

According to Samarjit Kar (a science writer), futurology is a science that deals with the understanding, basically of future aspects of human interest. Principally, it is based on strong scientific logic, properly integrated for understanding and determining a viable scenario of better life, better environment, better management of resources for the benefit of man.

According to Manas Pratim Das (AIR, Kolkata) to present science on the radio, the following points should be kept in mind. The language should be simple and free from terminologies as far as possible. Long sentences are difficult to comprehend. So short sentences should be used as much as possible. Too many statistics must not jam any presentation. Anecdotes and examples, if used, will help illustrate the content. Finally, orientation of the presentation should be according to the educational or comprehension level of the target audience.

'Dynamics of science club movement should be increased', said Sabyasachi Chattopadhyaya (*Kalantar Patrika*, Kolkata).

On 23 August 2005, a science communicators' meet was organized as a part of this workshop, at National Library, Kolkata. The meeting was sponsored by NCSTC, Ministry of Science and Technology, Govt of India.

The main objective of this programme was to provide training on leading aspects of science journalism, to those who are interested in taking up science communication as a profession or those taking up enterprises on public understanding of science writing in the different public media. The programme was so structured that it appraised the participants with

new dimensions of science and technology pertaining to communication.

According to Amit Krishna De (convener of the training course and Assistant Executive Secretary, Indian Science Congress Association, Kolkata), the objective of organizing such a meet was to evaluate the present status of science communication in West Bengal and build a platform where all the present and past students of the course can interact with renowned science communicators of the city.

In the inaugural address, Anuj Sinha, Director, NCSTC (Rashtriya Vigyan Evam Prodyogiki Sanchar Parishad, New Delhi) spoke on challenges for science communicators in the next ten years. According to him, science communication is an interdisciplinary area; it is a challenge as well as an opportunity. Communication of S&T, he felt, is stimulation of scientific temper, making and learning of effective science, and accelerating societal development that is translated into informed decision-making. Principles of S&T communication, characteristics of communication technology, importance of S&T literacy and elements of good S&T communication programmes were also detailed by him.

Subhendu Mandal (Director, National Library, Kolkata) spoke mainly on the rich cultural heritage of the National Library and its direct link with development of science in the 18th as well as the 19th centuries.

There were four panel discussions. The first one was devoted to 'Developing writing skills'. Speakers in this session were of the opinion that jargons should be avoided wherever possible, using sim-

ple language to explain even highly technical matters. It was felt that the essential job of a science writer is the development of an accurate and compelling story for the person who does not practice science.

The next panel dealt with 'Tackling terminologies'. The panelists were of the opinion that science writing should be written in the style of literature and that stress must be laid on the formation of a forum where scientists, non-scientists, science communicators and linguists should all be included.

The third panel was on 'Developing information and communication base'. Science communicators should be able to influence the society through their work. Areas of common interest like medical, environmental disaster, etc. should be identified and resource base should be built up accordingly.

Apart from the above-mentioned lectures, the workshop covered a variety of topics like herbs, spices, bioethics, etc. in addition to topics on science communication. These were included so as to enable the students to prepare reports on science-related topics. However, the one-day symposium held as a part of the course has been extensively covered in this report as it was totally devoted to science communication. In addition, the course included visits to different science institutes in Kolkata, to make the participants aware of the scientific work being carried out there.

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MEETING REPORT

Ethical challenges in health care*

The First National Bioethics Conference was organized by the *Indian Journal of Medical Ethics* (www.issuesinmedical-ethics.org) which has been published

*Based on the First National Bioethics Conference held in Mumbai from 25 to 27 November 2005.

continuously since 1993 and is possibly the only indexed journal in biomedical ethics from Southeast Asia. There were 20 other collaborating institutions, which included private and government organizations as well as NGOs. About 350 participants attended the Conference. While most delegates were from India,

many leaders in the field from the West and South Asian countries also attended it.

The main aim of the conference was to help develop bioethics as a major health concern and discipline in India. The specific objective was to understand and debate the emergence of bioethics, as linked to

biomedical and social science disciplines in India, especially in relation to the globalizing world. It hoped to provide a forum to people to address their concerns on cross-cultural health care practices and issues in public health and research, and to present perspectives and work in bioethics on the sub-themes. The conference provided an opportunity to organize workshops and discussions on issues that various groups are working on, plan the direction that the bioethics movement in India should take and organize its network.

The main theme of the conference was 'Ethical challenges in health care: global context, Indian reality'. There were four subthemes. These included ethical challenges in HIV/AIDS, ethics of life and death in the era of high-tech health care, ethical responsibilities in violence, conflict and religious strife and lastly, ethics and equity in clinical trials. These four subthemes were discussed through the three days, each day focusing on one dimension of health ethics, the first day being on research ethics, the second day on clinical practice ethics and the final day on public health ethics. On each day, there were plenary sessions by keynote speakers, paper presentations by delegates, individual theme workshops and film presentations.

