# The Royal Society and the Promotion of Science since 1960

The Royal Society is one of the world's oldest and most prestigious scientific bodies, but what has it done in recent decades? Increasingly marginalised by postwar developments and the reforms of civil science in the 1960s, the Society was at risk of resting on its laurels. Instead, it found ways of exploiting its unique networks of scientific talent to promote science. Creating opportunities for outstanding individuals to establish and advance research careers, influencing policy-making at national and international levels, and engaging with the public outside the world of professional science, the Society gave fresh expression to the values that had shaped its long history. Through unparalleled access to the Society's modern archives and other archival sources, interviews with key individuals and extensive inside knowledge, Peter Collins shows how the Society addressed the challenges posed by the astounding growth of science and by escalating interactions between science and daily life.

PETER COLLINS worked at the Royal Society from 1981 to 2013, responsible primarily for the science policy function and latterly for governance and for history of science. These roles included substantial engagement in international affairs and in often controversial public debates. As a long-term core member of senior staff, he was closely involved in development and delivery of the Society's strategy, and had a ringside seat at many key events in this period. In addition to many Royal Society reports, he has published on the history of the British Association and of the Royal Society, including a volume of conference proceedings on the Society in the twentieth century.

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For Geralyn

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# Preface

The Royal Society is about science. Its Fellows, a group with a wide range of conflicting opinions on almost every subject, are united in their passion for science. The Society is embedded in the scientific life of the UK, and is recognised throughout the world where science flourishes. Its mission, in the words of its founders, is 'promoting by the authority of experiments the sciences of natural things and of useful arts, to the glory of God the Creator and the advantage of the human race'. But the Society does not directly employ scientific researchers. Rather, it uses its particular attributes and resources in other ways to promote the sciences of natural things. Exactly how it does this reflects its understanding of its own identity and of the opportunities available to it. That understanding and those opportunities developed markedly in the years after the Second World War, and particularly after 1960, against a background of astonishing growth in the scientific enterprise and unprecedentedly intense interactions between scientists and non-scientists.

My aim in this book is to analyse some key features of the Society's approach to promoting science during this period, and thus to uncover something of its identity. This can be only a partial undertaking, focused on the institutional life of the Society. Individuals who have encountered the Society may assess it in other terms, for example its positive or negative impact on their own careers, or its support or opposition for particular points of view, or what they see it as representing more generally. The Society can arouse strong feelings, and these feelings are germane to its identity. But they are difficult to disentangle on a sufficient scale from other factors operating at the personal level. My task is the simpler one of looking at the documentable behaviour of the Society as a corporate entity in the context of what was happening elsewhere in the world of science.

The Society's most defining characteristic is its concern with the highest standards in science. For example, it elects its Fellows in a hugely competitive process from among those it judges to have made the most substantial contributions to science. This is, of course, a

potentially hubristic undertaking. At various times the Society has been slow to recognise not just particular individuals but also the achievements of women scientists, and of applied scientists, and of scientists working outside the major academic centres or outside academe altogether. Nevertheless, by common consent, the Royal Society is unequivocally the elite body for natural science as a whole within its geographical span.

There is an element of potential paradox here. Elitism, in the negative sense of an arbitrary exercise of self-proclaimed authority, is a suffocating force, destructive of scientific creativity. The Society's motto recognises that, indeed warns against it. *Nullius in verba*, or 'Not committed to swearing by the words of any master',[1] advocates freedom to reach one's own conclusions, a rejection of human authority as a source of truth in favour of evidence from critical observation and experiment. The motto celebrates the fact that the talent needed to make scientific advances can be found at almost any point in the spectrum of seniority. By gathering into its fold some of those who have made the most substantial contributions to scientific knowledge, and by securing enough public assent to its judgement in this, the Society acquired authority in scientific matters – despite its disavowal of the concept. It was accepted as specially skilled in the business of sifting scientific evidence, elite in the positive sense. But in order to flourish, or even survive, during the period covered in this book, the Society had to exercise its authority with great care, grounding it at all times in scrupulous attention to scientific evidence and always alert to new developments that might challenge its established positions. And it had to learn to look outward beyond itself and to use its authority to work for the public good.

