frequency instrument based on the Mills Cross design, but the collecting area was scaled down by a factor of ten and additional frequencies were added when the possibility of super-synthesis using earth rotation was demonstrated. This collaboration among the Benelux countries was supported by financing from the OECD, but when that collaboration fell apart the Dutch Government assumed full financial responsability.

The telescope represented the significant step from prototype, university scale, specialist instruments elsewhere, to a well supported, rapid imager having spectral and polarization capabilities. It also pioneered the mode of operation now common for satellite observatories, in which data is taken and calibrated by technicians and provided ready for analysis to researchers.

When the Very Large Array (VLA) began operation in the early 1980's, the response of the Dutch communicaty was to move to a "multi-spectral" mode of research, reducing the annual budget of the WSRT facility by nearly forty percent to finance access to optical, IR and mm observatories at foreign sites, and to provide for the support of resarch at Dutch universities making use of the available observing facilities.

Today, the telescope is being upgraded to provide frequency agile, tunable receivers, new frequencies of operation, a new broad-band correlator and major maintenance. The goal of this effort is to make the instrument fully competitive with the VLA, as well as to open up research possibilities for studying the early Universe, pulsars and dark matter around spiral galaxies. The techniques of VLBI find ideal nurturing ground in the (internationally oriented) Dutch community and with telescopes such as the WSRT. The NFRA has become host institute for the joint Institute for VLBI in Europe as part of the strategy to exploit the NSRT to its fullest in the coming years.

Discussion

Anonymous : There could be groupings in the future of radio astronomers along the lines of the optical astronomers in ESO.

A poster by **I. Pustylnik** (Intitute of Astrophysics and Atmospheric Physics, Tartu, Estonia) was given under the title ***George Gamov's Unique Style*** *(in Commemoration of the 90th birthday anniversary of G.Gamov).*

RECENT WORK ON THE HISTORY OF ASTRONOMY IN INDIA

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During the last four years, significant work has been carried out in the history of Indian astronomy. Various groups of Indian scholars (in Aligarh, Bangalore, Calcutta, Madras) and their colleagues abroad worked on various topics. These historical researches could be divided into the well-known three classical periods: The *ancient*, the *medieval* and the *modern* periods. To begin with the latter, noteworthy are the studies on the development of astrophysics (Bhattacharayya 1991) which could be traced back to the solar eclipse observations and of variable stars (1868-1920). The „Indian national renaissance" which began with the famous work of M.N. Saha (1893-1956)

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led till to-date to a few major contributions/discoveries: cooler regions in the solar corona (Bappu et al 1970), very thin atmosphere on Ganymede, ring systems around Uranus and Saturn (Bhattacharyya and Bappu 1977; Vasundhara and Mehra 1984-85) etc. Presently with the available instrumentation in India (Bappu Telescope, Oty Radio Telescope and the proposed Giant Meter Wave Radio Telescope etc.) modern studies in all-wave astronomy are being carried out intensively in India. To mention is the extension of the pioneering work on the history of observatories in India (Ansari 1977 & 1985) towards the growth of modern astronomy in pre- and post-independent India (Bhattacharyya 1985; Kochhar 1991). In the *medieval* period, much work has been done particularly on Jai Singh's (1686-1743) efforts to revive and to build observatories in 18th century India (V.N. Sharma 1991-92). To note are the studies on Jai Singh's astronomical tables and their connection or dependence on La Hire's tables (Ansari 1991; Mercier 1993), the Sanskrit text edition of a manual on Islamic astronomical instruments (S.R. Sarma 1989-91) and the Persian text edition of the above-mentioned tables (Ansari 1994). We may also mention studies on the dissemination of Arabic-Islamic astronomy, scientific collaboration between India & Iran and scientific contacts between India & Uzbekistan (Ansari 1991-93). However, the main thrust of researches was on the astronomical instruments in pre-Mughal and Mughal India (Sarma, Ansari et al 1991-93). A catalogue of Indian Astronomical and Time-Measuring Instruments is also under preparation (S.R. Sarma 1994).

