Thirty
Third

LONDON INTERNATIONAL YOUTH SCIENCE FORTNIGHT

1991

Founded by the late Philip S. Green, MBE in 1959, the Science Fortnight aims to give a greater insight into science and its applications for the benefit of mankind and to develop a greater understanding between young people of all nations.

10 DOWNING STREET

LONDON SW1A 2AA

THE PRIME MINISTER

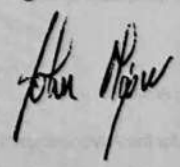
Ours is a scientific world. Our prosperity is based upon scientific discoveries and advances in all aspects of life, from domestic electronics to space exploration.

When we look at the way that scientific progress can improve the quality of our lives, we must also consider the quality of our environment. Science can tell us what effects our actions are having on the world around us and give us the solutions to problems that have already arisen. It also ensures that social and economic needs can be reconciled with the protection of our planet.

You, the young scientists of today, will be the inventors of the future and will make the discoveries that will change the way we live.

These changes raise world issues and international gatherings such as this are vital if the ideas and achievements are to be shared. I hope this Science Fortnight will be but the first of many such gatherings that you will attend as your careers progress.

May I take this opportunity to welcome you all to the 1991 London International Youth Science Fortnight.



April 1991

INTERNATIONAL SPONSORS

The following have assisted in the selection and sponsorship of participants from overseas, who make up approximately two thirds of those attending the Science Fortnight.

Australia
CRA National Science Summer School

Austria
Ministry of Education, Culture & Sport

Bahrain
University College of Bahrain
Bahrain School

Belgium
British School of Brussels
European School, Brussels

Canada
Youth Science Foundation
Manitoba Schools Science Symposium
Memorial University, Newfoundland

Cyprus
The English School, Nicosia

Denmark
Ministry of Education

France
Ecole des Mines de St Etienne
British School of Paris

Germany
Stiftung Jugend Forscht, Ev

Greece
Athens College
Moraitis School

Hong Kong
King George V School, Kowloon

India
Central Board of Secondary Education

Indonesia
Bandung Institute of Technology

Ireland
Royal Dublin Society

Israel
Weizmann Institute

Italy
Provincia di Pordenone
Collegio del Mondo Unita dell Adriatico

Jamacia
Campion College

Jordan
University of Jordan, Amman

Kuwait
Kuwait Foundation for the Advancement of Sciences

Luxembourg
M. Charles Muller

Malta
NSTS Youth & Student Travel Service

Namibia
Rossing Uranium Limited

New Zealand
Royal Overseas League

Norway
Norwegian Young Scientists

Sultanate of Oman
Sultan Qaboos University

Portugal
Fundacao Calouste Gulbenkian
St Julian's School, Carcavelos

Puerto Rico
Department of Education

Singapore
Ministry of Education

South Africa
Foundation for Education, Science and Technology

Spain
Professor Francisco Torio

Sweden
Forbundet Unga Forskare

Switzerland
Stiftung Schweizer Jugend Forscht
International School of Geneva
La Chataigneraie
La Grande Boissiere
University of Zurich

Taiwan (Republic of China)
British Taiwan Cultural Institute
Ministry of Education

Thailand
Science Society of Thailand
Institute for the Promotion of Teaching Science & Technology
Institute of Marine Science

Trinidad & Tobago
Holy Name Convent School, Trinidad
Arima Senior Comprehensive School, Trinidad

Tunisia
Lycee Bourguiba, Tunis

United States of America
Department of the Navy
Academy of Applied Science

Union of Soviet Socialist Republics
Moscow State University

Venezuela
British Council

Zambia
JETS of Zambia

The Science Fortnight gratefully acknowledges the assistance of **The British Council** and of the **Great Britain / East Europe Centre** in facilitating participation from a number of overseas countries.

This list was compiled in March 1991, and is therefore incomplete.

OPENING CEREMONY 1990

The following countries were represented:

Australia
Austria
Bahrain
Belgium
Bulgaria
Canada
Cyprus
Czechoslovakia
Denmark
France
Germany (GDR)
Germany (FRG)
Greece
Hong Kong
Hungary
India
Indonesia
Ireland
Israel
Italy
Jamaica
Jordan
Kuwait
Luxembourg
Malta
Namibia
New Zealand
Norway
Oman (Sultantate of)
Pakistan
Phillipines
Poland
Portugal
Puerto Rico
Romania
Singapore
Somalia
Sri Lanka
South Africa
Spain
Sweden
Switzerland
Taiwan (ROC)
Thailand
Trinidad & Tobago
Tunisia
USSR
USA
Venezuela

United Kingdom

UNITED KINGDOM SPONSORS

The following have assisted in the selection and sponsorship of participants from the United Kingdom, who make up approximately one third of those attending the Science Fortnight.

