

FOREWORD

I am most grateful to André Heck for his invitation to write a foreword to OSA Volume 4 – I will use this valued opportunity to emphasise those topics in Vol. 4 which I consider important even if other topics may be of even greater importance in the universal scale of things. At the outset let me say that I commend Vol. 4 to its readers – it contains much of very great interest for organisations and strategies in astronomy.

A topic which I consider to be of very great importance at this time is Adverse Environmental Impact on Astronomy. There are two papers on this topic in OSA 4 – Cohen on Strategies for Protecting Radio Astronomy and Schwarz on Light Pollution Control. The growth in the extent of use, the power and spectral demand for radio transmission continues to increase virtually exponentially. The impact on the ‘listening’ services such as radio astronomy has been severe. Only by creativity in developing new techniques for radio noise (including legal transmissions) reduction and by participating fully in the allocation process for radio frequencies has radio astronomy developed to the powerful investigative tool it is today.

But as Cohen points out most radio astronomers are obsessed (not unnaturally) by astronomy and not by spectrum management. The ability to prosecute radio astronomy research depends heavily on very few, very dedicated spectrum managers and I can only underline heavily Cohen’s plea for more, well-trained, spectrum managers. I hope that astronomers will reflect on Cohen’s wise words and give full and meaningful support to spectrum management – not just in radio astronomy, vital though that is, but also in optical/IR astronomy: a situation may be creeping up on optical/IR astronomy where communications may start making claims on optical and IR frequencies for transmission purposes. Optical and IR astronomy has a great deal to learn from the experience, and successes, of radio astronomy in the field of spectrum management.

Unlike radio astronomy, there are gains for most parties in controlling Light Pollution. Taking Chile as his principal case study, Schwarz looks at the efforts being made locally, nationally and internationally to control

the steadily increasing menace of light pollution. A great deal has been achieved in this area. But light pollution had two great advantages not shared by radio astronomy – the effects of light pollution are (all too) easily demonstrable and, if controlled, astronomers are happy and we all save money by not uselessly illuminating the sky. But despite the growth in excellent outdoor lighting designs, light pollution continues to increase because of unconstrained access to cheap outdoor lighting fixtures whose light control properties are of a very low order. We still need to pay relentless attention to control of light pollution at local, national and international levels.

Bonnet has contributed a most illuminating document on the ESA Experience. While budgetary matters are there, it is the discussion of the rôle of the second largest space agency having about one sixth the budget of the largest agency. He points out that ESA deliberately refrains from defining the objectives of its missions, seeking excellence in science which commands wide community acceptance. He also stresses the need for tight financial control and short timescales from project acceptance to launch. Not un-naturally, Bonnet notes this can lead to intense stress. He discusses the thorny question of managing the ESA member states. Conflict can arise over budgets, between basic and applied science and disappearance of expertise as a consequence. His discussion of NASA/ESA relations is highly intriguing but shows a developing partnership of some strength. As with scientists, ESA also has to manage industry to ensure equitable distribution of the industrial space base within the member states and to encourage enthusiasm among engineers to tackle apparently intractable problems. The section on managing risks is of particular interest. In space endeavour there will be failure. ESA has had its share but it also has a good track record on recovery – the spectacular recovery of the Hipparcos programme after the apogee boost motor failure and the recovery of SOHO after loss of control from the ground. Bonnet can, with justification, conclude with an account of some of ESA's triumphs.

Education has been one of my lifelong priorities. In a world where there seems to be a trend away from the study of the physical and mathematical sciences – surprising in a world dominated by products based exclusively in the physical and mathematical sciences – continuous effort need to be directed at interesting the young (and their ageing progenitors) in the physical and mathematical sciences. Isbell & Fedele look at the outreach programme at Kitt Peak – outreach being highly important to initiating interest. One aspect struck me very forcibly – the Nightly Observing Program and the Advanced Observing Program. The nightly program gives a 3hr session using binoculars or a 0.4 and 0.6m telescope.

