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Forum

Journal of the Association for Women in Science and Engineering

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AWiSE

Association for Women in Science and Engineering

Inside…

New Year's Resolve

Our website is now launched, by the Science Minister, no less. Lord Sainsbury, whose speech is given on p. 2, spoke of the need for networking and outreach organisations such as AWiSE, which share the objectives of Caroline Roberts' Unit *Promoting SET for Women* in his Office of Science and Technology.

Our speakers were profiled in Forum 4. Dr Susan Greenfield, first-ever woman Director of the Royal Institution in 200 years, President of Oxford AWiSE, took up the Minister's remark that we must use the talents of all our people. A mixed environment is more conducive to ideas! She had some inventive suggestions for how we could use our website: to compare notes on tactics – how to run a group – women are less hierarchical than men, less hyped on power; women should recognise the particular skills they can contribute, not least in the boardroom! The website should discuss school science, which is often heavy on facts, light on relationships, which interest girls. Coping with motherhood is a big problem for women in SET – 'you're dead if you don't publish'; funds for women to return to science should be ring-fenced.

Dr Gill Samuels, Director of Science Policy for Pfizer (Europe), one of AWiSE's earliest supporters, said that Pfizer looked for quality in its applicants, wanted more women to apply, and promoted family friendly policies. Pfizer has four women directors and a female vice-president: "the glass ceiling is there only if you believe in it: if you don't, you walk through it".

Dr Julia Higgins, Dean of Engineering at Imperial College, emphasised the need for networking among women, particularly on a SET-oriented campus with rather few women. The College has a flourishing AWiSE group of which she is President, and now has a Rector's Committee working with Opportunity 2000 to improve the environment for women and encourage them to apply to the College.

Our launch was an inspiring event to propel us into building up our Association in the New Year, with a publicity campaign for national as well as regional membership. We shall develop euro-networking, comparing notes with sister organisations in Europe, as well as further afield. We want to raise more help nationally for the branches, particularly newly emerging regional groups such as AWiSE Northwest and Scotawise; and to reach disadvantaged girls and women, working with appropriate sister organisations. AWiSE branches show different modes of adaptation to different circumstances: holding lunchtime meetings, for example, in cities where people scatter at the end of the day. Activities are planned on topics such as Contract Research and SET for girls.

We need to develop the interactive career development program on our website (volunteers welcome!), and work towards a counselling and mentoring network, perhaps on the lines of the new **www.mentornet.net** in the USA. A further project is to collect comparative *age-related* statistics for women in SET, to see how women can be helped to keep going in SET or else to return.

Joan Mason – AWiSE chair

In this issue...

This journal is supported by the Biotechnology and Biological Sciences Research Council (BBSRC), the Engineering and Physical Sciences Research Council (EPSRC), the Natural Environment Research Council (NERC), the Economic and Social Research Council (ESRC), the Particle Physics and Astronomy Research Council (PPARC) and the Medical Research Council (MRC).

Website Launch Day 5 October 1998

Address of the Science Minister, Lord Sainsbury

I am very pleased to open the launch of the Association of Women in Science and Engineering's website. This is a project which received substantial financial support from the DTI's Network Challenge for Professional Institutions, so it is gratifying to be able to host the launch here and see the results.

I congratulate AWiSE on their achievement in establishing this valuable website for women in science, engineering and technology. I want to say something about AWiSE, and the need for organisations like this, including those aligned with specific sectors such as Women in Physics, Women Chemists, and the Women's Engineering Society.

These organisations exist because in all these sectors, women are in a minority, the numbers significantly worse in engineering than in biosciences and chemistry. But the representation of women at senior levels is very low indeed, in all sectors, in industry and in academic research. So not surprisingly many network groups have evolved to support and encourage the women who are intending to pursue careers in these sectors. These organisations are doing a very important job.

It is truly regrettable that so few women are interested in taking up careers in the sciences and engineering, and that many who embark on such careers evidently experience difficulty in progressing. This situation matters very much to this Government. It is a Competitiveness issue – the strength of our science and engineering base depends critically on the quality of people. Obviously we should try to take advantage of all the best available talent, attracting all the best brains, not just the best male ones.

We know that there is no fundamental difference in ability between girls and boys at GCSE level: a current concern is about girls outperforming boys at school in all subjects, including science and technology. But beyond compulsory science at GCSE level, gender stereotyping persists, and physical science and technology are predominantly seen as subjects for boys. Girls have not been encouraged and in some cases may even have been dissuaded from pursuing their education, or careers, in science or engineering.

Thankfully there have always been, and will always be a minority of girls and women who are unconcerned by gender stereotyping and have chosen to become scientists or engineers. You will be hearing from three particularly eminent examples later today, and there are many more, gathered here.

As a nation, we need to encourage many more to do the same, so that we can gain from this massive resource of potential talent. We need to ensure that there are no barriers inhibiting the career progression of women in SET. Too high a proportion of the women who start out as scientists or engineers drop out of those careers completely. Whether this is through choice or because of a feeling that their career prospects are not bright, it probably represents a poor return on the investment in their training.

Many of you know of the Unit in the Office of Science and Technology which has been established specifically to focus attention on the issue of the under-representation of women in sciences and engineering, and importantly, to encourage an increase in numbers.

The Unit is engaged in a wide range of activities – from promoting the business benefits to industrial employers of adopting family friendly employment practices, to a campaign aimed at increasing the number of girls taking science subjects beyond GCSE level.