Local Education Authorities
Belfast Education & Library Board
London Borough of Bromley
Buckinghamshire
Central Region
Durham
Dyfed
Essex
Fife Region
Gwynedd
Humberside
Lothian Region
Mid Glamorgan
North Eastern Education & Library Board
Orkney
Shropshire
Solihull
Southern Education & Library Board
South Eastern Education & Library Board
Strathclyde Region
West Sussex
Western Education & Library Board
Wirral

Colleges and Schools
Belfast: Methodist College
Birmingham: King Edward VI
Camp Hill School
King Edward School
Edgbaston Park
Beverley: High School
Croydon: John Ruskin Sixth Form College
Greenwich: John Roan School
Leeds: Leeds Grammar School
Letchworth: Fearnhill School
St Albans: Beaumont School
Totton: Totton College
Wolverhampton: Highfields School
Brockenhurst: Brockenhurst College

Commercial & Industrial
Aitchison Charitable Trust
British Gas plc
Headquarters Training Department
West Midlands
British Steel plc
Welsh Laboratory & Strip Mills Products
Strip Products, Shotton Works
Strip Products, Port Talbot Works
Electrics, ORB Works, Newport
Conoco Ltd
Croda International plc
ECC International Ltd
Fife Industry Committee
Freemans plc
Grantham Yorke Trust
Joseph Lucas Charitable Trust
Roche Products Ltd
Shell UK Ltd
Shell Research Ltd
Sittingbourne Research Centre
Tarmac plc
3M Health Care
Yardley Educational Foundation
BP Chemicals Ltd
Barry
Port Talbot

The generous support of the Trustees of the International Contact Trust is gratefully acknowledged

This list was compiled in March, 1991 and is, therefore incomplete

THIRTY THIRD
LONDON INTERNATIONAL YOUTH SCIENCE FORTNIGHT 1991

'More than other forms of learning, science is an assault on ignorance. That knowledge is a good thing is its creed; that progress depends on knowledge is its boast . . .' So began a recent survey of science in the respected journal 'The Economist.' Sixteen pages later the survey ended with the sentence 'Ignorance has shrunk because of science, but it has also grown: every discovery reveals how much is not known.'

As tomorrow's scientists the participants of the Science Fortnight might therefore feel they are faced with a paradox . . . in the search for knowledge that is the basis of their scientific careers, they are cautioned that the sum total of the achievement of a life's work might be an increase in the realisation of how little is known!

This should not in any way be a deterrent. The pursuit of knowledge may be a limitless goal, but what is to be gained from that pursuit will surely outweigh the disappointments. As Lord Porter, immediate Past President of the Science Fortnight has remarked '. . . it is unwise to think that there's anything science cannot do.'

The scientist is highly regarded in the community. For over thirty years opinion polls in the United States have consistently indicated that 88% of the population believe that the world will be a better place because of science. But if that is to be so, the scientist must ensure that the opportunities and finance needed for his work are guaranteed and that his discoveries are employed for the benefit of all mankind. To achieve these goals, he must be involved in his community and decision making in his country. Only by doing so can scientists themselves help direct 'the assault on ignorance' and help to reduce 'what is not known.'

George McGowan
Director
London International Youth Science Fortnight

ACKNOWLEDGEMENTS

The Science Fortnight extends its gratitude to all those who have so generously assisted in the organisation of the 1991 meeting, and in particular to:

The Council and Staff of the Institution of Electrical Engineers for providing premises and facilities for lectures and meetings.

The Speakers and Lecturers whose contributions are invaluable.

The Academic, Commercial and Industrial organisations, Research Establishments, University Departments, Museums etc which have arranged visits and lectures.

The Wardens, Bursars and Staff of the Halls of Residence where participants are accommodated.

The New Chef in a Box Ltd. and Mr Michael Warner for the provision of packed meals.

Capital Group Travel, and Mr Peter Campling for assistance with coach transportation through the Science Fortnight.

