

CHAPTER I  
INAUGURAL CEREMONY

19th November 1985

The Inaugural Ceremony was held at Siri Fort Auditorium, Delhi, with distinguished representatives from the Government of India, the City of Delhi, the University of Delhi, and the Indian National Science Academy.

Prime Minister Rajiv Gandhi was the Chief Guest. Shri Ram Niwas Mirdha represented the Ministry of Posts and Telegraphs of India, Prof. C.N.R. Rao represented the Indian National Science Academy, Prof. M.G.K. Menon was the representative of the National Organizing Committee.

The chair was taken by Prof. A.P. Mitra, Chairman of the Local Organizing Committee, Director of the National Physical Laboratory, in Delhi.

The musical interludes were performed by Gandharva Mahavidyalaya. The group consisted of the Principal of Shri Vinaya Chandra Maudgalya College and of his students. They sang the Indian National Anthem and one invocation song.

All the addresses were taped during the Inaugural Ceremony, and typed in Paris. The editor and the IAU staff apologize for the errors or misinterpretations that might have occurred during this process ; Mr. Sahu nevertheless provided quite a useful input in deciphering the tape.

After some words of welcome from Prof. Rao, Prof. Mitra introduced Prof. M.G.K. Menon, Chairman of the National Organizing Committee.

**Address by Prof. M.G.K. Menon, President of the  
National Organizing Committee**

Professor R.H. Brown was born in the Nilgiris at Aruvankadu and he was just mentioning standing outside, that his mother used to play golf where the large cylindrical radio telescope built by the Tata Institute of Fundamental Research is located at Ootacamund. Of course, Hanbury Brown has also been a visitor to India particularly as a Raman Professor of the Indian Academy of Sciences. A very special welcome to you Hanbury. The International Astronomical Union has a special character and perhaps it is worth just mentioning it briefly. It is a Union in which there is individual membership. That is very important. It is also a Union which supports on a significant basis young scientists. And indeed there are about three hundred young astronomers attending this meeting including about a hundred from India ; and this is part of the programme of IAU and it is certainly a programme which augures well for the future.

Mr. Prime Minister, you have practically in every address you have given, since you took over as Prime Minister a little over a year ago, referred to the modernization of India, referred to the great role of science and technology, and we have been aware of the fullest support which science and technology have received in India as Prof. C.N.R. Rao mentioned. First, at the hands of our first Prime Minister Pandit Jawaharlal Nehru, and thereafter in the hands of Srmt. Indira Gandhi, our Prime Minister for a period of almost eighteen years. This

particular General Assembly takes place today on the 19th of November, the birth anniversary of Indiraji. In fact, we had quite intentionally kept it so. She had graciously consented, when I had spoken to her, to inaugurate this General Assembly. We had all hoped to welcome her here on a very auspicious day in her life, her birthday. But, alas, that was not to be, and I certainly hope that this very large meeting of scientists coming from all parts of the world, in an area which received the fullest support from her : international understanding, cooperation, and inter-dependence that exist in the world today, that this meeting, will indeed be a fitting tribute to the memory of that great lady who stood for peace, secularism, social justice, human understanding and the broadest holistic concept of culture to which very brief reference was made this morning, Mr. Prime Minister, in the function when the Indira Gandhi National Center was opened by you.

India has had a long and distinguished tradition in science from its earliest days. And in this tradition were recorded the great contributions of Indian astronomy covering mathematical aspects such as the decimal place value system, the Aryabhaṭīya written by the great astronomer mathematician Ārybhata, the trigonometric system which is characteristic of Hindu astronomy best known through the Sūryasiddhanta, and much else. But, in the in between period, prior to the British period, there has been a decline ; we of course have the last of the great efforts in observational astronomy, the masonry structures, the Jantar Mantars, of which those who are attending this conference will be able to see in Delhi itself, but which there are other specimens in the country. And indeed, it is from that we have the logo of this particular meeting.

