Prof. J C Bhattacharyya

1930 - 2012

Souvenir on the occasion of the dedication of the 1.3 metre telescope at the Vainu Bappu Observatory

19th April 2014

Indian Institute of Astrophysics

J.C. Bhattacharyya stands out as an innovator, an eminent instrumentalist, and a leader of great modesty admired and respected by colleagues. He grew with the Kodaikanal Observatory led by the young M.K.V. Bappu and through its transformation to an autonomous institution for research in astronomy. Apart from being a friend and student of Bappu, he was the key advisor in technical and administrative functions of the Institute. It can be said that while Bappu had a vision to build the Institute, Bhattacharyya devised means of achieving it.

"JCB" as he was referred to by colleagues, obtained a Master's degree in Electronics (Calcutta University) in 1951, and spent a year working on instrumentation with S.K. Mitra at the Institute of Radio Physics and Electronics before joining the India Meteorological Department in 1953. He worked in the Radar Laboratory of the IMD for a year at Delhi and then spent several years at its Instrumentation Division in Pune. During this time he worked in the area of ionospheric physics and developed instruments for these studies.

He was transferred to the Astrophysical Observatory, Kodaikanal in July 1964 to lead the Ionospheric research group. Influenced by Bappu, Director of the Observatory, JCB took up research in the area of solar and solar system astronomy. He built the instruments he needed,

J.C. Bhattacharyya (seated 2nd from left) and M.K.V. Bappu at Kodaikanal (mid 1960s)

especially the Solar Magnetograph which he used in research leading to a D. Phil from the Calcutta University in 1971.

Starting in Kodaikanal he took up the development of equipment and techniques for observations of both stellar and solar system objects. Bappu had to run the observatory under severe financial constraints and this meant that equipment and observatory buildings could not be set up or built without financial approvals from the IMD headquarters. Better days appeared with the formation of a high powered Committee for Scientific Reorganisation (COSR) which visited Kodaikanal in 1967.The recommendations of the COSR included the setting up of a new stellar observatory, a large telescope facility and the formation of a new research institution. Through the period 1966 to 1972 Bappu, JCB and A.P. Jayarajan were kept busy with the development of the Kavalur campus and the facilities, leading to the installation and operation of the 1 metre Zeiss telescope. JCB's own account (1997 Bull. Astr. Soc.India 25, 19) makes for very interesting reading.

In the midst of all this, Bappu and JCB also mounted a successful expedition to observe the solar eclipse in Mexico, in 1970. JCB started using photoelectric photometry at Kavalur with a 15 inch aperture telescope (built in-house) and observed the occultation of the star b Scorpii by Jupiter in 1971. Improving upon the electronics, he observed the occultation of a star by Ganymede with the 1 metre telescope in 1972, leading to the detection of an atmosphere in this satellite of Jupiter. Extending his technique using millisecond photometry, in 1977, he observed the occultation of a star by Uranus, leading to the discovery of a ring system around it.

The IIA was formed on 1st April 1971, and work towards the new headquarters at Bangalore and the establishment of a new "93 inch" aperture telescope at Kavalur were initiated during 1973-75. This was effectively building a new Institute starting with aquiring land at Bangalore, designing its buildings and facilities and concurrently working towards the design proposal for the new telescope, to be built in the country. While Bappu was the main architect of these changes and had to move continually between Kodaikanal, Bangalore and Kavalur, JCB started the temporary offices of IIA, in 1973, at the Raman Research

J.C. Bhattacharyya in the library at the IIA campus in Bangalore (1977)

Institute (courtesy late V. Radhakrishnan).This was a hectic period of growth for IIA and JCB played an admirable role in steering the activity alongside Bappu.

JCB was deeply involved from the early stages of design of the 2.3metre telescope. He was a member of the Project Board from the start (in 1975) and took up the responsibility of building the telescope control system, electronics and computer control. He led the group at IIA for doing this. The telescope project invovled technologies in the fabrication of optics, mechanical and control systems of a high degree of accuracy that had not been achieved in the country before.

In August 1982, Vainu Bappu passed away in Munich just before the General Assembly of the IAU that he would have presided over. As JCB wrote (1997 Bull. Astr. Soc.India 25, 29) " I felt like a sailor who has lost his captain in a stormy sea". The responsibility of steering the Institute and completing the 2.3 metre telescope fell squarely on his shoulders. The mirror blank was being polished at the IIA campus, the fabrication of the telescope structure was going on, and the telescope piers and concrete building were nearing completion at Kavalur.

With the encouragement and support of M.G.K. Menon, Chairman of the Governing Council and his own colleagues, JCB was able to complete the project by the end of 1985. This was in large part due to his personal character as an affable 'boss' with the resilience to absorb adversity and continue with his job.

JCB flagging off the 2.3 metre mirror from the IIA optical shop to Kavalur (July 1985)

The telescope was ready for test observations by October 1985. Initial visual and photographic images bore out the result of years of dogged labour and efforts with complex technical issues in the later phases of the project. The credit for leading these efforts unreservedly lay with JCB. The achievement was significant enough for the then Prime Minister to wish to view Halley's comet with the new telescope and name the telescope and observatory after Vainu Bappu on the 6th January 1986. The Vainu Bappu Telescope was declared and operated as a 'National Facility' soon thereafter and many astronomers today will recognize that as the beginning of a new frontier for observational astronomy in India.