It all begins with the Fellowship. Election to the Fellowship brings a tacit trade-off between the individual Fellow and the corporate Society: the Society associates itself with the scientific achievements of the new Fellow – which may or may not owe something to the Society's earlier support – and the Fellow is affirmed by public recognition of his or her merit as a scientist. There is mutual benefit, each bestowing kudos on the other. The Society therefore subjects the election process to constant and intimate scrutiny to ensure, within the subtle limitations of human behaviour, that it judges well whom to admit. At a strategic level, too, the election process holds a key to the Society's identity, in that it can be used

[1] The full quotation, *Nullius addictus iurare in verba magistri*, is from Horace; the translation is by the Society's President Andrew Huxley. The context is that of a newly freed slave who no longer has to agree with everything his ex-master said. The common colloquial translation, 'Take nobody's word for it', misses some of the richness of the original. Andrew Huxley, 'Nullius in verba', *Nature*, 315 (23 May 1985), 272.

to express new priorities, new recognition of where and how the most substantial contributions to science are being made.

Beyond the individual achievements of its current Fellowship, the Society also carries considerable aura from the sheer fact of its longevity and from its association with many of the famous scientists one has heard of from earlier periods (as well as many now forgotten). Now well into its fourth century, the Society's unparalleled history adds to its authority, and to the need for care in how it is exercised.

The Royal Society was founded in 1660. Its early days have long attracted intense historical scrutiny. But its recent history has not. A two-day conference in April 2010 on the Society in the twentieth century was said, only partly in jest, to have tripled the amount of scholarship on the subject.[2] Longevity in human affairs may imply that something important is going on. The Society's motto was revolutionary when it was chosen in 1662. It is still revolutionary. An organisation trying to live up to such a motto, and on that account held in high esteem around the world, is a rich object of study.

In a slightly arbitrary way, this book focuses on the period 1960–2010, from the Society's 300th anniversary to its 350th. The time frame is not rigid. Some parts of my narrative start in 1945 or earlier, while others stop before 2010 or go beyond it almost to the present day. I have not gone back to the beginning of the century to pick up the story from where Marie Boas Hall left it,[3] nor have I set out to record all of the Society's postwar activities. Rather, I have concentrated on aspects of its work that usefully illustrate its identity. Some of the Society's core characteristics, such as its commitment to the highest standards in science, have been constant throughout the period of this book; others, most obviously its dealings with the public beyond the world of professional scientists, have developed radically. There is continuity and there is change, as with most human institutions, and both are important.

The Royal Society is very much alive, and the history of its recent past must therefore butt against its unfinished present. I have not dealt evenly with all parts of the period. The most recent years, in particular, are generally covered more sketchily than earlier years, not only for reasons of due confidentiality but also because of the difficulty in judging long-term significance. On the other hand, I have in several places, and especially in the final chapter, added comments, based on reflections on the

[2] Jeff Hughes, 'Introductory comments to final discussion session', *Notes Rec R Soc*, 64 (2010), S173.
[3] Marie Boas Hall, *All scientists now: the Royal Society in the nineteenth century* (CUP, 1984).

historical narrative, that may hold interest for those concerned with the current Society.

Contemporary history is not the only hazard of this undertaking. I worked for the Society from 1981 to 2013, responsible at various times for the policy advice function, for aspects of governance and for history of science. There is a fine tradition of people closely associated with the Society writing about its history,[4] so I am in good company, but I recognise that I cannot be wholly objective. On the other hand, there are some advantages in having inside knowledge. I have, in short, written the sort of history that someone in my position could write, in the hope that it will have value alongside the histories that may be written by other people with other prejudices.

This book is aimed at historians of science, at scientists and at others interested in the Society, including those concerned with national academies of science in other countries. It will also be of interest to those concerned with the postwar period more generally, since the Society's work touched many areas of public life. And, I hope, it will prove of use to those charged with guiding the Society through future phases of its existence. That range of audiences might ideally need a corresponding range of approaches, which is a further hazard: some may have wanted more about how the Society has affected particular areas of research, while others may have wanted more on the Society's dealings with other organisations, or more international comparisons, or more analysis of the accolade function, or a fuller historiographical commentary, and so on. I hope the current book will be found a useful starting point for such further studies.

