

present are very poorly understood. The most recent results tend to show that as far as they can be observed, all galaxies move relative to the CMWB with a velocity of several hundred kilometres per second in the direction of Centaurus. Thus, it is not clear at what distance one should start correcting the velocities for this effect or if one should correct them at all!

(b) Malmquist Bias

This is an unpleasant effect which has caused and continues to cause endless troubles to those who engage in the quest for the Hubble constant. Malmquist bias occurs because all correlations used to determine distances have considerable cosmic scatter. So if one selects galaxies which are brighter than a certain limiting value, close to this value one tends to observe galaxies which are systematically brighter than the luminosities one would predict from the distance indicator in the absence of bias. This causes the distances to be biased towards lower values.

I am very fortunate to have Edmond Giraud ("Mr. Malmquist Bias") next doors who showed me how to correct magnitude limited samples for this effect. Because at any distance HII galaxies span a very large range of luminosities, and because there are luminous HII galaxies at small distances, the Malmquist effect on the distance indicator is, as we shall see, very small.

The Hubble Constant from Giant HII Regions

The resulting values for H_0 are given in Table 2 for different redshift cuts of the data.

The errors quoted are 1σ deviations from the mean of all galaxies and do not include the zero point error. When this is included, our best estimate is $H_0 = 85 \pm 10$ km/sec/Mpc. this value compares very well with the value of $H_0 = 92 \pm 1$ found by Aaronson and co-workers using the Tully-Fisher relation (the error they quote does not include zero point uncertainties). Our value disagrees with the value of $H_0 = 50 \pm 7$ km/sec/Mpc obtained by Sandage and Tamman. If we use the Sandage-Tamman local distance scale (Table 1) we obtain a value of 78 ± 10 which still disagrees at the 3σ level with $H_0 = 50$.

Caveats

Recently, a well-known cosmologist told me: "Your results are very nice, so... what's wrong with them?" What he meant, of course, was that I had

TABLE 2: *The Hubble constant*

Redshift range	$\langle H_0 \rangle$ km/sec/Mpc	Malmquist correction	Number of galaxies
Full sample	94 ± 5	-11	29
Excluding Virgo	97 ± 5	-12	24
Redshift > 2000	99 ± 5	-14	21
Redshift > 4000	102 ± 6	-16	16

obtained the wrong value for H_0 . This illustrates the philosophical prejudices involved in cosmology; this is only natural because Cosmology reaches the boundary between science and religion. Personally, I find the story of Adam and Eve more elegant and easier to believe than the Big-Bang!

Nevertheless, observers must forsake philosophical and theoretical prejudices in the analysis of the weak points of our own data. In the case of giant HII regions, the caveat is that the H_β luminosities of some HII galaxies may come from more than one giant HII region superimposed along the line of sight. This would not only bias the luminosities towards larger values but also introduce the gravitational potential of the parent galaxies as an additional parameter. As far as we can tell from deep CCD pictures and spatially resolved spectroscopy, the effect of multiplicity in our sample is small. The fact that the scatter of the HII galaxy correlations is similar to that exhibited by the giant HII region sample lends strong support to this conclusion.

It is clear, however, that if the emission-line component of all HII galaxies consisted of four identical giant HII regions of exactly the same redshift superimposed along the line of sight we would not distinguish them from single objects but our value of H_0 would be overestimated by a factor of 2!

Epilogue

A large value of H_0 is only one of a number of new observations which are beginning to erode the old edifice of Big-Bang cosmology. Inflation, dark matter, superstrings and other scaffoldings are being used to save the "standard" Big-Bang but in the end it will surely fall. This should not worry us, for we know that new buildings are always more solid than old structures. Unfortunately, however, there are very few modern buildings that are nicer than the old ones they replace.

References

For the sake of brevity I have not included formal references to the work I quoted. I have based the discussion on

the following works where complete lists of references can be found:

- (1) R. Kippenhahn: *Light from the Depths of Time* (Springer) for the history of the Hubble constant.
- (2) A. Sandage: "The Dynamical parameters of the Universe", in First ESO/CERN Symposium, *Large Scale Structure of the Universe, Cosmology and Fundamental Physics*, p. 127, for a modern account of the quest for the Hubble constant and the defence of $H_0 = 50$.
- (3) M. Aaronson and co-workers in *Astrophysical Journal* Vol. 302, p. 536 (1986) for a detailed discussion of the Tully-Fisher method, the various radial velocity corrections and a defence of the $H_0 = 100$ view.
- (4) J. Melnick and co-workers in ESO preprint number 440 (1986) for a discussion of the use of giant HII regions as distance indicators.

