

RSC Environmental Chemistry Group (ECG) Distinguished Guest Lecture 1995/1996

The ECG usually arranges its Distinguished Guest Lecture and Annual General Meeting (AGM) for late November or early December each year. However, following the award of the John Jeyes Lectureship to Professor Roy Harrison of Birmingham University, the next ECG Distinguished Guest Lecture will be combined with the John Jeyes Lecture and will be held on **Thursday March 7th 1996** at 2.00 p.m. in the **Scientific Societies' Lecture Theatre**, Burlington Place, off Saville Row London.

The title of Professor Harrison's John Jeyes Lecture is '**The Chemistry of the Urban Atmosphere**', and it will be accompanied by presentations from Dr Martin Williams who works at the Department of the Environment Air Quality Division, and Dr David Hendrick of Newcastle General Hospital. The ECG's AGM is also scheduled to take place on the afternoon of March 7th.

1995/1996 RSC John Jeyes Lecturer - a Profile of Professor Roy Harrison

The RSC's John Jeyes Lecture and Medal is awarded biennially by the Society in recognition of outstanding achievements in the field of environmental chemistry.

The 1995/1996 John Jeyes Lecturer, Roy Harrison, graduated from Birmingham University in 1969 and obtained a PhD in organic chemistry from there three years later. He then spent 10 years as a Lecturer in the Department of Environmental Sciences at Lancaster University before moving to the University of Essex as Reader and Director of the Institute of Aerosol Science in 1984.

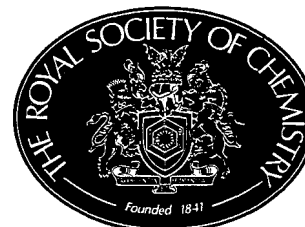
Whilst at Lancaster he made significant contributions to the understanding of the behaviour of lead and other trace metals in the environment, as well as conducting early studies of photochemical air pollution in Britain.

At Essex the emphasis of his research changed to the behaviour, physics and chemistry of ambient aerosol particles, with particular attention to the chemistry of reactive nitrogen species in the atmosphere.

In 1991 Roy Harrison returned to Birmingham as the Queen Elizabeth II Centenary Professor of Environmental Health and Director of the Institute of Public and Environmental Health. There he has continued his prolific output of publications, now totalling over 200, covering a wide range of air pollution and atmospheric chemistry research issues.

As well as his contributions to scientific research, Professor Harrison has also a distinguished record of public service. He is currently Chairman of the Department of Environment's Quality of Urban Air Review Group and a member of its Photochemical Oxidant Review Group and its Expert Panel on Air Quality Standards. He is also a member of the Department of Health's Committee on the Medical Effects of Air Pollutants, and its Health Advisory Group on Chemical Contamination Incidents. He is a member of the Physical Sciences Sub-Committee of the Defence Scientific Advisory Council and a consultant to the World Health Organisation. In addition, Professor Harrison was a member of the Environmental Chemistry Group's committee for many years, and was Chairman of the Group in 1990/91.

The dates of Professor Harrison's lecture at the Scientific Societies' Lecture Theatre (and subsequently at other venues) will be advertised in "Chemistry in Britain" and in the next issue of this Newsletter.



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Fifth International Symposium on Highway and Urban Pollution (22-24 May 1995)

'Something Nasty in the Air', 'The Death of Fresh Air', 'Where did all the Fresh Air Go'

Newspaper headlines such as these reflect current concerns about urban pollution; the scientific realities behind the headlines were the subject of a recent international symposium held in Denmark (organised by Professors Ron Hamilton and Mike Revitt, University of Middlesex, and others).