British Airways plc for its generous assistance with travel arrangements for students from a number of overseas countries.

The Foreign & Commonwealth Office for its guarantee against loss.

All those who have assisted in the planning and preparation of the programme, together with the many people not included in this list who have, by their generous assistance, made the organisation of the Science Fortnight possible.

RESIDENTIAL STAFF OF THE LONDON INTERNATIONAL YOUTH SCIENCE FORTNIGHT, 1991

Chief of Staff: Keith Martin

COLLEGE HALL
Malet Street
London WC1E 7HZ
Tel: 071-636 8982

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Counsellors	Liz Magowan
	Claudiu Stanescu

The Student Staff of the Science Fortnight is selected from former participants. Applications to serve as staff are not accepted and appointment is by invitation only.

DAILY PROGRAMME

Wednesday 24 July		Arrivals Welcome & Orientation in Halls of Residence
Thursday 25 July	10.00	*Introductions & Programme Briefing
	11.00	*OPENING CEREMONY
	14.15	*Lecture/Demonstration *'The Shape of Things to Come'*
	20.00	Welcome Disco at the Elizabeth Suite
Friday 26 July		Half Day Visits to Research and Industrial Establishments
	20.00	Student Topics at University College London
Saturday 27 July	10.00	*Lecture/Demonstration: *'Colour is Fun'*
	14.15	Optional Half Day Sightseeing Tour of London
	16.30	Inter Hall Swimming Gala at University of London Union
		Optional Theatre and Concert Visits
Sunday 28 July	09.00	Optional Day Excursions to (a) Stonehenge and Salisbury (b) Portsmouth
	20.00	Feature Film at College Hall: *'Some Like it Hot'*
Monday 30 July	10.00	Specialist Lectures
	14.15	*Lecture/Demonstration: *'How Green is Space?'*
	20.00	Student Topics at University College, London
Tuesday 31 July		Day Visits to Research & Industrial Establishments
	21.00	Topics for Tonight Informal Discussions in Halls of Residence
Wednesday 1 August	10.00	Visits to Scientific Museums at South Kensington
	14.15	* Seminars
	20.00	*Lecture/Demonstration: *'Chemistry of Light'*
Thursday 1 August	08.00	Day Visits to Oxford and Cambridge
	21.00	Morning visits to University and Research Establishments Discussion in College Hall: *The Great Divide . . .*
Friday 2 August	10.00	* Specialist Lectures
	14.15	* Lecture/Demonstration: *'Modern Approaches to Cancer Diagnosis and Therapy'*
	20.00	International Cabaret at Carisbrooke Hall
Saturday 3 August	10.00	*Lecture/Demonstration: *'Musical Squares'*
	14.15	Inter Hall Rounders in Regent's Park Optional Theatre and Concert Visits
Sunday 4 August	09.00	Optional Day Excursion to (a) Stratford upon Avon (b) Hampton Court & Windsor
	20.00	Feature Film at College Hall: *'Blazing Saddles'*
Monday 5 August	10.00	* Question Time with Members of Parliament
	14.15	*Seminars led by former participants of the Science Fortnight
		Hall of Residence Visits
Tuesday 6 August	10.00	*Participants' Forum
	15.00	*CLOSING CEREMONY
	20.00	Farewell Disco at the Elizabeth Suite
Wednesday 7 August		Departures

*Events marked thus take place at
The Institution of Electrical Engineers,
Savoy Place, London WC2R 0BL

Thursday 25 July — 11.00

Opening Ceremony

Principal Address:
The Rt Hon Paddy Ashdown, MP
Leader: Liberal Democrat Party

14.15

'The Shape of Things to Come'

Professor Brian F G Johnson, BSc PhD MA
Professor of Inorganic Chemistry, University of Edinburgh

The shape of a molecule is a subject of intense scientific interest, both from the academic and the industrial point of view.

The purpose of the lecture will be twofold:

1 To illustrate the way in which ideas of shape have developed over the centuries.

2 To show how this view pervades modern chemistry.

Saturday 27 July — 10.00

'Colour is Fun'

Dr Arthur Tarrant, PhD FInstP FCIBSE CPhys CEng
Honorary Fellow, University of Surrey

The precise specification of colour is vital to many branches of science and industry, and particularly the consumer industry; just as we have been able to specify engineering dimensions, with tolerances, so we have to be able to specify colours with tolerances. But colour is not just a physical thing like the diameter of a crankshaft. It is a psycho physical phenomenon which occurs as our eyes and brain try to make sense of the physical signals that come into them.