Invited speakers included physicians, social scientists and representatives of the government. They included V. I. Mathan (ICMR Epidemiology) who, while speaking on ethical issues in hi-tech medicine explained that the agenda for research must originate in the mind of the scientist and that an externally prescribed agenda was bad science and by logical extension, unethical. Vasantha Muthuswamy (ICMR, New Delhi) suggested that the aim of reducing the 10/90 gap, the term used to denote that 90% of the world's resources are used for research into 10% of the world's population, to 50/50, was utopian but profoundly ethical. P. N. Tandon (National Brain Research Centre, Manesar) showed how the ambit of ethics in biomedicine had expanded over the years, from Charak and Susruta, through the Nuremberg code to today, a time of gene therapy and genetic engineering, artificial reproductive therapy, stem cell therapy and genetic testing – all of which offered unique ethical issues. T. Jacob John (Christian Medical College, Vellore), speaking on ethics and public health reminded delegates that the public health approach may often seem to trample

on the human rights of an individual. He went on to say, however, that the HIV/AIDS epidemic had shown that individual sufferers can also be a partner in public health efforts to control the disease. Sunithi Solomon (YRG Care, Chennai) spoke on issues arising in the care of HIV/AIDS patients. She reiterated that many difficulties still existed: from confidentiality, to lack of a holistic approach to the patients, lack of equitable access to treatment, problems with positive children and with the uninfected spouse. M. D. Gupte (National Institute of Epidemiology, Chennai) spoke on the important current day topic of ethics in clinical trials. He touched on the ethical concerns regarding sponsors, researchers and patients involved in clinical trials. He also advocated the establishment of a system to register, standardize and regulate clinical trials. C. M. Gulhati (Editor, *Monthly Index of Medical Specialities*, New Delhi) reported that many drugs were more expensive in India than in the UK. He added that very few, if any, drugs were ever rejected by Indian authorities and millions were at risk because of the intake of useless supplements and substandard drugs. The absence of user guidelines in most drug packs kept consumers in the dark. He suggested that permission given to a company for sale of a new drug must be a limited period of time, followed by re-evaluation, before a final decision was taken. Jayashree Ramakrishna (National Institute of Mental Health and Neurosciences, Bangalore) lamented the fact that HIV was not treated like any other disease. The moral police have to a large extent dictated terms in our approach to the disease; this mistake must not be repeated with new diseases in future. S. Parasuraman (Tata Institute of Social Sciences, Mumbai) dealt with the ethics of research in displaced populations. He focussed on the problem of enforcement of protective regulations and negligible accountability, and lamented the minimal role of governments and communities in commissioning research in these populations. Manisha Gupte (Masum, Pune) explained that violence was a public health and human rights issue and came well under the ambit of bioethics. Abhijit Sen (J.N. University, New Delhi) stated that a crucial issue in ethics was to balance the 'good' for many with individual rights. Women were more vulnerable to illness and in our society, more susceptible to violence. Since discrimination was the basis of such violence, it

was imperative to remove the discrimination through various measures such as affirmative action and equitable distribution of resources. The papers presented by the delegates were of high quality; there were a wide range, presented on issues such as gender-based violence, end of life care, informed consent, cultural dimensions of research, economic dimensions of health and research, new technologies, regulatory mechanisms of research ethics, sex selection, disaster management and the role of community advisory boards.

The workshops also saw a wide variety of topics discussed. 'Can neurosurgeons play God and switch off ventilators on their quadriplegic patients merely because their family does not have the money to support them? Should we welcome technologies to prevent pregnancy – or should we employ assisted reproductive technologies, which allow us to create human beings? Is it correct to perform clinical trials in countries with vulnerable populations? In a land of many religions, how far does faith and belief influence the art and science of medicine, both, for the patient and the health care provider? Should we always tell the truth when dealing with terminally ill patients?' were among the many questions discussed by the speakers and audience. The abstract book of the conference is available at <http://www.issuesinmedicaethics.org/suppl.pdf>. The proceedings of selected papers presented during the conference will be shortly brought out in the form of two books.

Some workshops discussed a broader range of issues. Unethical clinical practices in India are clearly on the rise. Are doctors primarily responsible, or are there other factors, which have contributed to this? Are community advisory boards necessary, and do they have a role in bridging the gap between researchers and the community? What is the health care profession doing to help women who are victims of violence? And importantly, do the providers have the necessary training? Ethics deal not just with hospitals, but also about life in general. Therefore, in a period where disasters are a part and parcel of everyday life in our world, we need to reflect on how ethical we are in our response to disasters, and also in its research, especially after the acute phase is over. Such topics, which are not usually discussed in bioethics conferences, were also debated. The WHO also conducted a

workshop on ethical issues in international health research. Overall, the workshops provided an opportunity to provoke thought and discuss practical and relevant bioethical issues facing the medical world, both for the providers and the receivers of health care.