I hope you look at the Unit's display outside this room which outlines its aims and objectives. A current project is a series of role model posters, targeted at 14-16 year old girls, which we will be launching in about 3 weeks time. The posters challenge the stereotyped perception of scientists as 'boffins in white coats' or engineers as 'up to their elbows in grease' and of course as being almost exclusively

Lord Sainsbury at the launch of the AWiSE website with (from left to right) Anne Leeming, AWiSE vice-president, Dr Joan Mason, AWiSE chair, Dr Gillian Samuels, Science Policy Director of Pfizer, and Prof. Susan Greenfield, Director of the RI

male. Instead, they show young successful women who are quite the reverse of boffin like, in appearance and lifestyle, and who are all extremely enthusiastic about their careers.

Here is one of Sandie King, now a senior chemical analyst at Pfizer. She explains that she went to work for Pfizer after starting in a bank where work was boring and she didn't meet many people, because she was stuck behind a desk. She is enthusiastic about the camaraderie and the feeling of responsibility in her job, and speaks highly of the way Pfizer have looked after her, and invested in her as a person. I hope that she and the other role models will provide an inspiration to pupils and their teachers when these posters go out to schools.

I must introduce the three eminent speakers, and thank these distinguished scientists for making time to address this event, strong testimony to the importance of the issue that we are focusing on today. First, Dr Gillian Samuels, Pfizer's European Director of Science Policy. She is being kept very busy by a frenzy of press interest in one of the recent drug discoveries from her department, which I don't need to name.

Second, Professor Susan Greenfield: I don't suppose she needs much introduction. As well being an eminent neuroscientist, Susan is a valuable and well known communicator of science, and an important contributor to public understanding. Susan is the first woman Director of the Royal Institution, and was the first woman to give the Royal Institution Christmas Lectures.

This afternoon, Professor Julia Higgins will be speaking. As a Professor of Polymer Science and Dean of Engineering at Imperial College, and one of only 40 female Fellows of the Royal Society, Julia is another inspirational role model.

Some further words about the website: I spoke of the realities of women being very much in the minority in science and engineering, and about the importance of support networks under those circumstances. We all rely to some extent on the support and advice of others at some stages in our careers. We look for role models and mentors to inspire us, and when we face problems we look to the advice and experience of colleagues who have experienced similar circumstances.

Women, ***and men***, who are trying to combine a career with family responsibilities, or who are trying to get back to work after taking a career break face particular problems. It is of course predominantly women who shoulder the greatest burden of family responsibilities, and then experience the greatest difficulties in balancing those responsibilities within the framework of a career.

Clearly, other women who have had similar experiences are likely to be the best source of advice. When there are few women working in close physical proximity, it can be extremely difficult to find anyone to get advice from.

The website offers an ideal medium to overcome the difficulties of people being thinly spread, by offering the possibility of making links with mentors, role models and sources of advice. This is one of the main and very important aims of the AWiSE website.

I am in particular impressed by the pioneering approach of using the website to provide an Internet based Personal Development Planner. This could turn into an exceptionally valuable tool for those using the website. In our job markets, there is an increasing need for flexibility, and a growing awareness amongst both employers and employees of the need to define and develop competencies.

What is perhaps less well recognised by employers and employees alike, and, I think, not promoted enough by women themselves, is that those who have additional responsibilities outside the workplace often have additional talents and competencies to bring into the workplace, ones they don't necessarily recognise themselves. A woman who has spent some time bringing up a young family will doubtless have developed exceptional time management and negotiating skills, and the ability to deal with conflicts and disciplinary issues.

The personal development planner has a refreshingly imaginative approach to recognising and defining competencies, which I hope will build confidence in women and help them to recognise and market their own talents. I am keen to see this concept developed. I hope it will encourage employers and employees alike to think in a more positive way about the skills that individuals can offer in the workplace, and encourage a more creative use of the available pool of talent.

May I wish you a successful day.

Member Profile

Dr Joan Mason, Chair of AWiSE

We had a good geography teacher at school who taught us weather science, about trade winds and anti-cyclones, and earth science, meanders and ox-bow lakes; I got into science through liking to know how things worked. I should have preferred a more human science, but opted for physical science as my vocation, since my father wanted me to become an accountant. He wanted a son to join him in his practice, but had three girls – we grew up knowing we were second best. He decided that girls could do as well as boys, and I realised in later years that this might have increased my self confidence.

Lacking adequate grounding in physics I chose Chemistry. I enjoyed research, and received some useful mentoring from my Professor. He said why not go postdoccing in America, a new idea in those days. He told me to pick some names from the literature of professors doing related work, and write and ask if they had any research money. I received four offers, and went off to Southern California as a Fulbright scholar. There I discovered Americans were ahead of us in teaching, research and even childraising; I liked their more relaxed attitude.

When I returned I applied for jobs that were advertised, but particularly liked the chemistry of reaction mechanisms in Ingold's department at University College London. So I followed my Professor's advice again, and wrote to Ingold. While at UCL I met my husband, who is a chemist and historian of science (and my career is punctuated by his moves).

I found the world of science competitive and sexist. When I was a research student, the student on the next bench appropriated my results (and some other people's). He went from strength to strength: to a chair, FRS, then became Principal of UMIST, before colleagues had him impeached for sharp practice. People used to say 'he got his come-uppance in the end', but it took some time! In California, my department was split by an argument whether to give a (very competent) woman tenure – they didn't. Cambridge and UCL did not appoint a woman lecturer in chemistry until 1990; crystallographers fared somewhat better. I encountered discrimination when my husband moved to a lectureship in Exeter in 1956. A colleague offered me research support, but the Professor was feuding with him and didn't want a woman in his department, and was supported by two ambitious young readers.

