H. Rickman (ed). Transactions of the International Astronomical Union, Vol. XXIVB, 1-10.

CHAPTER I

TWENTY FOURTH GENERAL ASSEMBLY

INAUGURAL CEREMONY

August 9, 2000, 14.00
Bridgewater Hall

Address by Prof. Nigel O. Weiss, President, Royal Astronomical Society

Distinguished Guests, Fellow-members of the IAU, ladies and gentlemen:

It is my privilege to welcome you all here to the 24th General Assembly, on behalf of the Royal Astronomical Society (which is the official adhering body) and the Royal Society (which is our national academy).

The Royal Astronomical Society represents all branches of astronomy and astrophysics in this country. Its history goes back almost 200 years. Although we like to boast about the great achievements of Newton and his contemporaries, intellectual activity in England had sunk to a low level by the end of the 18th century and what science there was took place outside the universities. Attempts to reform this situation led to specialisation of learned societies and a group of young men gathered to dinner in a London tavern in 1820 and resolved to form an Astronomical Society. The new Society took off rapidly, with the elderly William Herschel (some of whose music we have just heard) as its first President. The three secretaries were Francis Baily (of Baily's beads, familiar to anyone who saw last year's eclipse), John Herschel (who, among many other activities, catalogued objects in the southern skies) and the irascible Charles Babbage (inventor of the Computing Engine). So there at the beginning we have an emphasis on precise observations and high performance computing that remains true of our research today. Now, however, we cater for a much larger and more active membership, by publishing *Monthly Notices* and holding regular Discussion Meetings, and all the UK astronomers who are present here belong to the RAS, well, almost all: and I trust the rest will have joined by the end of this meeting.

This is the third time that the IAU has met in Britain. The second Assembly took place in Cambridge in 1925 and was attended by 225 members; there were 2300 astronomers at the 14th Assembly in Brighton, the first that I myself attended, in 1970; and today we have about 2000 of us here. But the format of such a gathering has changed: 80 years ago, when transatlantic travel took almost a week, it was a rare opportunity for colleagues to meet and get together. Nowadays, air travel is fast and relatively inexpensive, so astronomers are always rushing to specialised conferences around the globe. The cosy style of the Brighton meeting, centred on the activities of Commissions, is no longer appropriate. Instead we have a cluster of conferences, one-week Symposia and one-day Joint Discussions spanning a huge range and providing opportunities for astronomers with different interests to interact with one another.

To most of you, Manchester is probably best known for industry and commerce but this city also has a distinguished intellectual history. The Literary and Philosophical Society (founded in the late 18th century) had as successive Presidents John Dalton (the originator of modern atomic theory) and James Joule (known for Joule heating and for formulating the conservation of energy); Ernest Rutherford's famous experiment on α-scattering, which showed the existence of the atomic nucleus, was carried out here (and first described at a meeting of the same Literary and Philosophical Society) and it was here that Niels Bohr began to develop his concept of quantized orbits round the nucleus. What is best-known to us, of course, is the radio astronomy at Jodrell Bank indeed the Lovell Telescope has become the icon of astronomy in this country. (May I say how glad we are to have Sir Bernard Lovell, who among other things chaired the NOC for the Brighton IAU, here with us today). Jodrell is now the centre of the Merlin VLBI network and we all hope that e-Merlin, with fibre-optic links, will soon succeed in being funded.

When the Brighton Assembly was opened by the Secretary of State for Education and Science none other than Margaret Thatcher, said ``Provision of many new large optical telescopes and the growing exploration of the other, and hitherto largely inaccessible, regions of the spectrum have recently combined to make astronomy, despite its long history, one of the most exciting frontiers of knowledge". That remains as true now as it was then. In 1970 the Isaac Newton telescope was still at Herstmonceux and the WHT was scarcely being planned; now we in this country have our share of the first Gemini 8 m telescope and are negotiating (I hope successfully) for entry into ESO and access to their VLT. Meanwhile we are all talking about 30 m and even 100 m telescopes, and planning ALMA and the NGST as a successor to Hubble. So observational astronomy continues to flourish and so does theory too, with advances in cosmology, in studying the origin of galactic structure and in exploring the role of magnetic fields and Charles Babbage would be delighted by the computing power that is now available!

We in the Royal Astronomical Society are proud to have had the opportunity of making arrangements for this gathering. Here I must pay tribute to Carole Jordan and the National Organizing Committee and also to Rod Davies, Dennis Walsh and their Local Organizing Committee, who have done all the hard work. I hope that you have a very successful meeting and that you enjoy your stay here in Manchester.

