

THE ROYAL SOCIETY OF CHEMISTRY *FOR SCIENCE AND HUMANITY*

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The title of this article comes from the coat-of-arms of the Royal Society of Chemistry (RSC). Many organisations in the UK have quaint logos like this and most find it necessary to provide notes to explain what they mean. I shall refer only to the words on the scroll 'For Science and Humanity'



because they underpin the work of the Society and explain why it does some things and not others.

The Chemical Society was founded with 77 members in 1841, about the time that chemistry was becoming a separate discipline, distinct from other branches of natural science, such as physics and biology. In 1997 the Royal Society of Chemistry as the original society has now become, has about 45,000 members, about 35,000 in the UK and the rest distributed widely throughout the world. It is one of the longest established and most international of all the chemical societies. About 50% of the members work in industry and the others are mainly in the educational sector. About 20% of the members are under 30; many of us joined when we were students and have remained members all our professional lives. The Society employs over 300 full-time staff and about 30 part-time staff.

The words 'For Science and Humanity' are expanded in the present Royal Charter, the legal

document that defines the Society's status and powers. The aims of the Society are:

- To serve chemistry and chemists**
- To advance the science of chemistry**
- To set and maintain standards and qualifications**
- To serve the public interest.**

The first aim is **to serve chemistry and chemists**. For young people who have not yet chosen a particular career the Society produces a series of exciting eye-catching posters to encourage them to study chemistry. It supports its members who give demonstrations and talks. It organises competitions and careers fairs. Its journal *Education in Chemistry* is provided free to schools. Its Schools Publications Service provides, for a small subscription, a regular information pack containing a variety of other teaching materials, including publications from the American Chemical Society and others from Canada, Ireland and New Zealand. At the international level the Society provides financial help to support a small number of young teachers working for Voluntary Services Overseas and to provide them with textbooks.

When people move on from school to university the Society sponsors lectures and events where chemists can meet other chemists. It provides bursaries for post-graduate students to attend conferences. Its house journal *Chemistry in Britain* is sent each month to all members and this provides space for the airing of current developments and discussion of issues of general interest. Throughout a member's career the Society provides advice on continuing professional development and publishes a series of documents on standards, both academic and ethical, and on matters concerned with employment. It collects information from its members and publishes one of the most comprehensive and reliable surveys of professional remuneration in Britain. It has a benevolent fund to help chemists or their dependants who fall on hard times.

The Society groups its members into local sections covering particular geographical areas. Most of these are in the UK but there are others, particularly in the countries of the Commonwealth which were formerly linked administratively with Britain. Besides these international links within the RSC there is growing collaboration with members of sister societies, especially in Europe. The European Communities Chemistry Council was set up to link the 24 chemical societies of the states in the European Union, and was mainly concerned with policy, *e.g.*, on research or the mutual recognition of qualifications. The Federation of European Chemical Societies is a bigger body with 40 societies in 32 countries. For many years it brought together chemists from countries that were split politically between East and West. Now, with increasing collaboration across the former European divide, the European Communities Chemistry Council and the Federation of European Chemical Societies have merged.

The Library and Information Service of the Society has the largest collection in the UK of material specifically devoted to chemistry and its applications, with 2000 journal titles (700 current), 20,000 reference and text books, a growing collection of CD-ROM's and a large historical collection. All this is available, much of it in open access, in central London and by photocopy and fax to all corners of

the world. Information about the Library can be accessed through the Internet; the website can be visited at

[HTTP://chemistry.rsc.org/rsc/library.htm](http://chemistry.rsc.org/rsc/library.htm).

Most of these services have to be paid for but some, which do not involve the Society in increased marginal cost, are free to members. For universities and research institutes which are building up new libraries, for those where the libraries have been destroyed by war, and for those where runs of journals are incomplete, the Society collects back issues from people who no longer require them and arranges for their dispatch to their new location.

In these ways the Society seeks to serve chemists throughout their professional lives and to keep them in touch with other chemists both within their own country and internationally.

The second aim of the Society is to **advance the science of chemistry**. The main vehicles for this are the sponsoring of awards for excellence in research or teaching, the organisation of scientific meetings, and publications. There are about 40 endowed lectureships and 50 specialist awards sponsored by industry (though not all of these awarded each year).

The main meetings are organised by the six major divisions of the Society covering the traditional branches of the subject.