The lecture will describe the processes by which a specification of a colour can be achieved, and will go on to examine some of the many factors that may affect the appearance of colours. It will indicate how a plain commercial problem can on analysis offer an intellectual challenge of the highest kind to scientists and will convey something of the delight of the scientist who works in this field.

Monday 29 July — 14.15

'How Green is Space'

Dr Alan Johnstone, BA MSc PhD
Mullard Space Science Laboratory, University College London

It was a photograph from space, showing the Earth rising above the Moon's surface, which dramatised the loneliness and isolation of our planet. It demonstrates that our resources are limited and that our system is a fragile one. Now that all the planets, except Pluto, have been visited, can we turn our expertise in space towards solving the problems on Earth? What do space techniques have to offer that cannot be done from the surface? What can we learn by comparing the Earth with other planets? What has been done so far and what is the potential for the future? Or, in the end, will our space vehicles have to transport emigrants to a new colony in space?

Wednesday 31 July — 20.00

'Chemistry and Light'

Dr Andrew Mills, BSc PhD GRSC and Dr Peter Douglas BSc PhD
Department of Chemistry, University of Swansea

The aim of the lecture is to increase the awareness of the audience of the importance of photochemistry in our modern world. The lecture begins with a series of illustrations of how light may be generated electrically, thermally and chemically. In some cases light can generate light and this is demonstrated by the luminescence of everyday objects such as plastics, washing powders and drinks. We then look at the uses of chemistry and light and highlight its application in medicine, communications, electronics, photography and plastics, though a series of demonstrations. Finally, we consider ways in which sunlight, an alternative energy source to fossil fuels, can be converted into electricity or a chemical fuel with 'state of the art' devices.

Friday 2 August — 14.15

'Modern Approaches to Cancer Diagnosis and Therapy

Dr Richard O'Kennedy, BSc PhD MIBiol MIBiolI DipFS DipC DipCS
Head of School of Biological Sciences, Dublin City University

The immune system is a vital part of the body's defence mechanism, that detects and destroys disease and removes 'worn out' components. Recent advances in research on cancer have highlighted the role that the immune system plays in the detection, development and elimination of tumour cells. This lecture will examine these studies and describe how we can use components of the immune system to detect, localise and destroy malignant cells and tissues. For example, scientists have now managed to manipulate the immune response so that antibodies can be produced, labelled with drugs, toxins or radiopharmaceuticals and targetted to tumours. It is also possible to produce a range of antibody derivatives that may provide novel ways of detecting and treating cancer. New sensors are also under construction that allow the detection of tumour-related molecules at a very early stage in the development of the disease thus speeding up diagnosis and allowing rapid treatment before the cancer progresses. There are also a range of molecules secreted by cells which have been characterised and may act to destroy or inhibit tumour growth. By combining basic knowledge of the molecular events occurring in cancer development and immunological approaches the potential for understanding and treating cancer can be greatly increased.

Saturday 3 August — 10.00

'Musical Squares — Adventures in Sound and Music'

Dr Mike Gluyas, BSc PhD
Department of Pure and Applied Physics, University of Salford

This demonstration lecture is an audio-visual presentation which explores the most important properties of sound and investigates its effects upon our senses and the way instruments work? What happens if we play musical instruments backwards? How do we recognise sounds? How can we tell if a person is telling lies? How do animals make use of sound?

Using a wide range of special effects, the properties and applications of sound are discussed. By comparing known types of sound with descriptions of what is heard, many fascinating and incredible features of the human hearing system are revealed, including ways in which our ears may also deceive us. An appreciation of these facts leads to greater awareness of the sounds that surround us and to a more accurate interpretation of what they mean.

The presentation is a fast moving overview of sound, packed with special acoustic and visual effects, and many 'on the spot' experiments and live demonstrations are excitingly mixed to produce an event which is highly informative (it makes the science of sound easy and accessible), entertaining and enjoyable.

