Commission 8 (Positional Astronomy)
Business Session: Thursday, 18 August 1994
President: L V Morrison

The President displayed the agenda for the Business Session which was accepted by the members.

1 IN MEMORIAM

The members stood in silence in memory of the following deceased members of the Commission: Wilhelm Gliese, Robert Harrington, James Hughes, Pierre Lacroute, Clayton Smith and Yu Zverev.

2 MEMBERSHIP

The membership in 1991 was 138. Two circulars were sent to each member asking them if they still had an interest in belonging to the Commission. As a result of this exercise the membership was reduced to 120 in 1994. The IAU Secretariat was given the revised list.

The following were proposed by the President as new members of the Commission:

George H Kaplan, US Naval Observatory, USA

Xu Jiayan, Shaanxi Astronomical Observatory, China

E Felicitas Arias, Facultad de Ciencias Astronomicas y Geofisicas, Argentina;

and as Consultant:

Vladimir Yershov, Pulkovo Observatory, Russia.

3 NEW OFFICERS 1994-1997

3.1 PRESIDENT 1994-1997

Following the death of Clayton Smith, Vice-President 1991-1993, and after consultation with the Organizing Committee, the President considered that it was fitting and appropriate that

Thomas Elbert Corbin, US Naval Observatory

should be appointed Vice-President for the remainder of the triennium 1991-1994. He thus becomes the next President for 1994-1997

I. Appenzeller (ed.), Transactions of the International Astronomical Union Volume XXIIB, 135-142.

3.2 VICE-PRESIDENT 1994-1997

The following three candidates were proposed for Vice-President 1994-1997:
Leif Helmer, Copenhagen University Observatory, Denmark
Dmitri Polojentsev, Pulkovo Observatory, Russia
Heiner Schwan, Astronomisches Rechen-Institut, Germany.
Following a ballot of the membership

Heiner Schwan, Astronomisches Rechen-Institut

was elected by a clear majority.

4 NEW ORGANIZING COMMITTEE 1994-1997

The meeting agreed to the following composition of the Organizing Committee:

Benevides-Soares	Brazil
Helmer	Denmark
???Xu Jiayan	China
Kovalevsky	France
Lindegren	Sweden
López	Argentina
Morrison	UK
Noël	Chile
Polojentsev	Russia
Réquième	France
Schwan	Germany
Stone	USA
Yoshizawa	Japan
Corbin	USA (President)
Schwan	Germany (Vice-President)

5 COMMISSION REPORT FOR 1991-1994

The President introduced his report, which can be found in *IAU Reports on Astronomy* **XXIIA**, 29-37, as follows:

- An attempt to cover activities in wide-angle (global) optical astrometry 1990-1993.
- Based on reports from members of the Commission; but in several areas I had to resort to AAA to find out what was going on!
- Content:
  Ground-based; in alphabetical order of country
  Space; Hipparcos [not HST, because it is not wide-angle]
  ..... future; Roemer (ESA), AIST (Russia)

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- Highlights
  Hipparcos, Mark III Optical Interferometer

- Preparing report brought out the arbitrary, historical boundaries of the interests of our Conmmission 'Positional Astronomy': times and techniques have changed. Re-alignment and re-definition of Commissions is required (see §8).

6 SPONSORSHIP OF IAU SYMPOSIA & COLLOQUIA 1992-1995

- Symposium No.156: Developments in Astrometry and their impact on Astrophysics & Geodynamics, Shangai, China, September 1992.

- Not sponsored! Galactic & Solar System Optical Astrometry: Observation & Application, Cambridge, UK, June 1993.

- Symposium No.166: Astronomical & Astrophysical objectives of sub-milliarc second Optical Astrometry, The Hague, The Netherlands, August 1994.

- Symposium No.?: Astrometry, ephemerides & dynamics in the Solar System, Paris, France, 3–8 July 1995.

7 REPORTS FROM WORKING GROUPS

7.1 ASTROLABES

Chollet (Chairman), Dongming, Gubanov, Noël, Bénévidès (read by Débarbat)

After 1986 most of the astrolabes either stopped work or engaged in new programmes, because their results were no longer used by the BIH (IERS from 1988) or the IPMS. Due to the primary considerations of accuracy and stability, the astrolabes were limited to bright stars and certain zones of the sky. However, their capacity to observe the Sun in Brazil and France for more than a decade, has increased the scope of the instruments.

