

Chapter 1 Chemistry and the Environment

1.1 Introduction

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Theme 1 of the Conference covered problems of pollution on land and in the air and water. Speakers came from every continent though the representation was inevitably thinly spread and, for instance, there was only one speaker from Africa and there were complaints that small countries, eg. the West Indies, were not represented. The papers presented are listed below and extended summaries are given in 1.2 to 1.11. While no formal resolutions were passed at the sessions, points raised by speakers and in the discussion session are included in the following. The importance of chemistry in dealing with environmental problems is in all papers.

Professor Peter J Peterson (1.2) gave the opening paper on endemic diseases caused by natural pollution: deficiencies in essential trace elements (pollution in a negative sense) or an excess of a toxic element. Extensive analytical programmes are needed in this field. In the case of fluorosis, he emphasises the need for work on low cost defluoridation processes.

Professor Dilip Biswas (1.3) described the problems of land pollution following human activities. While this was based on Indian experience these would be similar in any heavily populated developing country especially in a tropical climate.

Dr J G Kretzschmar (1.4) and Professor Tania Tavares (1.5) spoke on air pollution in cities in Mexico and Brazil in which motor vehicle exhausts were the main culprit. Professor Tavares made the point that when analytical measurements were made over a period of time, improvements in methods could bias conclusions drawn from trends in such measurements. This could be corrected by a suitable use of standards.

Dr David Mage (1.6) dealt with the difficult determinations involved in assessing the amounts of pollutants actually taken in by people in the Human Exposure Locations Assessment (GEMS) programmes in which emphasis on correct sampling and calculation is as important as the analysis.

Dr Deborah Chapman (1.7) gave an account of the GEMS/WATER global water quality monitoring and assessment programme. Chemical data is essential for water quality assessment and chemical techniques need to be simple so that they can be used on a global scale.

Dr Jerome Nriagu's paper (1.9) was concerned with the increasing levels of metal pollution to which African populations were exposed. Many factors were responsible for the special vulnerability of Africans to toxic metals: their particular lifestyles, their low nutritional status, the dusty conditions throughout Africa leading to the spreading of metal contamination. He referred to foreign companies which were able to carry on operations, eg. mineral exploitation, which would not be permitted in their own countries.

Professor Wang Ju-Si (1.10) spoke on the most serious environmental problem in China-water pollution. She gave a case history of the rapid development of a petrochemical industry in Beijing which threatened to overwhelm the water treatment plants in the city and of the major role played by chemistry and chemists in saving the situation. A serious water problem was also the subject of Dr Handa's lecture (1.8), in which he dealt with the Ganga Action Plan and the study made by the National Environmental Engineering Research Institute to design effective measures for water quality management of the Ganga river.

Dr Barry Noller (1.11) described a Commonwealth Science Council initiative in the Asia-Pacific region in which the most urgent programmes needing the application of chemical research were chosen by the participants. A similar idea could with advantage be adopted in many other developing countries. He compared the component projects in this initiative with those to be discussed at a UN Conference on Environment and Development (UNCED) in Brazil in 1992. In considering environmental analytical techniques, Dr Noller emphasised the importance of field methods being essentially simple and avoiding hazardous chemicals so that they can be widely used (cf. Dr Chapman).