Address by Councillor Hugh Barrett, the Lord Mayor of Manchester

My task is to welcome you all to the City of Manchester, Mr. President. So welcome on behalf of the City. Manchester has a history of many firsts including the people that your President mentioned. We have some rather wonderful sculptures in the Town Hall of Dalton and Joule, so when you enter today through the main entrance to the Town Hall please look to your left and your right and you will see those famous people right in front of your eyes.

Manchester was the first industrial city in the world. We also have other firsts which are rather interesting. We have the first full-time orchestra, the Hallé Orchestra; we have the first commercial computer, built in Manchester University. We have the first passenger railway station in the world in Liverpool Road, so I do hope you will go along and have a look at the reconstruction which is part of our Museum of Science and Industry in Castlefield. And of course we have the first scheduled airliner service in the world and that was with KLM. And we have the first municipal airports and the first Urban Regeneration Heritage Park, Castlefield, where work began ten years ago. It was the catalyst to revitalise the city. We had to reinvent ourselves, heavy and light engineering were disappearing very rapidly, cotton was no longer a major product, so we had to do something rather special and rather attractive to

make sure that the city continued to develop from its past. Four years ago last June there was the awful terrorist bomb which destroyed a vast area of our city. We are now concluding the rebuilding of that particular area which can be seen and enjoyed now, far more than in the past.

We are preparing for the Commonwealth Games, barely two years away, in 2002. We are a friendly city hosting the friendly games. At the moment we have dedicated a part of the city called East Manchester and launched a company called "East Manchester Company". It is our intention that when the Commonwealth Games are ended, "sports city" will be a centre of excellence for all types of sports in the United Kingdom and we are ensuring that the management structure is in situ now before the buildings are completed. We have actually completed the new swimming stadium on Oxford Road which cost 32 million pounds. So the intention there again is to create an area for training athletes from all backgrounds.

This city is the largest commercial, financial and educational centre and the cultural capital outside London. We are also a city of drama, a city of music and a city of some wonderful restaurants, so please go out and enjoy yourselves; there is a lot to see. We have four universities and the largest student population in the whole of Europe, so we are a major centre of education of which we are particularly proud. We are exceptionally proud of Jodrell Bank as well and of Professor Lovell; he is a Freeman of our City and I am delighted to meet him today. We are really pleased to see you here today, Professor.

We hope you enjoy our city. In twenty minutes journey you can be in the countryside, in one hour you can be at the seaside, in two hours in the Lake District, so we have got a lot to offer everyone who comes here. We are actually experts in tourism, would you believe!

In 75 AD the Roman Legion arrived and all the inhabitants disappeared rather rapidly. Then they realised they could sell something to the soldiers so they all came back. In 1800, when we invented factories, people from all over Europe came to Manchester to see what these factories were. So we are quite used to tourists and are aiming to get into the tourist trade in a very, very big way because that is where we think our ethos will ultimately lie, to attract people to the North West as a whole.

We are very much aware that what we achieve in Manchester affects the whole North West region and so we are very careful not to upset our other local authorities. It is important that we all work together to ensure that the North West is the most successful economic growth area in the United Kingdom.

Finally, welcome to Manchester. I hope you enjoy your stay here. I hope you meet new friends as well as old ones. I am sure you have picked a great place for your conference. Thank you very much indeed.

Address by Professor Katherine Perera, Pro-Vice Chancellor of the University of Manchester

Lord Mayor, ladies and gentlemen,

It gives me great pleasure to welcome you to the 24th General Assembly of the International Astronomical Union, on behalf of the University of Manchester; we are proud to be your hosts for this triennial scientific meeting.

Manchester is an international university of over 20,000 full-time students, some 3,000 come to us from over 130 different countries, and our staff not only come from every corner of the world but also maintain research links with academic colleagues in every continent. But

the University is also firmly rooted in this city and in the north west region of England. There is no more potent symbol of the University's presence in the region than the Lovell telescope at Jodrell Bank. The annual report of every sizeable business and industry in the north west typically includes a photo of that world famous, and photogenic, parabolic dish. It has become an icon of science and of discovery.