About 180 delegates from 22 countries gathered at the WHO regional office for Europe in Copenhagen, and over three days reviewed topics such as the urban environment, vehicle emissions, cultural heritage, monitoring and modelling, highway runoff, and air quality. Some of the more environmental chemical aspects of this meeting are described below. Dent and McGinty (Associated Octel) discussed the emissions of benzene from vehicle exhausts, via unleaded fuel. At present benzene is limited to 5% by volume in petrol in Europe, but there is pressure that this should be reduced - particularly in view of a likely European Air Quality Directive on benzene emissions.

In Canada, the octane enhancer methylcyclopentadienylmanganese tricarbonyl (MMT) has been used in increasing amounts since 1976, as the use of lead-based additives has declined. MMT itself has adverse pulmonary and neurological properties, and there is also concern about the toxicity of Mn-containing exhaust emissions (manganese oxides). Dr Grace Wood, from Health Canada in Ottawa, described the health implications from inhalation of the emitted fine particles of Mn_3O_4 . Ambient air levels of these Mn-containing particles (measured as

PM_{10} and $PM_{2.5}$) did not increase between 1986 and 1992, and Dr Wood concluded that airborne Mn from MMT combustion is not at present a health risk. (PM_{10} and $PM_{2.5}$ are **particulate** matters with diameters less than 10 microns and 2.5 microns respectively; they are under suspicion as causative agents in some lung diseases).

Professor Roy Harrison, University of Birmingham, highlighted the need to elucidate the sources of PM_{10} and also the origin of NO_2 in winter pollution episodes. Current chemiluminescence techniques cannot differentiate between the various species of NO_x present in air, and improved methods of analysis (e.g. for HNO_3) are needed.

Geoff Marshall and co-workers (Birkbeck College and Charles University, Czech Republic) outlined an analytical method to **determine** the elemental composition of PM_{10} . Miniaturised microwave sample preparation followed by ICP-MS was used to quantify 35 elements in these particles.

The Urban Pollution Research Centre at Middlesex University has used remote sensing to measure carbon monoxide and hydrocarbons from the exhausts of free-flowing traffic in Middlesborough, UK. A small number of high emitters contributed significantly to total emissions while the large majority of low emitters contributed little. In another study, in Israel, Anilovich and Hakkert found that vehicle age influenced carbon monoxide and hydrocarbons emission levels.

Sjodin, and his co-workers from the Swedish Environmental Research Institute, quantified the beneficial effects of catalytic converters in reducing urban NO_x emissions.

Clarke, Chen and Pititsangchand from the Department of Fuel and Energy at Leeds University have measured air particulates at two street levels. Firstly at the roadside and then from a neighbouring building at an elevated level. In this way a distinction could be made between background levels and air contamination from vehicle emissions. Higher concentrations of nitrate, chloride, iron, and zinc were found at the roadside level.

Dr Neil Ward from the University of Surrey reviewed the analysis of trace metals in the runoff from London's orbital motorway, the M25. Motorway runoff drains into balancing ponds which provide storage during storms and restrict access to downstream watercourses. Levels of Cd, Cu, Pb, and Zn in the balancing ponds, and at their discharge points, exceeded EU water quality standards. **Sediments** in the balancing pond also contained high levels of **trace** metals which during **heavy** storms are pulsed into downstream watercourses. The speciation of metals in these M25 sediments was **different** from the type of metal ion complexes found in natural watercourses.

Copenhagen is a clean and attractive city - an ideal venue to address the intricate issues of urban pollution. The Danes clearly appreciate the importance of good facilities for (non-polluting) cyclists and provide designated cycle tracks. I noticed parents and their children cycling in the middle of the city. Can you imagine that outside Burlington House in Piccadilly!?

*Report by Geoff Marshall, RSC ECG
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The Environmental Chemistry Degree Course at Lancaster University

Background

The Environmental Science Division at Lancaster University has had an active, internationally renowned, Environmental Chemistry research group for more than twenty years, with the staff contributing to the successful Environmental Science degree course which was established in 1964. As environmental chemistry developed rapidly it became clear that the subject was capable of supporting a degree in its own right, allowing students to pursue topics in greater depth than is possible in a more general degree course.