Monday 5 August — 14.15

QUESTION TIME WITH MEMBERS OF PARLIAMENT

Speakers will include:

Andrew Bowden, MBE MP	Conservative, Brighton Kemp Town
W E 'Ted' Garrett	Labour, Wallsend
Lord (Stephen) Ross of Newport	Liberal Democrat (formerly MP for Isle of Wight)

Tuesday 6 August — 15.00

CLOSING CEREMONY

All of the above events take place at
The Institution of Electrical Engineers Savoy Place, London WC2R 0BL

Monday 29 July — 10.00 — Institution of Electrical Engineers, Savoy Place, London WC2R 0BL

LECTURE A

'Guinea Pigs and Patients — The Role of the Controlled Clinical Trial in Cancer Research'

Dr Frances Calman, MB BS FRCP FRCR
Department of Radiotherapy and Oncology, King's College Hospital, London

Until Harvey's scientific treatise on the Circulation of Blood, there was ignorance about the human body, the nature of disease, and how to remedy ills. For the next two hundred and fifty years careful and meticulous scientific observation added steadily to knowledge of the anatomy, physiology and biochemistry of disease, but apart from surgical intervention, little could be offered as treatment. We now have extensive therapeutic resources but have to decide how to choose the best treatment for each condition.

The randomised clinical trial is the only method of choosing between different treatments which is free from bias. The theory, methodology and ethics of the randomised clinical trial will be discussed.

LECTURE B

'Codemakers versus Codebreakers: An Introduction to Cryptography'

Professor Fred C Piper, BSc PhD ARCS DIC FIMA
Professor of Mathematics
Royal Halloway and Bedford New College, University of London

For centuries armies, governments and spies have been exchanging secret information over insecure (public) channels. The art (or science) of inventing secret codes is called cryptography while the science of breaking them is known as cryptoanalysis. In this lecture we look at some aspects of this fascinating 'duel' between the codemakers and the codebreakers and, in particular, look at the effect which computers have had on both sides.

The use of cryptography has broadened from its traditional (somewhat mystical and glamorous) arena and has spread to the financial and commercial sectors. Thus, in addition to discovering secret information, the codebreakers are now trying to rob banks and/or raid databases containing personal information about us. There is no doubt that cryptography now impinges on all our lives!

LECTURE C

'Fossils, Evolution and the Origin of Species'

Dr Peter R Sheldon, BSc PhD
Department of Geology, University of Wales, Cardiff

Fossils — the remains of ancient animals and plants — give us a historical perspective on evolution that cannot be obtained from a study of living organisms alone. Fossils are more easily found than most people realise and, unlike most progress in science, significant discoveries are often made with little more than a hammer and chisel. The lecture will begin with illustrations of a wide range of fossils, and we will see how organisms often get preserved in rocks for hundreds of millions of years.

One of the hottest debates in evolution biology concerns the pattern of change by which new species evolve from their ancestors. Until the mid-1970's it was generally believed that if the fossil record was complete we would see a continuous series of gradual changes between successive forms of life. The theory of punctuated equilibrium challenged this picture of gradual evolution. It was proposed that evolution took place in remarkable jumps, with new species appearing suddenly and then persisting with little or no change before becoming extinct. We will look at some of the latest evidence in this debate, including work on tribolites, beautiful extinct marine creatures distantly related to the crabs and lobsters of today. A recent general model suggests a surprising relationship between patterns of evolution and different environments.

We will end by discussing a variety of intriguing mysteries of evolution that remain to be solved in the years ahead.

Friday 2 August — 10.00 — Institution of Electrical Engineers, Savoy Place, London WC2R 0BL

LECTURE I

'The Uses of Ultrasonics'

Dr R C Chivers, MA PhD
Physics Department, University of Surrey, Guildford

The elements of the principle which is used by bats in navigation has been utilised by man in a number of different applications. The historical origins of the subject show the interaction of developments in electronics and in piezo-electric materials that are used to generate and detect the ultrasonic waves. The first application was the detection of objects underwater using SONAR, the next was the detection of defects in metal components to be used in machines. This 'non destructive testing' extended to medicine in the early 1960's and has shown an extraordinarily rapid growth, both in terms of the technology and in terms of the breadth of its applications. High energy ultrasound can be used in a number of industrial applications. When applied to humans it can be used for surgery. However, extensive research has shown that no significant harm is caused by the machines.

LECTURE II

'Nuclear Power — Can the World Manage Without It?'

Harry A Cole, CEng MIEE
Formerly of UK Atomic Energy Research Laboratory, Harwell

Present and future world energy requirements are discussed and compared with the world's current resources. The relationships between standards of living and energy consumption is considered and comparisons made between the richest and poorest countries in the world.

