



Newsletter



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This issue of the ECG Newsletter may also be seen on the Internet at

<http://chemistry.rsc.org/rsc/ecg.htm>

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Recent Activities of the Environmental Chemistry Group

Since publication of the last Newsletter the Committee of the Environmental Chemistry Group has been engaged in several activities on behalf of the Group.

In March the Group's Distinguished Guest Lecture for 1997 was given by Dr R.G. Derwent of the Meteorological Office, with supporting lectures by Dr J. Pentreath of the Environment Agency and Ms I. Smith of IEA Coal Research. Unfortunately there was a disappointingly small audience for this, our major event in the year. This was partially compensated for by a very successful Young Environmental Chemists meeting held in Leicester, but the next two symposia in our calendar, on New Initiatives for Regulatory Monitoring of Industrial Processes and on Water Quality – Monitoring, Pollution and Treatment, were both cancelled because of a paucity of prior registrations. The Committee is naturally concerned that the

symposia it is organising are not attracting more than a handful of participants. If you have any comments on our programme or ideas for future meetings please let me know.

Other Committee activities include participation in the Royal Society of Chemistry's review of its activities in the whole area of environment and health and safety, and in its response to the Society's Scientific Forward Look which appears on page 2 of this Newsletter. Comments on this draft document are welcome as are your views on any other aspects of the Group's activities.

Professor C.N. Hewitt
Chairman, June 1997

RSC Environmental Chemistry Group Officers (1997)

Chairman

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The ECG's Response to The Royal Society of Chemistry's Scientific Forward Look

The UK Government's Technology Foresight Programme was established in 1994 with the aim of linking industry and the science, engineering, and technology communities and to identify opportunities in markets and technologies which will enhance the nation's prosperity and quality of life over the next 20 years. Sixteen Technology Foresight Panels were designated to carry out this work.

The RSC is strongly committed to the Foresight programme and has launched its own **Scientific Forward Look** which will identify science and technology opportunities relevant to chemistry. As part of this initiative, the Society has asked its Subject Groups for their views on the developments which are likely to occur over the next decade or two. The

Scientific Forward Look will incorporate the conclusions of the Subject Groups into a report and this will be used as part of the Society's action in the next consultative phase of the Foresight programme due to take place in 1999.

In response to the Society's Scientific Forward Look, the following draft document has been drawn up by the committee of the Environmental Chemistry Group. It seeks to predict the thrust of scientific research and development necessary to accommodate the societal demands placed on environmental chemists over the next decade.

Although the document deals with five topics – atmospheric pollution, aqueous

pollution, soils and waste, analytical chemistry and toxicology – these topics are, of course, to be viewed as heavily interdependent.

The committee of the ECG seeks responses, comments, advice and opinions on this draft document before the construction of the final report. These should be mailed to the Secretary of the Environmental Chemistry Group *before the end of August 1997*:

*Dr Leo Salter, Research Director,
Cornwall College,
Pool, Redruth,
Cornwall TR15 3RD*

The ECG's Draft Scientific Forward Look Document

1. Atmospheric Pollution

A significant focus for atmospheric pollution studies over the next decade will be created by the requirements placed on Local Authorities by the NAQS – much more air quality data are required. There will be a need for cheap, reliable, mobile, easy-to-operate-and-maintain monitoring equipment. The monitoring of pollutants such as PM_{2.5}, PM₁₀, VOCs and PAHs will require significant innovation, and increased awareness of indoor air pollution and odour monitoring will demand easier and cheaper characterisation of problem compounds.

Better systems for the continuous monitoring of stack emissions will need to be developed, and quantitation methods for dispersed dust emissions from mines, quarries, waste dumps and building sites need to be refined. Additionally biodiversity initiatives will require considerable refinement of our understanding of critical load data – including renewed research into the long distance transport of compounds such as dioxins and agrochemicals.

There will also be a need for the continued development of software packages

capable of modelling air pollution data – especially in conjunction with GIS systems and real-time telemetric delivery of data from distant sites. It is also important to note that unless UK legislation demands air quality monitoring standards in advance of those legislated for by the EU and the USA, monitoring air pollution in the UK will remain largely dependent on imported equipment and expertise. The increasing need to abate greenhouse gas emissions will require development of chemically-based control methodologies for these gases.

2. Aqueous Pollution

As with air pollution the need for continuous real-time monitoring of water quality will increase. The impact of the recent dry years, the surge in recreational use of marine and freshwater systems, and the improvements demanded for sewage and landfill disposal are all going to make studies of this aspect of the environment particularly challenging over the next decade. Studies of the toxicological aspects of pollutants are required – especially when biodiversity initiatives are considered. Oestrogenic compounds stand out as an area of current

concern and it is likely that similar problems lie ahead. Laboratory analytical techniques are well able to deal with the challenges of low level concentrations of pollutant species in water, but there is a real need for cheap, robust, field methods – immunoassay and passive sampling techniques show promise. Computer models which link the physico-chemical status of water systems to their ecology need to be developed and the next decade will demand that such models have a similar predictive capacity to those used for atmospheric research.

3. Soils and Waste

Taking these two topics together focuses attention on the need to understand the manner in which chemicals bind to and leach from soils of different types. Additionally, detailed studies of the long term safety of contaminated land will be required. Agrochemical deposition, particulate transport and soil-related biodiversity concerns (habitat creation and preservation) all rely on fundamental studies of the physical chemistry of the processes of association between surfaces and chemical species. Also, there is no doubt that methods for the remediation of contaminated land and for the

PLEASE
DISPLAY

ENVIRONMENTAL SCIENCE AND TECHNOLOGY MEETINGS

ISSUE 23/JUNE 1997

THE CHARTERED INSTITUTION OF WATER AND ENVIRONMENTAL MANAGEMENT

INTERNATIONAL EVENT

ACTIVATED SLUDGE INTO THE
21ST CENTURY
17 - 19 SEPTEMBER 1997
MANCHESTER, UK

- ◆ Review the range of applications of the process
 - ◆ What the limits are
- ◆ What new developments are in prospect?
- ◆ The operational problems that remain and how to deal with them

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1997 CSCE-ASCE

Environmental Engineering Conference
Protecting People and the Environment

23-25 July 1997
Edmonton Convention Centre, Alberta, Canada

For further information contact: The Conference Secretariat,
The Canaglobe Group Inc., 15016 77 Avenue, Edmonton, Alberta
Canada. Tel: (403) 487 8102, Fax: (403) 487 2417
Email: meetings@canaglobe.com
Web site: <http://www.canaglobe.com.csceasce.htm>

SEEEG

INTERNATIONAL
CONFERENCE

The Sea Empress
Oil Spill

11-13 February 1998
Cardiff, Wales, UK

FIRST ANNOUNCEMENT

For further information contact:
Hannah Sims, CIWEM Events
Tel: 0171 831 3110, Fax: 0171 405 4967

Date(s)	Title/Venue	Organiser/Contact
JUNE 1997 – Stop Press		
4 Wed – 6 Fri	1997 LONDON INTERNATIONAL CHLORINE SYMPOSIUM Gloucester Hotel	SCI Electrochemical Technology Group SCI Conference Secretariat Tel: 0171 235 3681, Fax: 0171 235 7743 Email: conferences@chemind.demon.co.uk
5 Thu	TREATMENT OPTIONS FOR LANDFILL LEACHATES The Clock Tower, Wakefield	AE Technology Transfer Zena Hickinson Tel: 0113 233 2308, Fax: 0113 233 2243
5 Thu	TREATMENT OF CONTAMINATED LAND SCI, 14/15 Belgrave Square, London	SCI Separation Science & Technology Group SCI Conference Secretariat Tel: 0171 235 3681, Fax: 0171 235 7743 Email: conferences@chemind.demon.co.uk
5 Thu 6 Fri	SUMMER MEETING/AGM Delivering Customer Service during Environmental Change Droitwich	CIWEM West Midlands Sarah-Jane Oversby Tel: 0121 745 4892, Fax: 0121 733 2268

Date(s)	Title/Venue	Organiser/Contact
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JUNE 1997

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16 Mon – 17 Tue	50th ANNIVERSARY GOLDEN JUBILEE CELEBRATION. SPECIALIST CONFERENCE ON THE CHALLENGES OF THE NEXT 50 YEARS The Majestic Hotel, Harrogate	IWSA IWSA Secretariat Tel: 0171 957 4567, Fax: 0171 222 7243
23 Mon	WATER CONSERVATION & PUBLIC HEALTH Scientific Societies Lecture Theatre, London	The Royal Society of Health Samantha Jeffries Tel: 0171 630 0121, Fax: 0171 976 6847 Email: rsh@cygnet.co.uk
30 Mon – 4 Fri (July)	ENGINE EMISSIONS MEASUREMENT Short Course Weetwood Hall, Leeds	Dept of Fuel & Energy Jamie Strachan Tel: 0113 233 2494, Fax: 0113 233 2511 Email: shortfuel@leeds.ac.uk