Our goal was to produce an innovative, integrated, interdisciplinary degree course which, unlike many of the courses offered by other institutions, would be based in an Environmental Science Division and would not be simply a general Chemistry degree with final year options in Environmental Chemistry topics. By taking advantage of the University's modular teaching system we have devised a course which we believe provides a unique course structure by including modules in Biological Sciences, Chemistry, Environmental Chemistry and Environmental Science.

These aspirations were realised in 1991 with the first intake of undergraduate students. Despite its short lifetime the quality of the teaching provided was recognised in March 1995 as being excellent after a visitation by a HEFCE assessment panel. The output from the course has also been of high quality: to date 21 students have graduated, gaining 2 first class degrees, 11 upper second and 8 lower second class Honours degrees.

The nature of the course is still evolving and from October 1996

students will have the opportunity of spending their second year at the University of Alberta in Edmonton. They will follow courses similar to those available at Lancaster and the assessments gained at Alberta will be transferred to Lancaster to form part of the degree assessment.

Course Aims

The ultimate aim is to produce highly motivated graduates with a sound chemical base, and a flexible approach to environmental problems, who will flourish in academic and industrial environments. This is achieved by providing students with:

- a sound appreciation of the role of chemistry in the environment;
- a firm foundation in basic undergraduate chemistry; and
- a clear understanding of the application of chemical principles in studies of the natural environment.

Structure and Curriculum

Part I (First Year)

The Part I course is designed to provide students with a thorough grounding in the relevant areas of Chemistry, Environmental Science and Biology, together with an introduction to a unified approach to Environmental Chemistry. Lectures are supplemented with laboratory sessions and field trips as appropriate. Students without A-level mathematics take a tailor-made module.

The chemistry modules cover the areas of basic inorganic, organic, and physical chemistry using

environmental examples where appropriate. The biology modules deal with *the Biology of Lakes and Rivers; Plant Growth and Development; Introduction to the Cell and Impact of Microbes*. The Environmental Science modules cover the basics of *Geological Processes; Atmosphere, Weather and Climate; Hydrological Processes; Surface Processes and Environmental Management*.

As students make the final choice of major subject at the end of Part I, University guidelines recommend students to take a combination of modules in Part I which leads to a choice of major subject. We are consequently not able to offer a specialised Environmental Chemistry course in Part I, but appreciate that there is a need to integrate some of the material taught to give students a flavour of environmental chemistry. This is done by offering two optional modules: *Chemistry, Pollution and Human Health* and *The Changing World: Environmental Pollution*.

Part IIA (First Two Terms of Second Year)

Building on the firm foundation provided by Part I the aim of Part IIA is to obtain a deeper understanding of the topics covered in Part I, to introduce new topics, and to further integrate the components into a distinctive Environmental Chemistry course. Field work is an important constituent of many Part II modules and its importance is emphasised at the very beginning of Part II when students take a one-week residential field course in the Lake District. A number of geological, geochemical and geophysical experiments are carried out centred on the potential

environmental effects of re-opening a disused tungsten mine which still contains significant deposits. This field course enables students to appreciate the advantage of team work and an interdisciplinary approach and, being residential, also encourages good social contact between both students and staff and students. The field course is assessed by means of a written report which provides students with their **first** experience of preparing an extensive scientific report. The chemical principles are reinforced by taking further modules in organic, physical, inorganic, and analytical chemistry. Additional environmental aspects are introduced using modules on *Soil Science; Planning and Environmental Assessment* and *Data Processing*. A module on *Microbiology* introduces students to the theory and techniques of working under aseptic conditions. Environmental chemistry topics are explored further by offering modules on *Aqueous and Sedimentary Geochemistry; Introduction to Atmospheric Chemistry and Geochemistry*.

