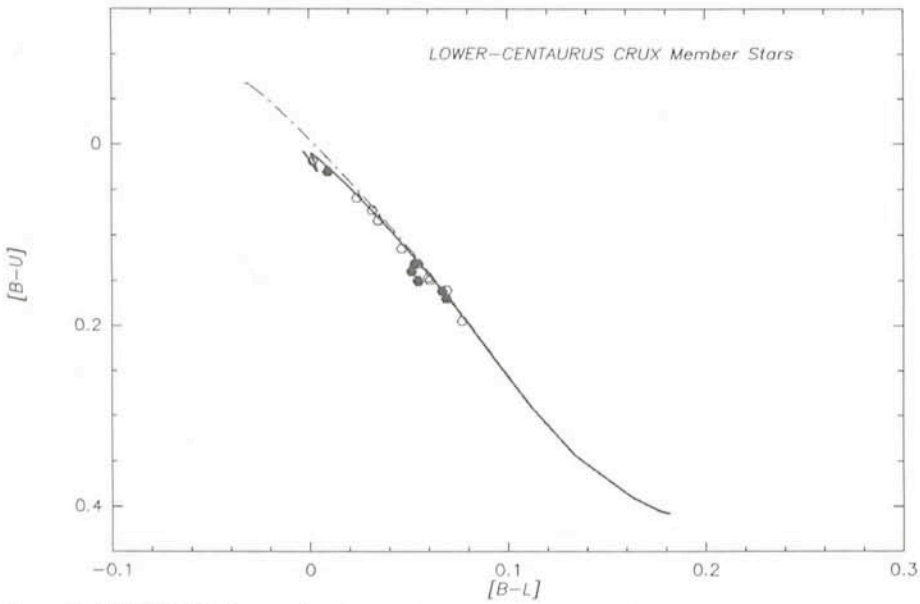

Figure 6: *([B-U], [B-L]) diagram for the certain members of Lower Centaurus Crux. Fast rotating stars are denoted by filled symbols. Stars for which no rotational velocities are available are denoted by a cross. Dashed line: ZAMS. Solid line: best fitting isochrone (age: 11.5 million years).*

Centaurus Lupus is positioned between the two younger ones. This however does not contradict the idea that star formation in the two younger subgroups was ignited by the propagating ionization front driven into the molecular cloud by the Lyman continuum radiation of the stars in Upper Centaurus Lupus.

Future Work

First of all we want to determine the effect of stellar rotation on the observed colours in the Walraven photometric system. This can be done in a similar way as Collins and Sonneborn (1977) have done for the Strömgren system. By simulating measurements of a group of stars, in which the effect of rotation is included, we can quantitatively determine the effect of rotation on the age determination.

Secondly we want to determine both radial and rotational velocities for the early-type stars. Radial velocities together with the proper motions of the stars will give us the space motions of the stars, which is first of all an accurate way to determine membership, but in the second place also a more accurate way to determine the kinematic age than from proper motions alone. The rotational velocities will be used to try to correct the age determinations for the effects of the rotation.

In the third place we want to study the interstellar medium of the OB associations. Most of the young associations still possess remnants of their parent molecular cloud. The gaseous component can be traced using for instance the J = 1 → 0 transition of the ^{12}CO molecule. A study by Blitz (1981) showed that most remnants of molecular clouds associated with OB associations are situated at the edge of the stellar aggregate. Furthermore, we can determine the gas-to-dust ratio. In Sco OB2 the only remnants of the parent molecular cloud are the clouds forming the Ophiuchus Complex of Molecular Clouds. CO observations of this region were made by one of us (EDG) using the Columbia 1.2-m telescope on Cerro Tololo. The instrument was built for large-scale surveys of the Galactic Plane, but is excellent for the study of large molecular clouds too. A preliminary investigation of the data shows that there is no clear 1-1 correlation between the gas and the dust (IRAS skyflux maps). This is probably due to the high UV flux in the associations.

A careful study of both the stellar content and the ambient interstellar medium can give us many clues to why and how the stars in the Sco OB2 association started to form about 15 million years ago.

We thank Dr. J.W. Pel for communicating the transformation formulae to derive the magnitudes in the Johnson system in advance of publication.

Table of Nuclear and Kinematic Ages

Association	t_{nuc} [10^6yr]	t_{kin} [10^6yr]
Sco OB2: Lower Centaurus Crux	10–13	
Sco OB2: Upper Centaurus Lupus	13–16	
Sco OB2: Upper Scorpius	3– 6	4.5

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Visiting Astronomers (April 1 – October 1, 1986)

Observing time has now been allocated for period 37 (April 1 – October 1, 1986). As usual, the demand for telescope time was much greater than the time actually available.

