. However, at \$19,500 the PDS was too expensive and it was awhile before the first one was sold. It is interesting to note that, back then (circa 1968) the machine came with a choice of output media - papertape, computer cards or magnetic tape. (Imagine digitizing a 10" x 10" CFHT plate at 25 micron resolution on papertape or computer cards!). After running into financial problems in the early 70's, PDS sold out to the Boller and Chivens Division of Perkin Elmer. A few days after the sale was finalized a tornado ripped through their office and manufacturing plant. The second part of the conference dealt with microdensitometers of the future and data storage. Don Wells indicated that the distribution of very large data bases, such as the Palomar Sky Survey, in digital form, is technologically feasible today and predicted that it will be economically feasible within the next few years.

The organizers hope to publish the proceedings of this meeting in August. I strongly recommend that anyone interested in using a PDS or any other microdensitometer read these proceedings.

As a result of these 2 meetings, a number of modifications to our PDS are being considered to improve its performance.

On a more personal note, one of the astronomers I met at Goddard told me that his brother-in-law had done a Ph.D. thesis on an area of interest to me. It's titled "Behavioral Thermoregulation in Anisoptera". I've already ordered it from University Microfilms.

Ray Carlberg's Trip to Europe
March 8 - April 10

After a few days in Cambridge to diminish the jet lag and restart a project on disk dynamics, a small group of us collected in the grey light of an English dawn to set off for Geneva. Dick Bond had been working on a letter to Nature until 4 a.m. and proved a bit difficult to thoroughly awaken, but after a cacaphony of telephone calls and doorbells we succeeded in getting him out into the car. On the way to Heathrow, George Efstathiou demonstrated a few of the capabilities of his car, and we duly arrived with 25 minutes to spare, and bounded on to the plane.

On the way into Geneva the Matterhorn was visible off in the distance, and the snow line was at about 2000 meters, evidently good conditions for the Third Moriond Recontre on Astrophysics, being devoted to Galaxy Formation and Evolution. At the airport we set off in search of other astronomers, and proceeded directly to the cafeteria for coffee/beer. As expected, we immediately encountered others including Martin Rees. After coffee/beer we headed off in a bus to La Plagne, a ski resort in France that was to be the venue of the meeting.

During the following week we pursued at great pace the twin goals of good science and good skiing, which turned out to be mutually compatible. In fact, amazingly so, in that it was a small meeting to start off with and the relaxation of skiing and fresh air made for much livelier discussions than one often finds at conferences where people hold different views. Particularly interesting trends and developments included the ever growing body of work on pancakes and large scale structure now being seriously investigated by a number of western theorists. Simon White, attired in ski clothing, gave a short lecture on why the universe could not be filled with neutrinos. Alex Szalay gave a clear discussion of how pancakes of the I, II and III type may help alleviate some of the problems brought up by Simon. Jim Peebles, after losing his spectacles somewhere on the mountain, gave an all encompassing picture of the evolution of the universe using exons to provide most of the gravitating mass, and then revived the idea of primeval globular clusters. Joel Primack presented a somewhat similar picture for the particles that provide the gravity and contain the initial fluctuations. Closer to earth discussions included a beautiful talk by Tim deZeeuw about an analytic model for a triaxial galaxy containing orbits with three integrals. The talks were good, but the discussion was the real highlight of the meeting. After skiing all afternoon we would start the meeting again at 4:30, and continue until 8, when we were ejected in favour of movies for the other tourists at the resorts. Our discussions were then removed to the dining room, and continued until 10 or 11, and then to bed for another day. An excellent meeting.

The Saturday morning after the conference ended involved an intensive ski, first on icy snow, then as the day warmed and the sun shone the glorious freedom of off piste skiing over hills and down into valleys. Then off to Geneva, by bus, enlivened by George Efstathiou, Bernard Pagel, and Martin Rees. We spent the night in the Hotel Windsor, listening, at 3 a.m., to the very rich voiced male choir.

Back in England it was raining. However Jerry Sellwood and I pushed our project investigating the question as to where transient spiral waves come from, and where they might go to, forward considerably.

We launched a number of bold hypotheses, and then demonstrated that they were partially right and partially wrong. However a number of exciting discoveries about the nature of oscillations in nonlinear disks were made, that seem to be very close to ideas that exist in linear theory.