Part IIB (Remaining Part of the Course)

The **Part IIB** course consists of six compulsory, core modules which further develop the chemical base and ensure a fundamental understanding of chemical processes in the main environmental compartments. In addition, there are six optional modules which provide an element of specialisation. Topics can be chosen from three main themes: biological (further microbiology, enzymes), chemical (surface chemistry, photochemistry, organic radicals) and environmental topics (sedimentology, meteorology, environmental impact assessment, environmental radioactivity, environmental spectroscopy, water pollution control). One quarter of the assessment in **Part IIB** is derived from the Dissertation. This is based on 4 weeks of project work on a topic chosen by the student and is carried out in the Summer vacation between the second and third years. It is felt to be very important for a number of reasons.

- It develops individual initiative.

- It provides constructive experience in:
 - (i) planning and execution of the project;
 - (ii) the analysis of the results; and
 - (iii) preparing a **major** scientific report using word processing and graphics packages.
- It introduces students to the methodology of research work and to the excellent facilities available in a Grade 5 rated research department.
- It offers the opportunity for the student to gain an **in-depth** appreciation of a particular aspect of environmental chemistry.

Further information on the Environmental Chemistry degree course at Lancaster University can be obtained from:
Eric Davies, Admissions Tutor,
Environmental Science Division,
Lancaster University,
Lancaster LA1 4YQ.
Tel: 01524-593654
Fax: 01524-593985
e-mail: esa023@lancaster.ac.uk

Symposium on Air Pollution in the United Kingdom - new date

This one-day symposium will now be held on **Monday 23rd September 1996** at the University of Lancaster. The programme for this meeting includes the following speakers:

Dr Martin Williams (DoE)
 Dr Dick Derwent (Meteorological Office)
 Dr John Ayres (provisional)
 Professor David Fowler (Institute of Terrestrial Ecology)
 Dr D. Crump (Building Research Establishment)
 Professor Roy Harrison (Birmingham University)
 Dr Steve Read

UK and EU Legislation on Air Pollution
Global Air Pollution Problems
Health Effects of Air Pollution in the UK
Rural Air Pollution in the UK
Indoor Air Pollution
Urban Air Pollution in the UK
New Measuring Techniques in Air Pollution

For further details of this meeting, please contact the organisers:

Professor C.N. Hewitt, Institute of Environmental & Biological Sciences, University of Lancaster. Tel: 01524 593931 (direct), Fax: 01524 593985; or

Dr Gerry Davison, Marketing & Commercial Liaison, University House, University of Lancaster. Tel: 01524-65201 ext. 4524/4084, Fax: 01524 594069.

News of UK- and USA-based Environmental Chemistry Groups

ECG members may be interested in details of some other national and international environmental chemistry groups which are active in the UK:

Association of Exploration Geochemists Environment Committee (AEG)

An international organisation with the largest proportion of members based in the USA, Canada and Australia. Originally the scope of the AEG was the use of water, soil, sediment and vapour chemistry in the exploration for metal deposits, petroleum, and sources of geothermal energy. But in recent years the organisation has broadened its scope to consider environmental geochemistry. The AEG hosts and sponsors international conferences, some of which are devoted to environmental geochemistry - the last being in Poland in 1994.

Journal: J. Exploration Geochemistry, 6 issues per year, Elsevier.

Newsletter: Explore, 4 issues per year.

Society for Environmental Geochemistry and Health (SEGH)

An international society but with members largely based in the USA and UK. A very multi-disciplinary group of chemists, earth scientists, soil scientists, limnologists (limnology is the study of fresh water), plus some epidemiologists. Hosts annual meetings in Europe and the USA, and international conferences every 2-3 years (often in collaboration with the AEG). Primarily concerned with the behaviour, interactions and fate of

elements and species in the environment.

Journal: Environmental Geochemistry & Health, 4 issues per year, Chapman & Hall.

Newsletter: Interface, 1-2 issues per year.