Clearly, it was time to have children: I wanted three, close together, so that I could get back into science when they were all at school. Childcare facilities were lacking, and John Bowlby was influential, saying that little children need constant care from their mothers. During eight years at home I wrote up my research, which stood me in good stead.

I returned to science on my husband's move to UEA, when our youngest son was four. I received some kindly mentoring from a colleague of my husband's, who said I should apply for a Research Council fellowship. He would support me, but would not expect me to work for him. I managed to build up my research, in six years, and do some teaching.

When my husband moved to London in 1970 the Open University was just setting up, and I was appointed lecturer in chemistry – remarkably – at the age of 47. Of course, the OU is directed at returners to education. It was tremendous fun, though hard work; commuting to Milton Keynes, designing courses, home experiments, summer schools, writing course texts, making TV and radio programmes, doing research if we could. Then I noticed that my salary was that of someone 15 years younger, and that my younger colleagues, who lacked my research record and teaching experience, were being promoted to senior lectureships (they had families to support, while my husband could keep me!). I felt like a case of arrested development. I found an unexpected mentor in the chair of the Promotions Committee, the Vice-Chancellor. He said that with my research record I should apply for an ScD, then they would have to make me a reader. So I did and they did (this was only the third higher doctorate on the campus).

I began to work on women and science, and realised that I was the only one among my Cambridge contemporaries who had 'survived' in science after having children, and there were almost no senior women in chemistry. I joined OU course teams producing courses in women's studies, and carried out an analysis of women OU students, showing that their examination performance was consistently better than the men's (except in engineering and hardcore technology), in contrast to all other UK universities.

Although sorry to reach retirement age, I continued to work on women and science, as well as chemistry. I discovered that the proportion of women Fellows of the Royal Society has stayed around 3% for 30 years! and that 3% is an average for women in those self-replicating bodies, the world's Academies of Science (the higher the fewer!). I was secretary of the working group chaired by Nancy Lane producing *The Rising Tide, a Report on Women in SET* (HMSO 1994). The government's Response, in July 1994, accepted several of our proposals, including setting up a unit within the OST to take forward our recommendations, and 'looks forward to the work in this area of the newly formed Association for Women in Science and Engineering'.

Tips to younger women: network! and if you want a particular job, try the direct approach.

Joan Freeman's Passion for Physics

Joan Freeman (1918-1998), whose autobiography 'A Passion for Physics' came out in 1991, died earlier this year. Her book is an honest and humorous account of her earlier struggles and her later triumphs, for she was the first (and still the only) woman to win the Rutherford Medal of the Institute of Physics.

Joan Freeman was born in Australia, into an unscientific family, in financial difficulties in the depression. She discovered the delights of Meccano as a child. With her mother's support, she went to Sydney University, to read maths and physics. She worked on radar during the war, then won a scholarship in 1946 to Cambridge to work for a PhD. It took her half a year to find her own project and a supervisor in nuclear physics, such was the turmoil in the Cavendish Laboratory after the war.

In 1951 she moved to the Atomic Energy Research Establishment at Harwell, following her friend John Jelley. They married in 1958 and spent a sabbatical year in the US as an extended honeymoon. She worked at MIT on the Tandem van de Graaff Accelerator, and on her return, led the Tandem Group at Harwell, studying nuclear reactions. with an eye to reactor design. These reactions included the emission of electrons (beta-rays) by unstable nuclei.

Her work in the 1960s provided a direct experimental test of theories of the weak nuclear interaction, one of the four fundamental forces of physics; the others are gravity, the electromagnetic interaction (including Coulomb interactions between electrons and nuclei), and the strong (intra)nuclear interaction. The weak interaction is responsible for beta decay. Weinberg and Salam developed a unified theory for the electromagnetic interaction and the weak nuclear interaction in 1967. The theoretician Roger Blin-Stoyle, at Sussex (whom she met at MIT) realized that beta-decay measurements could be used as a test of the theory. Joan's very accurate measurements of beta-decay of nuclei showed that the theory must include a heavy W particle transmitting the weak interaction. She and Blin-Stoyle were awarded the Rutherford Medal and prize of the Institute of Physics in 1976 for this discovery. In 1982 the W boson was identified at CERN by Carlo Rubbia and his team.

She retired unwillingly in 1978: women then had to retire at 60, as against 65 for men. John took early retirement and they both did consultancy work, and went sailing in their own yacht, until John's death in 1997.

A Passion for Physics: The Story of a Woman Physicist, Adam Hilger, 1991,

is available from IOP Publishing Ltd (www.iop.org/Books).

History of Medicine

2000 BC Here, eat this root.
1000 AD That root is heathen. Here, say this prayer.
1850 AD That prayer is superstition. Here, drink this potion.
1940 AD That potion is snake oil. Here, swallow this pill.
1985 AD That pill is ineffective. Here, take this antibiotic.
2000 AD That antibiotic doesn't work anymore. Here, eat this root.

from NZ AWIS Newsletter, Auckland Issue no.5, September/October 1998

Forums for Discussion: The Women's National Commission

The WNC, which links organisations representing women to the Government, held its annual consultation meeting in Westminster on 19 January 1999, to discuss this Government's record so far, and prepare for the UN *Commission on the Status of Women* in New York in March.

Fiona Reynolds, Director of the Women's Unit in the Cabinet Office supporting the Ministers for Women, introduced a discussion of their report *Delivering for Women: progress so far*[1] which cross references the text with the headings[2] of the *Platform for Action* agreed at the UN Conference on Women in Beijing (1995). Discussion continued in workshops, reporting to a plenary session. My workshop on *Women and Opportunity*, under the heading *Institutional Mechanisms for the Advancement of Women*, included a discussion of ageism, which women encounter after taking time out.