By using a solar filter placed close to the objective, it was shown in Paris that the instrument could easily be adapted to observe planets and stars. Reflecting prisms of the 'Thomas' type were also introduced and after tests in Paris the Observatoire de Paris instrument was moved to Malatya in Turkey. Meanwhile, solar observations were made in Santiago de Chile where the classical astrolabe was also modified. Recent work by Chollet and Noël (1993) gives a description of the instrument, with the first results reported by Noël (1993). Observations at Malatya were begun in 1992 by a team of young astronomers from Inonu University.

Measurement of the solar diameter continues at CERGA under Laclare using the classical solar astrolabe and another equipped with a prism of variable angle

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and a CCD camera. Results published in 1991 by Laclare & Merlin show that the instruments produce similar quality of results.

The instrument at San Fernando which is of the full pupil type has also been modified, as described by Sanchez in 1991 and 1993.

In China, Xu Jiayan et al. have described in a paper in 1993 an automatic astrolabe using a CCD and working with only one image. Chollet is collaborating with Turkish colleagues in studying the possibility of automating the instrument at Antalya in the same manner.

In total, there are six modernised astrolabes, including one recently set up in Bucharest which is undergoing modification.

Regarding the measurement of the solar diameter, there is good agreement between the from the astrolabes at Malatya (Golbasi, 1993), San Fernando (Sanchez, 1993) and the long series from CERGA (Laclare, 1993). At Santiago, however, the measured diameter is systematically larger than at the other stations (Noël, 1993) and this is under investigation.

In order to improve the accuracy of the astrolabe series of solar diameter measurements and Earth rotation parameters prior to 1986, the global reduction method has been applied. The most recent results are from Manabe & Sakai (1990) and Chollet & Najid (1992). Applications of the method are mostly confined to the solar diameter, but it has also been applied to some stellar observations and a future application concerns the re-reduction of the astrolabe observations with respect to the HIPPARCOS reference frame in collaboration with the WG of Commission 19 chaired by Vondrak.

Dr Tongqi presented the following supplement on the activities of the astrolabes in China. At present ground-based observations play an important rôle in extending the optical reference frame to fainter magnitudes and in linking it to the radio frame. The type III photoelectric astrolabes should contribute to this work. Such an astrolabe was installed in 1992 at Xin Long Station, Beijing Observatory. In 1991 the type II photoelectric astrolabe of Beijing Observatory was moved to La Plata Observatory, San Juan, Argentina, to carry out observations for the Southern astrolabe catalogue. In 1992 the type II photoelectric astrolabe of Shanghai Observatory was moved to Beijing Observatory to make observations for the Northern astrolabe catalogue. The observational programmes of these photoelectric astrolabes includes the FK5, radio stars and faint stars down to a limiting magnitude of 11. Besides the work on catalogues (which is reported in the proceedings of Working Group Meeting 3, *International Catalog Projects*), the astrolabes are engaged in research activities which includes the determination of positions and proper motions of radio stars and the observation of planets.

7.2 HORIZONTAL MERIDIAN CIRCLES

Pinigin (Chairman), Hog, Zhigang, Gumerov, Ningsheng, Kirian, Menjajlo, Osorio, Tongqi

Li Zhigang reports that the Danish-Chinese Meridian Telescope (DCMT) is

being developed in the joint project between Shaanxi and Copenhagen Observatories. The control system for automatic observation has been finished and implemented on the DCMT. The scanning-slit photoelectric micrometers for the circle reading and star observations have been operating for two years. The instrumental errors of the DCMT and the internal refraction in the telescope tube have been investigated. Observational results have been obtained in right ascension and those in declination are being reduced.

P F Lazorenko reports that more than 1500 declination observations of FK5 stars have been made with the visual micrometer on the Horizontal Meridian Axial Circle of Golosseevo Astronomical Observatory. The accuracy of one observation is 0″.3. In 1993 the new photoelectric micrometer was installed and trial observations of FK5 stars show that the accuracy is 0″.30-0″.33 in position and 0.12 in magnitude. The magnitude limit of the instrument is 9.5.