JULY 1997

2 Wed – 4 Fri	32nd MAFF CONFERENCE ON RIVER AND COASTAL ENGINEERS Keele University, Keele, England	Ministry of Agriculture Fisheries and Food, Flood and Coastal Defence Division Edwin Webb Tel: 0171 238 6742, Fax: 0171 238 6665
7 Mon – 9 Wed	GROUNDWATER MODELLING USING VISUAL MODFLOW University of Bradford, Bradford, UK	University of Bradford Susan O'Brien Tel: 01274 383217, Fax: 01274 383218
15 Tue – 17 Thu	TOXINS – a symposium covering all aspects of microbiological toxins to include keynote addresses, discussion and poster sessions and a 'hands-on' workshop University of East Anglia, Norwich	Society for Applied Bacteriology Ann Baillie Tel: 01234 720047, Fax: 01234 720048

SEPTEMBER 1997

5 Fri	MINERWATER TREATMENT USING WETLANDS University of Newcastle	CIWEM Events Hannah Sime Tel: 0171 831 3110, Fax: 0171 405 4967 Email: events@ciwem.org.uk
7 Sun – 12 Fri	YOUNG MEMBERS' STUDY TOUR 1997 Norwich and Cambridge	CIWEM Events Hannah Sime Tel: 0171 831 3110, Fax: 0171 405 4967 Email: events@ciwem.org.uk
8 Mon – 11 Thu	INTERNATIONAL CONFERENCE ON ADVANCED WASTEWATER TREATMENT PROCESSES Weetwood Hall, Leeds	AE Technology Transfer Zena Hickinson Tel: 0113 233 2308, Fax: 0113 233 2243
8 Mon – 10 Wed	1st EUROPEAN CONFERENCE ON PRECISION AGRICULTURE Warwick University Conference Park	SCI Agriculture & Environment Group SCI Conference Secretariat Tel: 0171 235 3681, Fax: 0171 235 7743 Email: conferences@chemind.demon.co.uk
8 Mon – 11 Thu	MANAGING THE ENVIRONMENTAL IMPACT OF LANDFILL Imperial College, London, UK	Imperial College, Centre for Continuing Education Ms Sally Verkaik Tel: 0171 594 6882, Fax: 0171 594 6883
15 Mon – 19 Fri	PROCESS MODELLING Cranfield University, Bedfordshire	School of Water Sciences, Cranfield University Clive Temple Tel: 01234 754056, Fax: 01234 751671 Email: c.temple@cranfield.ac.uk
17 Wed – 18 Thu	ACTIVATED SLUDGE INTO THE 21st CENTURY Manchester	CIWEM Events Lavinia Gittins Tel: 0171 831 3110 Fax: 0171 405 4967 Email: events@ciwem.org.uk
17 Wed	TURNING WASTE INTO PROFIT SCI, 14/15 Belgrave Square, London	SCI Materials Chemistry Group SCI Conference Secretariat Tel: 0171 235 3681, Fax: 0171 235 7743 Email: conferences@chemind.demon.co.uk

Date(s)	Title/Venue	Organiser/Contact
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SEPTEMBER 1997

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20 Sat – 26 Fri	21st IWSA WORLD CONGRESS Palacio Municipal de Congresos de Madrid, Spain	IWSA IWSA Secretariat Tel: 0171 957 4567, Fax: 0171 222 7243
21 Sun – 27 Sat	GROUNDWATER IN THE URBAN ENVIRONMENT East Midlands Conference Centre, Nottingham	International Association of Hydrogeologists c/o Conference Nottingham Tel: 0115 985 6545, Fax: 0115 985 6533
22 Mon – 23 Tue	INCINERATION OF MUNICIPAL WASTE WITH ENERGY RECOVERY Short Course Weetwood Hall, Leeds	Department of Fuel and Energy University of Leeds Jenny Bannister Tel: 0113 233 2494, Fax: 0113 233 2511 Email: shortfuel@leeds.ac.uk

OCTOBER 1997

7 Tues – 9 Thu	ENERGY MANAGEMENT Short Course Leeds	ICHEME Pam Keeling Tel: 01788 578214, Fax: 01788 560833 Email: pkeeling@icheme.org.uk
8 Wed	THE WATER INDUSTRY: MANAGING STAKEHOLDER EXPECTATIONS Le Meridien Hotel, London	The Economist Conferences Jackie Cotterell Tel: 0171 830 1177, Fax: 0171 931 0228 Email: jac@eiuldn.mds.compuserve.com
21 Tue	TECHNOLOGY TRANSFER SCI, 14/15 Belgrave Square, London	SCI Agriculture & Environment Group SCI Conference Secretariat Tel: 0171 235 3681, Fax: 0171 235 7743 Email: conferences@chemind.demon.co.uk
22 Wed	THE URBAN WASTEWATER DIRECTIVE (91/271/EEC) Esholt Training Centre, Bradford, Yorks	The Royal Society of Chemistry Ms L Hart Tel: 0171 437 8656, Fax: 0171 287 9825
22 Wed	MEASUREMENT & CONTROL IN CLEAN WATER FLOCCULATION SCI, 14/15 Belgrave Square, London	SCI Environment & Water Group SCI Conference Secretariat Tel: 0171 235 3681, Fax: 0171 235 7743 Email: conferences@chemind.demon.co.uk
26 Wed – 28 Fri	INTERNATIONAL NO-DIG 97 TAIPEI Taipei International Convention Centre, Taipei World Trade Centre Exhibition Hall	ISTT/CTSTT Pat Nolan Tel: 0171 259 6755, Fax: 0171 235 6976

NOVEMBER 1997

6 Thu	HEALTH EFFECTS OF POLLUTANTS SCI, 14/15 Belgrave Square, London	SCI Environment & Water Group SCI Conference Secretariat Tel: 0171 235 3681, Fax: 0171 235 7743 Email: conferences@chemind.demon.co.uk
18 Tue	SUSTAINABLE DEVELOPMENT The Edinburgh Conference Centre, Riccarton	CIWEM Scottish Branch Richard Arnott Tel: 0131 244 0185, Fax: 0131 244 0404
24 Mon – 28 Fri	SPARK IGNITION ENGINE EMISSIONS Short Course Weetwood Hall, Leeds	Department of Fuel and Energy University of Leeds Jenny Bannister Tel: 0113 233 2494, Fax: 0113 233 2511 Email: shortfuel@leeds.ac.uk
25 Tue	FIBRE CROPS SCI, 14/15 Belgrave Square, London	SCI Agriculture & Environment Group SCI Conference Secretariat Tel: 0171 235 3681, Fax: 0171 235 7743 Email: conferences@chemind.demon.co.uk

Date(s)	Title/Venue	Organiser/Contact
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DECEMBER 1997

3 Wed - 4 Thu **AQUEOUS EFFLUENTS**
Loughborough

IChemE
Pam Keeling
Tel: 01788 578214, Fax: 01788 560833
Email: pkeeling@icheme.org.uk

16 Tue **WASTE MANAGEMENT FOR THE 21ST CENTURY**
SCI, 14/15 Belgrave Square, London

SCI Environment & Water Group
SCI Conference Secretariat
Tel: 0171 235 3681, Fax: 0171 235 7743
Email: conferences@chemind.demon.co.uk

FEBRUARY 1998

11 Wed - 13 Fri **THE SEA EMPRESS OIL SPILL International Conference**
Cardiff, Wales

SEEEC, CIWEM Events and CIWEM Welsh Branch
Hannah Sime
Tel: 0171 831 3110, Fax: 0171 405 4967
Email: events@ciwem.org.uk

MARCH 1998

29 Sun - 1 Wed (Apr) **DISINFECTION BY-PRODUCTS: THE WAY FORWARD**
Call for Papers
Cambridge, UK

RSC/CIWEM/SCI
Elaine Wellingham
Tel: 01275 853311, Fax: 01275 853311

JULY 1998

7 Tue - 10 Fri **TREATMENT INNOVATION FOR THE NEXT CENTURY - INNOVATION 2000**
Call for Papers
Cambridge, UK

CIWEM Events
Hannah Sime
Tel: 0171 831 3110, Fax: 0171 405 4967
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FEES

FEES MAY BE PAYABLE FOR ATTENDANCE AT MEETINGS, SO PLEASE CHECK WITH THE ORGANISER.