The political, economic, social, environmental and safety aspects associated with burning of fossil fuels (coal, oil, gas) are discussed and comparisons made with alternative forms of energy and the introduction of conservation measures.

Renewable energies (sun, wind, waves etc) are introduced and an assessment made of their likely impact on future energy requirements. Energy density, reliability and predictability are discussed and comparisons made with the established sources of energy.

The present world nuclear power programme is reviewed and comparisons made between the installed nuclear generating capacities of various countries. Different reactor types are briefly discussed and an introduction given to the expressions 'nuclear fuel cycle', 'reprocessing', 'burn up', and plutonium production'.

The lecture ends with a discussion on nuclear accidents waste disposal sites and the relationship between nuclear power and nuclear weapons.

Lecture III

'Symmetry, Spectroscopy and the Binding of Drug Molecules to DNA'

Dr Alison Rodger, BSc(Hons) PhD(Sydney) MA(Oxon)
Gladstone Research Fellow
Physical Chemical Laboratory, University of Oxford

We all respond to the beauty of cathedrals and flowers in the garden. Underlying our recognition of the beauty of these things is their shape and symmetry. Symmetry is not only aesthetically pleasing but also a very useful tool in chemistry since the symmetry of a molecule is determined by its measurable properties. symmetry imposes restriction on selection rules on the way molecules behave. The opposite of symmetry is asymmetry. Most molecules making up biological systems are asymmetric and the important ones, such as DNA are chiral. A chiral molecule is one whose mirror image is different from itself. Many of the special features about the way molecules react in biological systems are related to their asymmetry.

In this lecture we shall look at what symmetry is and how you might determine the symmetry of a molecule. Then we shall examine some examples of where symmetry affects the chemistry of molecules and the way they react. Finally, we shall examine some of the special features of the chemistry of DNA and see how it is dependent on both its symmetrical and assymetrical features.

Participants should select which of the Lectures being presented they wish to attend and indicate their choice on their programme preference forms.

SEMINARS

Wednesday 31 July 14.15 — **Institution of Electrical Engineers, Savoy Place, London WC2R 0BL**

Seminar 1
'Food of the Future'
Dr Suzanne E Emmett, BSc(Hons) PhD CertEd
Senior Information Officer, Leatherhead Food Research Association

Seminar 2
'Modern Approaches to Drug Discovery from Natural Products'
Dr Peter J Hylands, BPharm PhD CChem FRSC
Head of Natural Products Chemistry, Xenova Limited

Seminar 3
'Acquired Immunodeficiency Syndrome'
Dr Miguel Forte, Lic Med (Lisbon) DTM&H (London)
Honorary Registrar, East Birmingham Hospital

Seminar 4
'Elementary, my Dear Watson'
Martin L Perkins, MA(Oxon) FIMA FRSA
Senior Master & Head of Mathematics, St Olave's Grammar School, Orpington

Seminar 5
'Split Brains — Split Personalities?'
Dr George Savage, BSc PhD
School of Biological Sciences,
Queen Mary & Westfield College, University of London

Monday 5 August 10.00 — **Institution of Electrical Engineers, Savoy Place, London WC2R 0BL**

These Seminars will be led by former participants in the Science Fortnight, the speaker's first year of participation is indicated in parenthesis.

Seminar A
'The Environment: Help Me to Help You'
Charles Mulier LLM (1982)
Lawyer, Grand Duchy of Luxembourg

Seminar B
'At the Speed of Light'
L James St Ville, (1986)BA (Cantab) AMIEE
GEC Marconi Research Ltd

Seminar C
'Feline Immunodeficiency Virus'
Judith Purdy, BVSc MRCVS (1985)
House Physician in Small Animals Medicine, Veterinary College of Ireland, Dublin

Seminar D
'Manufacturing, Marketing & Money — A Different View of Science'
Nigel Lee, MEng(Hons) ACGI (1984)
Postgraduate Student, Manchester Business School

Seminar E
'Behind Closed Doors'
Dr Imelda Bennet, BA BM BCh DCH (1980)
Paediatrician, Bristol Children's Hospital

Seminar F
'Can Science and Industry Live Together?'
Ian Shepherd, BA(Hons) (1986)
Research Associate, The LEK Partnership

Summaries of the above Seminars are included in the Notes for Participants. Participants should select which Seminars they wish to attend and indicate their choice on their programme preference forms.