Visiting Astronomers

(April 1–October 1, 1987)

Observing time has now been allocated for Period 39 (April 1–October 1, 1987). The demand for telescope time was again 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: Martinet/Jarvis/Pfenniger/Bacon, Franz/Illingworth, Illovaisky/Chevalier/v.d. Klis/v. Paradis/Pedersen, Mathys/Stenflo, Francois/Spite M/Spite F, Jeffery/Hunger/Heber/Schönberner, Hunger/Heber/Werner/Rauch, Miley/Macchetto/Heckman, Kollatschny/Fricke, Maccagni/Vettolani.

May: Maccagni/Vettolani, Keel, Ortolani/Rosino, Cacciari/Clementini/Prévôt/Lindgren, Barbuy/Ortolani/Bica, Gratton/Ortolani, Lub/de Geus/ Blaauw/de Zeeuw/Mathieu, Cacciari/Clementini/Prévôt/Lindgren, Moorwood/Oliva, Danziger/Oliva/Moorwood, Tapia/Persi/Ferrari-Toniolo/Roth, Lacombe/Léna/Rouan/Slezak.

June: Lacombe/Léna/Rouan/Slezak, Chelli/Reipurth/Cruz-G., Richichi/Salinari/Lisi, Zinnecker/Perrier, Perrier/Mariotti, Habing/van der Veen, Sicardy/Brahic/Lecacheux/

Roques/Le Borgne/Barucci, Azzopardi/Rich, Azzopardi/Lequeux/Rebeiro/Rich, Baessgen M/Baessgen G/Grewing/Bianchi.

July: Baessgen M/Baessgen G/Grewing/Bianchi, Seitter, Angebault/Pakull/Beuermann/Motch, Barwig/Häfner/Mantel/Schoembs, Bertola/Guzzo, Schulz/Schmidt-Kaler, Metz/Häfner/Barwig, Schoembs/Roth, Houziaux/Kameswara Rao.

August: Houziaux/Kameswara Rao, D'Odorico/Pettini, Pizzichini/Pedersen, De Lapparent/Mazure, Sparks/Macchietto.

September: Ardeberg/Lindgren/Lundström, Webb/Vidal-Madjar/Carswell/Ferlet, Wolf/Baschek/Scholz/Krautter/Reitermann, Fosbury/Robinson/Danziger, Guzzo/Focardi, Rocca-Volmerange/Azzopardi/Guideroni/Roland, Danziger/Gilmozzi/Griffiths/Ward, Shaver/Clowes/Iovino/Cristiani, Christiani/Barbieri/Iovino/Nota, Wampler.

2.2-m Telescope

April: Le Bertre/Chelli/Perrier, Martinet/Jarvis/Pfenniger/Bacon, Jarvis/Martinet, Arpigny/Dossin/Manfroid/Häfner, Vreux/Manfroid/Magain, Trefzger/Grenon, Reinsch/Pakull/Festou, Gouffes/Cristiani, Loose/Thuan/Kollatschny, Röser/Hiltner/Meisenheimer, Magain/Courvoisier/Kühr/Surdej/Swings/Djorgovski, Schmutz/Hamann/Nussbaumer/Smith/Vogel.

May: Schmutz/Hamann/Nussbaumer/Smith/Vogel, Le Bertre/Chelli/Perrier, Galletta, Reipurth/Zinnecker, Seggewiss/Moffat, Gouffes/Cristiani, Reinsch/Pakull/Festou, Capaccioli, Paresce/Burrows/Vidal-Madjar, Christensen/Sommer-Larsen, de Jong/v.d. Broek/Lub.

June: de Jong/v.d. Broek/Lub, Courvoisier/Melnick/Mathys/Binette/Maeder.

July: de Vries/Verter/Habing, Gouffes/Cristiani, Binette/Fosbury/Courvoisier, Magain/Courvoisier/Kühr/Surdej/Swings/Djorgovski, Fusi, Pecci/Buonanno/Corsi/Ferraro, Ulrich, Metz/Häfner/Barwig/Schoembs/Roth.