Analytical	Faraday (physical)
Dalton (inorganic)	Industrial Affairs
Education	Perkin (organic)

These collaborate with each other or with the various international conferences to cover specialist areas. In addition there are 70 subject groups with membership ranging from 40 on a highly specific topic like Mössbauer spectroscopy to over 2000 on a topic of wide interest such as environmental chemistry. Some fit into specific divisions and others do not. The subject groups are much less formal than the *big conferences* and provide opportunities for younger members to present their work and gain experience. Meetings specifically for predoctoral speakers feature regularly in the twice-yearly congresses of the Society. A Younger Chemists Committee organises workshops, seminars and social events, and provides career advice and contacts with industry.

Industrial and academic members are also brought together in a series of industry/academic workshops to discuss issues such as the training of chemistry graduates and the maintenance of a strong chemical infrastructure. The Foresight Programme has also been considered. This was initiated by the Government in 1992 to attempt to determine the areas in which limited public resources should be invested. Its importance is not so much that it provides a way to predict how science will develop but that it brings together people from industry, universities and government who have common problems and overlapping aims. There has also been discussion on how to achieve the right balance between research directed towards economic well-being and improved quality of life on the one hand and curiosity-driven research pursued without such constraints on the other.

The Society seeks to advance the science of chemistry through its specialist publications which are recognised internationally for their quality. They are constantly being upgraded and several are

now available electronically. The best known titles are shown below.

Chemistry in Britain	Journal of Chemical Research
Chemical Communications	Chemical Society Reviews
Dalton Transactions	Analyst
Faraday Transactions	Natural Product Reports
Perkin Transactions I and II	Journal of Materials Chemistry

About 8000 papers are received each year by the primary journals and about 5000 published; 80% of these, and 90% of the revenue they generate, come from outside the UK. There is also a series of review journals with mainly commissioned articles from specialists. Since the publications of the Society, which have a turnover of £17m are truly international, it has recently been decided that £200,000 of the financial surplus each year should be used to provide funds for non-UK chemists to spend short periods in another country to collaborate in research, exchange ideas and results, or learn new techniques. There are also J.W.T Jones travel grants to enable younger members of the Society from Britain or Ireland to work for short periods outside the UK, *e. g.* in Ethiopia. These two-way exchanges, for members outside the UK to come to Britain and for British or Irish members to work abroad, are intended to advance the science of chemistry in both home and host countries.

Another concern of the RSC is the image of chemistry with the general public. Chemistry is seen as polluting, causing environmental damage, or, when drug treatments go wrong, unnecessary suffering. The contributions made by chemistry to everyday life, to medicine and health, art and conservation, sport and leisure, agriculture, food, transport and clothing are not often reported in the media and so are unnoticed by the public. In an effort to assess this phenomenon, the RSC recently took one medium-sized town, carried out a promotional programme over several months and conducted detailed studies of public attitudes. The conclusions were published last year. They were that the targeted RSC campaign had raised public awareness of what had been done through chemistry and the effects were greater among unskilled than among professional employees. People were reasonably well aware of the benefits of chemistry but this awareness was more sophisticated than we chemists sometimes imagine. People were unlikely to be fooled by image-building designed to hide the darker sides of the chemical industry such as the damage it sometimes does to health or the environment. The promotional exercise was considered to be worthwhile but it was not cheap: a national campaign to improve awareness of chemistry would be very expensive.

To summarise: the RSC seeks to advance the science of chemistry through meetings, awards, publications, and raising public awareness.

The third aim of the Society is **to set and maintain standards and qualifications**. A few decades ago, when a lower proportion of young people graduated from school to university the Society organised a series of examinations each year. These were recognised to be of degree standard and were important in providing for those who had gone straight from school to employment, mainly in industry, and had studied part time to gain academic qualifications. More recently, the number of university places in the UK has increased, so that a much higher proportion of the population is able to obtain degrees than was previously the case. The work of the Society in setting examinations has thus decreased. However it still validates chemistry courses on a five-yearly cycle in all UK universities and colleges.

The membership of the Society is graded as shown below.

Fellowship for chemists of established reputation who have achieved senior responsibility

Membership for those who have satisfied the academic requirements and have gained approved experience in the practice, application or teaching of chemistry

Graduateship for those with approved first or second class honours degrees.

Licentiate for those with qualifications of pass degree standard

Student membership for those undertaking approved chemistry courses

Associate members are required only to have an interest in chemistry as a subject but many have formal qualifications in it. Professional members in countries classified by the World Bank as least or less developed are entitled to pay subscriptions which are one third of the full amount.