We, of course, had during the British period, and prior to independence, a great deal of work arising through the setting up of the first Madras observatory, the Kodaikanal observatory, the great work of Megh Nad Saha. And indeed some of the great work on solar eclipses was done in this country, including the first observation of the element helium done in the plains of Andhra Pradesh. However, it is since independence and particularly over the past thirty years that we have had a renaissance in astronomy, with a large number of institutions, a fairly large community of astronomers, astrophysicists and cosmologists in the country, working over practically the entire spectrum. This covers new instruments such as several large optical telescopes, the latest being the 234-cm telescope which is now installed at Kavalur in the south, the large cylindrical radio telescope at Ootacamund, which I referred to, the proposal, Mr. Prime Minister, to take up in this plan a giant metre-wavelength radio telescope which will fill an important gap and which will be one of the major instruments when completed, the millimeter-wave telescope of the Raman Research Institute, the 1.2 meter infrared telescope at Gurushikar, of the Physical Research Laboratory in the Indian Space Research Organisation. There is, in addition, a considerable amount of ground-based, rocket-based, balloon-based and satellite-based astronomy, covering infrared, gamma-ray astronomy and a great deal of cosmic ray physics. And it is thus that we are now at a stage where one can say there are major new instruments that exist which offer opportunities for our scientists, particularly of the younger generation, and with the most modern techniques and technologies and electronics and so on, to work at the frontiers of this field. And, as I mentioned earlier, we have a large group here, about three hundred Indian delegates in what could be roughly about 1400 delegates in all as registered during the course of the conference, and of these, a large number are young astronomers. And we certainly, with these facilities, hope to work in this major international cooperative enterprise with our colleagues from round the world and in that sense, this particular meeting will be a milestone in the development of Indian astronomy.

We are honoured, Mr. Prime Minister, that in spite of the very heavy schedule which you have, you arrived early this morning from the Middle East, and since 6:30 or thereabouts, you have had a non-stop schedule of commitments. In spite of that, you have agreed to come here to inaugurate this meeting which your mother had so graciously agreed to earlier. We are very

happy to have you with us and would like to thank you for this interest in science, in fundamental research, and particularly, in this field which has been with man since the beginnings of human civilization, an area where we are dealing with distances, with energies, with phenomena on a scale unimaginable compared to anything that one experiences on Earth, where all of our current knowledge has been derived not by actual experimentation, as one does for example in physics, but purely through observation, analysis, building of a systematic picture which is truly magnificent. And here we see the great powers of science, of observation, analysis and building up brick by brick these capabilities, this understanding, we find these powers of science at its very best. And astronomy, as a challenging field, is one indeed through which one can develop interest in science and appreciation of the scientific methods, not only in terms of challenges and excitement that exist in it, but also in terms of the universality of this particular field, and we therefore are very happy to have this conference in India, and on behalf of the National and Local Organizing Committees, once again, a very warm welcome. We hope all of you will enjoy this meeting, and not only this meeting, but also the country you have come to, where we hope to receive you over the next ten days with hospitality, with friendship and in the great traditions of Indian culture.

Thank you very much.

**Address by Prof. R. Hanbury Brown, President of the  
International Astronomical Union**

On behalf of the International Astronomical Union, may I say how very honoured we are that you, Mr. Prime Minister, have consented to be with us today, on such a busy day for you. We greatly appreciate your presence here as a mark of your government's interest in science. May I also thank you, Professor Rao for your welcome.

I would also like to convey to all those concerned our very real gratitude for the invitation to meet in this country and for the generous facilities which you have provided for our meeting. We are indeed happy to be here - happy to be with people who are so welcoming and to meet in a city which is so handsome and so historic.

Our Union has been bringing its members together in General Assemblies ever since 1922 ; in fact it is one of the oldest of the Scientific Unions. Its broad aim is to develop astronomy through international cooperation and these General Assemblies are intended to serve that aim in three main ways. Firstly, they have the straightforward scientific function of exchanging and reviewing the latest scientific results and of planning the international cooperation in research which is so essential to astronomy - no matter what our nationality may be, we all work in the same sky.

Secondly, these Assemblies help to make individuals feel that they are part of a real, live, world-wide community of astronomers. For a short while they make visible the invisible community to which all true scientists belong, the invisible college of science. To know that they are part of that great community is particularly valuable to young astronomers who may have little, if any, opportunity of attending international meetings. I am glad to say that in planning this meeting considerable efforts have been made to help young astronomers to attend.

Thirdly, it has been our experience that these Assemblies help to promote a public interest in astronomy in the country in which they are held ; I hope that it will prove to be true in India.

Many members of our Union, will, I feel sure already, know something about India. If they were lucky they could have learnt it from our late President Vainu Bappu whose death was such a grievous loss to astronomy, especially to Indian astronomy and to our Union. He was an excellent ambassador for Indian science - courteous, charming and, moreover, extremely good at the task which he had undertaken - the modernising of Indian optical astronomy. We all miss him greatly at this meeting ; I know how much he valued the prospect of our Union meeting in India.