August: Metz/Häfner/Barwig/Schoembs/Roth, Schwarz/Aspin/Magalhaes/Schulte-Ladbeck, Chini/Krügel, Gouffes/Cristiani, Skillman/Melnick/Terlevich, Prugniel/Davoust/Nieto, Pizzichini/Pedersen, Ortolani/Piotti/Rosino, v. Paradis/Pedersen.

September: v. Paradis/Pedersen, Schwope/Beuermann, Coyne/Magalhaes, Danziger/Dalgarno, Stanga/Rodriguez-E./Binette, Leitherer/Appenzeller, Westerlund/Azzopardi/Breysacher/Rebeiro, Véron, Getty-Véron, Lortet/Testor.

1.5-m Spectrographic Telescope

April: Rafanelli/Marziani, Trefzger/Grenon, Mathys/Maeder, Courvoisier/Bouchet, Rosa/Richter, Kollatschny/Hellwig.

May: Kollatschny/Hellwig, Schmutz/Hamann/Hunger/Wessolowski, Arpigny/Dossin/Manfroid/Häfner, de Jager/Nieuwenhuijzen, Pottasch/Pecker/Karaji/Sahu, Bues/Rupprecht/Pragal, Quintana/de Souza.

June: Quintana/de Souza, Schulte-Ladbeck/Krautter, van Genderen/Thé, Tozzi/Donati-Falchi/Falcianni/Smaldone, Alloin/Pelat/Phillips M/Phillips D, Hunt/Trinchieri,

Alloin/Pelat/Phillips M/Phillips D, Pauls/Kohoutek.

July: Pauls/Kohoutek, Acker/Stenholm/Lundström, Reichen/Lanz/Golay, Courvoisier/Bouchet, Metz/Häfner/Barwig/Schoembs/Roth, Kameswara Rao/Nandy, Alloin/Pelat/Phillips M/Phillips D.

August: Alloin/Pelat/Phillips M/Phillips D, Kameswara Rao/Nandy, Mantegazza, Magain, Alloin/Pelat/Phillips M/Phillips D, Tanzi/Bouchet/Falomo/Treves.

September: Alloin/Pelat/Phillips M/Phillips D, Balkowski/Proust/Talavera, Alloin/Pelat/Phillips M/Phillips D, Lortet/Testor.

1.4-m CAT

April: Vreux/Manfroid/Magain, Arpigny/Dossin/Manfroid/Häfner, Baade, Lucy/Baade, Malaney, Gustafsson/Edvardsson/Magain/Nissen.

May: Gustafsson/Edvardsson/Magain/Nissen, Arpigny/Dossin/Manfroid/Häfner, de Jager/Nieuwenhuijzen, Pottasch/Sahu, Pottasch/Srinivasan/Sahu/Desai, Ferlet/Vidal-Madjar/Gry/Lallement, Andreani/Ferlet/Vidal-Madjar, Lagrange/Ferlet/Vidal-Madjar, Reipurth/Lago.

June: Reipurth/Lago, Baade/Stahl, Mandolesi/Palazzi/Crane/Hegyi, Crane/Blades/Palazzi, Crane/Blades/Mandolesi/Palazzi, Crane/Palazzi/Lambert, de Vries/van Dishoeck/Habing.

July: de Vries/van Dishoeck/Habing, Thé/Tjin A Djie/Monderen, Waelkens, Foing/Beckman/Castelli/Crivellari/Vladilo.

August: Crivellari/Beckman/Arribas/Castelli/Vladilo/Foing, Foing/Beckman/Castelli/Crivellari/Vladilo, Chmielewski/Lambert, Magain, Lenhart/Grewing/Beck.

September: Lenhart/Grewing/Beck, da Silva/Spite F/Vieira Costa, Burkhardt/Coupry/van't Veer.

1-m Photometric Telescope

April: Le Bertre/Chelli/Perrier, Schultz, Persi/Preite-Martinez/Ferrari-Toniolo, Reinsch/Pakull/Festou, Mermilliod/Claria, Jockers/Geyer.