The opening chapter, about the unusually controversial election of a new President in 1945, highlights some of the strategic challenges facing the Society at the end of the Second World War, in particular how much it was going to engage with public life and hence what sort of leadership it needed. This dilemma set stellar scientific achievement in contrast to political nous among the criteria for the incoming President. The issue of how much political nous mattered, and whether there was any scope (or need) for compromise on scientific achievement in order to secure it, would resonate increasingly in later elections. In describing how the 1945 election unfolded, the chapter uncovers some of the inner workings of the decision-making process at that time.

The second chapter examines the difficulties that the Society faced as, against its spirited opposition, the government took increasing control of

[4] For example, Thomas Sprat (1667), Thomas Birch (1756), C.R. Weld (1848), Archibald Geikie (1912), Henry Lyons (1940, 1944), Percy Andrade (1960), Harold Hartley (1960), John Rowlinson and Norman Robinson (1989).

civil science. The Trend review of civil science in the mid-1960s created new agencies and left the Society largely bereft of official function in running UK science. So, as an independent body outside the government system, and with relatively modest resources, the Society was challenged to reassess its particular strengths and weaknesses and to think imaginatively about just what it could do to promote science in these new circumstances. Under Howard Florey's leadership, the Society became more rather than less determined to be at the centre of affairs.

Subsequent chapters explore specific ways in which the Society responded to that challenge. Chapter 3 traces its financial and moral support for outstanding individual scientists at various stages of their careers, adding practical patronage of individual talent to its more nebulous accolade function. Such activity started before the Second World War but expanded massively afterwards, especially from the 1980s. In terms of fostering individual creativity and providing opportunity for the most promising researchers, the Society carved out an important and effective role for itself that played well to its instinctive strengths.

Chapter 4 deals with the Society's efforts to concern itself with the applications of science, the practical advantage of the human race. This was a more complicated niche, in which the Society struggled to define a clear role. Already starting to worry about the issue in the early 1960s, the Society was pushed into action by threats to create a separate elite body for engineering. It succeeded in heading off that dénouement for a while, and, when the Fellowship of Engineering was eventually established in 1976, insisted that the applications of science (including, but not limited to, engineering) remained very much within its purview. Its impact in this area has to date been at best ambivalent, but there is now a renewed commitment to the cause.

Chapter 5 analyses the Society's policy advice function and its efforts to defend the Science Base both to government and to public opinion. This is a long-running theme that has expanded very considerably in recent decades. The Society had clear and consistent views on how to manage the Science Base so as to promote fundamental science in particular, and it argued the case at every opportunity. It also addressed more publicly controversial aspects of research such as genetic engineering, animal experiments, in vitro fertilisation and cloning. The Society's direct involvement with the wider public, both in terms of promoting familiarity with scientific processes and findings and in terms of engagement on areas of scientific and social controversy, is the subject of Chapter 6. The Society made it respectable for successful research scientists to devote effort to improving public understanding of science. It also got deeply involved in public debates about such matters as acid rain, depleted uranium, BSE,

genetic modification, nanotechnology and climate change. In so doing it gained valuable experience in interacting with policy processes, and it helped to shape the making of public policy.

The next four chapters consider the Society's impact at the international level. Chapter 7 deals with the Society's role in helping the British Government recognise that civil science, and not just military science, was relevant to international relations in postwar conditions. The Society's global reputation and its independence from government enabled it to contribute significantly to diplomacy at the same time as promoting the interests of science. Chapter 8 details examples of scientific relations being used to mitigate diplomatic tensions, with the Soviet Union, with China, with South Africa and with Argentina, at periods when it was difficult to conduct government-to-government relations. The work could be controversial, especially where there were diverse views within the Fellowship over how most effectively to respond to human rights abuses.

The growing European dimension in scientific affairs, mirroring the growing European dimension in British public life, is the subject of Chapter 9. Challenged by its Australian President Howard Florey in 1965 to be 'good Europeans', the Royal Society launched its European Science Exchange Programme two years later with 16 partner countries; by the end of the century, the Programme had made 10,000 awards. Particular disciplines, notably molecular biology, were also busy establishing European groupings, and the Society was active in the associated debates. It was active, too, in European groupings of research funders and of national academies, and pushed hard to ensure that such groupings were run by scientists rather than civil servants. And it extended its policy advice work to policy-makers at the European level.