Institution of Environmental Sciences (IES)

Mainly a UK-based membership which has tended to concentrate its activities in London, but is now establishing regional centres. Covers all aspects of the application of environmental sciences and sponsors relevant meetings.

Newsletter: Environmental Scientist, 6 issues per year.

**If you would like more details of
these organisations, please contact:**

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Forthcoming Symposia

The following symposia on environmental topics, sponsored by the RSC and similar organisations and arranged for 1995 and early 1996, have come to our attention:

Coliforms and E. Coli: Problem or Solution?, sponsored by the RSC Water Chemistry Forum, the Institution of Water and Environmental Management, and Yorkshire Water plc, University of Leeds, 24-27 September 1995.

Environmental Management Systems for the Chemicals Industry, sponsored by the RSC Environmental Chemistry Group and Nabarro

Nathanson, 50 Stratton Street,
London, 29 September 1995.

Management of Industrial Water Supplies, sponsored by the SCI Environment & Water Group and the RSC Water Chemistry Forum, SCI, 14/15 Belgrave Square, London, 11 October 1995.

Cleaning Up Our Rivers, sponsored by the SCI London Section, SCI, 14/15 Belgrave Square, 26 October 1995. At this meeting the SCI Environment Medal will be presented to Dr A.K. (Joe) Barbour.

Effluent Toxicity and Treatability, organised by the IChemE (NW Branch) and sponsored by the RSC Environmental Chemistry Group, UMIST Conference Centre, Manchester, 8 November 1995.

Ecotoxicology of Organic Compounds in the Aquatic Environment, sponsored by the SCI Pesticides Group, SCI, 14/15 Belgrave Square, London, 5 December 1995.

Young Scientists' Research Symposium on Contaminated Land, sponsored by the SCI Environment & Water Group, SCI, 14/15 Belgrave Square, London 12 December 1995. (This meeting was originally scheduled for 6 June 1995).

Air Quality: Is There Cause for Concern?, sponsored by the SCI Environment & Water Group, SCI, 14/15 Belgrave Square, London, 7 February 1996.

The Chemistry of the Urban Atmosphere, RSC John Jeyes Lecture and RSC Environmental Chemistry Group Distinguished Guest Lecture (Professor R.M. Harrison) plus supporting programme, Scientific Societies' Lecture Theatre, London, 7 March 1996, 2.00 p.m.

Closure of Industrial Sites, sponsored by the SCI Environment & Water Group, SCI, 14/15 Belgrave Square, London, 14 March 1996.

14th European Environmental Geochemistry & Health Conference, sponsored by the Society for Environmental Geochemistry and Health, Imperial College, London, 1-3 April 1996.

Details of the RSC Environmental Chemistry Group Meetings will be sent in advance to all ECG members; enquiries about SCI-sponsored meetings should be addressed to the Conference Secretariat, SCI, 14/15 Belgrave Square, London SW1X 8PS (Fax 0171 823 1698); for the meeting at Imperial College on 1-3 April 1996, please contact Margaret Farrago, Tel.: 0171 594 6390, Fax: 0171 594 6408.

Recent Books on the Environ- ment 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 1995:

Barbour Index Water Quality Microfile: Mar'95, Windsor, Barbour Index, 1995, 121 pp., Accession No: 950035, Reference Shelves REF 014.3:628.1 R.

Benign by Design: Alternative Synthetic Design for Pollution Prevention, developed from a symposium sponsored by the Division of Environmental Chemistry at the 206th national meeting of the American Chemical Society, Washington, ACS, 1994. 195 pp. ISBN: 0841230536 (ACS symposium series no. 577), Accession No: 950053 West Gallery 628.5:547:542.95:061.3

Chemicalweek 1995 Environmental Services Directory, Chemicalweek, 1995, 20 pp, Accession No: 950033,

Reference Shelves, REF 058.7:628.5 R.