The following list gives the names of the visiting astronomers, by telescope and in chronological order. The complete list, with dates, equipment and programme titles, is available from ESO-Garching.

3.6-m Telescope

April: Keel/de Grijp/Miley, Zuiderwijk/Shanks, Fusi Pecci/Buonanno/Corsi/Renzini/King, Chincarini/Carpino, Bässgen/Grewing/Krämer/Maluck, Ulrich/Perryman, Festou/Dennefeld, Grec/Gelly, Mathys/Stenflo, Holweger/Steenbock/Steffen.

May: Holweger/Steenbock/Steffen, Schmutz/Hamann/Hunger/Wessolowski, Nissen/Gehren/Kudritzki, Magain, Schoembs/Pedersen/Marschhäuser, Kunth/Arnault/Tarrab, Epchtein/Nguyen-Q-Rieu/Winnberg/Lindquist/Le Bertre, Encrenaz/Lecacheux/Combes, de Muizon/d'Hendecourt, Chelli/Carrasco/Cruz, Zinnecker/Chelli/Perrier.

June: Danziger/Binette/Matteucci, Jarvis,

Fransson/Lindblad/Palumbo, Krautter/Frank/Sztajno, de Jong/Lub, Danziger/Oliva/Moorwood, Oliva/Moorwood, Moorwood/Oliva, Pottasch/Mampaso/Manchado.

July: Pottasch/Mampaso/Manchado, Angebault/Pakull/Beuermann, Seitter, Kollatschny/Hellwig, Miley/Heckman/Macchetto, Castellani/Caloi/King, Azzopardi/Lequeux/Rebeirot/Rich, Koornneef/Burrows, Habing/van der Veen, Moorwood/Rodriguez/Rudy, Quintana/de Souza, Mazure/Capelato/Proust.

August: Mazure/Capelato/Proust, Leitherer/Appenzeller, Véron, Ardeberg/Lindgren/Maurice/Prévot/Lundström, La Dous/Cacciari/Clementini, Barbuy/Ortolani/Bica, Richtler/Spite M./Cayrel, Wolf/Baschek/Scholz/Krautter/Reitermann, Ellis/D'Odorico/Couch, D'Odorico/Adorf/Ponz/Shaver, Bergvall, Danziger/Gilmozzi.

September: Danziger/Gilmozzi, Bergeron/Boissé/Puget, Pickles/van der Kruit, Östreicher/Ruder/Seifert/Wunner, Frandsen, Kunth/Sargent.

2.2-m Telescope

April: Reinsch/Beuermann/Weißsieker/Pakull, Gathier/Atherton/Pottasch/Reay, Keel, Gustafsson/Ardeberg/Jakobsen/Lynga/Nissen/Westerlund, Bässgen/Grewing/Krämer/Maluck, Capaccioli/Held, Chincarini/Carpino, Kohoutek/Schramm, Lacombe/Léna/Rouan/Perrier/Combes, Colina/Hellwig, v. Groningen/Perryman.

May: v. Groningen/Perryman, Bertola/Zeilinger/Galletta, di Serego Alighieri/Fosbury/Tadhunter, Tarrab/Kunth/Arnault/Vigroux, Pizzichini/Pedersen, Maccagni/Vettolani, de Bruyn/Stirpe, Vreux/Manfroid/Scuflaire, Trefzger/Grenon, Fricke/Loose.

June: Fricke/Loose, Clementini/Cacciari/Prévot/Lindgren, Falomo/Boksenberg/Tanzi/Tarenghi/Treves, Jarvis, Ortolani/Gratton, Ortolani/Rosino.

July: Barwig/Häfner/Schoembs, Aurière/Cordoni, Leitherer/Appenzeller.

August: Leitherer/Appenzeller, Hewett/Colless/Fabian/Efstathiou, Antonello/Conconi/Chincarini, Bergvall, Longair/Yates, Vogt, Falomo/Boksenberg/Tanzi/Tarenghi/Treves, Gottwald/Parmar/White/Haberl/die Serego Alighieri, Paresce/Burrows/Bely/Vidal-Madjar, di Serego Alighieri/Shaver/Cristiani/Perryman/Bergeron/Macchetto.

September: di Serego Alighieri/Shaver/Cristiani/Perryman/Bergeron/Macchetto, Prange/Gérard/Paresce/Vidal-Madjar, Schulz/ Rafanelli/di Serego Alighieri, Stahl/Wolf/Zickgraf, Cetty-Véron/Dennefeld.