PLEASE MENTION ENVIRONMENTAL SCIENCE AND TECHNOLOGY MEETINGS WHEN ENQUIRING ABOUT EVENTS

EDITOR

HANNAH SIME, CIWEM, 15 JOHN STREET, LONDON WC1N 2EB
TEL: 0171 831 3110 FAX: 0171 405 4967

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NEXT ISSUE

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capable of modelling air pollution data – especially in conjunction with GIS systems and real-time telemetric delivery of data from distant sites. It is also important to note that unless UK legislation demands air quality monitoring standards in advance of those legislated for by the EU and the USA, monitoring air pollution in the UK will remain largely dependent on imported equipment and expertise. The increasing need to abate greenhouse gas emissions will require development of chemically-based control methodologies for these gases.

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minimisation of landfill disposal need urgent attention.

4. Analytical Chemistry

Given enough time and enough money it's safe to say that the analytical chemists can identify and quantitate almost anything. It seems that during the next decade the developments required will be to translate these techniques into unmanned real-time remote devices of great robustness and flexibility which are cheap, reliable and produce high quality data. Hence, the UK needs to focus on creating the legislative and economic tools necessary to produce commercial (export) success from the current exceptionally high quality analytical chemists in the country.

5. Toxicology

The primary concerns of UK legislation seem to operate in the order – human health, wildlife impacts, vegetation and

nuisance. Unless toxicological research is advanced to provide a valid assessment of chemical effects on the environment, there is no early warning system to initiate action and there is no real justification for pollutant levels to be established in law. There is therefore an urgent need for standardisation of methods for toxicological assessment such as the Comet Assay, biomarkers *etc.*

The need for cheap, consistent, rapid and universally accepted toxicological assays is urgent. Short-term tests to replace classical toxicological methods are important not only for the immediacy of the information they supply but also because they will reduce reliance on long-term animal tests. Such assays need also to go hand-in-hand with the development of epidemiological studies of sufficient refinement to reveal how the complex nature of increased pollution exposure is affecting the environment.

6. Global Pollution

In all the topics discussed above no specific mention has been made of radioactivity, climate change and ozone layer depletion (and other global phenomena). In the future these will all make specific demands on instrumentation development and computer modelling – however in respect of these global problems particular note must be given to the increasing use of satellites for obtaining environmental data.

[The UK Office of Science and Technology have produced an article on the Technology Foresight Programme which appears on the following Web site <http://www.dcs.ed.ac.uk/foresight/> The RSC's involvement in the Foresight initiative will be described in a future issue of this Newsletter].

Environmental Chemistry at The Centre for Analytical Research in the Environment, Imperial College

Introduction

The Centre for Analytical Research in the Environment (CARE), Imperial College, is sited at the Silwood Park campus, near Ascot in Berkshire. The focus at the Centre is on practical investigation of contaminants, their concentration, speciation, mobility and ultimate fate. The key investigations of the senior researchers, Drs Susan Parry, Kym Jarvis and John Williams, are related to the fate of atmospheric particulates and their risk to human health; isotopic exchange within, and between, inorganic and organic species in atmospheric, aquatic and terrestrial systems; and the use of isotopic studies in both natural fractionation processes and anthropogenic activity. New methods of determining trace elements in the environment are developed, with emphasis on the sophisticated multielement techniques of inductively coupled plasma-mass spectrometry (ICP-MS) and neutron activation analysis.

Equipment

The Centre has the only nuclear research reactor in the UK, which provides a source of neutrons for neutron activation

analysis – a very sensitive tool for measuring trace contaminants in the environment. The ICP-MS facility, located at CARE, has a world-wide reputation and receives joint support from the Natural Environment Research Council (NERC) and Imperial College. The facility is equipped with three ICP-MS instruments and two laser ablation systems. This well equipped, high profile, group has a great deal of expertise, allowing it to offer a range of facilities including the operation of research projects, commercial analysis, training and short courses. The Centre's experimental facilities include a wind tunnel to study the deposition and resuspension of aerosols onto grass and model forest canopies, and the lysimeter system at Silwood Park is used to measure the migration of contamination from groundwaters into soils and crops.

Speciation

Speciation plays an important role in the group's work as demonstrated by the study to characterise heavy metals and their compounds released in landfill leachates and their attenuation in soil. Laboratory scale experiments and

sampling of leachates and soils on site will provide a database for modelling the behaviour of the species. An important part of this study is to establish levels of background contamination from previous site activities and/or atmospheric deposition. The final stage of the project is risk assessment to establish whether the contamination poses an actual or potential unacceptable risk to human health or to the environment.

Platinum Group Metals

The recent completion of a student project with the Water Research Centre, Medmenham, on the environmental impact of catalysts used in car exhausts, has highlighted the importance for further work on the speciation of the platinum group metals. The project resulted in a database for the concentrations of platinum, palladium and rhodium in road dust and soil adjacent to the road. The results have shown positive values for all three elements, at two sites of different traffic flow, with platinum/rhodium ratios consistent with those present in the catalysts. The work has provided a valuable database for the elements throughout a one year sampling period

and forms the basis for future work on the processes involved in deposition and transport of platinum, palladium and rhodium in the environment. Other pathways, including atmospheric deposition and transport in soil and groundwater, are now being investigated.

Radioactive Iodine

Iodine-129 is one of the most radiologically significant radioisotopes in emissions to the atmosphere from nuclear fuel reprocessing. Estimates of the total iodine-129 inventory stored in 1990 in spent fuel go up to 5660 kg. Since there is no environmental sink for iodine-129 and it has a half-life of 16 million years, it will become widely distributed on a global scale and will continue to recycle for millions of years. Research is being conducted through a collaborative programme with Westlakes Research Institute, to characterise environmental cycling of iodine-129 close to a nuclear reprocessing site. To date work has focused on parameters describing the deposition of iodine-129 from atmosphere to vegetation and soil. Dry deposition is found to occur mainly in the organic form, with little elemental, inorganic or particulate iodine being deposited. The important research, which is urgently required, is to establish the isotopic exchange rate between iodine-127 and iodine-129, in both inorganic and organic species of iodine. These rates will be different in atmospheric, terrestrial and aqueous systems, and the processes are further complicated by exchange between inorganic and organic iodine itself.

Boron Isotopes

The variation in boron isotopic ratios in natural waters, can be used to evaluate the extent of anthropogenic input into the system for example from landfill leachates. Boron is naturally present at low concentrations in groundwater and rainfall, and sensitive techniques have been developed using ICP-MS to measure boron isotope ratios with a precision of better than 0.2% RSD. Using these procedures, it has been possible to begin to establish a reliable database of natural isotopic variation in UK aquifers and rainfall.

This research is being continued to examine natural sub-surface mixing processes and to critically evaluate the influence of anthropogenic contamination of potable water supplies.

Heavy Metals

The group participates in the European Heavy Metal Survey, which is conducted every five years and uses the metal content found in natural moss samples to provide a measure of the integrated deposition of heavy metals across Europe. The heavy metals can be emitted from many industrial or power generation sources and travel many hundreds of kilometres before being deposited on land or sea. Representative mosses from across the UK have been collected and are being analysed for heavy metals including arsenic, selenium, cadmium, chromium, copper, iron, nickel, lead, vanadium and zinc. The data obtained from this survey will be used to identify sources of

airborne pollution and to map metal deposition. The most sensitive techniques, inductively coupled plasma mass spectrometry and neutron activation analysis, will provide values down to parts per billion concentrations of the metals. Both analytical methods are multi-elemental and so measurements will be available for many other elements, thus providing a full database of deposition across the UK which can be used in modelling the mobility of metal and non-metal species.

Courses

All the projects described here are being carried out by PhD students funded by research councils, overseas governments and by industry. In addition, a taught postgraduate one year MSc is based at Silwood for students with backgrounds in environmental sciences, geology, chemistry, physics and the biological sciences. Currently there are 15 students carrying out their research projects and working with industry, water companies, the Environment Agency and other environmental institutions. The Centre will merge with Imperial College Centre for Environmental Technology later this year, combining the resources of two significant departments for postgraduate teaching and research into the environment.

For further information about the work at CARE please contact: **Dr Susan J. Parry**, tel: 01344 294292, fax: 01344 24931, e-mail: s.parry@ic.ac.uk

The UK Environmental Law Association

Introduction

What is the UK Environmental Law Association (UKELA) and why should it be of interest to environmental chemists?