The Lord Mayor has spoken of some of the scientific discoveries and technological inventions that led to the City of Manchester becoming the birthplace of the industrial revolution. It was out of that industrial background that the University of Manchester grew. A wealthy merchant, John Owens, left his considerable fortune to found a college for young men. It was known as Owens College and was established in 1851, moving to its current site in Oxford Road in 1873. It was the direct forerunner of the University, so we shall be celebrating our 150th anniversary next year. In 1880, Owens College linked with the newer university colleges in Leeds and Liverpool and gained its charter as the Victoria University. Then in 1903 it was granted a charter as an independent university.

In the 1850s, it would have been easy for Owens College to become merely an establishment to train the workforce that local industries needed. But its founders had the vision to recognise that, to be truly useful to the industry and commerce of the City and the region, the College should teach the *principles* of the scientific subjects. Edward Frankland, discoverer of valency theory and the University's first professor of Chemistry, and his successor Henry Roscoe, were adamant that students could only learn about the practical applications of science when they had mastered the fundamental principles of their discipline. Their vision produced the largest department of chemistry in Britain in the second half of the 19th century.

It was these two chemistry professors who urged the College to appoint a professor of Experimental Physics, which they did in 1860. Thus began the department that was to become, in due course, the home for our astronomers. Since 1906, there have been 19 Nobel prizewinners who have been either members of staff or former students of Manchester University. Of those 19, nine have been physicists. They include a man who actually won the Chemistry prize for his work on radioactivity but was Langworthy Professor of Physics here from 1907 to 1919 Ernest Rutherford. The man known as the 'father of nuclear energy' carried out the work which led, in 1919, to the splitting of the atom in his laboratory in the Coupland building on the University campus. The laboratory is no longer there but the building is and while you are here you may like to visit that historic site. Rutherford's next two successors as Langworthy Professors of Physics, William Lawrence Bragg and Patrick Blackett, were both also Nobel prizewinners, Bragg for his work on X-ray crystallography and Blackett for his on cosmic radiation.

The physicist who was responsible for recruiting the young Rutherford to Manchester was Arthur Schuster. It was under his leadership that astronomy research and teaching first featured in the University here. On retirement he joined the editorial board of the *Astrophysical Journal* and after the 1st World War he was deeply involved in the foundation of your society, the International Astronomical Union.

It wasn't until after the 2nd World War that the University had its first Professor of Astronomy. Professor Zdenek Kopal, a refugee from Czechoslovakia, was professor here from 1951 to 1981. As a young boy of only six, he had been deeply impressed by Jules Verne's book, *From the earth to the moon*, so it is perhaps no surprise that, once space travel became a reality rather than a fantasy, he conducted studies of lunar topography. After the Apollo missions, he took some lunar soil and placed it on Jules Verne's grave in Amiens, in France as a tribute to the man who had fired his imagination when he was a boy.

But there was a second astronomy chair in 1951 and that was a Chair in Radio Astronomy created for Bernard Lovell, who had been a lecturer in the Department since 1936. Many of you will already know the story of how he established a radio telescope on the University's Botany grounds, in the countryside 20 miles south of Manchester, and those who didn't will have read the account in yesterday's edition of *Northern Lights*. When his biographer, Dudley Saward asked Sir Bernard what was the most exciting event of his professional life, he replied:

> *'Undoubtedly our association with the space programme, for which the telescope was not intended! The drama, the tremendous excitement and the underlying implications of the radar echo from the Sputnik carrier rocket on that memorable night of 12 October 1957 remain unforgettable. I still see that wonderful echo and have the vivid memory of the lab on that Saturday evening. The realisation that at Jodrell we had the only instrument in the world capable of detecting and tracking by radar an intercontinental ballistic missile in outer space was exhilarating beyond words.'*

Thirty years after that momentous occasion the hitherto prosaically named Mark 1A telescope was renamed the Lovell telescope, in honour of its creator.

Sir Bernard was succeeded as Director of the Nuffield Radio Astronomy Laboratories at Jodrell first by Sir Francis Graham-Smith, who became the 13th Astronomer Royal, then by Professor Rod Davies, co-chairman of the Local Organising Committee for this assembly. I am delighted that the current Director, Professor Andrew Lyne has, with his colleagues, won £2M from the Office of Science and Technology's Joint Infrastructure Fund which will enable the telescope's dish to be resurfaced and its steering mechanism to be upgraded. The resurfacing will enable the telescope to work to higher frequencies than ever before and will greatly extend the frequency range of the unique MERLIN array of radio telescopes, which are all run from Jodrell.

The University's astronomers are now all based at Jodrell and I hope that many of you will be able to take advantage of their invitation to visit the telescope and their laboratories there, while you are in Manchester.