TOPICS FOR TONIGHT

Tuesday 30 July 21.00 — **Informal discussions led by Science Fortnight Staff**

COLLEGE HALL — 'Science Education — Evolution or Revolution' introduced by Bridgeen McCloskey, BA PGCE

IFOR EVANS HALL — 'Artificial Procreation — Where Should We Set The Limits?' introduced by Michelle Gallagher, BSc

INTERNATIONAL HALL — 'Embryo Research — What Price for Progress?' introduced by Keith Martin

HALF DAY VISITS TO INDUSTRIAL & RESEARCH ESTABLISHMENTS AND TO UNIVERSITY DEPARTMENTS

Friday, 26 July

BBC Television Centre
British Gas plc
  South Eastern Gas, Croydon
Chester Beatty Research Institute
  Institute of Cancer Research
City University
  Department of Mechanical Engineering & Aeronautics
GEC Marconi Research Ltd
  Hirst Research Centre
Imperial College of Science Technology & Medicine
  Department of Chemical Engineering
King's College London
  Chelsea Department of Pharmacy
  Department of Biophysics
Royal Naval College, Greenwich
  Department of Nuclear Science & Technology
Royal Hospital of St Bartholomew
  Dept of Histopathology
J Sainsbury plc
University College London
  Department of Chemistry
  Department of Electronic & Electrical Engineering
University of Surrey
  UoSAT Unit
Wellcome Museum of the History of Medicine
Zoological Society of London
  Institute of Zoology,
  Department of Veterinary Medicine

DAY VISITS TO INDUSTRIAL AND RESEARCH ESTABLISHMENTS

Tuesday, 30 July

British Petroleum
  BP Research Centre, Sunbury on Thames
Esso Petroleum Co Ltd
Exxon Chemical Ltd
  Fawley Refinery
Freemans plc
  Distribution Division, Peterborough
National Institute for Medical Research
Nuclear Electric
  Dungeness A & B Power Stations
Royal Air Force
  Institute of Aviation Medicine
Royal Botanic Gardens, Kew
Royal Marsden Hospital, Sutton
Royal Navy
  Institute of Naval Medicine
Shell Research Ltd
  Sittingbourne Research Centre
SIRA Ltd, Chislehurst
Smith Kline Beecham Research Ltd
  Welwyn, Hertfordshire
Thames Water Utilities
  Beckton Sewage Treatment Works
University College London
  Mullard Space Science Laboratory

VISITS TO OXFORD AND CAMBRIDGE

Thursday, 1 August

Cambridge
UNIVERSITY OF CAMBRIDGE
  University Chemical Laboratory
  Department of Engineering
British Antarctic Survey
NAPP Laboratories Ltd
St John's Innovation Centre

Oxford
UNIVERSITY OF OXFORD
  University Botanic Garden
  Department of Engineering Science
Oxford Scientific Films Ltd

Descriptions of the above Visits are included in the Notes for Participants. Participants should select which visits they wish to attend and indicate their choice on their programme preference forms.

STUDENT TOPICS

Participants who wish to give a paper based on a project or investigation have have undertaken will be allocated a period during one of the sessions listed below. Papers will be grouped by category and a schedule circulated at the beginning of the Science Fortnight.

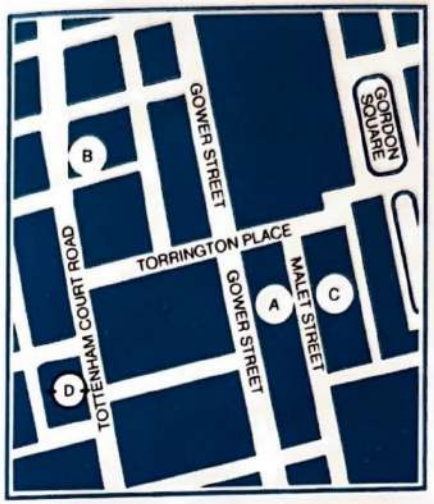
Friday 26 July	20.00	University College London Engineering Building, Gordon Street, London WC1 Lecture Theatres: G6, 421, 422, 508
Monday 29 July	20.00	University College London Engineering Building, Gordon Street, London WC1 Lecture Theatres: G6, 421, 422, 508