1.5-m Spectrographic Telescope

April: Antonello/Pastori/Gerbaldi/Morguleff/Pasinetti/Fracassini, Arpigny/Dossin/Manfroid, Dollfus/Zerull/Killinger/Suchail, Pati/Bhattacharyya, Kameswara Rao/Nandy, Fischerström/Liseau/Lindroos, Schmutz/Hamann/Hunger/Wessolowski.

May: Crivellari/Beckman/Arribas/Castellani/Vladilo/Foing, Bues/Müller/Pragal, Schmutz/Hamann/Hunger/Wessolowski, Schulte-Ladbeck, Bouvier/Bertout/Bouchet/Bastien, Andersen, Arpigny/Dossin/Manfroid.

June: Andersen, Viotti/Altamore/Rossi C./Rossi L., Schneider/Maitzen/Catalano F., Pottasch/Pecker/Karoji/Sahu, Trefzger/Grenon, Strupat/Drechsel/Boenhardt/Haug/Herczeg, Giovannelli/Vittone/Covino/Rossi C./ Foing/Nastari/Bisnovatyi-Kogan, Sheffer/Lamzin, Collmar/Kendziorra/Brunner/Kappelmann/Staubert.

July: Collmar/Kendziorra/Brunner/Kappelmann/Staubert, Duerbeck, Acker/Stenholm/Lundström, Thé/Westerlund/Singh Vardya.

August: Thé/Westerlund/Singh Vardya, Thé/Westerlund, Gerbaldi, Maciel/Barbuy, Aldrovandi/Faundez-Abans, Vittone/Covino, Milano/Rigutti.

September: Vittone/Covino, Milano/Rigutti, Rafanelli/Schulz, Falomo/Bouchet/Maraschi/Tanzi/Treves, North/Kroll, Lortet/Testor.

1.4-m CAT

April: Baade, Arpigny/Dossin/Manfroid, Baade, Gustafsson/Morell/Edvardsson, Heske/Wendker, Danks/Chalabaev/Zuiderwijk/Lambert, Grewing/Barnstedt/Bianchi/Gutekunst/Kappelmann.

May: Grewing/Barnstedt/Bianchi/Gutekunst/Kappelmann, Westerlund/Krelowski, Crivellari/Beckman/Arribas/Castellani/Vladilo/Foing, François/Spite M., Magain.

June: François/Spite M., Noci/Ortolani, Wolf/Stahl, Nissen/Andersen/Edvardsson/Gustafsson, Benvenuti, da Silva/Vieira/Spite F.

July: da Silva/Vieira/Spite F., McNally/Crawford, Lenhart/Grewing, Vladilo/Beckman/Crivellari/Molaro.

August: Barbuy/Vidal-Madjar/Ferlet/de Grijp/Paresce/Lagrange, Ferlet/Vidal-Madjar/Gry/Laurent/Lallement, Stalio/Porri/Polidon.

September: Stalio/Porri/Polidon, Barbieri/Benacchio/Cristiani/Nota, Ardeberg/Lindgren/Maurice/Lundström.

1-m Photometric Telescope

April: Jockers/Geyer/Hänel/Nelles, Encrenaz/Lecacheux/Combes, Heske/Wendker, Danks/Le Bertre/Chalabaev/Bouchet, Brahic/Barucci/Roques/Sicardy, Labhardt/Spaenhauer/Trefzger.

May: Labhardt/Spaenhauer/Trefzger, Brahic/Barucci/Roques/Sicardy, Reimers/Koester, Bues/Müller/Pragal, Bouvier/Bertout/Bouchet/Bastien, Encrenaz/Lecacheux/Combes, Crivellari/Beckman/Arribas/Castellani/Vladilo/Foing, Epchtein/Braz, de Muizon/d'Hendecourt.

June: de Muizon/d'Hendecourt, Clementini/Cacciari/Prévot/Lindgren, Schneider/Maitzen/Catalano F./Krautter/Ögelman, Reipurth, Picquette/Mauron/Lacombe, Giovannelli/Vittone/Covino/Rossi C./Foing/Nastari/Bisnovatyi-Kogan/Sheffer/Lamzin, Chini/Krügel.

July: Chini/Krügel, Reipurth, Danks/Le Bertre/Chalabaev/Bouchet, Barwig/Haefner/Schoembs, Habing/v.d. Veen/Geballe, Thé/Westerlund, Di Martino/Zappala/Farinella/Cellino.