What an opportunity that represents, given the Arizonian climate (to

one who has taught observational astronomy in the suburbs of London, UK, there is just a touch of extreme envy here) and the dark clear skies almost predictable for a large fraction of the year. It is no wonder that since its inception that program has averaged well in excess of 3000 people annually. The Advanced Observing Program allows all-night observing with a large telescope with no more than two users. Again it is no wonder the program has an international following. The programs are not free and have two full-time staff assisted by six part-timers. I hope more climatically well-favoured observatories will take note!

A related project is described by Roller & Klein – the Goldstone Apple Valley Partnership: Bringing the Universe to K-12 Classrooms. In this project pre-college students can carry out radio astronomy observations as part of a team carrying out an ongoing programme of observations. In this way the students have an opportunity to see their work in print in a major scientific journal – a good insight into the range of scientific work. It means that the students have access to a telescope and instrumentation of professional quality – a sine qua non in any experimental situation but which can be rarely afforded. Perhaps this project might take up Cohen's concerns about the lack of spectrum managers for radio astronomy.

Christensen of the Hubble European Space Agency Information Centre contributes a working manual to the popular communication. This is a very difficult area. In dealing with a mass audience one cannot get to the basic level of particular individuals. Therefore one has to work with an unknown in previous intellectual baggage. So very often there is no meeting of minds in outreach because both parties cannot make initial contact. On such matters Christensen has many wise words.

In the context of meeting of minds at degree level, Boily has some amusing anecdotes for the unwary lecturer. I particularly like the tale of introducing students to the Internet as part a course in astronomy and finding that the students were not downloading Boily's course notes but course notes from other courses. A highly salutary tale – always remember students are highly creative but not necessarily on a track parallel with their lecturer. All lecturers should have a read – and perhaps compile a treatise on undergraduate creativity! Boily makes the connection with another of my preoccupations – publication. Boily makes some pertinent observations on the Internet newsletters. He sees a precarious future for newsletters, though thinks there are ways to render this future less so. What he does not raise is the nature of unrefereed publication. Newsletters are on the whole unrefereed, though contributions may be selected in one way or another. Newsletters in part are ephemeral, and it may be that in their nature, they come and go as a need arises/disappears. A useful contribution to help the discussion evolve.

I am particularly pleased to see the short summary by Isobe on the IAU Activities in Astronomy Education. The IAU through its Commission 46 on Astronomy Education has for over 30 years tried to bring an international dimension to all aspects of education in astronomy. By its International Schools for Young Astronomers, its Teaching for Astronomy Development, its Newsletter and other forms of support, the Commission has assisted in helping young people around the world acquire a knowledge of modern astronomy and give them international contacts. Its success is now clearly apparent in that graduates of its schools now being found in positions of influence in international astronomy. All this has been achieved on a low budget – representing very good value for money. Isobe attaches the synopsis for an IAU Handbook on Capacity Building in Astronomy. This project came about by the recognition by the UN of the experience of Commission 46 in this area – having been a pioneer in the field. At its UNISPACE III event in Vienna in 1999, the UN, impressed by the spectacular integration of space technology in the sciences, engineering and commerce, wanted to ensure the continuing flow of motivated young scientists and engineers in the space sciences and asked COSPAR and IAU to study how capacity building world-wide should be sustained educationally. Astronomy was seen as a high-value stimulus to think about the space sciences. One outcome has been the synopsis for this Handbook. It is extremely encouraging to see this collaboration between COSPAR, IAU and the UN in the field of scientific educational development.