As the name of our Journal suggests, *Forum* is intended as a vehicle for *your views*, which AWiSE can transmit in forums such as the WNC.

JM

Notes

1 Obtainable from the WNC, Cabinet Office, Horse Guards Road, London SW1P 3AL. Tel 0171 238 0386. Fax 0171 238 0387. www.open.gov.uk/womens-unit/delivering

2 Women and Poverty, Education and Training of Women, Women and Health, Violence against Women, Women and Armed Conflict, Women and the Economy, Institutional Mechanisms for the Advancement of Women, Human Rights of Women, Women and the Media, Women and the Environment, Girls.

Dorothy Hodgkin: A Life

Georgina Ferry

Dorothy Crowfoot Hodgkin(1910-1994) was a remarkable woman: the first since Florence Nightingale to receive our highest honour, the Order of Merit, the first woman Nobelist in chemistry after the Curies (mother and daughter), the only British woman to win a Nobel prize. Georgina Ferry's biography admirably does her justice, and contains a wealth of information, including some which will be new to those who knew Dorothy well. She wrote countless letters and never threw anything away: letters to her parents in Egypt and the Sudan, where her father was director of Education and Antiquities, daily letters to her husband Thomas, who worked away from Oxford, letters to her mentor Bernal, and to scientific collaborators from Bangalore to Beijing.

Dorothy (Dossie to the family) was born into a demanding and supportive family, linked to an intellectual/ scientific aristocracy. Her mother yearned for higher education, which she was not allowed, and made up for this for herself and her four daughters. Her parents were disappointed to have no sons; and much responsibility fell on Dorothy, the eldest, while her parents were abroad, all a familiar pattern for high-achieving women.

Dorothy studied chemistry at Somerville College Oxford, then went to Cambridge to study the new science of crystallography with J. D. Bernal, known as Sage, because he was so clever, farseeing, and generous. Oxbridge and physical science were unfriendly to women, but newly expanding fields were more friendly, particularly those requiring painstaking, tedious work (which women do so well!). Returning to a fellowship at Somerville, she didn't just encourage her chemistry students to do crystallography, if they were able, she scooped them up. Her triumphs, the structures she solved, were of peculiarly 'vital' substances: cholesterol, vitamin D, penicillin, vitamin B12 (cure for pernicious anaemia), insulin. Unusual structures in the penicillin and B12 molecules startled the chemists.

It was no easy life. From the age of 24 she suffered badly from rheumatoid arthritis which was to cripple her hands and feet; she was free of this only while pregnant. She married Thomas Hodgkin when she was 27, and had three children. For many years she was juggling teaching, research and children, helped by her extended family. Oxford's treatment of her was shabby. At the age of 34, to make ends meet, she went to her head of department to ask for a junior university post. The men all had university as well as college posts, and the new readership in crystallography had gone to someone else. Yet three years later she was elected to the Royal Society, at the early age of 37, as only the fifth woman Fellow. The Royal Society awarded her a Research Professorship in 1960. In 1964 the Daily Mail ran the headline "Grandmother wins Nobel Prize".

Dorothy Hodgkin with her children Toby, Liz and luke on her election to the Royal Society in 1947 (reprinted by permission of the publishers)

Crystallography was not her only passion. She and Thomas were profoundly anti-war; all four brothers of Dorothy's mother were killed in World War I. She supported the Pugwash Conferences of scientists from both sides of the Cold War, working to oppose nuclear and chemical weapons, and was Pugwash President in the 1970s. There is a charming description of Dorothy advising her former pupil, Margaret Thatcher, on improving relations with the Soviet Union – advice which Thatcher took when she met Gorbachev and called him 'a man I can do business with'.

The Medical Research Council

A look at an AWiSE Supporter

The Medical Research Council is the UK's leading organisation dedicated to advancing knowledge in all areas of human health. The MRC supports research both in the UK and abroad. The total MRC budget for 1997/98 was £323.8 million, of which around half was spent on scientific programmes at the Council's 40 plus Units in the UK and abroad and the remainder was spent on funding the work of individual researchers and research teams in UK universities and teaching hospitals. Accountable to the Department of Trade and Industry's Office of Science and Technology, the MRC is independent in its funding decisions. The MRC was established in 1913, and has since been responsible for many major discoveries in medical science, and has directly supported or had associations with 17 Nobel Laureates over the years since then. The Council has an international reputation for scientific excellence and has also been instrumental in establishing high ethical standards in research practice.

Key Women at the MRC

Over the years many of the leading female scientists across the scientific spectrum have been associated with the MRC. The MRC's current female professors include Professor Nancy Rothwell, who gave the prestigious Royal Institution Christmas Lectures in 1998. Professor Sally Macintyre is Director of the MRC Medical Sociology Unit in Glasgow, Professor Janet Darbyshire has recently been appointed to head up the new MRC Clinical Trials Unit in London, Dr Sheila Bingham has taken up her appointment as Deputy Director of the MRC Dunn Human Nutrition Unit and Dr Ann Prentice heads up the new MRC Resource Centre for Human Nutrition Research. Director of Research at the MRC is Dr Diana Dunstan, who received an OBE in the 1998 Queen's Birthday Honours and other senior women at MRC Head Office include both Director of Corporate Affairs (Jane Lee) and Director of Personnel (Gillian Breen).