August: Di Martino/Zappala/Farinella/Cellino, Antonello/Conconi/Chincarini, Barucci/Fulchignoni/Harris/Zappala/Di Martino/Binzel/Lagerkvist, Clementini/Cacciari/Prévot/Lindgren, Chavarria/Leitherer, Haug/Drech-

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A Workshop organized by ESA and ESO co-sponsored by ASSA

on

"Interrelation of Ground Based and Space Astronomy"

27–28 May, 1986

Venue: Austrian Academy of Sciences, "Johannes-Saal" Bäckerstraße 20, A-1010 Vienna 1

Preliminary Programme

Survey Lecture (L. Woltjer, ESO, Garching)
Optical and UV Astronomy from Space (M. Longair, Royal Observatory, Edinburgh)
Optical Astronomy from Ground (J.-P. Swings, Institut d'Astrophysique, Liège)
Infrared Astronomy from Space (H. Habing, Sterrewacht, Leiden)
Infrared Astronomy from Ground (P. Léna, Observatoire de Paris)
X- and γ-Ray Astronomy (J. Bleeker*, Lab. for Space Research, Utrecht)
Radio Astronomy
(a) VLBI (R. Schilizzi, Dwingeloo)
(b) from Ground (R.S. Booth, Onsala Space Observatory)
Panel Discussion

*) to be confirmed

* * *

The aims of the workshop are to review the present status and major problems in astronomy and the projects which are being developed or planned, in space or on the ground, to study them. The discussions will focus on the question of the global approach to astronomical research and, in particular, on the complementarity between ground and space facilities.

Participation is by invitation only and limited to approximately 70 participants. People definitely interested in participating in the Workshop should write to: Dr. E. Mondre, ASSA, Garnisongasse 7, A-1090 WIEN, Austria.

sel/Strupat/Boenhardt/Herczeg, Liller/Alcaino.

September: Liller/Alcaino, Richtler, Maurice/Bouchet/Martin/Prévot.

50-cm ESO Photometric Telescope

April: Manfroid/Sterken/Arpigny, Antonello/Conconi/Mantegazza, Arlot/Thuillot/Morando/Lecacheux, Antonello/Conconi/Mantegazza, Carrasco/Loyola, Gustafsson/Morell/ Edvardsson, Fischerström/Liseau/Lindroos, Kohoutek.

May: Kohoutek, Bouvier/Bertout/Bouchet/Bastien, Herczeg/Drechsel, Busso/Scaltriti.

June: Busso/Scaltriti, Manfroid/Sterken/Arpigny, Giovannelli/Vittone/Covino/Rossi C./Foing/Nastari/Bisnovatyi-Kogan/Sheffer/Lamzin, Group for Long Term Photometry of Variables.

July: Group for Long Term Photometry of Variables.

August: Group for Long Term Photometry of Variables, Thé/Westerlund/Singh Vardya, Thé/Westerlund, Carrasco/Loyola, Debehogne/Zappala/De Sanctis, Vittone/Covino/Milano/Rigutti.

September: Vittone/Covino/Milano/Rigutti, Group for Long Term Photometry of Variables.

GPO 40-cm Astrograph

April: Koutchmy/Lamy/Castinel/Verseau, Seitter/Tsvetkov/Duerbeck.

May: Seitter/Tsvetkov/Duerbeck, Elst.

June: Elst.

August: Debehogne/Machado/Caldeira/Vieira/Netto/Zappala/De Sanctis/Lagerkvist/Mourao/Tavares/Nunes/Protitch-Benishek/Bezerra/Pereira.

September: Debehogne/Machado/Caldeira/Vieira/Netto/Zappala/De Sanctis/Lagerkvist/Mourao/Tavares/Nunes/Protitch-Benishek/Bezerra/Pereira.

1.5-m Danish Telescope

April: Mayor/Duquennoy/Andersen/Nordstroem, Stobie/Miller/Cannon/Hawkins, Arpigny/Dossin/Manfroid, Quintana/de Souza, Ilovaisky/Chevalier/Angebault/Motch/Mouchet, Reinsch/Beuermann/Weißsieker/Pakull.

May: Galletta, Reimers/Koester, Maccagni/Vettolani, v. Paradijs/v.d. Klis, Baade/Danziger, Barbuy/Ortolani/Bica.

June: Barbuy/Ortolani/Bica, Ortolani/Gratton, de Jong/Lub, Fransson/Lindblad/Palumbo, Picquette/Mauron/Lacombe.

July: Lewin/Pedersen/van Paradijs.

August: Lewin/Pedersen/van Paradijs, Mayor/Mermilliod, Mayor/Duquennoy/Andersen/Nordstroem, Clementini/Cacciari/Prévot/Lindgren.