Many members will, no doubt, have learnt something about India from those guidebooks which we all buy and promise ourselves that we will read, and often end up reading on the plane. From those books we can learn quite a lot about Indian history and culture. The word culture as it is commonly used, includes literature, architecture, painting, music, dancing, sculpture, religion and so on ; but it never includes science. Astronomy is an integral part of science and the pursuit of science should be an integral part of any worthwhile conception of modern culture and vision of progress. Maybe the more serious guidebooks have something to say about India's extensive and distinguished scientific past - perhaps they tell us something about India's contributions to algebra or to astronomy in the 5th century, or more likely they tell us about the magnificent medieval observatories such as the one at Jaipur. But what they do not tell us, unlike Professor Bappu, is anything much about what Indian science is like today. To take a very few examples from my own experience of this great country, I could tell you about the fine optical observatory at Kavalur, the impressive radioastronomical installation at Ootacamund or about the excellent work on radioastronomy at the Raman Research Institute in Bangalore. But I hope that some of you will see these things for yourselves.

One of the best ways of getting to know an unfamiliar country in a short time is to meet your opposite numbers in that country. I hope that you will meet some of the very many Indian astronomers and other Indian scientists at this General Assembly. If you do, you will discover something which cannot be discovered from a guidebook, that the tradition of scientific excellence which we find in Indian history is still very much alive today.

**Shri Ram Niwas Mirdha**, Minister of Posts and Telegraphs, was then asked to request the Prime Minister to release the one rupee commemorative stamp, depicting Comet Halley, which was issued at the occasion of the XIXth General Assembly of the IAU. The Minister then delivered the following speech :

सीरीफोर्ट सभाभवन में 19-11-85 को हुई हागोलीय संघ की 19वीं आम सभा में स्मारक डाक टिकट जारी करने के अवसर पर संचार मंत्री श्री राम निवास मिर्धा द्वारा दिया गया भाषण ।

माननीय प्रधानमंत्री श्री राजीव गांधी, प्रो० हेनवरी ब्राउन, अध्यक्ष, अंतरराष्ट्रीय हागोलीय संघ, प्रो० सी० एन० राव, अध्यक्ष, भारतीय राष्ट्रीय विज्ञान अकादमी, प्रो० एम० जी० के० मेनन, अध्यक्ष, राष्ट्रीय संगठन समिति तथा विरिक्त अतिथिगण ।

हमारे लिये यह वास्तव में गौरव का विषय है कि अंतरराष्ट्रीय हागोलीय संघ की 19वीं आम सभा का आयोजन यहाँ हो रहा है। ऐसा पहली बार हुआ है कि स्व० डा० के वेनु बाप्पु के विशेष प्रयत्नों के फलस्वरूप भारत में संघ की आम सभा का आयोजन किया गया है। हमें इस बात की प्रसन्नता है कि सौर - निकाय से लेकर ब्रह्मांड की उत्पत्ति तक के विषय के अध्ययनों पर चर्चा करने के लिए संसार भर के अनेक वैज्ञानिक इस सभा में भाग ले रहे हैं। इसके द्वारा विश्व भर की सहकारिता पर चल रही परियोजनाओं की समीक्षा की जायेगी तथा नये कार्यक्रमों पर सहयोग द्वारा कार्य आरम्भ होगा। सन् 1946 से भारत अंतरराष्ट्रीय हागोलीय संघ का एक सदस्य है। पिछले कई वर्षों में हागोलविज्ञान तथा हागोलभौतिकी के प्रायोगिक पहलू पर भारत ने महत्वपूर्ण योगदान दिया है।

भारत में हागोलविज्ञान को सदैव सम्मान जनक स्थान दिया गया है यद्यपि प्राचीन भारत में हागोलविज्ञान और ज्योतिष का परस्पर विषय हो गया था। उदाहरण के लिए वाराहमिष्र तथा ब्रह्मगुप्त दोनों को ही यह भलीभाँति ज्ञात था कि चन्द्रग्रहण पृथ्वी की छाया तथा सूर्यग्रहण चन्द्रमा के कारण होता है।

आधुनिक भारत में हमारे वैज्ञानिकों ने हागोल विज्ञान तथा हागोलभौतिकी के क्षेत्र में बहुत उपलब्धियाँ प्राप्त की हैं तथा विश्व-भार में उनके कार्य को सराहा गया है।

हागोलज्ञों की श्रेणी में मेघानाथ साहा का विशिष्ट स्थान है। डा० सुब्रह्मण्यम शोखर ने भी हागोल विज्ञान के क्षेत्र में बहुत योगदान दिया है।

हागोल भौतिकी के प्रयोगों में भारत ने असाधारण प्रगति की है, तमिलनाडु में केक्लूर, ऊटी में उधागमन्डलम् तथा कोटाईकनाल में स्थित विशेष दूरबीनों से हमारे वैज्ञानिकों को कार्य करने की उपयुक्त सुविधाएँ तथा वैज्ञानिक वातावरण उपलब्ध हो गया है।