The appearance of the supernova 1987a in the Large Magellanic Cloud and the long series of observations with the VBO facilities reaffirmed the value of Kavalur as the only Indian site for studies of the southern sky.

During the period he was Director, from 1982 till retirement in 1990, JCB brought in several major and welcome changes in the structure and functioning of the Institute; perhaps Bappu and he had discussed these issues earlier. He ensured that several of Bappu's students completed their work and obtained the PhD degree, in diverse areas from Stellar abundances to Stellar Populations in Galaxies. In addition, he guided his own students.

Proudly explaining the technologies of the telescope to the late Rajiv Gandhi

He formed the Faculty of the institute, involving senior scientists in an advisory role in institute matters and he was always present at its meetings. He formed four Group Committees to focus on major research areas. He was a strong believer in evolving consensus for decision making. Monthly scientific meetings were started by him, where everyone had an opportunity to present his/her work; rarely, if ever, did he miss these meetings. It was inspiring to see him take meticulous notes of the proceedings. These meetings greatly aided the formation of cohesive groups for specific research areas. There were, of course, differences with colleagues, but everyone would remember the grace with which he handled such situations. Wisdom and modesty were the traits he exemplified.

His own interest in solar system astronomy continued with his students and collaborators. He initiated an observational program in 1987 with R. Rajamohan using the 24 inch Schmidt telescope for detecting near-earth asteroids. This led to the discovery of six asteroids, one of which was named ‘Bhattacharyya’, later in 2008.

He pursued and urged his colleagues to develop modern detectors and instruments through the 1980s. The 2.3 metre and 1 metre telescopes got modern CCD imagers and Cassegrain spectrographs. He also initiated and encouraged work in the area of interferometry; a speckle

interferometer was built and initial studies for a two telescope interferometer were done. He pursued Bappu's early ideas to locate a high altitude astronomical site and gave full support of equipment and manpower for site surveys in the area around Leh. With colleagues, he proposed a 4 metre class telescope at such a site. This attempt led to new efforts by his successor R.Cowsik towards establishment of the Indian Astronomical Observatory at Hanle.

While steering the scientific activity of the Institute, JCB never lost

JCB at a meeting of the Faculty

sight of the human aspects. He realised that older staff from the IMD would get all the retirement benefits of govt. service. His concern was for those who joined the IIA after it was formed. He pursued and obtained sanction for gratuity, pension as per government norms. Numerous employees who joined the IIA after 1971 are and will be substantial beneficiaries of these efforts. After persistent efforts he also brought in a Contributory Medical Scheme and leased accommodation for employees. He interacted with his fellow scientists during 'faculty lunches' and evening sessions (called 'Palaver') where he regaled them with stories and anecdotes. These human qualities will long be remembered by colleagues.

His scientific work in solar system astronomy and in building modern

observing facilities won him several laurels. He was an elected Fellow of all the three Science Academies and the Institution of Electronics and Telecommunication Engineers. He was President of Commission 9 on "Instruments and Techniques" of the International Astronomical Union (1989-91), besides being a member of other Commissions. He served as President of the Astronomical Society of India during 1986-88. He received several awards, notable among them are: the 'UGC-Hari Om Ashram Trust C.V.Raman Award for Physical Sciences' in 1990 and the 'S.K.Mitra Birth Centenary Award' of the Indian Science Congress Association in 2005.

JCB was also prolific in what is now called 'outreach activity'. He was naturally inclined and adept at explaining the wonders of astronomy to the lay public. Though he started writing popular articles as far back as 1977, after the discovery of the Uranian ring system (the first one in Bengali) and often gave popular lectures on different occasions, he was more prolific after his retirement. He enjoyed writing in Bengali and conveyed the wonders of science to people of the Eastern India.

At the end of August 1990, JCB retired from service of the Institute. He was associated with IIA thereafter as Emeritus Professor and Honorary Professor till 1997. After this he served on the Governing Council till 2007.

JCB with his successor R. Cowsik and the Chairman of the Council, B.V. Sreekantan

The 1.3 metre Telescope at Vainu Bappu Observatory

In December 2005, the Chairman of the Council, Prof B.V. Sreekantan, initiated a project to set up a contemporary 1 metre class telescope. The old Zeiss telescope had been designed for photographic imaging and the primary mirror and supports needed replacement which would cost a lot. The VBT was mostly being used for high resolution spectroscopy. The new telescope was specified to have a configuration to suit the astronomical seeing and enable wide field imaging exploiting the new generation of large CCD arrays.

The telescope was custom built by DFM Engineering in the USA incorporating design inputs from IIA. It has a double horseshoe mount and hydrostatic bearings similar to the VBT. The optical system has a Cassegrain focus with an image scale of 20 seconds of arc per millimetre and a corrected field over 30 arc-minutes in diameter. The telescope has modern drive control systems and an instrument interface including filter changing devices at three ports. The telescope building and dome were conceptualized, designed with engineering consultancy and built by IIA using local contracts. The design is a radical departure from conventional domes; the entire building and dome is fully ventilated with natural airflow. The dome encloses minimal air volume to reduce thermal effects. The project started with the telescope contract in June 2006 and the first light was seen visually in March 2013. Regular observations for test and calibrations have commenced from January 2014.

*Remembering the significant contributions of **J.C. Bhattacharyya** to the field of observational astronomy and astronomical instrumentation, the Governing Council of the IIA has thought it appropriate to name this facility after him*