September: Ardeberg/Lindgren/Maurice/Prévot/Lundström, Cameron/Sandage/Binggeli/Brinks/Klein/Danziger/Matteucci.

50-cm Danish Telescope

May: Barrera/Vogt, Group for Long Term Photometry of Variables.

June: Group for Long Term Photometry of Variables, Ardeberg/Lindgren/Maurice/Prévot.

July: Ardeberg/Lindgren/Maurice/Prévot, Tobin/Viton/Sivan.

August: Tobin/Viton/Sivan, La Dous/Cacciari/Clementini, Group for Long Term Photometry of Variables.

September: Group for Long Term Photometry of Variables, Ardeberg/Lindgren/Maurice/Prévot/Lundström, Grenon/Oblak.

90-cm Dutch Telescope

April: van Genderen/Steemers/van der Hucht, Gathier/Atherton/Pottasch/Reay, de Loore/Monderen/van der Hucht.

May: Manfroid/Vreux/Scuflaire.

June: Manfroid/Vreux/Scuflaire, Trefzger/Pel/Blaauw, de Zeeuw/Lub/de Geus/Blaauw.

July: Grenon/Lub.

August: Grenon/Lub, Thé/Westerlund/Singh Vardya, Thé/Westerlund.

September: v. Amerongen/v. Paradijs/Blondel.

61-cm Bochum Telescope

April: Kohoutek/Schramm, Grewing/Barnstedt/Bianchi/Gutekunst/Kappelmann.

May: Grewing/Barnstedt/Bianchi/Gutekunst/Kappelmann, Schober/Surdej/Albrecht, Schneider/Maitzen/Catalano F.

June: Schneider/Maitzen/Catalano F., Gammelgaard.

July: Di Martino/Zappala/Farinella/Cellino.

IMPROVED MASKING TECHNIQUE APPLIED TO GRISM PLATES

Identification of New Carbon Star Candidates in SMC Globular Cluster NGC 419

M. AZZOPARDI, B. DUMOULIN and J. QUEBATTE, ESO
E. REBEIROT, Observatoire de Marseille

For quite some time we have been surveying the Magellanic Clouds for carbon stars. We have used the ESO 3.6-m telescope equipped with the red wide field corrector and a Hoag grism having its maximum transmission (85 %) at about 4850 Å. Each field covers a circular area of about 0.8 square degrees of which a sector of about 18 % goes from slightly to fully vignetted. In order to minimize the number of overlapping images, the instrumental spectral domain has been reduced to the useful spectral range 4350–5300 Å by combining a IIIa–J emulsion with a Schott GG 435 filter. In spite of the limited spectral range and the low dispersion used (2200 Å/mm), carbon stars can be identified, on our grism plates, by means of the strong Swan band of the C_2 molecule at 5165 Å (see Fig. 2 in the paper by Azzopardi and Westerlund, 1984).

About 8 observing nights in the autumns of 1981 through 1984 were necessary to observe, with reasonably good seeing ($\lesssim$ 2 arcseconds), 8 fields located in selected regions of the Large Cloud and 13 fields, partially overlapping, together covering the main body of the Small Cloud. Exposures of 60 minutes and 5 minutes have been secured for each field. At present all SMC grism plates have been systematically searched for C stars with a binocular microscope, and the spectrophotometric study completed for two fields (Westerlund, Azzopardi and Breysacher, 1985). Deep surveys in 37 small selected areas in the SMC have also been carried out by Blanco, McCarthy and Blanco (1980) using the grism technique in the near infrared. From this sample, Blanco and McCarthy (1983) estimated that the total number of carbon stars in the Small Cloud is about 2,900.

The degree of completeness of our green grism survey for SMC carbon stars has been investigated (Westerlund and al., 1985) by comparing the objects we identified in the very crowded field SMC B (bar) with those found by Blanco and associates (1980). This study shows that 11 objects have been identified only by our survey. The most likely explanations for the few stars not being detected by us is that they are either variable or very red and therefore too faint to be seen in the blue-green spectral range, or that they have extremely weak C_2 bands. From this comparative study we ascertained that the slight rotation of the spectra of one plate with respect to the others allows one to identify a number of overlapping objects in the field in common. Finally, the survey of short exposure plates reveals some relatively bright objects which are not visible on the deeper grism plates because they are overexposed. Consequently, we may consider that our survey technique allows a reasonably complete detection of the field C stars in the SMC, even in the most crowded regions of the bar. However, this detection technique is powerless in the areas of the plate where the optical density is particularly