First, it is important to note that it is not the UK Association of Environmental Lawyers but the UK Environmental Law Association! UKELA's *raison d'être* is the development, practice and understanding of environmental law itself, not the promotion of environmental lawyers. As a result a sizeable proportion of UKELA membership is made up of non-lawyers.

Secondly, UKELA is a national association. It covers all areas and regions of the UK. This is an important consideration when there are a number of different legal systems operating within the UK. There are some marked differences in the environmental laws between England and Wales, Scotland and Northern Ireland, and UKELA provides a forum for those who operate within these different jurisdictions.

To help in the development, practice and understanding of environmental law, UKELA publishes a quarterly journal and regularly organises meetings, talks and

conferences on the subject. It also has a sophisticated system of working parties which contribute to the development of the law including the making of new laws and the repeal of old ones. To help support this work UKELA positively encourages those with a technical or scientific interest in the environmental field to become members. Membership of UKELA does not distinguish between lawyer and non-lawyers, all are entitled to full membership.

Background

To understand why UKELA came into existence, the rapid development of

environmental regulation in the UK over the last decade and the pressure for such laws both within the UK and in the European Union, which built up in the mid to late 1980's, have to be considered.

Ten years ago an American academic, David Vogel, carried out a fascinating comparative study of US and UK environmental regimes, focusing specifically on pollution control. He summarised the British characteristics thus:

"An absence of statutory standards, considerable administrative discretion, minimal use of prosecution, flexible enforcement strategy, decentralised implementation, close co-operation between regulators and the regulated, and restrictions on the ability of non-industry constituencies to participate in the regulatory process."

Many of these features still exist today but certainly not to the same extent and significant progress has been made since that statement was written. This rapid progress in environmental regulation and the pressure for change which preceded it which was the catalyst for the formation of UKELA in 1986. The organisation began that year with 40 members and has now grown to over 1,000.

UKELA's Objectives

When the formation of UKELA was first discussed in 1985 there was by all accounts some vigorous debate regarding the objectives and more fundamentally the rationale for the new organisation. There were those who advocated an overtly environmental stance whilst others argued for a more disinterested neutral role. The latter was the role which the new association chose to adopt and with some success.

During the 1980's, Select Committees in both Houses of Parliament frequently examined new environmental policy proposals and issues with immense potential legal significance. But nearly all the evidence came from non-governmental pressure groups, special interest lobbies or specialist policy groups including government departments, trade associations or environmental interest groups. There was almost no pure legal analysis.

This position has now changed largely

due to the work of UKELA and its members. UKELA is now routinely consulted by government and key policy institutions including the Royal Commission on Environmental Pollution. They look to the organisation for informed and valuable insights.

UKELA's chosen position of seeking to inject a distinctive but dispassionate perspective is not always an easy one to manage. Representatives of UKELA are often pressed by Members of Parliamentary Select Committees or similar bodies for their views on whether a particular policy makes sense. When the UKELA representative seeks to reply that as lawyers their role is to comment on the law rather than the policy they have on occasion received a frosty response. This raises the question should UKELA seek a wider role than merely reviewing the efficacy of proposed laws? If it does it clearly cannot do so without input from a wide range of professionals such as environmental chemists.

Even if UKELA is to restrict its input to the black letter of the law it is increasingly clear that the future development of environmental law presents a number of complex scientific issues, for example the incorporation of concepts such as "sustainable development" and the "precautionary principle" into new law. If UKELA is to maintain the high standard of its commentary, it is essential that the membership of UKELA is not restricted solely to lawyers but includes a good spread of relevant professions and that these professionals work together within UKELA to influence the development of sound and effective environmental laws across the UK. In so doing the lawyers and non-lawyers can only benefit from the inevitable cross germination of expertise which is likely to result.

The Structure of UKELA

UKELA is run by a council of 24 who are elected by the members. The association is a registered charity. There is also an active network of regional associations for example in Scotland, Yorkshire, and the North West and the South West of England.

A series of talks and seminars are arranged from the Autumn through to the Spring each year at Lincoln's Inn in London. Many of the regional

associations also run similar talks around the country.

The Annual Conference

Once a year UKELA organises a conference for its members usually over a weekend in March or April. This includes a lecture programme and visits to sites of special environmental interest (the local landfill site or sewage treatment plant for the dedicated, an architectural tour of a local city for those less keen). The conference is a an opportunity for environmental professionals to meet and to exchange ideas, and in 1998 UKELA will have its annual meeting in Brighton.

The Working Groups

UKELA's working groups are active in areas such as: contaminated land; air; integrated pollution control; waste; water; noise; transport; bio-technology; nature conservation; planning and environmental impact assessment; nuclear power; and enforcement of environmental laws.

The working groups are open to members who can show a commitment to supporting the particular group and progressing its projects. In brief the group's role is to monitor policy in its area and to provide opinions to bodies such as Parliamentary Select Committees and the Royal Commission on the Environment. When new legislation is proposed by government, the UKELA's working groups will respond to consultation papers issued before such legislation is finalised.

UKELA also produces a highly regarded quarterly journal called *Environmental Law*. This journal covers all aspects of the subject and is a valuable publication for anyone developing their knowledge of environmental law.

Conclusion

In summary, UKELA is an organisation centred around the subject of environmental law rather than a body of environmental lawyers. Its primary purpose is to develop the field of environmental laws both in the application of existing laws and where possible the development of new legislation. Membership is open to all those with an interest in the subject and does not discriminate between lawyers and non-lawyers.

UKELA seeks to educate and disseminate information on environmental law through the Association's journal, talks and seminars. It also seeks to develop and influence the law-making process through its system of specialist working groups.

UKELA and its endeavours can only flourish through the involvement of a wide range of professionals including environmental chemists. Whether or not individuals in the Environmental Chemistry Group choose to become involved individually or through seeking to establish closer links between the ECG and UKELA, it is the author's view that such involvement or co-operation can only be of mutual benefit to both the Environmental Chemistry Group and UKELA.

The author would be happy to supply further details on UKELA; alternatively enquiries should be addressed to the UKELA secretary, *Dr Christina Hill, Honeycroft House, Pangbourne Road, Upper Basildon, Berkshire, RG8 8LP.* Tel/Fax 01491 671631.

Individual annual membership is £35. There is also a corporate rate and a reduced rate for students.

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June 1997.

The author would like to acknowledge and thank Richard Macrory, Professor of Environmental Law, Imperial College,

London for allowing the use of extracts from his Garner Environmental Law Lecture 1996.

[Anthony Hobley is a solicitor with the Environmental Law Group of the city law firm Cameron McKenna. He originally graduated in Chemistry with Physics from Plymouth University in 1988 and went on to Cambridge University for a year of postgraduate research into surfactant systems funded by Unilever. He then decided to requalify as a solicitor and was admitted as a solicitor of the supreme court of England and Wales in 1994. He is a Graduate Member of the Royal Society of Chemistry and is currently a committee member of the RSC's Environmental Chemistry Group. He has been a member of UKELA since 1989 when he first developed his interest in environmental law].

Environmental Chemistry at the University of Central Lancashire

Taught Courses

The University of Central Lancashire has been running Honours degree level courses in Chemistry since 1965 and in Environmental Management since 1990. In 1997 two new courses, **BSc (Hons) Environmental Science** and **BSc (Hons) Environmental Protection**, have been validated and will run in 1997/98. Both will incorporate a substantial core of environmental chemistry.

BSc (Hons) Environmental Science

The course aims to provide an opportunity for students to acquire scientific knowledge and skills in a range of disciplines central to the understanding of temperate environmental systems. An important feature of the course is its multidisciplinary approach, and students will be encouraged to synthesise the perspectives of several major scientific traditions in their development as environmental scientists. The course programme seeks to develop a foundation of scientific understanding and skills from which students can investigate a range of contemporary environmental problems and identify appropriate monitoring and abatement strategies within the context of current legal, economic and other decision criteria.

In the first year students will undertake introductory modules in Earth Science, Environmental Management and Ecology, plus Chemistry and the Environment, and Chemistry Principles for Analysis. In addition an elective requirement allows the student to undertake further study in a science or in study skills.

The second year course includes modules in Environmental Policy and Law, Environmental Change, Techniques in Environmental Analysis, and Pollution Chemistry. There are opportunities to gain credit for approved work experience.

In the final year students complete a piece of independent supervised research. More able students are allowed to select a double-weighted project prior to undertaking postgraduate study. Other required modules include Fieldwork and Further Techniques for Environmental Analysis. There is a range of specialist options available including: Environmental Hazards, Pollution Control, Waste Water Treatment and Management, Contaminated Land Management, Atmospheric Pollution Control, Environmental Regulation, Risk Assessment, the Nature and Properties of Soils, Biology of Pollution, and

Toxicology.