The expertise in education developed by the Society through its membership is made available in formal submissions to bodies, including Government, which are considering changes in the educational system. Recent discussion papers have been on *A New Core Syllabus for School Chemistry*, *Mathematics in Chemistry Degree Courses, Enhanced* (i.e. four-year) *First Degree Courses in Chemistry* and *The Chemistry Ph. D.* Documents on, e.g., *Modern Chemical Techniques* (background reading for chemistry teachers) and *The Reporting of Practical Work and Projects in Chemistry* have been distributed. The Society has also produced audio-cassettes on practical work and the use of computers, booklets on laboratory safety and professional briefs on environmental issues. It provides one-year fellowships to enable school teachers to develop new teaching materials. It services a Higher Education Chemistry Conference which provides a meeting place for heads of university chemistry departments and a pressure group to influence Government policy on higher education.

The RSC's role in maintaining standards and qualifications has changed over the years. It is no longer a major examining body but it has considerable indirect influence on the contents and structure of education in chemistry.

The fourth aim of the Royal Society of Chemistry is **to serve the public interest**. How can a Society of chemists, people like us, work together to serve the public as a whole, a public in which most people are non-chemists? In my account of how the Society tries to serve humanity as well as science my main examples are inevitably set in the context of British culture and the British parliamentary system. In these days of world-wide dissemination of news, however, practices in any one country influence those elsewhere. We all have much to learn from each other.

In Britain parliaments are elected for periods of up to five years. The members of the Government, who have executive power and are responsible for the day-to-day running of the country, are drawn from the political party with the largest number of seats in Parliament. In the House of Commons, called the lower house even though it has the greater power, there are only two sides and those Members of Parliament (MPs) of parties not in the Government are called the Opposition. The Leader

of the Opposition appoints a 'shadow cabinet' or 'front bench' whose members develop expertise in the main areas of government. This enables them to challenge, question and probe, often extremely robustly, the policies of their opposite numbers in the Government. In addition to the House of Commons there is an unelected upper chamber, the House of Lords, which can also initiate debates and legislation. There are few members of the House of Commons with qualifications in chemistry and fewer still who are active professionally. The House of Lords is served better because some members, including some very distinguished and well-informed professors of chemistry, are appointed for their contributions outside politics.

Public debates are therefore conducted and key decisions taken, as in most countries, by people whose knowledge of chemistry is slight and, at best, second-hand. Because of this the RSC has appointed a full-time 'Parliamentary Affairs Officer' whose brief is to ensure that the knowledge and expertise of the members of the RSC are made available and fed into public discussion of policy and legislation. He (it is he at present but it could equally well be she) operates in a variety of ways. First, he has close working relationships with two 'backbench' MPs (*i.e.* people not members of the Government or Opposition shadows) and less formal contacts with a number of members of the House of Lords. Secondly, he tries to arrange informal contacts between individual MPs and individual members of the RSC who live in the areas the MPs represent. In this way MPs have someone to whom they can turn for advice, assistance or just information about any matter involving chemistry. It takes a good deal of time to arrange these informal one-to-one relationships and inevitably many are broken when MPs are not re-elected. The Parliamentary Affairs Officer has to work particularly hard after general elections! Thirdly, he supplies direct assistance to MPs who ask for it. Sometimes issues blow up very quickly. A recent example started with a newspaper report about pesticide residues on apples. The Government had to make a statement. The Opposition had to ask probing questions. The apple importers and farmers wanted to protect their business. The British people, who eat a lot of apples, were alarmed. The names of the chemicals involved were unfamiliar and sounded frightening. Within a few hours the RSC was able to supply factual information to all sides.

The Society is unable to work solely for one particular political party. It can however feed information to both sides of the House. For example, it can remind a Government minister of the importance of the chemical industry in contributing to the economic prosperity of the country (something for which the minister will try to claim credit!) and at the same time prompt the Opposition shadow to ask about funds invested in education, or equipment for university research, necessary to keep a healthy chemical industry in being. Both sides are pleased to have debating points to make and public awareness of the importance of chemistry is increased.