Scenic highlights of the English stop, included the bluebells and daffodils on the college backs, and pausing on one of the bridges over the river in Cambridge to gaze on King's College Chapel in the golden light of evening. Mushy thought soon brings its own reward in Cambridge, and in this case, the delay stranded me on my bicycle in heavy rain, which quickly turned into a particularly nasty type of hail.

After three weeks I returned, tired but happy, to Toronto. It was raining when I arrived. The next morning I slept in to 3 a.m. and cycled off to work at 4:15.

(At press time Ray was just embarking on another European junket to attend the centennial celebrations of the Kapteyn Laboratory in Groningen who are hosting IAU Symposium #106, "The Milky Way Galaxy". This trip comes hot on the heels of yet another trip, this time to the west coast including talks at Kitt Peak and Berkeley. Good luck with jet-lag, Ray. - eds.)

REPORT OF THE CHANT FELLOW 1982-83
Mercedes Richards

This year, September 1982 to April 1983, I gave 24 regular Tuesday morning tours for a total of 798 people. In addition, there were four special tours for a total of 45 people, given to The Canadian Space Society, The Association for Bright Children (twice), and a group of University students from Oshawa and Pickering. There was also a special tour given to a possible future student of Astronomy on her Careers Day.

Mail was received from, and replies sent to, 8 people from Merlin, Milton Oshawa (2), Scarborough, Spencerville, Toronto and even Getzville, New York. There was additional mail (four pieces) mainly from Public School groups expressing appreciation for the tours. You should see some of the drawings I got! I must admit that those cheerful drawings always arrived at a time when I needed encouragement in other areas of my life, and I deeply appreciated them.

There was also the noticeboard out by the parking lot ... This year it was given a facelift on several occasions. Mostly, I just changed a few items around, and then I really made changes. So, now there is a heading:

WELCOME TO THE DAVID DUNLAP OBSERVATORY
UNIVERSITY OF TORONTO
HOME OF CANADA'S LARGEST OPTICAL TELESCOPE

All done in Letraset. Hope it doesn't peel on some warm summer night.

Lastly, there was the slide collection. I began the year with a tray full of uncatalogued slides in a room that had been forgotten after the sprinklers were installed. The slide cabinet was full of dust and little chunks of micrometeorites which had fallen from the ceiling. The slide collection book was also in bad shape, with pages inserted whenever new additions came in. I can say, with a feeling of accomplishment, that the slide collection is now in better shape. The micrometeorites have been removed, and the tray is now empty, but I had to add four slide shelves in order to accommodate the previously uncatalogued slides. In addition, the extra pages in the book have been replaced by more permanent pages. However, there is always more to do. There are plans to order new slides over the summer, and to put the list of slides on the computer; that way it should be easier to update the collection in the future.

- "The classical cepheids naturally send out a strong wavelength but their radiation is relatively strong too."
- "The major energetic events that take place in galaxies are nova explosions and the orbits of comets and meteors."
- "The ball or 'hub' at the center of the Milky Way is named after Hubble."
- "The main feature of Egyptian lifestyle was the flooding of the Nile ..."
- "... the euphemerides ..."
- "... he stated that the universe is not a closed system but rather its expanding to ubiquity."
- "... cepheroid variables ..."
- "17th century navigation: Precious ships and cargos were being lost at sea. What navigators did was travel to the required latitude of a journey and then flip a coin to decide whether to go east or west."
- Q: On an early evening in May, where would you look in the sky to find the Big Dipper?
A: "Locate Polaris and then look to the south"

Standard Star Velocity File

We are creating a file of recent standard velocity star measures. They are to be stored on the VAX as [STDVEL] POST80.DAT. All contributions from (1.88m) observers gratefully accepted. Please forward to Karl Kamper.

A Visit to VORG

VORG is not a weird character from the Return of the Jedi but the Vatican Observatory Research Group, informally attached to the Steward Observatory in Tucson for the last 2½ years. When I visited VORG during April I found the present group to be five astronomers and one engineer. The one non-Jesuit in the group was Mario Magalhaes of the University of Sao Paulo. He had initially undertaken the programming of VATPOL, a new polarimeter with provision for spectral line scanning, and was now staying a second year to reap benefits from the construction of that instrument. Its construction explains the presence of the engineer, Edmund Benedetti, who is presently working on a new photometer for use on the telescopes of Mount Lemmon. The other Vatican astronomers, Rick Boyle, George Coyne (Director), Martin McCarthy and Chris Moss, were enjoying the local observing and data reduction facilities, the interaction with other astronomers and the easier opportunities for collaboration than those at Castel Gandolfo. (Rick tells me that comet IRAS-Araki-Alcock was sighted while he was observing on Mount Lemmon. He reports about 25% polarisation in VRI, but much less in U, as expected from the emission seen in that band.)