BSc (Hons) Environmental Protection

The programme of study leading to BSc in Environmental Protection aims to provide students with the knowledge, skills and understanding of the ways in which the production and consumption processes of an advanced industrial economy impact on the environment; the methods available for identifying and monitoring environmental pollution; and the techniques and technologies available to environmental managers to minimise, reduce and control potentially damaging processes, thereby contributing to the achievement of sustainable development.

The course shares scientific modules with the BSc (Hons) Environmental Science. Its distinctiveness comes from modules such as Society, Environment and Development in Year 1, Sustainable Development in Year 2 and in a choice of options in Year 3.

Both courses have a strong element of pollution control and environmental monitoring. Case studies are carried out on major issues of current concern including PCBs, radioactive waste, contaminated land, water purity and

COSHH. Students develop a knowledge and understanding of the principles and practice of a range of analytical chemistry techniques including spectroscopy, atomic methods, plasma methods, XRF, NMR, DTA, DSC, radiochemical methods, tracer techniques, potentiometric and volumetric techniques. They learn the importance of speciation in selecting appropriate methods and the environmental sampling strategies needed to obtain good atmospheric, liquid and solid samples.

Chemistry courses at the University of Central Lancashire also retain a strong environmental core drawing upon the Environmental Science Modules and upon research strengths in the Department.

Research

Environmental chemical research at the University of Central Lancashire is focused in the following areas:

Plutonium Chemistry in Man

The pharmacokinetics of plutonium in man as demonstrated *via* urinary excretion following occupational exposure is studied together with protein binding of plutonium in blood and its relationship to excretion.

Photo-Electrochemistry

The Micro-Optical Ring Electrode (MORE) is a new type of photochemical sensor capable of delivering light *via* a fibre optic directly to the area of electroanalysis so allowing microelectrochemical studies of systems with complex photochemistry. MORE is currently under development within our laboratories.

Use of the electrode is envisaged in the *in situ* monitoring of the degradation of surface, ground and drinking water pollutants by photocatalytic means. One aspect of the work focuses on polyaromatic hydrocarbons (PAH). The optimum conditions for photoelectrochemical PAH remediation will be determined, the oxidation/reduction products investigated, and the kinetics of photocolloidal PAH remediation studied.

Photochemistry of Chlorophenols

The photochemistry of 4-chlorophenol in aqueous solution is being studied as a function of concentration, pH and oxygen concentration. The major photo-products have been determined and the use of nanosecond laser flash photolysis has revealed the formation of transient species which have been identified.

Fluorescent Sensors for Metal ions

The aim of this project is to produce a range of fluorescent sensors for metal ions of interest so that they can be deployed to detect the metal ions in remote /difficult environments and/or allow their detection to be automated. To this end we aim to build on our work on the strongly fluorescent 4-aminonaphthalamide system to incorporate various ionophores into the structure to yield fluorescent materials that are sensitive to the presence of the selected metal ions.

Clay Chemistry

Absorption of metal ions and radionuclides on clays is being studied. Transition metal cations, caesium and strontium are strongly absorbed on

smectite clays. The mechanism and reversibility of this is being elucidated.

The Effects of Silicon on the Toxic Nature of Aluminium

Investigation is being carried out into the bioavailability of Al and Si from the food and beverages that we consume. The theory behind this is that the bioavailability of Al and hence its toxicity may be reduced by an increase in the intake of Si. The balance will be affected by contributing factors such as the amount of citrate that is consumed when Al and Si are ingested.

The Effects of the Environment on the Speciation and Toxicity of Elements

This work involves the development of analytical methods, both biological and chemical, which allow the determination of the effect of the environment on the speciation of different elements within it which are there both naturally and through anthropogenic input. The environmental systems studied are both marine and freshwater with the current research investigating the species formed when industrial products such as printing inks are dispersed within them. This research aims to identify the species formed in the various matrices and to determine their potential toxicity.

Further information on all these courses and research activities at the University of Central Lancashire may be obtained from

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Book Review

Chemical Principles of Environmental Pollution, 2nd edition, B.J. Alloway and D.C. Ayres, Blackie Academic & Professional, London, 1997. Pp xvii + 395; £24.99, ISBN 0-7514-0380-6

Although the title of this undergraduate paperback text book, now in its second edition, stresses chemical principles, the book does cover in a broad sweep aspects

of legislation and toxicology which are relevant to the subject, and therefore it sets out to be a general book on chemical pollutants for the student reader.

The book is divided into three parts. A very interesting introduction on the social and political activity which has led to the present concerns about global pollution, is followed in the first part of the book

with descriptions of the main pollutants and physico-chemical models for their transport and dispersion in air, water, and soil. A brief mention of toxicology is coupled with some regulatory data on pollution control, and the first part ends with a longish chapter on analytical techniques used in environmental monitoring.

The second part of the book is devoted to a predominantly chemical appraisal of the main pollutants: inorganic (ozone, greenhouse gases, heavy metals, radionuclides, and mineral fibres), organic (coal and hydrocarbons and their pyrolytic and combustion products, organic solvents, organohalogens, organophosphorus and carbamate pesticides) and odours and indoor pollutants.

The final part of the book is a description of wastes and their disposal.

Though clearly a useful textbook with interesting accounts of the historical development of a particular pollution problem, some of the selection of scientific material and the presence of a few avoidable errors suggest more care should have been taken before producing this edition.

The book attempts to present some detailed organic chemistry using both reaction mechanism schemes (which often seem out-of-place) and structures. The curved arrows used in mechanisms rarely connect departing or incoming electrons with their destiny, and while the heterolytic schemes are bad enough, free radical mechanisms are truly perplexing (e.g. equation 6.11 and see also p. 35). A general problem with the chemical structures is that the number assigned to the structure is placed too close to the

name of the structure (and could be confused as part of the name). A more serious problem is that some structures are wrong. For example, the structures of benzo[a]pyrene and benzo[a]pyrene epoxide (pp. 268 and 269) both have an overaccumulation of double bonds.

The authors chose to give toxicology a very cursory treatment in the book. A more detailed treatment e.g. of metabolic activation and detoxification would have made the explanations of toxicity of individual pollutants (e.g. *N*-nitrosamines p. 337) clearer. The last paragraph on page 69 on Phase I and Phase II metabolism is highly misleading. As with so much of the book, the selection of references on toxicology is unsatisfactory. Too much prominence is given to symposium-type books, and the major textbooks and monographs (e.g. Cassarett and Doull) are ignored. References in other parts of the book (e.g. at the end of Chapters 6 and 7) would have benefited from being divided into sections, one section for each pollutant.

Some of the material in Chapter 4 – analysis and monitoring of pollutants – seems redundant in this type of book. For example there is a detailed account of how to perform tlc, a section on packed column glc, diagrams of a basic mass spectrometer and an atomic absorption spectrometer, and an account of the Beer-Lambert Law. All of these could have

been omitted particularly since the concluding part of this chapter, pollutant monitoring, would not have been covered in introductory courses on analytical chemistry.

The elementary treatment of analytical chemistry contrasts with the mathematical equations describing the transport of pollutants. Here a step-by-step approach would have been justified rather than expect the reader to be familiar with the Chezy and Manning equations (p.36) and Darcy's law (p.40).

Lastly, though informative, some of the longish lists of chemicals in the book gleaned from regulatory sources (e.g. UK priority pollutants, USA classification of hazardous substances) are perhaps not the best way to convey information.

Rupert Purchase, June 1997

Erratum

My review of the *Dictionary of Environmental Science and Technology* in the last issue of this Newsletter stated that there was no entry for EMAS. In fact this scheme does appear under Eco-Management and Audit Scheme and not its acronym. Radiative forcing (*vide infra*), however, is missing.

R.P.

Meeting Report: Greenhouse Gases and Sustainable Development

The RSC's Environmental Chemistry Group held a half-day symposium on March 4th 1997 at the Royal Society, London on the themes of greenhouse gases and sustainable development. At the meeting Dr Dick Derwent (Meteorological Office) gave the **Environmental Chemistry Group's 1997 Distinguished Guest Lecture on Atmospheric Chemistry and Climate Change**, while in two supporting talks Irene Smith from IEA Coal Research spoke on **Greenhouse Gas Emissions, Abatement and Control Options**, and Dr Jan Pentreath (Environment Agency) reviewed aspects of **Sustainable Development**.