A refereed journal at a critical stage of its 125-year evolution is *The Observatory Magazine* described by its managing editor Stickland. *Observatory* is a modestly priced bimonthly publication. It has no page charges. It has a convenient A5 format. Above all, its editors are independent and broadminded. It is therefore a journal in which to fly kites, to doubt the conventional wisdom of the day, to take issue with colleagues (but only within the bounds of common courtesy) and place small contributions to the progress of astronomy. More recently it has become a major journal for reviews of astronomical books – an entirely welcome development. That it reports Royal Astronomical Society (RAS) meetings is perhaps less of an advertisement but it could have a future replacing the loss of the *RAS Quarterly Journal* for longer specialised, non-mainstream papers which are such a joy to read. But it has a unique feature – Here and There – the exposure of those unfortunate phrasings and typos we all make and their perpetrators. *Observatory* connoisseurs turn straightaway to the back page for Here and There – worth the subscription alone! As a former Editor of that illustrious journal (and a possible maligned RAS Treasurer) I urge you to consider *The Observatory Magazine* for your next paper.

Finally in the publications area Abt gives an account of the *Science*

Citation Index. I am most grateful to have this education in the workings of that arcane index. Abt has done us all a fine service. But he has greatly spoiled my fun by discovering that there were errors in the 1995-2000 impact factors for the *Astrophysical Journal* (ApJ). With the benefit of these errors the *Monthly Notices of the RAS* (MNRAS) surged ahead of ApJ. Oh dear we learn that ApJ is indeed n° 2 and that MNRAS is but n° 4. Well we had our surge of glory – if misplaced.

There are three papers on astronomical societies – again one of my big interests. Ferlet looks at the history and future of the Société Astronomique de France (SAF). The SAF was founded in 1887 at the time of great public endeavour to encourage the sciences and bring science to the masses. But in the 21st century such high motives are somewhat muted despite their great need. Even well-established professional societies have their worries about sustainability into the future. We do well to think about that future and what is needed to maintain the spirit of their founders when confronted with challenges unimagined by those founders. Alexander tackled the topic of organising American Astronomical Society Meetings – a formidable task and has written a very useful manual to meeting preparation which I would have like to have to hand when General Secretary of the IAU to augment the good advice of my predecessors. I strongly recommend this as essential reading for any meeting organiser. Butcher has written a compact summary of the organisation and goals of the European Astronomical Society (EAS). This is a clear document on what the EAS sets out to do and how it achieves those aims.

Finally, there are five papers which defy classification. They are: Sage on The Mt. Graham Controversy; Mamon on the Selection of Tenured Astronomers in France; Castellani on the Changing Landscape of Italian Astronomy; McDonald & Storrie-Lombardi on the Astronomer's Pocket Guide to Astrobiology and Carty on a Canadian Vision of International Astronomy and Astrophysics. These present a wide range of topics which are full of interest. Sage invites us to consider which is the greater concern – the astronomers to have a world-class observatory site or the conservation of the natural habitat – he offers no answer but the history he relates provokes essential thought. Mamon tackles a subject impenetrable to those not born in France and sheds considerable light. It is of interest that this particularly gallic process manages to appoint foreigners to 11% of such posts. This is an achievement in which to take pride.

Italy is in the final stages of a major reorganisation of astronomy in which twelve observatories have merged to form the National Institute for Astrophysics (INAF) with the expectation that eight further astrophysical National Research Council institutes will join INAF. Castellani has given a useful guide to this sweeping change in Italian Astronomy. McDonald

and Storrie-Lombardi give a brief account of the changes taking place in the organisation and outlook in US astrobiology. In particular they give guidance in how to set about starting an astrobiology teaching program. The interest and support of NASA has been fundamental to ensuring the vitality of this exciting and forward-looking branch of astronomy.

Finally Carty says some very kind words about astronomy – its global community, its width of thought and its capacity to inspire right across the field of human endeavour. It is very gratifying to be appreciated when so many things seem against astronomy – adverse environmental impact, squabbles over land use, lack of interest in our science among the young (at least to the extent of serious graduate study), difficulties in getting sound publication structures and general lack of finance.

A good note on which to end.

Derek McNally
dmn@star.herts.ac.uk
University of Hertfordshire
May 2003.