Communicating Science

MRC has a strong programme of public communication to further the aims of medical research. This includes a schools programme, parliamentary links and sponsoring and presence at exhibitions. Recent sponsored events include the popular Women's Science nights at the Science Museum. The next one at the Science Museum is during SET week on 13 March. The events are aimed at women who do not have a science background but since the day after is Mothering Sunday we are suggesting that women scientists might like to treat their non scientist mothers or daughters over 18 to an insight into what enthuses them about science. We hope to extend these to other parts of the country later in the year.

Women as research scientists

MRC supports the aims of AWiSE and makes a financial contribution. We have recognised the concerns the organisation has expressed. In particular, MRC took very seriously the contention that there is bias against women as research scientists based on evidence presented in the paper in Nature in May 1997.

The MRC in the UK carried out an analysis of its own funding schemes. Across the five Fellowship Schemes and Project and Strategic Project Grant Schemes, the analysis showed no general evidence of bias for or against women applicants. We reviewed, as the Swedish study had done, whether the standard of academic achievement needed for a woman to be successful was the same as that for a man. Track records were measured by using the number of refereed papers published by the applicant and the standing of the journal in which they were published as a rough indicator, using the MRC's Career Development Award, an intermediate level non-clinical fellowship as a sample scheme. For the purpose of the analysis, the publication record of the applicants for five years prior to their application for funding was studied. The study showed that successful women had similar publication records to successful men and the differences were not significant. There are on the whole fewer female applicants than male for funding and also women tend to apply later than men, with only 19% applying before the age of 30, while 24% of men and 50% of successful men applied between the ages of 25 and 29.

No indication of bias was found in the overall MRC grant or fellowship awards to men and women. Analysis of publication records among applicants for MRC's Career Development Awards showed no difference between the standards male and female applicants must reach to win funding. The MRC will continue to monitor and publish award rates by gender over the coming years.

Overall 45% of MRC, excluding those in administrative roles, are women. Almost all these have at least a post A level science background. However latest figures show that 75% of grant holders are men. We urge women to apply to MRC for funding, since only by bringing up the number of total female applicants, can the number of successful female applicants be increased.

Further information:
Contact Elizabeth Mitchell,
Public Communication Manager on
0171 6365422

See our website on www.mrc.ac.uk

MRC
Medical Research Council

The Athena Project

The focus of the Athena project which is to be launched by CVCP on 23 February 1999, is the unacceptable wastage of the skills and talents of women in science, engineering and technology (SET) in Higher Education (HE). In the global markets of the 21st century, effective and well trained staff will represent the key competitive advantage of knowledge based enterprises. Although SET has a pivotal role to play in improving national wealth creation and the quality of life, women are an under-used resource.

The project builds on the *Winning Women* programme of the Scottish Higher Education Funding Council (SHEFC). This identified good practice in improving women's careers in SET in HE, in terms of access, participation and progression.

The *Athena* project will encourage strategies, promote good practice and offer incentives to HE Institutions to improve the participation and promotion of women in each SET subject area, by;

- reducing wastage and improving career retention and promotion prospects
- disseminating and encouraging good practice on participation in and progression through careers in HE
- raising the profile, visibility and contribution of women

The immediate goal is a 10% improvement by 2003 over current rates at all levels of academic appointments within HE.

The project will develop methodologies at national, regional and institutional levels for:

- imaginative and flexible working arrangements
- the identification and breaking down of the barriers to women's progression
- confidence building, career and personal development

Strategies and incentives being considered, include:

- mentoring schemes for women/ returners
- promoting flexible working arrangements
- a UK database of women working in SET in HE
- pump priming funding for transferable initiatives
- a high profile award scheme supported by industry

The project Director is Dr Susan Bullivant and further information can be obtained from The **Athena Project Office, 15 Prince's Gardens, Exhibition Road, London, SW7 2QA**. Tel. 0171 594 5509, Fax. 0171 594 5510

Did I Say Hairdressing? I Meant Astrophysics

Narrated by Alan Bennett, this watchable story of Nod, the great man of science, and his family, highlights not only the stereotyping of roles for girls but also for boys.

Subverting themes from traditional stories, this short, entertaining and thought provoking cartoon shows why women are under-represented in SET. It illustrates the subtle and not-so-subtle gender typecasting which still prevails from childhood to the professional level. Taking a positive and practical approach, it encourages women and girls to consider study and training in these fields. It also helps audiences to appreciate how SET affects our daily lives and highlights the transferable skills gained at home and in the workplace.

The video can be used to raise awareness and stimulate discussion in educational and training sessions and conference presentations. It will also appeal to those already in the field who will appreciate some of the more subtle comments.

Available from **Leeds Animation Workshop**, 45 Bayswater Row, Leeds, West Yorkshire, LS8 5LF, Tel & Fax 0113 248 4997. Sale £40, hire £10 inc. vat & p&p

CUCO

The Commission on University Career Opportunity (CUCO) was launched by the Committee of Vice-Chancellors and Principals in June 1994, to overcome the barriers to equal opportunities in universities, and ensure that they benefit from selecting and developing the best people from all sections of the community.

CUCO's role is to inform, advise, promote and persuade universities and HE colleges to realise the educational, economic and cultural value of diversity by employing, at every level of responsibility, people drawn from all the varied communities which universities and HE colleges serve and influence.

The Commission uses publicity and persuasion to:

- emphasise that diversity includes age, colour, disability, ethnic or national origin, gender, marital status, nationality, race, religion and sexual orientation.
- help universities and higher education colleges to ensure that staff in all modes of employment are fairly selected, deployed, appraised, developed, rewarded, promoted and otherwise fairly treated.
- encourage universities and higher education colleges to set their own programmes of action and goals to achieve a balanced representative body of staff.