Bioethics is a relatively new but rapidly growing discipline in India. There are many reasons for this. Among these are

the failures of the government to provide the utopian dream of health for all, and of the regulatory bodies in the medical profession to contribute to optimal and relevant health care. This has led to proactive steps being taken by activists, committed medical professionals and social scientists. The conference achieved its goal of organizing a common platform for health activists to network towards ethical

health science in India. The next conference will be in November/December 2007.

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MEETING REPORT

An integrated strategy for food security in the developing countries*

Under the auspices of the 93rd Indian Science Congress, and as a part of the event 'Science, and the UN Millennium Development Goals', a Panel Discussion on 'Biophysical and socio-economic dimensions of food security in the developing countries', was held. The output of the Panel Discussion was the development of an integrated strategy to make use of the synergy between bio-, nano- and information technologies, innovative agricultural and management practices, combined with administrative policies, to achieve the UN Millennium Development Goal of halving by 2015, the number of undernourished people in the world. Out of about 850 million undernourished people in the world, India has 221 million and China has 142 million.

The panelists included: P. M. Bhargava (Vice Chairman, National Knowledge Commission), Jan Lundquist (Stockholm International Water Institute, Sweden), K. Radhakrishnan (Director, NRSA, Hyderabad), Ajay Parida (MSSRF, Chennai), C. V. S. K. Sarma (Principal Secretary, Department of Irrigation, Govt of AP) and H. Hemnathrao (Administrative Staff College of India, Hyderabad). The discussants included Kiran Sharma (ICRISAT, Hyderabad), J. B. Prajapati (Anand Agricultural University, Gujarat), Swarna Vepa (MSSRF, Chennai), S. P. Wani (ICRISAT, Hyderabad) and Hema Achyuthan (Anna University, Chennai).

*A report on the Panel Discussion on 'Biophysical and socio-economic dimensions of food security in the developing countries' held in ANGR Agricultural University, Hyderabad on 6 January 2006.

Three multi-dimensional approaches have been identified as the means to achieve food security in developing countries. The principal themes of the approach, and the activity components of each approach are as follows:

1. More crop per drop (food and water security are inseparable, as food cannot be grown without water. Ways of optimizing the soil-water-plant system, in order to produce more food crops with less water).

- Use of remote sensing, GIS, GPS and VRT (Variable Rate Technology), for making surface water inventories, groundwater mapping, airborne salinity mapping, management of irrigated agriculture, vegetation indices, soil moisture, crop production forecasting, wasteland reclamation, regulation of water rights and aquifer depletion through the use of evapotranspiration and lysimeters, etc. Fragmented farm holdings in the country constitute a serious impediment in the farmer-specific application of remotely sensed soil moisture and other kinds of data applications.

- Development of drought-resistant and salinity-tolerant crop varieties. Use of recombinant DNA technology and methods for transferring (e.g.) salt-tolerant genes (say, from mangroves) into important food crops, such as rice. Gene isolation and development of transgenics in locally adapted cultivars.

- Preparation of hydroclimatic calendar on the basis of the analysis of satellite-based, climate-related information (including ENSO impacts), for use in crop planning.

- Maintenance of soil health. Use of soil microorganisms and micronutrients such as zinc, sulphur and boron, to improve soil fertility and productivity.

- 'Blue' water irrigation – To make irrigation water available on demand, and to price it in proportion to the quantity used per unit area of land. Reduction in conveyance losses. Efficient use of irrigation water through practices such as drip irrigation.

- Use of wastewater and brackish water to grow appropriate crops.

- Use of SRI (System of Rice Intensification) method of rice cultivation, which uses less seed, less water and better harvest.

- Study of how the quality of irrigation water (say, arsenious water) affects food grain quality.

- Rainfed agriculture: The greatest potential for meeting the burgeoning demand for food lies in rainfed agriculture based on 'green' water (soil moisture), and conversion of non-beneficial evaporation to beneficial transpiration through crops, using, for example, on-farm rainwater harvesting, and moisture conservation methodologies. Integrated watershed management can increase crop productivity two- to threefold through productivity-enhancing agricultural technologies (e.g. supplemental irrigation, micronutrient management), and thus break the unholy nexus between drought, land degradation and poverty ('access to affordable water is the first step out of poverty').

2. Food fortification (ways of processing foods to improve their nutrition, so that the same quantity of, say, cereals