छगोल विज्ञान तथा छगोल भौतिकी केवल वैज्ञानिकों का ही विषय नहीं है बल्कि सभी युगों में इसके द्वारा स्त्री - पुरुष रोमांचित होते रहे हैं। विशेषकर इस समय यह रोमांचक स्थिति नई ऊँचाइयों को छू रही है। हैली धूमकेतु 76 वर्षों के बाद पुनः सूर्य तथा पृथ्वी के निकट आ रहा है तथा सन् 1985 के अंत और सन् 1986 के आरम्भ तक निकट बना रहेगा। 27 नवम्बर को यह पृथ्वी से 9 करोड़ 30 लाख मील की दूरी पर होगा। हम डाक विभाग के सदस्य ब्रह्मांड की उत्पत्ति में किये जा रहे मानव-प्रयासों में भागीदार होना चाहते हैं। इस ऐतिहासिक घटना के अवसर पर हमने हैली धूमकेतु दशाति हुए एक डाक टिकट को स्मारक के रूप में जारी किया है। हम यह भी आशा करते हैं अंतरराष्ट्रीय छगोलीय संघ को इस आम सभा के आयोजन से उत्पन्न वैज्ञानिक वातावरण से भारत की छगोल भौतिकी के क्षेत्र को नया जीवन मिलेगा।

The English translation as provided by the Indian hosts is given below :

"Respected Prime Minister Shri Rajiv Gandhi, Prof. Hanbury Brown, President of the International Astronomical Union, Prof. C.N.R. Rao, President of the Indian National Science Academy, Prof. M.G.K. Menon, Chairman of the National Organizing Committee, and distinguished guests,

It is indeed a matter of great honour for us that the XIXth General Assembly of the International Astronomical Union is being held here. This is the first time that a General Assembly of the Union is held in India mainly as a result of the efforts of late Dr. M.K. Vainu Bappu. We are glad that the General Assembly is being attended by a large number of scientists from all over the world to discuss a wide range of subjects ranging from the study of the solar system to the origin of the Universe. The progress in on-going international cooperative projects will be reviewed and new collaborative programmes will be instituted. India has been a member of the International Astronomical Union from 1946. Over the years, it has made significant contributions to the practical aspects of astronomy and astrophysics.

India has always had a place of honour in astronomy, though invariably in ancient India, astronomy got merged with astrology. For example, Varahmishra and Brahmagupta knew perfectly well that the Moon is eclipsed by the shadow of the Earth and the Sun is eclipsed by the Moon.

In modern India, we have scientists who have achieved a great deal in the field of astronomy and astrophysics and have been acclaimed all over the world.

Meghnath Saha is one bright name in the galaxy of astronomers. Dr. Subramanian Chandrasekhar has also contributed significantly to the world of astronomy.

India has also made remarkable progress in experimentation in astrophysics and now with specially equipped telescopes in Kavalur, in Tamil Nadu, in Udhyamandalam, in Ooty and in Kodaikanal, our scientists have proper facilities and scientific climate to work in.

Astronomy and astrophysics do not belong to the scientists alone, but have for long fascinated men and women of all ages. At this particular juncture, the fascination is at a new height. The Halley's comet is coming back towards the sun and the earth after 76 years, and will pass near them in late 1985 and early 1986. On November 27 it will be 93 million kms from the Earth. We, in the Department of Posts like to share the human endeavour in understanding the origin of Universe. On this historic occasion we have brought out a commemorative postage stamp depicting the Halley's comet. We also hope that the field of Indian astrophysics will get a new life in the scientific climate generated by the XIXth General Assembly of the International Astronomical Union."

### **Address by the Prime Minister of India, Shri Rajiv Gandhi**

Sri Mirdha, Professor Hanbury Brown, Professor C.N.R. Rao, Professor Menon, Professor Mitra, distinguished astronomers, friends, let me first welcome you to India and I hope that you do have not just a good meeting which I am sure you will have, but also a good time in India and get to see our country just a little bit. Professor Brown, I believe, is connected much more closely to India than we were told by Professor Menon. Not only his mother, but his father and grandfather as well were born in India. And well, we welcome him back.