Dr Dick Derwent gave a detailed account of the sources and sinks of a variety of atmospheric trace gases and aerosols, and presented the latest estimates of the effects of the more important species on radiative forcing and climate change as evaluated by the Intergovernmental Panel on Climate Change (IPCC).

[Radiative forcing is a perturbation in the balance between incoming solar radiation and that being radiated back into space resulting (for example) from a change in the composition of the atmosphere. Radiative forcing provides a measure of global warming].

It is now beyond doubt that the concentrations of many greenhouse gases have increased, and are continuing to increase. Atmospheric measurements of greenhouse gases together with an understanding of their physico-chemical properties allow the resultant radiative forcing and influence on climate to be estimated using appropriate models. The situation with regard to carbon dioxide, methane, nitrous oxide, ozone, halocarbons and sulphate aerosols was summarised.

Dr. Derwent indicated that the current concentration of the major greenhouse gas, carbon dioxide, is approximately 356

ppmv (parts per million by volume), which is about 30% greater than in pre-industrial times.

Any stabilisation in the concentration of atmospheric carbon dioxide is estimated to require a substantial reduction in its emissions, probably by a factor of about two or three. The concentration of methane (the second most important greenhouse gas) has also increased substantially as a result of man's activities. This has an additional impact on the chemistry of the atmosphere through its effect on the atmospheric concentration of the hydroxyl radical (OH), the major oxidising agent, not only for methane, but also for most trace gases emitted into the atmosphere.

The concentrations of nitrous oxide and a variety of halocarbons also continue to increase, and these have a smaller, but significant effect on radiative forcing.

One of the major challenges to the atmospheric chemist is to understand the processes which control the production and removal of ozone throughout the atmosphere and, particularly, man's influence on ozone formation and depletion. Ozone is an important greenhouse gas present both in the stratosphere and troposphere and, unlike the other gases, changes in the concentration of ozone can cause radiative forcing by influencing both solar and infra-red radiation. Current estimates suggest that the radiative forcing resulting from the increase in tropospheric ozone is only partially offset by the decrease in stratospheric ozone.

The presence of aerosols in the atmosphere can alter the radiation budget by absorption or scattering of incoming solar radiation. Aerosols also play an important role in the formation of clouds, which reflect solar radiation. Both these effects can lead to atmospheric cooling (*i.e.* negative radiative forcing) which may offset the warming influence of the radiatively active trace gases.

Sulphate aerosols, globally the most significant of the aerosols, are mainly produced by the oxidation of anthropogenic emissions of sulphur dioxide. Although sulphate aerosols cause significant negative radiative forcing, current estimates of their influence are subject to a high degree of

uncertainty.

Greenhouse Gas Emissions, Abatement and Control Options (Irene Smith)

The greenhouse gases emitted as a consequence of energy production and combustion are primarily CO₂ with some CH₄ and N₂O. Other gases produced such as NO_x, non-methane hydrocarbons and CO, have indirect effects on greenhouse gas concentrations in the atmosphere, while sulphates formed as a by-product of SO₂ can have a cooling effect.

CO₂ emission factors for fossil fuels are 25.8 gC/MJ (LHV) for bituminous coal, 20.0 gC/MJ for oil and 15.3 gC/MJ for natural gas. CO₂ emissions from coal utilization amount to about one third of the CO₂ emissions from human activities. The volume of CH₄ discharges from coal mining is about 8% of overall CH₄ production, while N₂O from coal combustion accounts for about 5% of total N₂O formation. In the UK, trends since 1990 show a decrease in the proportion of CO₂ emitted from coal and a relative increase from natural gas, reflecting changes in the choice of fuel for power generation. This has also resulted in a reduction of CH₄ emissions from coal mining. The proportion of N₂O emissions from non-combustion processes has decreased but those from agriculture and transport have increased.

There are many ways of reducing greenhouse gas emissions. In coalmining, CH₄ can be extracted and used as a fuel. Some countries *e.g.* Poland, Germany and the UK are better at this than others (*e.g.* China).

The efficient and optimised combustion of fossil fuels minimises greenhouse emissions whereas short-term fluctuations, for example at start-up, can increase emissions. Improving the efficiency of power generation worldwide is the key way to achieve reductions in greenhouse gases from coal use. Advanced power generation has the potential to reduce emissions by about 20-30%. Co-generation of heat and power offers a means of recovering heat from the steam cycle and further improving total plant efficiency. Reductions in CO₂ emissions of up to 40% could be achieved by improvements in plant efficiency.

For further CO₂ reductions, capture and disposal technologies are available but these incur considerable energy penalties and costs. The CO₂ capture methods include absorption using amines, adsorption, cryogenics and membrane separation. For CO₂ disposal, the largest potential sink is the ocean, with a potential capacity of 73 million GtCO₂. Other large sinks with an estimated capacity of 150 - 520 GtCO₂ are aquifers, natural gas fields, oil fields, and forestry.

Sustainable Development

In the second supporting talk, Dr Jan Pentreath from the Environment Agency, defined sustainable development with reference to the 1987 Brundtland Report as "present developments not compromising future generations." The Earth Summit at Rio in 1992 and the UK's Sustainable Development Strategy (1994) both reiterated this concept and it is also one of the aims of the UK's newly-established Environment Agency.

The Environment Agency, formed in 1995 from an amalgamation of the National Rivers Authority, HM Inspectorate of Pollution, parts of the Department of the Environment, and many of the UK's waste regulatory authorities, is not only involved in general policy decisions on environmental protection and sustainable development but is also engaged in new technologies for sampling and monitoring the environment. Dr Pentreath described some of these techniques for observing changes caused by localised populations and their changing patterns of behaviour – human activity being central to the problem of sustainable development.

Toxicology, the Environment and Health: a Centre for Studies at the Centre of England

The Medical Research Council's Toxicology Unit, previously located in Carshalton, Surrey for over 40 years, moved to Leicester in May 1993 where it now functions as an independent but integral part of the Interdisciplinary Research Centre (IRC) for Mechanisms of Human Toxicity at the University of Leicester. In addition a new unit – the MRC Institute for Environment and Health (IEH) – has been inaugurated on the same site. The Institute for Environment and Health operates under the aegis of the Toxicology Unit and its main role is to provide information and advice on the risk assessment of environmental chemicals to government departments.

The MRC Toxicology Unit

The aim of the Toxicology Unit at Leicester is to understand the mechanisms of action of chemicals on the body with the long-term aim of preventing unintentional risks to humans from chemical hazards.

The Toxicology Unit consists of five sections: Neurotoxicology; Carcinogenesis; Biochemical Mechanisms; Biological Mechanisms; and Target Cell Toxicity.

Since the move from Carshalton, significant progress has been made on a range of projects many of which are new enterprises for the Unit. Studies are in progress on the toxicity of anti-cancer drugs including tamoxifen and taxol together with work on a number of strategies for cancer prevention. A broad range of biomonitoring studies is being undertaken. The role of iron in carcinogenesis is under investigation, and the mechanisms of apoptosis and of target organ toxicity (*e.g.* for compounds which injure the lungs and the central nervous system respectively) are being elucidated. [Apoptosis is a physiological process of programmed tissue death associated with normal development in animals].

The scientific achievements of the Unit have led to important developments. First, regulatory agencies in the UK and elsewhere, notably in the European Union, seek expertise from the unit to

help with the framing of new legislation. Many of the scientific staff have been co-opted onto Expert Advisory Committees. Also, the Unit has been invited to submit research proposals by government departments in the UK and by the Commission of the European Union. As a result, a number of important fundamental research programmes on the mechanisms of chemical toxicity have been commissioned by official bodies for individual scientists in the Unit.

A second development, symptomatic of the present age, has been approaches made to the Unit by various industrial organisations to undertake research work on their behalf. A beneficial spin-off of these additional research commitments has been the need to recruit and train young scientists to conduct the research work. This has provided a useful stimulus and the necessary resources for further implementing the strategic aim of training mechanistically orientated toxicologists. The consequence of this is that many of these young scientists are avidly sought and recruited by government agencies and industrial organisations on completion of their term of training in the Unit.

The MRC Institute for Environment and Health

The beginnings of the Institute for Environment and Health (IEH) can be traced to the UK Department of the Environment and the Department of Health who wished to see the establishment of an organisation which could act as a focus for a diverse range of resources arising from issues related to the environment and health. The 1992 White Paper *The Health of the Nation* identified as a priority the need for research to pinpoint more accurately the link between the quality of the environment and human health. It recommended that a new institute should be established which could act as a co-ordinating centre for work on environment and health issues and be a central focus for national and international initiatives in the environment and health field.