Pinigin, Gumerov and Kirian report as follows on progress with the Pulkovo HMC and MAHIS. The observations of two star lists were completed with the Pulkovo HMC in 1990. Catalogues of 170 reference stars around 63 radio sources and 911 fundamental stars (502 FK5 & 409 FKSZ) were compiled and published. It was shown that the systematic accuracy of the Pulkovo HMC was nearly 0″.02-0″.03. It was confirmed that the FK5 has systematic errors of $\sim 0''.1$ in the declination zone $+40°$ to $+60°$ (IAU Symp. 156 119). The results of the differential observations made with the HMC in 1982-83 were also completed and published. Some aspects of the HMC were modernised: mirror, computers etc. The theory of the HMC was further developed.

Good progress was made in the construction of the Meridian Automatic Horizontal Instrument of Sukharev (MAHIS). In 1991-92 a new mirror was made from cabide silicon. All the optical and mechanical parts of the MAHIS were built in tripilicate and located at Pulkovo during 1990-94. Some investigations were carried out (IAU Symp. 156 117). At present, the CCD micrometer has been made. The Nikolaev Observatory finished the collection of meteorological data and the time service for MAHIS (IAU Symp. 156 117).

Pinigin, Shulga and Federov report that the operation of the Nikolaev AMC was investigated and it was automated. The stability of the horizontal flexure and the collimation is 0″.037 and 0″.026 per 1° C., respectively. The variation of the inclination of the collimator is $\sim 0''.09$ per 1° C. Trial visual observations of FK5 stars show that variations of the instrumental system of the AMC do not exceed 0″.1. The CCD micrometer for the AMC has been built. The magnitude limit is expected to be ~ 14 and the systematic accuracy 0″.02.

As regards the future of the WG on HMC, my personal opinion is that this WG should be disbanded. From the very beginning in 1976, the WG on HMC fostered cooperation and collaboration between different Observatories under the tireless efforts of Dr Erik Hog. As a result we now have operational HMCs in Pulkovo and Kiev and HMCs under development in Shaanxi and Nikolaev. Generally speaking, the principal peculiarities of this type of meridian circle are well known from the work of producing six catalogues with HMCs. Now the main interest is in carrying out observations with these instruments. This is the

task of another group.

The Commission agreed to disband the WG on Horizontal Meridian Circles.

7.3 REFRACTION

Hughes (Chairman, deceased), Currie, Nefedeva, Rafferty, Spoelstra, Yoshizawa

No report was received from this WG. The Commission agreed to disband the WG on Refraction.

7.4 STAR LISTS

Corbin (Chairman), Carrasco, Helmer, Luo Ding-Jiang, Miyamoto, Morrison, Polojentsev, Réquième, Röser,Abalakin,Turon, Li Dong-Ming, Klemola, van Altena, Yatskiv

Corbin reported on the Star Lists Working Group. During the period since the XXIst General Assembly the WG implemented the course of action decided at that meeting:

- A list of about 3000 stars for an extension of the fundamental list to the 13th magnitude was to be selected.
- As many of the stars as possible should come from the HIPPARCOS Input Catalog.
- The stars should be evenly distributed over the sky.
- Double and multiple stars in the list should be minimized.

Work at the RGO and the USNO has resulted in a list of 3507 stars of which 3417 are taken from the HIPPARCOS list. All candidates that were found in either the Washington Double Star Catalog or among the 'problem' stars identified in the observations from the HIPPARCOS program have been removed. The list was submitted to the members of the WG for approval about two months prior to this meeting of the GA.

With the completion of this phase of work, Corbin resigned as Chairman. Helmer was appointed as the new Chairman with a mandate to have the WG now consider the question of stars for the densification the HIPPARCOS system and its extension to fainter magnitudes. The new membership of the WG is: Helmer (Chairman), Carrasco, Corbin, Miyamoto, Polojentsev, Requieme, Röser, Ding-Jiang, Wenjing, Abalakin, Morrison, Turon, Dong-Ming, van Altena, Yatskiv.