The **Athena Project** (see opposite) is part of CUCO's action agenda to remove discrimination for women at all levels. The **Women in Higher Education Register** (see next page) looks to fulfil one of CUCO's current action points – "the establishment of a data base of senior women in HE as part of its targets:

- to remove the barriers to women at all levels
- to have women in 15% of the top posts in 2002 and 25% by 2007"

Further information from **Fiona Waye at CVCP on 0171 419 5483**, or email **Fiona.Waye@cvcp.ac.uk**

Contracts and Careers

The Women in Higher Education Register

The core business of the Register is the collection, analysis and dissemination of information on women in HE, collectively and individually. The Register will be open to all working in HE in the UK, with key objectives

- to make accessible the skills and expertise of women in HE
- to address the current inaccessibility, under utilisation and under representation of women in the corridors of power
- to provide data for research
- to address the significant issues for women in HE:
  - training and development
  - under utilisation, inequalities of opportunity and outcome
  - career breaks, retention and returning
  - progression and promotion
  - stalled and frustrated career ambitions
- to facilitate a resource centre and networking base for women in HE
- to raise the profile of women in HE
- to demonstrate commitment to the progress and contribution of women in HE
- to give an impetus to women in HE to discover the power and uses of Information Technology

The register will provide its members with a resource centre and facilities for networking, links with other networks, career and personal development opportunities, assistance to participate in decision-making and influencing forums, national committees, working and advisory groups.

Further information, including membership forms are available from **Caroline Fox, The Women in Higher Education Register, 15 Prince's Gardens, Exhibition Road, London, SW7 2QA**, Tel. 0171 594 5509, Fax. 0171 594 5510.

Forum 4 described heartsearching over the status and insecurity of research staff employed on fixed-term contracts (CRS). Women, in particular, risk uncertain provisions for maternity, childcare and re-entry after breaks in a career or part-time working. They also risk ageism: this can include 'commonsense' notions such as favouring the man with a young family and a mortgage as against the older woman 'whose husband can keep her', and favouring younger people who are cheaper ('research grants are training grants'). Such hazards ensure that the proportion of women surviving to occupy senior positions in our profession is around 10%: thus women are 60% of biology students, but only 6% of Biology Professors.

In 1996 a *Concordat* on CRS was reached between university and college representative bodies, as employers of CRS, and funding bodies including the Research Councils, the Royal Society and the British Academy (the Wellcome Trust says that its provision will be at least as good as those agreed). The *Concordat* may be found on the website www.cvcp.ac.uk of the Committee of Vice-Chancellors and Principals. Now we have the report of the *Research Careers Initiative* (RCI) which was set up last year to monitor progress following the *Concordat*; this is available on the OST website at www.dti.gov.uk/ost/concord.

The RCI included representatives of funding bodies in public and private sectors, universities, unions, and the OST, and was chaired by Professor Sir Gareth Roberts FRS, Vice-Chancellor of Sheffield University. Working groups looked into careers guidance, career structure and management, the training of CRS and those responsible for managing research, and the finance-related issues which underpin the rest. The CVCP website carries the reports of some of the working groups (with guides to best practice): one on career guidance and training, one on career management and structure, the latter directed to CRS, to HEI personnel responsible for them, and to those funding research. Also on the website is an analysis of end-of-grant questionnaires completed by CRS, and material from the CRS Initiative, now in its second phase, of SHEFC, the Scottish HE Funding Council.

The problem is substantial. Higher Education Institutions (HEIs) employ over 30,000 CRS, compared with 70,000 academic staff on more permanent contracts, teaching and researching. Thus CRS amount to 30% of staff overall, but in science and engineering the figure is 40% and increasing. At Cambridge in February 1998 the proportion of CRS was 60%, with 1277 academic staff (13.9% female), and 1941 CRS (38.4% female). Note that the proportion of women among CRS is nearly three times the proportion among tenured academics.

The RCI Report finds that measurable progress is being made, and expects further improvement over the next two to three years, although problems persist and there is still much to be done. It stresses the importance of career guidance, management and development of CRS as a distinct category of staff and development. A useful proposal is for each HEI to set up a designated body and an annual forum to monitor implementation of the Concordat. The RCI's *Guide to Best Practice* includes the following proposals:

- two-tier career progression, from research associate to research fellow
- financial and other levers, such as bridging funds, HEI-funded fellowships (taking over from the funding bodies), and research support units
- progress must be monitored.

Gareth Roberts's Preface concludes 'I hope our report will contribute to the process of putting things right. Good practice should be publicised, to persuade backward institutions that this is in everyone's interest'.

An institution that has led the way is University College London, which has provision to move CRS into established positions after a specified period in post.

JM

Branch News

Oxford AWiSE

Singing Flames that Break... Power Stations and Jet Engines

The sixth Oxford Science Lecture was given on October 15 by Ann Dowling, Professor of Mechanical Engineering at Cambridge University. It was the first on a purely engineering subject, and was attended by a strong contingent of sixth-form boys. The theme of Professor Dowling's research is 'unstable flows'; it involves studies of the conditions which cause apparently stable systems to develop instabilities, and finding routes for calming or preventing such situations from reaching dangerous levels. She is currently applying the theory and techniques to investigations of flames in specific cases: in the afterburner of a jet engine, and in gas-fired power stations.