There is to be an evaluation of the VORG "Tucson experiment" this summer, back at Castel Gandolfo where the sight of Rome gives one an eternal perspective! From the obvious success of the experiment in stimulating the Vatican Observatory's research I can predict that the question for evaluation will not be whether VORG will continue but what balance between Tucson and Castel Gandolfo will be best to maintain the international interests of the Vatican Observatory. Clearly the STARLINK data reduction system planned for Italy would be an attractive alternative to the well subscribed systems, e.g. "Richfield" program, running at KPNO.

That reminds me to pass on greeting to their friends from Lindsey Davis and Chris McAlary, both of whom find it hard to consider moving from the sunny south.

ABSTRACTS OF THESES

This month we present additional abstracts of theses recently submitted to the School of Graduate Studies. Last month we inadvertently truncated Armando's abstract to one page (abstracts are growing in proportion to the sizes of the theses) so we have included a continuation of that summary below. [-eds.]

Armando Arellano (continued)

For the long-period stars empirical masses, radii and pulsation constants Q were determined. For HD 161796 high luminosity ($M_V = -8$ to -9) and mass ($M = 14$ to $24 M_\odot$) are consistent with fundamental radial mode pulsation as proposed by Fernie.

The membership of ϵ Aur, HR 8752 and ρ Cas in associations favours high luminosity ($M_V = -9.5$ to -9.0). It is concluded that these stars are likely non-radial pulsators, massive ($15 < M/M_\odot < 30$) and large ($250 < R/R_\odot < 800$) stars evolved from fairly massive main sequence stars ($40 < M/M_\odot < 60$).

H α emission variations on time scales of weeks were found to be common in the circumstellar material associated with the long-period stars.

The possibility that 89 Her has a companion is revived, due to the discovery of a well-developed periodicity of about 285 days in the radial velocities.

* * *

Southern Close Visual Binaries: MK Spectral Classification and Evolutionary Status

Christopher J. Corbally

Close visual binaries were studied to provide the observational parameters for an homogeneous check to theories of stellar evolution.

New MK spectral classifications were presented for 170 visual binaries, south of -25° declination and with separations mostly between one and five arcseconds. Area scanner data in UBV colours was available for 153 of the binaries from Hurly (1976), and somewhat less complete data came from Rakos et al. (1982) for an additional 15 binaries. The problem of contamination from the primary on the secondary's spectrum was controlled by two new procedures. These allowed an assessment of the external accuracy of the classifications, and so of the reliability of the derived absolute magnitudes.

The photometry was tested by comparing the 39 binaries in common to both Hurly and Rakos. The B-V and U-B colour indices proved reliable within 0.01 magnitudes. However, a systematic underestimate was found in the V magnitude differences given by the Rakos photometry.

The binaries with the most secure data were used to decide between maps of MK classes to absolute magnitudes. The Keenan (1963) map, especially with an improved giant calibration (Egret et al. 1982), agreed with the photometry better than the Schmidt-Kaler (1961) map. A Garrison (1978) map, as yet only for main sequence stars, was also found to be good.

These investigations established how well the binaries could be placed on the colour-magnitude diagram. The most secure binaries were used to test new Yale isochrones (Demarque et al. 1982). An isochrone composition of $Y=0.25$, $Z=0.04$ proved best. Small decreases in the mixing length parameter were suggested for the coolest stars, but the good fit of the binaries to the isochrones showed that stellar evolution had in general been well modelled by Demarque et al.

In turn, the isochrones were used to investigate binaries with less secure positions on the c-m diagram. Various solutions were developed why particular binaries might not fit well to the isochrones, and a likely status for those systems was proposed (e.g. duplicity of the components; pre-main sequence; post-helium flash; optical pair; inaccuracy in the data). A listing of these statuses, together with the new Am and peculiar stars, provide a wealth of new stellar data and suggestions for further investigation.

* * *

UBVRI Observations of Magellanic Supergiants and Cepheids

Gerald R. Grieve

Photoelectric UBVRI observations of luminous supergiants in the Magellanic Clouds are presented. Most of the known supergiants of spectral type A, F and G brighter than $m_V=13$ have been observed.