This evening I understand that the Lord Mayor has graciously invited participants in this General Assembly to a reception in the Town Hall. It is a fine building, which was designed by an eminent Victorian architect, Alfred Waterhouse. Waterhouse also designed the Whitworth Hall, which is the focal point of all the activities of the Assembly, and the adjacent group of late 19th century buildings around the quadrangle at the heart of the University.

I hope that you enjoy your time in our University, and that you find here warm hospitality, congenial company and stimulating science.

Address by Sir Robert May, Chief Scientific Advisor to the UK Government

It is a great pleasure for me to be here because, as you have just heard, two lifetimes ago I was a practitioner of theoretical physics. I even did some research in astrophysics and it has been a great pleasure to see some of my old friends here today. I have since then strayed into a lifetime as an ecologist and more recently to a rather improbable career as an *Apparatchik*. I can think of few more appropriate jobs for the 'UK Chief Scientific Advisor' than to open an intellectual event like the General Assembly. This is not just any conference, but a conference on astronomy, a subject which has been the driver of our intellectual development as humans since before history began, and which is still continuing to be of central importance in our journey to the future.

Some of you are visitors to Britain and may be visiting places like Stonehenge, which (in the light of the previous two talks) I may point out was a sort of Jodrell Bank of its age. Stonehenge with all its astronomical alignments is only one of several hundred such monuments in the UK, most of them not in nearly such good preservation or nearly so grand in their conception. Quoting from one of the learned treatises, they were "constructed all over the country apparently by a coordinated network of priestly experts"; people like you. Indeed, if I can tease out one further moral for this convocation of priestly experts, Stonehenge like all else that has followed it is a mixture of basic science and its application. I have no doubt that the priestly experts basically did this because it was fun, which is why we do it. Equally, I am sure they were funded in this activity by slightly different procedures than those current today. But that "funding" came because it was seen to have practical application, as it did in that golden age of astronomy and astrophysics, the 16th and 17th centuries.

We do not reflect as often as we should that much of the impetus for astronomy in those earlier centuries came from the practical needs of navigation in the great age of exploration, with their focus on better observations of planetary motions and the stars in general. The flip-side was that those better observations provided a stimulus for the development of the basic science itself. This was the great age in which the Royal Society itself was founded, an age in which - properly seen - Cook's mapping of Australia, and all that followed, were essentially an epiphenomenon of the astronomical voyage to observe the transit of Venus. The Royal Society sponsored this voyage.

The past century has seen more advance than over all previous time. It is interesting to reflect on all the changes that have occurred over the lifetime of the International Astronomical Union, since it was founded in 1919. Only a little before that the largest optical telescope in the world was built in Ireland by Lord Rosse and was entirely privately funded. Yet, by the time the IAU met in Britain in the 1970's, the world had changed out of recognition and the centre of gravity of astronomy in Britain as elsewhere was firmly within universities. In the UK today about half of the universities, some 60 of them, have substantial courses in astronomy and astrophysics; and about a quarter, 25 to 30, have substantial research programmes in astronomy. Today is an exceptional time of astronomical and astrophysical discovery.

New areas of the electromagnetic spectrum are becoming available, particularly from space, along with other technical and theoretical advances. As Martin Rees said in his recent book, "dramatic advances have brought the broad cosmic picture into sharp focus during the 1990's". At the same time there are problems, or what we in Whitehall call challenges, when observing from the earth's surface, whether it is light pollution or radio frequency interference. However the most important challenge is the sheer cost of taking advantage of the opportunities available to us.

Cost has always been a notable factor in astronomy and astrophysics. The cost has been as much a driver as the intellectual excitement itself in the internationalisation of your science. All science of course is international, but I would say astronomy has from its earliest days been a leader and exemplar of the true internationalisation of science. Today not only for intellectual reasons, but increasingly for cost reasons, we have to make priorities and choices.

Again, I think some of the responsibilities and the general maturity of the subject are such that it has also been an exemplar in recognising you can't do everything you want to. Getting together, even on occasions such as the General Assembly, subjugating egos - and astronomy is a subject no less rich in egos than any other part of science - your community has recognised the painful necessity to pursue some brokered consensus as to what comes first,

what comes second. In short, your subject, both for its intellectual character and for the way it has managed its challenges, is of huge importance across the whole spectrum of doing and managing science.