May: Jockers/Geyer, Reinsch/Pakull/Festou, Silvestro/Busso/Roberto/Scaltriti, de Jager/Nieuwenhuijzen, Cacciari/Clementini/Prévôt/Lindgren, Reinsch/Pakull/Festou, Fischerström/Lindroos/Liseau, Bues/Rupprecht/Pragal.

June: Tapia/Persi/Ferrari-Toniolo/Roth, Richichi/Salinari/Lisi, Reipurth/Zinnecker, Perrier/Mariotti, van Genderen/Thé, Habing/van der Veen/Geballe, Courvoisier/Bouchet, Bouchet/Cetty-Véron/Véron, Antonello/Conconi/Mantegazza/Poretti.

July: Antonello/Conconi/Mantegazza/Poretti, Kroll/Catalano F, Courvoisier/Bouchet, Spinoglio/Persi/Ferrari-Toniolo/Coe, Barwig/Häfner/Ritter/Schoembs/Mantel, Magain.

August: Magain, Braz/Epcstein, Wargau/Chini, Steiner/Jablonski/Cieslinski, Barucci/Fulchignoni/Harris/Zappalà/Di Martino/Binzel/Lagerkvist.

September: Barucci/Fulchignoni/Harris/Zappalà/Di Martino/Binzel/Lagerkvist, Clementini/Cacciari/Prévôt/Lindgren, Bergvall/Johansson/Olofsson, Liller/Alcaino.

50-cm ESO Photometric Telescope

April: Manfroid/Vreux/Magain, Mekkaden/Geyer, Kohoutek.

May: Kohoutek, Fischerström/Lindroos/Liseau, Manfroid/Arpigny/Häfner/Sterken.

June: van Genderen/Thé, Thé/Westerlund, Busso/Scaltriti/Corcione/Silvestre.

July: Busso/Scaltriti/Corcione/Silvestre, Group for Long Term Photometry of Variables.

August: Metz/Häfner/Barwig/Schoembs/Roth, Group for Long Term Photometry of Variables.

September: Group for Long Term Photometry of Variables.

GPO 40-cm Astrograph

April: Scardia.

May: Scardia, Böhnhardt/Drechsel/Kohoutek.

July: Seitter/Duerbeck/Horstmann, Dommanget.

August: Dommanget, Elst/Ivanova/Shkodrov/Geffert.

September: Elst/Ivanova/Shkodrov/Geffert, Debehogne/Machado/Caldeira/Vieira/Netto/Mourao/Zappalà/De Sanctis/Lagerkvist/Protitch-Benishek/Javanshir.

1.5-m Danish Telescope

April: Leibundgut/Tammann, Rasmussen/Möller, Reipurth.

May: Reipurth, Sinachopolus, Arsenault/Roy, Ortolani/Gratton, Reimers/Koester/Schröder, Giraud.

June: Giraud, de Jong/v.d. Broek/Lub, Christensen, Reiz/Pirola.

July: Reiz/Pirola, Veillet/Dourneau/Oberti/Mignard/Martins/Lazzaro, Griffin RF/Griffin REM/Mayor/Clube, Mayor/Duquennoy/Andersen/Nordström, Collins/Stobie/MacGillivray/Heydon-Dumbleton/Shanks, Schulz/Schmidt-Kaler, Castellani/Calo, v. Paradis/v.d. Klis.

August: Rasmussen/Möller.

September: Ardeberg/Lindgren/Lundström, Clementini/Cacciari/Prévôt/Lindgren, Trefzger/Mayor/Pel, Grenon/Mayor.

50-cm Danish Telescope

April: Franco.

May: Olsen/Gray, Grenon/Hög/Petersen.

June: Waelkens/Cuypers.

July: Waelkens/Cuypers, Verschueren/Sterken/Hensberge.

August: Ardeberg/Lindgren/Lundström.

September: Ardeberg/Lindgren/Lundström.

90-cm Dutch Telescope

April: van Genderen/van der Hucht/Röttgering.

May: de Jager/Nieuwenhuijzen, Trefzger/Pel/Blaauw, de Zeeuw/Lub/de Geus/Blaauw.

June: de Zeeuw/Lub/de Geus/Blaauw.

July: Grenon/Lub, Waelkens/Heynderickx.

August: Waelkens/Heynderickx.