Estimates of interstellar extinction from dust within the Magellanic Clouds are determined for individual stars. Reddening-free colour indices, denoted by Q , are formed from the observed colours and reddening ratios. Blue envelopes to the distribution of the LMC sample in the colour- spectral type diagrams and in Q - colour diagrams are adopted as intrinsic loci. Total reddenings are found from these diagrams including an assumed uniform contribution to the foreground reddening.

Photometric variability is determined from these data and from comparison with published photometry. Approximately fifty percent of the stars are probably variable with amplitudes of at least 0.04 mag. More luminous stars are more likely to be variable. Candidates for very luminous Cepheids are identified. Possible periods, consistent with those of the Cepheids, have been found for two of these variables.

The dereddened photometric data are used to estimate fundamental parameters suitable for comparison with theoretical results. Comparison of different estimates of the radii suggest that the Flower (1977) temperature scale may be slightly too hot.

New photometry for twelve long period Cepheids is also reported. Comparison with published photometry indicates that the periods of most of the very long period Cepheids are unstable. Analysis of photometric data for all Cepheids in the Magellanic Clouds with the aid of the reddening free Wesenheit function indicates that the colour term in the PLC is probably close to zero. The use of the period luminosity relation in the visual for distance determinations is recommended.

* * *

Radio Continuum Properties of Bright E/SO Galaxies which contain
Compact Radio Core Sources

Joan M. Wrobel

The presence of compact radio continuum sources in bright E/SO galaxies is correlated, statistically, with the occurrence of nuclear optical emission lines, a fact which may imply a causal connection between the radio- and line-emitting regions. Hence, it is of interest to determine the physical conditions within the radio sources and to investigate the nature of any links between these two constituents. To this end, the radio continuum properties of a selected sample of eleven bright E/SO galaxies, each of which contains a compact radio core source, were investigated with interferometric techniques.

Maps made with the Very Large Array (VLA) were used to search a 30-arcmin field in the vicinity of each of seven sample galaxies for 1.5-GHz emission on arcmin scales. Each galaxy shows evidence of extended structure, either in the form of emission within one arcmin of the compact core, or in the form of discrete features which appear to be offset by ~ 30 kpc from the compact core, or in both forms. Maps of ten of the sample galaxies were also obtained with the VLA at 1.5, 4.9 and 15 GHz, with angular resolutions of 1, 0.4 and 0.1 arcsec, respectively. Only two of the ten galaxies remain unresolved at 4.9 GHz and only one is resolved at 15 GHz.

VLA maps of the total intensity and linearly polarized emission from the sample galaxy NGC 1052 were obtained with arcsec resolution at two frequencies near 1.4 GHz. A 30-arcsec (3-kpc) source straddles a compact core of extent < 1 arcsec (100 pc). This extended source shows a double, collimated, bent and asymmetric structure. Embedded within each of the double's lobes is an active region of extent 5 arcsec (500 pc) \times 2 arcsec (200 pc) with a spectral index of ~ -0.4 . The active regions are in pressure-balance with the post-shock gas associated with the "clouds" of gas which form the galaxy's nuclear optical emission line region. The existence of a hot intercloud medium, which pressure-confines the post-shock gas and is responsible for the observed X-ray emission, is proposed. One of the active regions is depolarized by about a factor of two over only 0.3 GHz, possibly due to the presence of magnetic fields within the optical emission line clouds.

Very Long Baseline interferometric observations of the sample galaxies NGC 1052, NGC 3894 and NGC 4278 indicate that each contains pc-scale radio components. The ratio of the energy in fast electrons to that in magnetic fields within these components appears to be significantly lower than is typical for the components associated with luminous compact extragalactic radio sources. For NGC 1052 and NGC 4278 the position angle of elongation of the pc-scale radio emission is much closer to the projected rotation axis of the galaxy's neutral hydrogen than to that of its stars, indicating that the compact object which is presumably powering the radio source has its rotation axis aligned with that of the gas fuelling it, and the source of this fuel is infall into the nucleus of gas from the reservoir of neutral hydrogen.

A sensitive 5.0-GHz map of the sample galaxy NGC 3894 and its spiral companion galaxy was successfully obtained using a phased-array observing technique at the VLA. This nonstandard technique, plus its advantages and disadvantages, are outlined, and the map is used to investigate the environs of the galaxy pair.