Changing gears, I wish to say something that not all of you may welcome. Namely that one of the reasons for the continuing disproportionate importance of astronomy, astrophysics, theoretical physics and particle physics is actually not so much within their own discipline, but for the future of biology. There is a widespread misapprehension among those basking in the euphoria of having produced the first draft of the human genome that they've got to something other than what they have got to, which really is only the end of the beginning. I would say the greater part of that community, immensely talented in its own way, is under the delusion that what comes next is going to be more of the same; more massive batch processing with sophisticated widgets, out of which, by some kind of mystical process, will emerge understanding. I think that's wrong and I'm not alone. For example, John Salston, who established and led the Sanger Centre in Cambridge, has articulated what I'm trying to say by pointing out that the really important next step - as we move beyond the sequence data - is to try to understand how what is coded assembles itself in the cell and gives itself instructions. That journey is going to be much more in the idiom of Watson and Crick than in the idiom of the genomic sequencing - the Ford-like production line - that many think it is. The great challenge is seen, in the jargon of the trade, as "bioinformatics", simply making sense of that wealth of information. It is fairly widely recognised that the kind of people who are going to be most skilled at that process are likely to be those who come out of computer science, theoretical physics and astrophysics. The influential conference on Bioinformatics held in Canberra two summers ago brought together molecular people, biodiversity people, particle physicists and astronomers to exactly that agenda.

I think even more interesting, and less well appreciated, is the need for people who will actually think about things! Let me crudely ram home what I mean. There is a huge number of people working on HIV and AIDS; a vastly greater number than you have here; very able people doing extremely clever things. They have been working at it for fifteen years. They have a description in unimaginable molecular detail of how HIV interacts with individual immune system cells. But, fifteen years on, they simply have no agreed explanation of the basic question of why there is such a long and variable interval from infection with HIV to the onset of AIDS. That remains a wide open problem. But I would estimate that nine out of ten people in that subject are so "heads down", under the delusion that an increasingly minute description of the molecular detail will illuminate that question, that they do not even realise it is an unanswered question. Yet I believe it very difficult to imagine creating a vaccine without such understanding of disease progression. In short, much of post-genomics is still in the Tycho Brahe phase, although many of the practitioners fancy themselves as Newtons. Bioinformatics is going to take the subject into the Kepler phase, and I believe the Newtons of the subject are disproportionately likely to come from the kind of training provided by your background - the particle physics and astrophysics background. This is yet another reason for keeping the discipline strong, apart from its own intrinsic merits.

I come to you today having recently had the outcome of the three-year spending review in the United Kingdom, which has put 23% real terms growth over the next three years into basic science in Britain. This is hard on the heels last week of the first 'White Paper' since the one seven years ago that created the Office of Science and Technology. At the heart of both of those enterprises is a recognition of the importance of basic science as an underpinning of the way life is lived and the economy is run in Britain. But I want to conclude on a rather different note; the third part of the White Paper deals with a challenge

which was essentially absent from the previous White Paper. It is the challenge of the coming century: the challenge of engaging the public in a deep and assenting way in how we use our advances in knowledge, which is going beyond the understanding of the external world increasingly to an understanding of the molecular machinery of life itself and all that it entails. It is wrong, I think, to suggest that we live in a time when people are unusually mistrustful or worried about science. In an earlier age those who questioned the established order were burnt or at least forced to recant in public. The debates these days are more civilised, but are at the frontier of a science that moves at a vastly faster pace than in the past. Its not true that simply educating people better will make them unworried about the future application and use of science; all the survey data we have show that the better-educated citizenries are the ones that worry most. In Europe, Denmark tends to lead in surveys of knowledge about science, with the UK coming second, Mediterranean countries not showing so well. Conversely, Danes and Brits show better appreciation of the unintended adverse consequences of some advances, and generally worry more, than do Mediterraneans. That's how it should be: the more you understand, the more you recognize that most of the swords forged from our knowledge have two edges. What we need is an educated citizenry that is fully engaged, so that the Government, in its policy making, both takes advice and is seen to be taking advice in an open and consultative way. Not just from the experts, but from those who have a general wish to express their opinion about the way knowledge should be used. All the tools that you can use to engage people are valuable. And you know, better than I do, that nothing engages the public better than questions in astronomy. Partly it is a bit of a trick, because really a lot of them think you are astrologers!