Our traditions with astronomy are very old. Man has always looked up at the stars in wonder and India was no different. Our star gazers developed a science in our very early stages of development. Some of it as you mentioned is still visible in Jaipur and in Delhi at the Jantar Mantars which, as I was reminded, are still serving a very useful purpose in bringing tourists to India. And that set me wondering, I was thinking, how would people, maybe three or four hundred years hence, look at what we are setting up today, the big radiotelescopes, the other equipment. I wonder if they would be coming back to look at it as tourists. Indian astronomers have been in touch with their counterparts in all parts of the world, for a long time. And it has helped our sciences to develop themselves. When India became independent, we had various choices in front of us, and although I was not very old at that time, I still remember the heated arguments that used to go on, the discussions, the controversies in the newspapers, about whether we should try and develop our own science and technology, or we should just try to give work to our people, limit ourselves to rural industries. And we are fortunate that our leaders had the vision to look ahead, look at science and technology for answers to our day-to-day problems. Jawaharlal Nehru gave a thrust for not just applied science but also for fundamental research in India at that time, and it is the fruits of that vision that we are having today. India, unlike many other developing countries, set out to develop its own basic sciences. And we have produced results, we have produced eminent personalities, many have mentioned Professor Vainu Bappu, but he is only one amongst a long chain of scientists that have come out of our system. It is a continuation in the same theme that we are trying to do today. We are looking to science for most of our answers. We have found that we have only succeeded where the latest technology, the newest technology, in that particular field, has been applied to the problem. If it was agriculture, today we are self-sufficient, we have vast stocks of food grains, because the most modern genetic technology was applied to the seeds, the best methods for irrigation, fertilizers, equipments were applied and the results are in front of us. Wherever we have hesitated, we have not achieved such success. And the incredible thing is that the average Indian farmer may be illiterate, not educated, but he has the capacity and capability to absorb the technology when it is put in front of him. He is able to cope. This has been perhaps our biggest achievement in post-independence India.

We set out to use science and technology as a tool to remove poverty. One of the primary goals that was put in front of us by Panditji was to develop what he called a scientific temper. Professor Brown, you have mentioned the word "culture" and what one pictures when one sees culture. Is it just architecture, paintings, dance, music? Or is it something more than that? We have always looked at culture slightly differently, in a much wider perspective and science and technology have been very much part of that perspective. We have felt that if our country is to progress, then this scientific temper must be built into our culture; not just in pockets, at the highest levels of development, where we might have top class scientists and technologists, but the pyramid must start from the bottom. It must have a wide base which will support these small groups right at the top. And this is the direction that we would like to take.

Ultimately, when we are talking of development in a developing country, we are not talking just of major projects, whether they are large industries or steel plants or dams, we are not really talking about anti-poverty programmes. What we are really talking about is the development of the human being, how are we going to make a better human being out of, well in India, our 750 million people. The root has to be from our heritage, from our traditions, but today that is coming under tremendous pressure with modern technological development, with modern sciences, which we ourselves are striving to develop. And it is this balance that we are trying to build, balance between science and technology, the 20th century, and the values, the spirituality, the inner strength that we have inherited from our ancient civilizations. It is such questions that need answers today. We, in India, are striving for these answers, striving to see that we are able to produce just such a balance.

In today's world, we have perhaps as the biggest problem, barriers that have set up, maybe I should say political barriers that we have set up, in between us. Fortunately, there are many areas where we cut across all such barriers: science and scientists are definitely one such area. It does not matter what the political problems are, it does not matter what other complications there are, but invariably, we find that when it comes to scientific knowledge, there is a sharing among scientists. There is a brotherhood, a oneness, which we would like to spread to the rest of our society, to other fields, in modern day life. I hope that this seminar, this annual meeting, will lead to much more such comradeship, much more friendship among scientists, not just scientists from abroad and India, but also among scientists from all the different countries that are here today. I wish you all the best and, once again, I hope you have a nice time in India.

Thank you.

**Address by Dr. A.P. Mitra, Chairman of the Local Organizing Committee**

Honourable Prime Minister, Sri Mirdha, Professor Hanbury Brown, Professor C.N.R. Rao, Professor Menon, distinguished delegates and guests, for us in the Organizing Committee, it has been a labour of love, to have brought together a galaxy of distinguished astronomers on the occasion of this inauguration, many distinguished diplomats, administrators, and intellectuals. As Professor Menon mentioned, in spite of the distance and the costs involved, the total number of registered participants we expect will exceed 1400, of which about 300 are Indian astronomers. A very satisfying feature is the large number of young astronomers present here, we would like to welcome them. I would like to thank the distinguished delegates and invitees who are present here for coming to this inaugural function and encouraging us. The Organizing Committee would like to thank the Prime Minister for finding time to inaugurate this General Assembly on a very busy day. We are happy that he came here and encourage us at the beginning at of this important scientific conference.

Thank you.