The Society's many-faceted role on the global scientific stage, including at the Commonwealth level, is discussed in Chapter 10. In 1900, one seventh of the Society's Fellows and Foreign Members lived outside the UK; by 2010, that figure had grown to one third. That was one response to the globalisation of science during the twentieth century. Other responses are seen in the Society's capacity-building activities, its involvement with global scientific bodies, its publishing operations and its scientific expeditions.

The final chapter offers some reflections on the identity of the Royal Society and how it has developed since the War, in response to its own internal dynamics and to changing external circumstances. The Society has a remarkable history and a global reputation among scientists. These were not enough in themselves to ensure continued useful existence in the complex and competitive conditions of the postwar world. The Society is

a private organisation, but it could not live its life privately. It had to engage imaginatively with key groups beyond its Fellowship, to extend its established practices and to find new ways of promoting science. Its 350th anniversary in 2010 in effect celebrated its success in becoming more outward looking over the previous 50 years.

The Society is both a corporate entity and a collection of individuals. For the Society to express a corporate view is a matter of the elected Council (or honorary Officers acting on behalf of Council) agreeing what line to take; it does not imply that every Fellow shares the corporate view, still less that every Fellow has been explicitly consulted. The Annex provides information, in an historical context, about how the Society operates formally: aspects of its governance, including the role of the Council and honorary Officers; finance; and the process of electing Fellows. It includes a detailed list of all Officers and Executive Secretaries in post between 1945 and 2015. Those unfamiliar with the Society may find it convenient to look at this Annex before embarking on the rest of the text.

The sources of evidence for this book are described in 'Sources'. They are of four types. First, the Society's own archives, as valuable for the twentieth century as for the seventeenth and including modern administrative records en route to permanent archival status. I have enjoyed the privilege of unrestricted access to the complete collection. I have also made extensive use of archives from other institutions, including the National Archives at Kew, and of various holdings of personal papers. Second is published material, including that arising from the 2010 conference on the Royal Society in the twentieth century. One of the features of contemporary history is the possibility of consulting surviving participants. I therefore carried out interviews with nearly 60 individuals able to comment from personal experience on the Society as an institution. The transcripts from these interviews constitute a third source of evidence, valuable not only for this project but also for future studies, and some provide unique evidence of the personal impact that the Society can have. They are available for consultation at the Society's Centre for History of Science. A fourth source, informal but vital, is colleagues at the Society who have responded untiringly to requests for information.

To make both the writing and the reading easier, I have omitted formal titles when using people's names, if only because, in quite a few cases, the titles changed as a person's career developed. I have similarly omitted the conventional post-nominal 'FRS'; individuals mentioned in the text who are or were Fellows or Foreign Members are shown as such, with their dates of election, in their index entries.

This is not an 'official' history, in the sense of having been commissioned or vetted by the Royal Society. Nor is it an anniversary history, expected by convention to celebrate its subject. It has, nonetheless, been written with the warm support and encouragement of the Society, which I most gratefully acknowledge. This has made my task far easier and more genial.

I did not appreciate at the outset just how many people would be involved in the solitary occupation of researching and writing this book. It is a pleasure here to record my indebtedness to those who facilitated what turned out, of course, to be a far from solitary experience. Archivists and librarians at the Royal Society, the National Archives and numerous other institutions (see 'Sources') eased my path with their knowledge and good cheer. Royal Society staff generously fielded my requests for detailed information. Joanna McManus at the Society's Centre for History of Science did valuable work on the illustrations; Bill Johncocks in the wilds of Skye produced a very thorough index; and Michael Watson and others at CUP steered the book through the publication process.

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Three individuals – Pat Bateson, Julie Maxton and Stuart Taylor – demonstrated the meaning of friendship by reading the entire draft text. The final product owes much to their insightful comments, challenges and generous encouragement over a sustained period. I am greatly in their debt.

My wife, Geralyn, not only read and commented on the entire draft text but also coped with me during the writing of it and, indeed, during the three decades of work at the Royal Society that preceded the writing. I gladly take this opportunity to value her role in this as in much else.