The primary Sanskrit sources on astronomical instruments during *ancient* India have also been studied and surveyed (Sarma 1994; Ohashi 1993). Besides the mathematical treatment of various astronomical concepts and topics in *Vedas* and *Vedanga Jyotisa* (Abhayankar 1991-93), a very important publication is the English translation of the *Pancasidhhanta* of Varahamihira by the late Sanskritist Kuppana Shastri (edited by K.V. Sarma 1993). The most significant discovery however, is a study of „Heliocentric picture of planetary motion in Kerala School of astronomy" (Ramasubramanium et al 1994). For want of space the bibliography is not being appended here, but can be obtained from the author. An elaborate version of this report is intended for publication elsewhere.

Discussion

Y. Sabouti : Related to the question of the existence of old records on fireballs, recently I have come accross two history books in Persian (recording events in chronological orders) that mention the appearence of two bright stars that outshined the Moon and were observable in day-light. One of these seems to correspond to the Crab supernova. I am planning to collect the documents and bring them to the attention of the astronomical community.

M. Kretlow : Are there any old comet observations available in Indian recodrs (like in Chinese records) ?

R.S. Ansari : Yes, for special and extraordinary appearances, but probably not in a chronological sense.

C. Keay : Do you know of any historical records of large meteor fireballs, particularly those which produced sounds which were heard while the fireball was still visible in flight?

R.S. Ansari : Not exactly. But I have been told that in another class of litterature (which is non-astronomical) there are descriptions of such phenomena.

M. Al. Milki : There is a Msc. Thesis, in 1994, by H. Al. Trabuky, supervised by F.R. Stephenson titled : "Investigation of some Astronomical Phenomena in Medieval Arabic Chronicles"

(University of Durham, UK). In this thesis there is a lot of tables about comets, supernovae, solar eclipses,... seen by Moslem Astronomers.
S. Dick : What about Indian Astronomy and Islamic Astronomy ?
R.S. Ansari : Lot of work has been done on these two cultural areas and there are authorities on these fields.
S. Dick : Make a comment regarding my belief that Prof. Lankford is including a section in the Encyclopedia on the History of Astronomy on Islamic contributions.
H. Butcher : I hope you have some sort of collaboration with the Indian radiotelescope at Ooty which is a synthesis telescope and our new GMRT.

In the case of **Canada**, the Report prepared by **E. Kennedy** (unable to attend the GA) was read by S. Débarbat. News were given about the book published under the title "A history of the Royal Astronomical Society of Canada", on the occasion of its centenary which occured in 1990, about the obituary which appeared in the Journal for the History of Astronomy (XXV, 94) stated that "For more than thirty years, Stillman Drake (who died in late 1993) was the world's pre-eminent interpreter of the life, work and times of Galileo, and that the papers of E. Kennedy have been donated to the University of Saskatchewan Archives, about books published such as "Clyde Tombaugh, Discoverer of Planet Pluto" (University of Arizona Press, 1991) by David H. Levy.

HISTORY OF ARGENTINE ASTRONOMY

Esteban Bajaja, *IAR, Villa Elisa, Argentina*

Astronomy started in Argentina with B.Gould who inaugurated the Cordoba Observatory in 1871. Many important star catalogues, like the Cordoba Durchmusterung, were produced till 1942 when the 1.5m telescope was dedicated in Bosque Alegre and the astrophysical work began. In 1956 was created the school for Astronomy. In La Plata, the Observatory was constructed between 1885 and 1895 and several good telescopes for that time were purchased. The astronomical work started only in 1905, together with the formation of astronomers, when the Observatory became part of the University of La Plata, with telescopes which permitted not only the production of star catalogues but also astrophysical work. The third observatory, the Felix Anguilar, was inaugurated in 1953 in the city of San Juan concentrating mainly on astronomical work producing several fundamental catalogues. In 1962, was created the Instituto Argentino de Radioastronomia (IAR) to install a radiotelescope near La Plata, in cooperation with the Carnegie Institution of Washington, two 30 parabolic antennas for the observation of HI 21cm line. Several important HI surveys have been produced. A centre for the study of cosmic radiation became in 1966, in Buenos Aires, the Instituto de Astronomia y Fisica del Espacio (IAFE) in which sevceral groups are working on cosmology, stars and radioastronomy and also on projects of scientific satellites. In 1986, a 2.15 m telescope was dedicated in the Prov. of San Juan, at 2500m a.s.l., within the Complejo Astronomico El leoncito (CASLEO). This telescope is, at present, the main Argentine astronomical instrument.