7.5 REFERENCE FRAMES

de Vegt (Chairman), Aoki, Arias, Corbin, Dong-Ming, Feissel, Fukushima, Hutter, Johnson, Kovalevsky, Kumkova, Lestrade, Ma, McCarthy, Miyamoto, Morrison, Murray, Nicholson, Preston, Requieme, Reyolds, Russell, Sovers, Walter, White, Winkler, Zhigang

There were two meetings of the WG; in 1993 (Washington) and 1994 (Hamburg). At the meeting in Hamburg, the WG drew up a list of ~400 VLBI radio positions having an accuracy better than 1 mas overall, but relaxed to 3 mas in parts of the Southern hemisphere to increase the otherwise low density. Efforts would be made to improve these rougher positions. The positions in this primary list defines the extragalactic reference frame which will replace the FK5 as the fundamental reference frame.

The WG drew up a second, subsiduary list of candidate radio sources of rougher accuracy, which, after their accuracy has been improved, will be used to densify the primary list.

A third list contains objects not in the first two categories, but which could be useful in a global sense for linking the optical frame to the radio frame. These include radio stars. The JPL group reported on VLBI positions, proper motions and parallaxes of 11 radio stars which provide a very good link between HIPPARCOS and the radio frame.

The WG gave consideration to the maintenance of the radio frame and identified that more support was required in the Southern hemisphere.

The Commission resolved that the WG should continue, but its scope should be broadened to extend the primary reference frame beyond radio and optical positions to those at other wavebands.

8 RESTRUCTURING OF COMMISSIONS AND WORKING GROUPS

The President summarised the debate that had taken place between the Executive Committee of IAU and the Presidents of Commissions over the past three years.

The General Secretary/ Exec. Comm. (EC) arguments in favour of change are:

40 Commissions, membership ranging from 63 to 752

Main interaction of EC and IAU is through Presidents of Commissions

Newer areas of astronomy are under-represented

New structure should reflect better the interests of IAU members

Steady decrease since 1976 in attendance at GAs

20% of membership not in any Commission.

PROPOSAL 1 from EC to Presidents/Vice-Presidents September 1992:

Form ~ 12 large Commissions on broad scientific themes, and Working Groups (WGs) representing disciplines within each:

Astrometry, The Solar System, The Sun, Stellar Dynamics, Stellar Atmospheres, Formation/Structure/Evolution of Stars, Interstellar Matter,Galaxy Structure & Dynamics, Galaxies & Clusters of Galaxies, Active Galaxies, Cosmology

+ few on techniques: for example - Instruments & Techniques, Radio Astronomy, Astronomy from Space.

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There was general acceptance by Presidents of the need for some changes, but the following points were raised:

Reaction against very large Commissions:

How are they to be administered?

Cost of running them? Postage?

Many smaller Commissions with a specific purpose are the most effective!

New arrangement would effectively introduce another 'divisional' layer of bureaucracy between the EC and the membership.

PROPOSAL 2 of EC : September 1993

Interim mergers/regrouping producing Commissions of ~ 300-400 members: Presidents/Vice-Presidents to consider and report on 22 August 1994

PROPOSAL 3 of EC : August 1994

Leave the Commissions as they are and group them into 12 Divisions. The Presidents of these Divisions would act as a link between the Commission Presidents and the EC. Being 12 in number, it would be more feasible for the EC to liaise with them rather than the 40 Commission Presidents. Re-grouping would then take place within the Divisions to produce revised Commissions. The 12 Divisions in the proposal are:

Fundamental Astronomy, Sun/Heliosphere, Solar System, Stars, Variable Stars, Interstellar Matter, Galactic System, Galaxies and the Universe, Interdisciplinary Division

+ three technique oriented Divisions: Optical, Radio, Space.

Commissions 4, 7, 19, 31 are assigned to Division 1 (Fundamental Astronomy), whereas Commissions 8 and 24 are assigned to the technique oriented Division 'Optical'

The Commission thought that it was wholly inappropriate to be put in a technique oriented Division because many different optical and radio techniques are used in positional astronomy. It considered that Division 1 (Fundamental Astronomy) was the most appropriate Division and it instructed the President to convey this resolution to the EC.

There then followed a discussion on how best to regroup the Commissions involved in the field of 'astrometry'. The conclusion was that Commissions 8 and 24 (Photographic Astrometry) should be amalgamated under the title ASTROMETRY, and that this should also embrace the astrometric interests of Radio Astronomy (40), Solar System (4, 20).