Jet afterburners bring about acceleration in aircraft; the greater the velocity of gas issuing from the back, the greater the forward thrust on the vehicle carrying the engine. The process is not efficient in acceleration per fluid consumed, so is only applied for short periods. However, the conditions of operation can cause the gas to burn in a highly unstable mode; large pressure oscillations can build up, capable of causing severe structural damage to the engine. Gas-fired power stations are very efficient and are therefore desirable energy generators, but are prone to commence unsteady combustion. The pressure waves, or sound, thus generated have already caused many such power stations to be damaged – linings crack and whole buildings may eventually collapse – so there is an urgent need to analyze the conditions responsible for the onset of these combustion instabilities and to devise a suitable remedy. (The damage that sound waves can cause is well known: you can cause a wine glass to shatter by playing the right note on a violin.)

Instabilities occur through interaction between sound wave and unsteady heating. Unsteady combustion generates sound (acoustic) waves, and conversely sound can cause flames to become unsteady. The principles involve the properties of an organ pipe (an open or closed tube is made to vibrate), and what makes it resound. By heating a gauze placed at one of the nodes in a Rijke Tube (a large metal 'organ pipe' with a diameter of about two inches) Professor Dowling showed how the tube resounded loudly when held with the gauze below the middle of the tube, but ceased to do so when it was turned the other way up. Indeed, it was surprising that only a few calories of heat energy could be responsible for producing so much sound energy; the equivalent effect when scaled up to the size of a power station was difficult to imagine...

Unsteady burning is often traced back to methods of gas injection and air mixing, and instabilities can sometimes be damped by applying suitable interruptions to the input flow. In simple situations one can determine the frequencies which the unsteady burning causes, and design the relevant structure so as to avoid resonances from building up. In other cases the boundary conditions may be changed by electronic interference; this was again demonstrated convincingly by lowering a glass tube over a flame until it 'sang' loudly, and then controlling it via a feedback mechanism. The feedback was achieved by using a microphone to record the sound being produced at the top of the tube, analysing its frequency, shifting its phase electronically by 180 degrees, and then playing the new sound back at the level of the flame using a loudspeaker. The difference between the sound with and without feedback was appreciable.

We were also shown video films of experiments in which flames were 'attacked' by acoustic waves, and heard about models for analyzing problematic situations and current efforts at controlling them. The stable gas-fired power station is not yet a reality, nor is the silent afterburner, but by pursuing experiments and theories such as these the Cambridge team is surely on the right road to finding solutions.

Professor Dowling has already made history as the first woman to be appointed to a Professorship of Engineering at Cambridge University. Someone with such natural talent and clear insight, such fascination for mechanical problems and evident zeal for every facet of the science, must be on course to bring down important scientific barriers as well. We wish her all the best in the years ahead.

Elizabeth Griffin

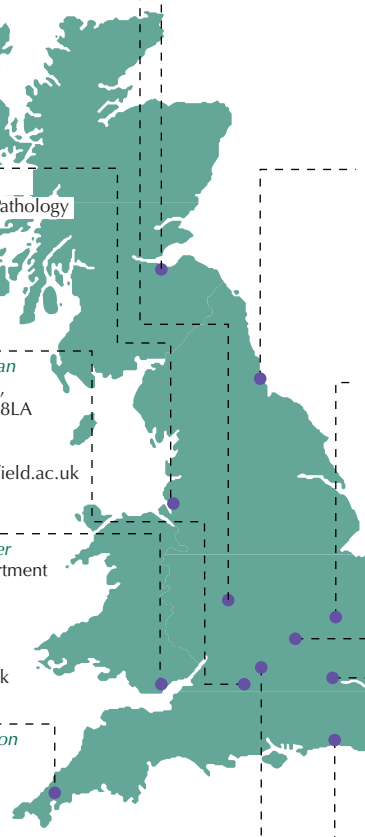
North West

Joint Venture between University of Liverpool and the Everyman Theatre during Science Week 99

AWiSE members are contributing to a series of workshops combining science and stage presentations. A number were held in secondary schools in the Manchester/Merseyside area during November; these were open to students from age 14-18; students groups have comprised a whole class sometimes, but smaller groups have also worked well. Science teachers who have had no experience of drama, and drama teachers with no experience of science have been involved. There has also been a combined 'Masterclass' session for everyone in December. The co-operation and creative possibilities which developed between teachers and students who have never met before were quite remarkable. All the sessions have been thoroughly enjoyed by all participants, with science and presentation skills equally explored. During January, the pieces devised by each group will be assessed, and the best of these will be staged at the Everyman Theatre during Science week.

In December Anne Leeming (AWiSE vice-president) addressed a meeting of IT women in Birkenhead and AWiSE

Branch Contacts



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was also represented at the Standing Conference of Women's Organisations held on Wirral during December.

Judith Varley

Cambridge AWiSE

Anyone for video-conferencing?

Cambridge AWiSE has again made a Christmas visit to Schlumberger Cambridge Research. Before a festive dinner, the evening began with a guided tour of the multi-disciplinary research facilities under the remarkable tent structure that graces our western skyline. Paricularly interesting are the downhole measurements in oil and gas exploration and production. Schlumberger uses sophisticated information-networking between its various locations in 100 countries, including research centres in Connecticut and Texas. Thus, they generally use video-conferencing. They are also keen to attract a more diverse workforce, and the suggestion arose, that we should hold a video-conference in 1999 to discuss how to improve women's contribution to science and engineering. Anyone who'd like to participate, please let us know!