Chemistry and Environment: Legislation, Methodologies and Applications, Boston, Kluwer, 1995, 531 pp., ISBN: 0792332407 (Euro Courses: Environmental Management Volume 4), Accession No: 950336, West Gallery 628.51.

Environment Bill: lists of amendments to be moved in committee on report and on third reading, London, HMSO, 1995, Accession No: 950190, Reference Shelves REF 628.5:328.34 R.

Environmental Action Guide Advisory Notes No. 1,3-6, London, Department of the Environment, 1993, Accession No: 950092, West Gallery 628.5.

Environmental Auditing, London, CSTI, 1994, 4 pp. (CSTI environment information paper 2, 1994), Accession No: 950183, West Gallery 628.5.

Environmental Protection (waste recycling payments)(amendment) Regulations 1995, London, HMSO, 1995, 3 pp., ISBN: 0110525302 Accession No: 950203, A 100, SI 1995/476.

Environmental Protection Act 1990 (commencement no. 15)(amendment no. 2) Order 1994, London, HMSO, 1994, 2 pp., ISBN: 0110437055, Accession No: 950199 A 100, SI 1994/3234(C.81).

Environmental Toxicology Assessment, London, Taylor & Francis, 1995, 438 pp., ISBN: 0748403051 Accession No: 950308, West Gallery 628.5:371.279.7.

EU Environment Guide 1995, Earthscan, 1994, 231 pp., ISBN: 1853832499 Accession No: 950006, Reference Shelves REF 628.5:339.923:061.1EC R.

Financial Assistance for Environmental Purposes Order 1995, London, HMSO, 1995, 2 pp., ISBN:

011052327X, Accession No: 950200, A 100 SI 19951150.

Financial Assistance for Environmental Purposes (no. 2) Order 1995, London, HMSO, 1995, 2 pp., ISBN: 0110526015 Accession No: 950204, A 100, SI 19951554.

Genetically Modified Organisms (Deliberate Release) Regulations, London, HMSO, 1995, 11 pp., ISBN: 0110524330 Accession No: 950202, A 100 SI 19951304.

Implementation of the EC Freshwater Fish Directive: Water Quality Requirements for the Support of Fish Life, London, HMSO, 1994, 50 pp. ISBN: 0118865153, Accession No: 950211, West Gallery 621.6.031:613.281.

Instrumental Determination of Total Organic Carbon and Related Determinands 1995, London, HMSO, 1995, 47 pp., ISBN: 0117529796 (Methods for the examination of waters and associated materials) Accession No: 950261, Basement (pamphlets) 543.3P.

Integrated Pollution Management: Improving Environmental Performance, London, McGraw Hill, 1995, 185 pp., ISBN: 0077078675 Accession No: 950306, West Gallery 628.5:658.

IWSA Yearbook 1995, London, IWSA, 1995, 369 pp., Accession No: 950168, Reference Shelves REF 058.2:644.61 R.

National Rivers Authority Annual R & D Review, 1994, London, HMSO, 1994, 102 pp., ISBN: 0118865099 Accession No: 950216, West Gallery 621.6.031:048.1.

OECD Environmental Performance Reviews: United Kingdom, Paris, OECD, 1994, 188 pp., ISBN: 9264142606, Accession No: 950140, Reference Shelves REF 628.5 R.

Waste Management Licensing (amendment etc) Regulations 1995, London, HMSO, 1995, 10 pp.,

ISBN: 0110524748, Accession No: 950201, A 100 SI 19951288.

Water Quality - Evaluation of the Aerobic Biodegradability of Organic Compounds in an Aqueous Medium - Semi-Continuous Activated Sludge Method (SCAS), Milton Keynes, BSI, 1995, 10 pp., ISBN: 0580231704 (BS 6068:section 5.14:1995), Accession No: 950102, West Gallery 628.1:543.3.

Water Quality- Examination and Determination of Colour, Milton Keynes, BSI, 1995, 10 pp., ISBN: 0580234339 (BS 6068:section 2.22:1995) Accession No: 950171, West Gallery 626.881.