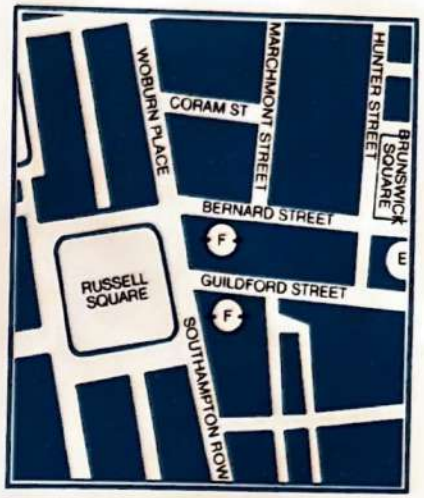
MUSEUM VISITS

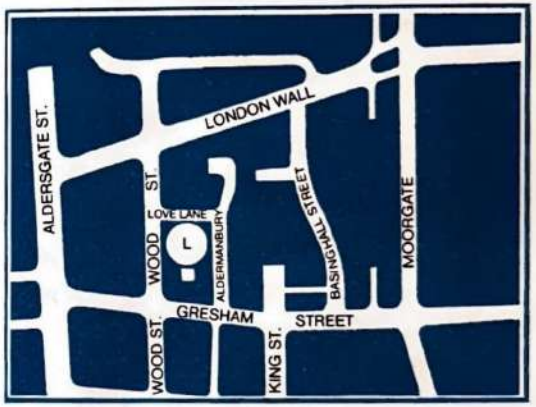
Wednesday 31 July	10.00	Natural History Museum: Life Space Galleries Cromwell Road, South Kensington, London SW7
	10.00	Natural History Museum: Earth Science Galleries Exhibition Road, South Kensington, London SW7
	10.00	Science Museum Exhibition Road, South Kensington, London SW7

SOCIAL PROGRAMME

Thursday 25 July	20.00	Welcome Disco The Elizabeth Suite, Barrington House, Gresham Street, London WC2
Saturday 27 July	16.30	Inter Hall Swimming Gala University of London Union, Malet Street, London WC1
Sunday 28 July	20.00	Feature Film: *'Some Like it Hot'* College Hall, Malet Street, London WC1
Friday 2 August	20.00	International Cabaret Carisbrooke Hall, Seymour Street, London W2
Saturday 3 August	14.15	Inter Hall Rounders Competition Regent's Park, London NW1
Sunday 4 August	20.00	Feature Film: *'Blazing Saddles'* College Hall, Malet Street, London WC1
Tuesday 6 August	20.00	Farewell Disco Elizabeth Suite, Barrington House, Gresham Street, London EC2

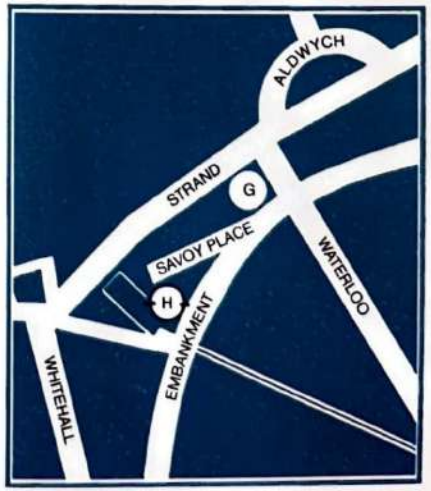


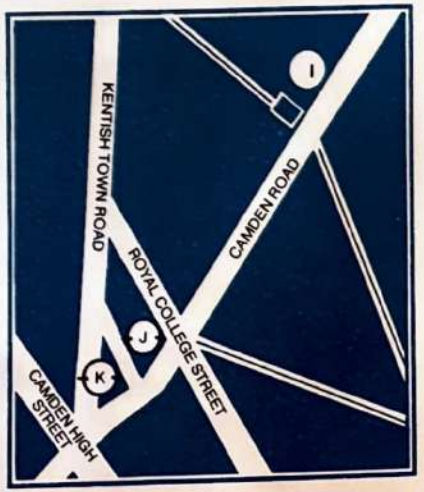




KEY TO MAPS

- A College Hall
- B Empire Rooms
- C University of London Union
- D Goodge Street Station
- E International Hall
- F Russell Square Station
- G Institution of Electrical Engineers
- H Embankment Station
- I Ifor Evans Hall, 109 Camden Road
- J Camden Town Underground
- K Camden Road Station
- L Elizabeth Suite





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YOUTH SCIENCE FORTNIGHT
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