In this connection, the notice board in my office in London shows what I'm doing today. Yesterday it said I was going to the International Astrological Congress! Even worse perhaps, some of you may have heard the BBC radio programme through the week that dealt with the question of the newly discovered planets, which was promptly followed by a relevant expert - an astrologer - to discuss the really important consequences for reading your horoscope! Martin Rees was telling me the other day that he felt very pleased on being paid what seemed to him to be a large sum of money, in the order of a thousand pounds, for an article, but when he read the next day that the same newspaper chain had paid two millions to steal someone else's astrologer he felt he had it in perspective. Although there is an element of truth in all this, you astronomers have the real advantage of using people's sometimes confused fascination with things in the heavens to convey an engagement with, and a sense of the wonder of, science. The opportunities for training children in science, beyond the trivially descriptive into real understanding, and for engaging the general public, is just what the third leg of the White Paper is about. This is the essence of the concept of the Citizen Scientist.

For all these reasons I therefore take a special pleasure in opening this meeting, on a subject so important for illuminating our vision of our place in the universe.

Address by Her Majesty the Queen

Please convey to the Royal Astronomical Society my sincere thanks for the kind and loyal message sent on the occasion of the opening of the XXIVth General Assembly of the International Astronomical Union, which as Patron I much appreciate. I send to you and all participants my best wishes for a stimulating and successful General Assembly.

Address by Dr. Robert P. Kraft, President of the International Astronomical Union

The General Assemblies are the glue that keeps the IAU together, and this is the third time we have met in the United Kingdom. When the second General Assembly met in Cambridge in 1925 under the Presidency of W. W. Campbell (a predecessor of mine from the Lick Observatory), there were only 189 participants, three quarters of the total membership. When the IAU met again in the UK, in Brighton in 1970, that General Assembly was the largest ever in terms of participants, 2255, more than half the total membership. Were we to see the same fraction of members today, our hosts would have had to plan for an attendance in excess of 4500!

After an interval of 30 years, we meet once again in the UK, this time in the historic "industrial north" of the country, famous as the seat of the "industrial revolution" that shook the entire world. But we meet also in a country renowned for sparking scientific and, in particular, astronomical revolutions too. From Newton's epochal work on gravitation and optics, on through the observational discoveries of Bradley, Halley and the Herschels, British astronomers have remained at the forefront of advances, both theoretical and observational, in virtually all sub disciplines of our science.

The scientific program of this meeting reflects, in modern terms of course, the foundations laid in countless ways by the work of British astronomers. In Invited Discourse 2 and Symposium 202, for example, we shall hear the latest about the search for planets revolving about distant stars, the latest "application" of Newtonian mechanics! The far Universe will be explored in Invited Discourse 1, Symposia 201, 204 and 205 and Joint Discussions 2, 9, and 11, as modern observations and theory tackle thorny issues in cosmology, a subject that has been at the forefront of British astronomical thought for generations. We will hear new results derived from high angular resolution studies of galaxies and parts of galaxies, an area pioneered in radio astronomy here at Jodrell Bank and in Joint Discussions 3, 5 and 8, reports on recent advances in star formation, stellar structure and stellar evolution will be given, subjects to which Eddington made so many fundamental contributions.

Since the IAU last met in the UK, astronomy has moved forward on a broad front. Our British colleagues have now a wide range of observational facilities at their disposal on the ground and in space (e.g., Gemini in the optical and MERLIN in the radio domain). The institutional basis for British astronomy is being recast. An earlier tendency toward national scientific independence has been displaced by an increasingly strong emphasis on participation in international collaborative projects in numerous combinations, i.e., more in the spirit of the IAU itself.

At the University of Manchester, we have found an excellent venue for our General Assembly. A vibrant, modern University, with myriads of young students, new buildings seem to be going up everywhere. Research in astronomy and physics has a vigorous present as well as a strong tradition behind it, perhaps best symbolized to astronomers by the Jodrell Bank Observatory, which is part of the Department of Physics and Astronomy. This is the place where the first firm identification of normal galaxies, such as M31, as radio sources was made. Jodrell Bank today also continues the tradition of excellence symbolized in the names of so many famous physicists posted over the lecture rooms in which we meet. These include Sir Ernest Rutherford who first split the atom here, and his predecessor Arthur Schuster who was not only a brilliant physicist but also general secretary of the International Research Council under whose aegis the IAU was founded in 1919.

The next two weeks will be busy and enjoyable for us all, but most busy of all for our Manchester colleagues and their many helpers from all over British astronomy who have

worked so hard to organize a memorable meeting and make us comfortable in Manchester. On behalf of the IAU, I thank the Royal Society and the Royal Astronomical Society for inviting us to the UK again. I look forward to a great General Assembly in which we will learn much that is new, socially, culturally and scientifically!

Thank you very much. The General Assembly is now in session.