Towards the end of 1993 the Medical

Research Council (MRC) confirmed its support and announced that it was to set up the IEH at the University of Leicester, close to the recently relocated MRC Toxicology Unit. The Institute has as its prime aim the promotion of a healthier environment, through facilitating information exchange, identifying and evaluating environment and health issues, and managing research programmes on the adverse effects of chemicals.

The Institute is largely funded by the Department of the Environment and the Department of Health, and other Government departments and agencies, by way of specific research and consultancy contracts.

The siting of IEH in Leicester adjacent to the Interdisciplinary Research Centre for Mechanisms of Human Toxicity has given it access to approximately 200 scientists and support staff working on the diverse range of toxicology research problems noted above. This also means that there is opportunity for the MRC Toxicology Unit to act, at least in part, as a technical resource for IEH as well as providing a valuable source of toxicological expertise, thus strongly complementing the work of the Institute.

In the first two years of its operation, the IEH has hosted a number of major international scientific workshops on the following topics: Air Pollution and Health, Developmental Neurotoxicology, Research Priorities for Asbestos and Man-Made Fibres, and Environmental Oestrogens. The Institute has so far published three reports in its Report and Assessment series, and a further three are in the process of completion. Additionally, it has devised and managed the first phase of a research programme on air pollution and respiratory disease. This programme is being jointly funded by the Medical Research Council, the Department of Health, and the Department of Environment. Other projects being undertaken by the Institute are on metals; biomarkers of exposure; fibrous materials in the environment; lead levels in blood; and the risk assessment of exposure to low levels of carcinogens.

John Hoskins, June 1997

Meeting Report: Society for Environmental Geochemistry and Health (SEGH) - 15th European Conference: Mining and the Environment

The annual SEGH conference was held at the Geological Survey of Ireland (GSI) in Dublin on 24-26th March 1997. The theme of the conference, Mining and the Environment, was particularly suited to the Irish location since Ireland hosts a wide variety of mineral deposits in different geological and geochemical settings with a mining history extending back over many centuries. The timing of the conference was also highly relevant as the Irish Environmental Protection Agency has recently established an Integrated Pollution Control licensing framework for all new mining proposals which will eventually extend to existing mining activities. A keynote address by Jonathan Denham of the EPA, Ireland emphasised the need for geochemists to become involved in the legislative process, especially concerning contaminated land and groundwater supplies to ensure that such legislation is effective.

The conference was well attended with delegates from both Western and Eastern Europe as well as delegates from further afield including the USA and South Africa. Many excellent presentations were made on a wide variety of aspects

concerning the impact of mining on the environment as well as the broader field of environmental geochemistry and health. Papers included the results of a study by Imperial College on the bioavailability of soil-arsenic and human exposure to arsenic in an area of South-West England affected by past mining. An animated discussion on toxicity-based legislation followed papers from the University of Missouri-Rolla describing the implications of Whole Effluent Toxicity (WET) legislation to the US mining industry in Missouri. A further paper from Aberdeen University showed that the toxicity of solutions from heavy metal contaminated soils could be offset by high nutrient concentrations. The Delbert Hemphill Prizes for best student presentations were awarded to Clare Gee of Imperial College for her presentation entitled The role of secondary minerals as buffers at historical smelting sites and to Matthew Hill of Bradford University for his poster entitled Spatial and fractional distribution of Cd, Cu, Pb and Zn in river Aire bed sediment downstream of a disused Pb mine.

A stark reminder of the need to provide for the closure of mines was provided on

the field trip to the Avoca mine in Co. Wicklow. Avoca was Ireland's largest copper mine which had been extensively mined, both deep and open cast, for 250 years before its closure in 1982. This has left an estimated 1,000 tonnes of unvegetated spoil heaps which contribute to acid mine drainage problems in the area. The GSI are currently involved in EU-funded studies aimed at site characterisation and the development of rehabilitation strategies including revegetation trials.

The next annual SEGH meeting will be held in Derby on 6-8th April 1998 with thematic sessions on river and estuarine pollution and fossil fuels and pollution. For further information, please contact **Dr. Aradhana Mehra**, School of Environmental and Applied Sciences, University of Derby, Kedleston Road, Derby DE22 1GB; tel: +44 (0)1332 622 222 x 1133; fax: +44 (0)1332 622 747; e-mail: A.Mehra@derby.ac.uk.

Janet Cotter-Howells

Department of Plant and Soil Science
Aberdeen University

Meeting Report: The Second Young Environmental Chemists Meeting

The second meeting for young environmental chemists supported by the RSC Environmental Chemistry Group took place at De Montfort University, Leicester on March 18th 1997. The purpose of these meetings is to allow younger researchers in the environmental sciences to present their work to members of their peer group and to exchange ideas and views with fellow workers. This year's gathering, attended by 65 younger scientists included 11 lectures and 37 poster presentations. Prizes were awarded for the best talk and for the three best posters.

The day's events were also combined with De Montfort University Department of Chemistry's contribution to the UK Science, Engineering and Technology week, and two plenary lectures with an environmental theme were included in the programme. An audience of over 100 heard Professor K.J. Irgolic's account of Man, Arsenic and the Environment through the Ages, while Mr. B. Pretzel from London's Victoria and Albert Museum described environmental issues encountered at the V&A.

The organising committee at De Montfort

University (Professor Peter Craig, Dr Belinda Colston (Executive Organizer), Dr Audrey Matthews, Professor Stuart Laurie, and Dr Tracy-Anne Morris) acknowledge the sponsorship of Zeneca Agrochemicals, William Blythe Limited, John Wiley, PS Analytical, BNFL, and Unilever for this meeting and for the participation of the two invited speakers.

Meeting

Environmental Technology Network Meeting and Technology Car Boot Sale, G-Mex Seminar Centre, Manchester, Thursday 11th September 1997

The first environmental technology network meeting and technology car boot sale will be held on 11 September 1997 during Solutions '97 at the G-Mex Seminar Centre, Manchester. This event is being organised by the Royal Society of Chemistry in association with the Environmental Industries Commission and the Natural Environment Research Council, and is being sponsored by JEMU (Joint Environmental Markets Unit) and the three research councils, NERC, BBSRC and EPSRC.

Background

The global market for environmental technology is one of the fastest growing as governments, companies and consumers move to cleaner manufacturing processes and products. This expansion presents increased opportunities for industry. The environmental industry in the UK supplies technology products to a wide range of industrial sectors but is not well placed in terms of its links into the science, engineering and technology base.

There is no shortage of potential suppliers or customers for environmental technology but the problem is in the lack of networks that can bring them together. Building on the success of the Royal Society of Chemistry in networking in other areas, this event will focus on:

- Establishing a new on-going network between companies and university research groups
- Increasing the awareness of the needs of industry and of the available UK technical expertise
- Publicising schemes for technology transfer and government grants
- Facilitating technology transfer, sale, licensing, and joint venturing between interested companies and university groups through a technology car boot sale.

The Event

The emphasis throughout the day will be on practical steps to help companies understand what is available from the UK science, engineering, and technology base and to facilitate technology transfer and application.

There will be presentations from representatives of industry, higher education and government to highlight:

- Developments in environmental regulation in Europe
- New environmental challenges and research opportunities
- Barriers to innovation and exploitation
- Technology partnership issues
- Government programmes and funding sources.

The technology car boot sale at the meeting will take the form of a fair where individuals from industry and universities can meet. There will be an opportunity to display posters and to discuss, head-to-head, areas of common concern such as:

- Technology interests
- Problems looking for a solution
- Capabilities looking for a problem
- Technologies that are available for transfer
- Opportunities for collaboration.

During this session there will be representatives from Government Departments, the Teaching Company Scheme, and Business Links to answer specific questions arising from the morning presentation and to facilitate actions.

At the end of the day there will be a short open session to answer questions and to establish the Environmental Technology Network. Delegates will have an opportunity to input into the future of the network and suggest topics for future focus meetings.

The Network Directory

Following the meeting, a Network Directory will be published and circulated to delegates for their own use in identifying skills and technologies for follow up action. This will be an important output from the day in terms of a tangible, simple and useful product.

The meeting will cost £15.00 (+VAT) for academics, £50.00 (+VAT) for smaller companies and £75 (+VAT) for delegates from the larger companies.

Further details including the programme for the day are given in an insert which accompanies this issue of the Newsletter.