MK WORKSHOP 1983
OUTLINE OF SCIENTIFIC SESSIONS

Monday 6 June

- 0915 Official Opening: Vice President and Provost, Dr. David Strangway.
0930 Invited Talk by D. Mihalas "On the Relevance of the MK Classification System and Process to the Theory of Stellar Atmospheres".
1100 Invited Talk by W.W. Morgan "The MK System and the MK Process".
1400 Invited Talk by P.C. Keenan "What's Wrong with the MK Classification".
1500 Invited Talk (30 min.) by W.P. Bidelman "Some Problems of Composite Spectra".
1615 Contributed paper by M.F. McCarthy "Natural Groups: the Gateways for the MK Classification Structure".
1630 Contributed paper by A.B. Underhill "The Meaning of Spectral Type for O and WR Stars".
1645 Comments on poster by D.E. Turnshek and P.C. Boeshaar "MK Criteria Applied to a Scanner Spectral Atlas of the Cooler Stars".

Tuesday 7 June

- 0900 Invited Talk (30 min.) by N. Houk "The First 100,000: a Mid-Course Look at the HD Reclassification Project".
0945 Invited Talk (30 min.) by C. Jaschek "MK Data Bases".
1100 Invited Talk by D. Gray "Electronic Detector Arrays for Spectral Classification".
1400 Invited Talk by M. Kurtz "Progress in Automation Techniques for MK Classification".
1500 Contributed paper by P. Rybski "Electronic Data and Computer-Assisted Spectral Classification".
1600 Contributed paper by N. Walborn "Spectral Classification of OB Stars with Digital Detectors".
1615 Contributed paper by H. Zekl "A Program for Two-Dimensional Classification".
1630 Contributed paper by H.E.P. Neilson "A Comparison Between the MK Classification in the Michigan Spectral Catalogue and $ubv\gamma$ photometry".
1645 Comments on poster by A.B. Underhill "The Paradoxical Behavior of the SiIV Lines at Spectral Type 03".

Wednesday 8 June

- 0900 Invited Talk by D. Crawford "Photometry's Relation to MK Spectral Classification".
1000 Contributed paper by B. Hauck "Chemically Peculiar A-F Stars: a Photometric Approach".
1015 Contributed paper by C. Millward and G.A.H. Walker "Comparison of a New $H\gamma$ Luminosity Calibration with Other Early Type Luminosity Systems".
1100 Contributed paper by A. Heck "Prediction of MK Spectral Classification from Photometry".

Wednesday 8 June (continued)

- 1115 Contributed paper by N. Walborn and R.J. Panek "An Approach to Ultraviolet Spectral Classification of OB Stars with IUE Data".
- 1130 Contributed paper by M.L. Malagnini, C. Morossi and R. Faraggiana "T_e Determination from UV and Visual Spectrophotometry and Comparison with MK Classification".
- 1145 Contributed paper by M. Jaschek "Classification of IUE Spectra".
- 1400 Invited talk by R. Humphreys "MK Classification of Individual Stars in Galaxies".
- 1500 Contributed paper by R. Crowe "Classification of Southern Hemisphere Mira Variables".
- 1515 Contributed paper by M. Hirai "The Identification of the Double Lines in the Photographic Infrared Spectrum of the Mira-Type Carbon Star, U Cygni Near the Maximum Light".
- 1530 Posters and coffee.
- 1630 Comments on poster by N. Walborn "An Unstable Ofpe Star in the Large Magallanic Cloud".
- Comments on poster by Y. Yamashita, Y Norimoto, and K.H. Yoo "Spectral Peculiarities in the Recent Spectra of PU Vul (Nova Vul 1979) and CH Cyg".
- Comments on poster by H.A. Abt "The Occurrence of Peculiar Stars in Clusters and Visual Binaries".
- Comments on poster by C. Corbally "A Test of Stellar Evolution Theory by Visual Binaries".
- Comments on poster by R. Gauthier "Spectra of Cepheids".

Thursday 9 June

- 0900 Contributed paper by H.A. Abt "The Discovery of the Lambda Bootis Stars".
- 0915 Contributed paper by W. Buscombe "How Can We Retrieve Data About Faint Stars?".
- 0930 Contributed paper by C. Corbally "Which Map of Absolute Magnitude: Keenan or Schmidt-Kaler?".
- 1100 Discussion and Recommendations
- 1400 Discussion and Recommendations
- 1530 Review and Comments by R.F. Garrison

The MEETINGS will be held in the McLennan Physical Laboratories, Room 102.

Coffee and Tea with donuts or cookies will be served at 1030 and 1530 daily and lunch will normally be from 1200 to 1400.