Water Quality: Determination of Dissolved Fluoride, Chloride, Nitrite, Orthophosphate, Bromide, Nitrate and Sulfate ions Using Liquid Chromatography of Ions: Part 1 Method for Water with Low Contamination, London, BSI, 1995, 18 pp., ISBN: 0580234363 (BS 6068:section 2.46:1995), Accession No: 950301, West Gallery 626.881.

Water Quality: Determination of Permanganate Index, London, BSI, 1995, 10 pp., ISBN: 0580234355 (BS 6068:section 2.32:1995), Accession No: 950302, West Gallery 626.881.

Water Quality: Part 0 Introduction, Milton Keynes, BSI, 1995, 11 pp., ISBN: 0580234177 (BS 6068:part 0:1995), Accession No: 950101, West Gallery 628.1.

Water Quality: Part 2 Physical, Chemical and Biochemical Methods: Section 2.48 Determination of Inorganically Bound Total Fluoride After Digestion and Distillation, Milton Keynes, BSI, 1995, 7 pp., ISBN: 0580239594, (BS 6068:section 2.48:1995), Accession No: 950247, West Gallery 626.881.

Water Quality: Part 2 Physical, Chemical and Biochemical Methods: Section 2.47 Determination of Chromium (VI) - Spectrometric Method Using 1,5-diphenylcarbazide,

Milton Keynes, BSI, 1995, 5 pp., ISBN: 0580241173 (BS 6068:section 2.47:1995) Accession No: 950248, West Gallery 626.881.

Water Qualify: Part 5 Biological Methods: Section 5.16 Evaluation in an Aqueous Medium of the 'ultimate' Aerobic Biodegradability of Organic Compounds- Method by Analysis of Biochemical Oxygen Demand (closed bottle test), Milton Keynes, BSI, 1995, 9 pp., ISBN: 0580239446 (BS 6068:section 5.16:1995), Accession No: 950240, West Gallery 626.881.

Water quality: Part 5 Biological Methods: section 5.17 Determination of the Prolonged Toxicity of Substances to Freshwater Fish - Method for Evaluating the Effects of Substances on the Growth Rate of Rainbow Trout, Milton Keynes, BSI, 1995, 12 pp., ISBN: 0580241319 (BS 6068:section 5.17:1995) Accession No: 950246, West Gallery 626.881.

Water quality: Sampling in Deep Waters for Macro-Invertebrates - Guidance on the Use of Colonization, Qualitative and Quantitative Samplers, Milton

Keynes, BSI, 1995, 17 pp., ISBN: 0580234347 (BS 6068:section 5.15:1995) Accession No: 950172, West Gallery 626.881.

RSC Environmental Chemistry Group: Officers (1995)

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COMPETITION

This year the Environmental Chemistry Group (ECG) is holding an essay competition for its younger members (those who are 32 years old or less on 1st October 1995).

With the approach of the twenty-first century, you are invited to write an essay of not more than 2000 words on the current *and* future roles for chemistry in any environmental topic or problem of your choice.

Two prizes, each of £200.00, will awarded - one to the best entry from a member aged 25 years or less, and the other to the best entry in the 25-32 year age-group.

Prizes have been generously donated by Bechtel Ltd and ICI respectively, and the competition will be judged by committee members of the Environmental Chemistry Group.

All those who enter the competition will be awarded free membership of the Environmental Chemistry Group for 1996, and the two winners will be invited to give a talk based on their essays at a future ECG meeting.

Entries for this competition, together with your date of birth, should be sent by the closing date - *September 30th 1995* - to the Secretary of the ECG:

Dr R.J. Gemmill, HMIP, Government Buildings, Burghill Road, Westbury-on-Trym, Bristol BS10 6EZ.

This competition will also be announced in *Chemistry in Britain*.