The Society also prepares evidence for select committees (committees of backbench MPs) who can initiate enquiries into all aspects of Government business. It assists MPs in the scrutiny of legislation while it is still in draft form. Points can be forgotten by both sides, particularly when technical issues are not very well understood. For example, the Society was able to suggest and have written into the Water Bill (1989) that the committees set up to oversee water quality should include professional chemists, biochemists, biologists, civil engineers, geologists, *i.e.*, those with expertise in water analysis, management and quality control. In the Chemical Weapons Bill (1996) the Society was able to propose and have included in the Act of Parliament a provision for a national advisory committee with specialists with appropriate knowledge, and a provision for an annual report to be presented to Parliament. The Committee will be chaired by the current Secretary General of the RSC.

Public interest is served by transparency and openness, particularly in a secretive government culture like that we have seen in contemporary Britain. In the Criminal Appeal Bill (1995) the Society proposed that the commission considering miscarriages of justice should have within it specific expertise in forensic science. The general argument in these issues is that those taking decisions which affect individual people or the public in general should not simply be able to call for expert advice if they think this is useful or necessary. Instead, the decision-makers themselves should include people with first hand knowledge of technical matters, people who are able to assess the quality, and understand the limitations, of the expert evidence offered in any particular case.

A recent example in which the Society decided to act in the public interest concerned the Laboratory of the Government Chemist (LGC). This organisation dates from 1842, so its history is almost as long as that of the RSC. The Laboratory was set up to serve various government departments and was particularly concerned with the analysis of food, drink, tobacco, fertilisers, animal feedstuffs and, more recently, illicit drugs. A year or two ago, the Government announced that this long-established Laboratory was to be privatised and run as a commercial organisation. There was considerable concern within the RSC and the Royal Society, the oldest and most distinguished of all the scientific societies in London, that this move would prejudice the independence and impartiality of the Laboratory. The Royal Society stated: 'There is a fundamental difference between sustaining the national knowledge base and buying particular information for a particular purpose. The latter may be suited to a process of competitive tendering; the former must accommodate longer-term considerations.' The Government were adamant that they would no longer accept responsibility for the Laboratory and, after much heart-searching and a good deal of legal advice, the RSC, the Laboratory management and a venture capital firm called 3I formed a consortium which was able to buy the LGC from the Government. The Society's involvement is described as 'hands on for quality - hands off for business', *i.e.* it will not be involved in day-to-day commercial decisions but it will be able to ensure, through the expertise available from its members, that the integrity and impartiality of the Laboratory's work are maintained.

I have described how the RSC serves the public interest, informing and influencing Government without being a party to it. There is of course a downside. The Society's influence is limited precisely because it has no financial interest and often no clear view. Contrast the RSC with the Chemical Industries Association. The latter *has* a clear view. It wishes to influence Government to promote the prosperity of the chemical industry. Its aim is limited and clear. It does not have to balance the wide range of interests which together make up the public. Governments find it much easier to support, or to decide not to support, one particular section of the community than to weigh conflicting claims from different sections of the community with different interests.

I conclude with some questions for the future. First, the present time is one of rapid development in information technology and communication techniques and it is likely that the next few years will see an enormous increase in the ease of electronic access to scientific publications, teaching materials and data bases. Can the national societies throughout the world have a common web-server? Can the complex financial problems be overcome? We all know that many scientific papers contain much more factual material than discussion. Can the facts be accessed through data bases and only work which genuinely contributes to discussion be published? There are already international collaborations in publishing, *e.g.* between the RSC and the American and German Chemical Societies. These are likely to be extended.

The second series of questions concerns the influence of national societies on Government.

Europeans face the challenge of extending the contacts between their national societies and national governments to embrace European-wide chemical societies, the European Commission and the European Parliament. Can the networks of contacts developed through national cultures thrive in growing political entities covering much wider regions than the nation-state? Can the beneficial collaboration which has been established through the Federation of European Chemical Societies be extended to include North America, Africa and Asia? We have only just begun to explore such questions.

The third set of questions relate to discussion between different categories of members within organisations like the RSC. Academic scientists have been well served and there have been contacts between academics and people from the large chemical and pharmaceutical companies. But these days there are a lot of small companies (small and medium enterprises in European Union jargon) without large research bases and engaging in activities which involve other academic areas besides chemistry, *e.g.* materials, environmental science, agriculture, medicine or health. How can people from these be actively involved?

These issues are complex and possibly controversial. The RSC through its international office in London would like to discuss ways of working with, supporting, and learning from, sister organisations in other parts of the world. Science and humanity know no international boundaries. I am grateful to members of staff at the Royal Society of Chemistry, Burlington House, Piccadilly, London, especially Tom Inch, Evelyn McKewan, Stanley Langer and Stephen Benn for their help in preparing this article.

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