Joan Mason

Wales and Avon

We are starting a new AWiSE branch, to cover the Wales and Avon area. We hope that it will provide a focus for everyone in the region who is interested in women in science and engineering, to enable us to make contacts and get to know one another. If there is sufficient interest, we very much hope to organise regional meetings and social events, probably focused on Cardiff and Bristol initially. Please get in touch with the regional co-ordinator, Amanda Baker (see branch map for details), especially if you have any suggestions or would like to volunteer your services. We will be setting up an email discussion list to supplement the other available means of communication.

Amanda Baker

CWEST

Forces of Nature

In the South West during SET week99 a competition is being held for local schools and colleges entitled Forces 0f Nature – Are we safe from earthquakes? Are all volcanoes dangerous? Why is Cornwall the best place to see the eclipse? Schools and colleges are invited to explain these and other aspects of a natural phenomenon. Presentations can be in the form of displays or demonstrations and prizes will be awarded to both schools and individuals.

The event will take place at the Camborne School of Mines, March 12-21 and anyone interested in taking part should contact Lesley Atkinson or Bob Barley on 01209 714866.

Lesley Atkinson

Scotland

ScotAWiSE

The ScotAWiSE mailing list now has 28 subscribers and a reasonable trickle of mail. We would like to welcome more people with enthusiasm and time to join in the development of an active and lively Scottish AWiSE section. Anyone interested in joining the mailing list can subscribe by sending the message:

subscribe scotawise

to

scotawise-request@ling.ed.ac.uk

For information, send the message

info scotawise

to the same address.

Astrid Schepman

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Call for Contributors!

We want your news & views! Copy date for the next newsletter is 1 March 1999. Please send all items for inclusion to Christine Linfield at the above address.

Diary

For information on meetings at the Royal Society, 6 Carlton House Terrace, London SW1Y 5AG, tel 0171 839 5561, x 2574/2575 www.royalsoc.ac.uk.
Registration is required only for discussion meetings: discussion.meetings@royalsoc.ac.uk

JANUARY

28 *INTRACELLULAR MEMBRANE TRAFFIC: GETTING PROTEINS SORTED*
Hugh Pelham FRS, 17:30 Croonian Lecture at the Royal Society.

FEBRUARY

2 *INTRACELLULAR MEMBRANE TRAFFIC: GETTING PROTEINS SORTED*
Hugh Pelham FRS, University of Edinburgh.

10 *THE MOLECULAR CHEMISTRY OF MAGNETS AND SUPERCONDUCTORS*
Peter Day FRS, 17:30, Bakerian Lecture at the Royal Society.

15 *THE MOLECULAR CHEMISTRY OF MAGNETS AND SUPERCONDUCTORS*
Peter Day FRS, Bakerian Lecture, Oxford

24-25 *WAVELETS: THE KEY TO INTERMITTENT INFORMATION?*
discussion meeting at the Royal Society

25-26 *HEALTHY HERITAGE: COLLECTING FOR THE FUTURE OF MEDICAL HISTORY*
Wellcome Institute for the History of Medicine, Euston Road, tel 0171 611 8888

MARCH

8 *INTERNATIONAL WOMEN'S DAY*

12-21 *NATIONAL SCIENCE WEEK SET99*
British Association for the Advancement of Science
▽ tel 0171 973 3500, fax 0171 973 3051

13 *WOMEN'S SCIENCE NIGHT* Science Museum
▽ Science Night, Science Museum, Exhibition Road, London, SW7 2DD, tel 0171 9389785

20 *CAMBRIDGE AWISE WOMEN AND SCIENCE DAY*
with the Cambridge Medical Women's Federation, Rosie Maternity Hospital, Addenbrooke
▽ tel 01223 247827

29-31 *CHANGING THE BALANCE: WOMEN, MEN AND THE TERTIARY TECHNICAL EDUCATIONAL EXPERIENCE*
University of Central Lancashire, Cumbria
▽ Sally Edmundson 01772 892250 s.edmundson@uclan.ac.uk

APRIL

24 *GASAT (UK) Networking Meeting* Open University, Walton Hall, MIlton Keynes
▽ g.e.kirkup@open.ac.uk

JUNE

8 *PRETTY PRETTY BANG BANG!*
Jackie Akhavan's Fireworks in the Cambridge University Chemistry Laboratory, Lensfield Road, Cambridge, CB2 1EW, 18:00. tel 01223 336300/336454

JULY

4-9 *GASAT-9 INTERNATIONAL CONFERENCE* Accra, Ghana
▽ Georginia Quaisie, gquaise@africaonline.com.gh

24-27 *SCIENCE AND TECHNOLOGY FOR GLOBAL ECOLOGY*
11th International Conference of Women Engineers and Scientists (ICWES), Chiba, Japan
▽ Akiko Tsugawa tel +81 3 3812 2413, tsugawa@adm.s.u-tokyo.ac.jp

SEPTEMBER

13-17 *BRITISH ASSOCIATION ANNUAL FESTIVAL OF SCIENCE* Sheffield University
▽ tel 0171 973 3500, fax 0171 973 3051

Change of AWiSE Address

From 1994, when AWiSE was first mooted, we enjoyed the hospitality of the Wellcome Trust, with the use of an office in their building at One Park Square West (PSW), a mile or so from the main Wellcome Building in the Euston Road. The Trust has now relinquished the PSW lease, and our London address has moved around the corner to **59 Portland Place, London W1N 3AJ**, by courtesy of the Biochemical Society. When people telephoned us at PSW the call usually went through to Christine Linfield on **01647 221316**, and this should now be used as the AWiSE telephone number. The email address remains **awise@wellcome.ac.uk**, courtesy of the Wellcome Trust.