For more information, please contact **Dr Mario Moustras**, Foresight Officer, The Royal Society of Chemistry, Burlington House, Piccadilly, London, W1V 0BN. Tel: 0171 440 3388, Fax: 0171 437 8883, e-mail moustrasm@rsc.org

The IChemE Internet Conference “Environment97”

The Engineering Council is currently carrying out a major exercise called the “20/20 Vision” project to examine the future of engineering in four sectors: communications, energy, transport, and the environment.

The Institution of Chemical Engineers (IChemE) are engaged in the review of the environment sector, and as part of this process have organised a conference, **Environment97**, which will be held on the Internet from **3 to 14 November 1997**.

The RSC’s Environment, Health and Safety Committee is one of the bodies involved in the planning of this conference.

The aim of **Environment97** is to communicate the engineering and scientific community’s views to a wide audience – from regulators to the general public – especially under twenty-five year olds. Considerable media interest is expected and it is hoped educational institutions will see the conference as a source of ready made supplementary

teaching material. Conclusions from the conference will form part of the Engineering Council’s deliberations and the conference will be held again at regular intervals in future years.

At its most basic a “cyber-conference” consists of word-processed papers available over the Internet with the facility for discussion by e-mail. While this may not sound all that exciting **Environment97** will go well beyond this basic concept.

The conference (located at <http://www.environment97.org>) will be capable of handling 40,000 delegates every day. There will be no charge to participants though they will have to register. IChemE, in conjunction with the University of Surrey, will carry out a life-cycle assessment of cyber-conferencing versus a “flesh” – or real – conference using data on the distance each visitor would have travelled and the mode of transport they would have used, if the conference had actually taken place in London.

We hope that RSC members will wish to submit papers for inclusion in **Environment97**. If these are sent via the Society, an RSC logo will be added and this will have the benefit of raising the Society’s profile at the meeting. Relatively non-technical papers (“New Scientist” level) are also welcomed.

Any papers should be sent to: **Bob Hazell**, Health, Safety and Environment Officer, Royal Society of Chemistry, Burlington House, Piccadilly, London W1V 0BN or by e-mail to: hazellr@rsc.org.

Further details on how to submit an article for **Environment97** can also be obtained from **Mark Smith** of the Institution of Chemical Engineers at m.smith@icheme.org.uk. **Environment97** can be accessed now (via <http://www.environment97.org>) for details of its aims, people to contact, and the titles of papers accepted so far for the conference.

Environmental Chemistry on the Internet

Issue No. 5 of the ECG Newsletter contained an extensive list of environmental organisations which may be found on the Internet. This list was incorporated into the version of the ECG Newsletter which appears as part of the RSC homepage and as result all the environmental addresses quoted are hyperlinked for direct access. The ECG would like to thank Judith Cravitz of the Royal Society of Chemistry at Cambridge for producing the Internet version of the Newsletter and for correcting various errors in syntax which were present in the original printed list of addresses. The RSC will continue to display details of these environmental organisations in future versions of their Web pages.

The ECG is keen to publicise other Internet sites which contain information on environmental chemistry and details should be sent to the Editor. One useful site which is worth looking at is produced by the University of Liverpool. *Environmental Chemistry Resources* is one part of an extensive list of chemical information on the Internet which has been collated by the chemistry department at Liverpool University. Their address is <http://www.liv.ac.uk/Chemistry/Links>

Ten sites are included on the *Environmental Chemistry Resources* page: Chlorine/PVC Information; Contaminated Land in the UK;

Environmental Information (from the University of Sussex); Enviro-Net (US); Environmental Science Resources (from Brunel University); Greenpeace International; Metal Ion Removal from Effluents; National Environment Information Service (US); PCBs and Dioxins; Water Online (water/wastewater site, US).

Each of these sites is linked to other sites and much useful information is available. For example the University of Sussex page (<http://ahudson.mols.sussex.ac.uk/envirolinks.html>) gives access to the British Atmospheric Data Centre, the Centre for Atmospheric Science, Cambridge, UK Air Quality Bulletins, and much more.

Forthcoming Symposia

Details of many meetings related to the environmental sciences to be held in the UK in the second half of 1997 and early 1998 are given in the leaflet *Environmental Science and Technology Meetings* which accompanies this issue of the ECG Newsletter.

Other symposia on environmental and related topics for this period which have come to our attention are as follows:

Managing Risks of Nitrates to Humans and the Environment

Organised by the RSC Industrial Affairs Division (Agricultural Sector) and the

RSC Toxicology Group, 1-2 September 1997, Wivenhoe Park Conference Centre, University of Essex, Colchester (Dr W.S. Wilson, Department of Biological Sciences, University of Essex Tel: 01206 872818 for details)

Advances in Analytical Toxicology and the Implications for Risk Assessment

Organised by the RSC Toxicology Group, 10 December 1997, St. Bartholomew's Hospital, London (Dr R.H. Hinton, School of Biological Sciences, University of Surrey Tel: 01483 300800 for details)

Catalysis and the Environment

Organised by the RSC Industrial Affairs Division (Process Technology Group) and the IChemE, 7-8 January 1998, University of Birmingham (Dr J.M. Winterbottom Tel: 0121 414 5293 for details)

Recent Books on the Environment and on Toxicology at the RSC Library

The following books and monographs on environmental topics have been acquired by the RSC library, Burlington House, during the period January – June 1997. Recent additions on toxicology are also included in this list.

Air Toxics: Problems and Solutions

Ganesan, K. (ed.), Gordon and Breach Publishers, Amsterdam, 1996, ISBN:9056995049, 342 pp., Accession No: 970202, Reference Shelves REF 628.52:615.371 R

Antinutrients and Phytochemicals in Food

American Chemical Society, Washington DC, 1997, ACS Symposium Series No. 662, ISBN:0841234981, 334 pp., Accession No: 970617, West Gallery, 664:615.9:061.3

Biomarkers for Agrochemicals and Toxic Substances: Applications and Risk Assessment

American Chemical Society, Washington DC, 1995, ACS Symposium Series No. 643, ISBN:0841234493, 282 pp., Accession No: 970263, West Gallery, 631.8:615.9:061.3

Environmental Chemistry: Experiments and Demonstrations, 2nd edition

Ondrus, M.G., Wuerz Publishing, Winnipeg, 1996, ISBN:0920063691, 231 pp., Accession No: 970472, West Gallery, 628.54

Environmental Management Systems – Specification with Guidance for Use: Implementation of ISO 14001:1996

British Standards Institution, London, 1996, ISBN:0580267083, 22 pp., Accession No: 970016, West Gallery, 628.5:658

Environmental Management Systems - General Guidelines on Principles, Systems and Supporting Techniques

British Standards Institution, London, 1996, ISBN:0580267075, 31 pp., Accession No: 970017, West Gallery, 628.5:658

Environmental Protection (Prescribed Processes and Substances etc) (Amendment) (Petrol Vapour Recovery) Regulations 1996 (SI 1996/2678)

HMSO, London, 1996, ISBN:0110631935, 6 pp., Accession No: 970035, A 99

Environmental Protection Act 1990 Chapter 43

London, HMSO, 1990, ISBN:0105443905, 235 pp., Accession No: 970183, Reference Shelves REF 628.5:502.3 R

European Union Environmental Law: A Guide for Industry

Lister, C., John Wiley, Chichester, 1996, ISBN:0471962961, 301 pp., Accession No: 970366, Reference Shelves, REF 628.5:34 R

Green Chemistry: Designing Chemistry for the Environment

American Chemical Society, Washington DC, 1996, ACS Symposium Series No. 626, ISBN:0841233993, 251 pp., Accession No: 970487, West Gallery, 628.5:54:061.3

Inorganic Chemistry: An Industrial and Environmental Perspective

Swaddle, T., Academic Press, London, 1996, ISBN:0126785503, Accession No: 970535, Reading Room, 546

Nuclear Magnetic Resonance Spectroscopy in Environment Chemistry

Nanny, M. (ed.), Oxford University Press, Oxford, 1997, ISBN:0195097513, 326 pp., Accession No: 970604, West Gallery, 628.5:54:543.422.25

Special Waste (Amendment) Regulations 1996 (SI 1996/2019)

Stationery Office, London, 1996, ISBN:0110628942, 4 pp., Accession No: 970038, A 99

Substances of Abuse: An Assessment of Carcinogenicity

Duffus, J.H. (ed.), Royal Society of Chemistry, Cambridge, 1997, ISBN:0854044477, 123 pp., Accession No: 970565, West Gallery, 615.9

Volatile Substance Abuse: Practical Guidelines for Analytical Investigation of Suspected Cases and Interpretation of Results

UN International Drug Control Programme, Vienna, 1997, 56 pp., Accession No: 970561, Reading Room, 543:615.9