61-cm Bochum Telescope

- June: Pauls/Kohoutek, Barwig/Häfner/Ritter/Schoembs/Mantel.
July: Barwig/Häfner/Ritter/Schoembs/Mantel.
September: Debehogne/Di Martino/Zappalà/Di Sanctis.

Italian Delegation Visits ESO

An Italian delegation, headed by the Italian Ambassador to the Federal Republic of Germany, His Excellency Prof. Luigi Vittorio Ferraris, and the Acting Italian Consul General in Munich, Dr. Lelio Crivellaro, visited the ESO Headquarters in the afternoon of January 14, 1987. After a show of the ESO film, the delegation had the opportunity to familiarize itself with a variety of sci-



entific and technical activities at ESO. This photo was taken in the Optical Laboratory (from left to right: Prof. Wolfgang Alles, Scientific Attaché at the Italian Embassy in Bonn; the Consul General; Prof. Giancarlo Setti, ESO; the Ambassador; Ms. Ursula Geiger, Italian General Consulate in Munich; Prof. Romano Toschi, Director of the NET Project, MPI, Garching).

List of ESO Preprints

December 1986–February 1987

476. T.J.-L. Courvoisier et al.: The Radio to X-ray Continuum emission of the Quasar 3C 273 and its Temporal Variations. *Astronomy and Astrophysics*. December 1987.
477. T. Le Bertre: The Opacity of the Dust Around Carbon Star IRC+10216. *Astronomy and Astrophysics*. December 1986.
478. S. Cristiani and B. Koehler: Redshifts of Quasar Candidates. *Astronomy and Astrophysics*. December 1986.
479. T. Le Bertre and N. Epchtein: Optical and Infrared Observations of Two Oxygen Rich Unidentified IRAS Sources. *Astronomy and Astrophysics*. December 1986.
480. D. Baade and L.B. Lucy: A Search for Coronal Line Emission from Early-type Stars. I. Zeta Puppis. *Astronomy and Astrophysics*. January 1987.
481. E.J. Wampler: Observational Study of the Hubble Diagram. *Astronomy and Astrophysics*. January 1987.
482. C.N. Tadhunter et al.: Detached Nuclear-like Activity in the Radio Galaxy PKS 2152-69. *Nature*. January 1987.
483. J.-L. Nieto, A. Llebaria and S. di Serego Alighieri: Photon-counting Detectors in Time-resolved Imaging Mode: Image Recentering and Selection Algorithms. *Astronomy and Astrophysics*. January 1987.
484. R.N. Wilson, F. Franz and L. Noethen: Active Optics I: A System for Optimizing the Optical Quality and Reducing the Costs of Large Telescopes. *Optica Acta*. January 1987.
485. E. Brocato and V. Castellani: Evolutionary Constraints for Young Stellar Clusters: I. The Luminosity Function of H-Burning Stars. *Astronomy and Astrophysics*. February 1987.
486. M. Azzopardi: Small Magellanic Cloud: Hy Equivalent Widths and Luminosity Classes of the Brightest Blue Star Members. *Astronomy and Astrophysics Supplement Series*. February 1987.
487. A. Tornambè and F. Matteucci: Subluminous Type I SNe: Their Theoretical Rate in Our Galaxy and in Ellipticals. *Astrophysical Journal*. February 1987.
488. O. Stahl, B. Wolf and F.-J. Zickgraf: Photometry and Spectroscopy of the Eclipsing P Cygni Star R 81 of the Large Magellanic Cloud. *Astronomy and Astrophysics*. February 1987.
489. G.A. Tammann: The Cosmic Distance Scale. February 1987.
490. A. Robinson et al.: Emission Line Activity in Radio Galaxies. *Monthly Notices of the Royal Astronomical Society*. February 1987.

First Announcement

A conference organized by NOAO (National Optical Astronomical Observatories) and ESO on

High-Resolution Imaging by Interferometry

will be held from 15 to 18 March 1988 at ESO in Garching, FRG.

The scope of this conference is ground-based interferometry at visible and infrared wavelengths.

The programme will include the following topics:

- Scientific Goals
- Interferometric Imaging with Single-Dish Telescopes
- Ground-Based Long-Baseline Interferometer Projects
- Methods for Reconstructing Images and Spectral Information from Optical Long-Baseline Interferograms

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