PETER COLLINS
*March 2015*

# Abbreviations

| | |
|---|---|
| ABRC | Advisory Board for the Research Councils |
| ACARD | Advisory Council for Applied Research and Development |
| ACME | Advisory Committee on Mathematics Education |
| ACSP | Advisory Council on Scientific Policy |
| ALLEA | All European Academies |
| ARC | Agricultural Research Council |
| ASE | Association for Science Education |
| BA | British Association for the Advancement of Science |
| BBC | British Broadcasting Corporation |
| BSE | bovine spongiform encephalopathy |
| CAS | Chinese Academy of Sciences |
| CAST | Chinese Association for Science and Technology |
| CEGB | Central Electricity Generating Board |
| CEI | Council of Engineering Institutions |
| CERN | Organisation Européenne pour la Recherche Nucléaire |
| CISC | Committee on International Scientific Cooperation |
| CJD | Creutzfeldt-Jakob disease |
| CONICET | (Argentina) Consejo Nacional de Investigaciones Científicas y Técnicas |
| COPUS | Committee on Public Understanding of Science |
| COSR | Committee on Overseas Scientific Relations |
| CPRS | Central Policy Review Staff |
| CSIR | (South Africa) Council for Scientific and Industrial Research |
| CSA | Chief Scientific Adviser |
| CSP | Council for Scientific Policy |
| DES | Department of Education and Science |
| DfID | Department for International Development |
| DoE | Department of the Environment |
| DPRC | Defence Policy Research Committee |
| DSIR | Department of Scientific and Industrial Research |

| | |
|---|---|
| DTC | Department of Technical Cooperation |
| EASAC | European Academies Science Advisory Council |
| EEC | European Economic Community |
| EFSF | European Fundamental Science Foundation |
| EIJC | Engineering Institutions Joint Council |
| EMBC | European Molecular Biology Conference |
| EMBL | European Molecular Biology Laboratory |
| EMBO | European Molecular Biology Organisation |
| EOC | Equal Opportunities Commission |
| EPS | European Physical Society |
| ERC | European Research Council |
| ESEP | European Science Exchange Programme |
| ESF | European Science Foundation |
| ESFP | European Science Fellowship Programme |
| ESRC | Economic and Social Research Council |
| ETI | (Royal Society) Engineering, Technology and Industries Committee |
| EUCHEM | European Association for Chemical and Molecular Sciences |
| EuroHoRCs | European Heads of Research Councils |
| FA | Football Association |
| FCO | Foreign and Commonwealth Office |
| FRD | (South Africa) Foundation for Research and Development |
| FRS | Fellow of the Royal Society |
| GM | genetically modified |
| IAC | (Royal Society) Industrial Activities Committee |
| IAC | InterAcademy Council |
| IAP | InterAcademy Panel |
| IAU | International Astronomical Union |
| IBP | International Biological Programme |
| ICSU | International Council of Scientific Unions (from 1998, International Council for Science) |
| ICT | information and communications technology |
| IGY | International Geophysical Year |
| IIASA | International Institute for Applied Systems Analysis |
| IoP | Institute of Physics |
| IPCC | Intergovernmental Panel on Climate Change |
| IQSY | International Quiet Sun Year |
| IRC | Interdisciplinary Research Centre |
| IRDA | Industrial Research and Development Authority |

| | |
|---|---|
| IUPPS | International Union for Prehistoric and Protohistoric Sciences |
| IVF | in vitro fertilisation |
| MEP | Member of the European Parliament |
| MRC | Medical Research Council |
| NAPAG | National Academies Policy Advisory Group |
| NAS | (USA) National Academy of Sciences |
| NATO | North Atlantic Treaty Organization |
| NERC | Natural Environment Research Council |
| NGO | non-government organisation |
| NIRNS | National Institute for Research in Nuclear Science |
| NPL | National Physical Laboratory |
| NRRC | Natural Resources Research Council |
| OECD | Organisation for Economic Co-operation and Development |
| ORC | Overseas Research Council |
| PGA | Parliamentary Grant-in-Aid |
| PRS | President of the Royal Society |
| RDS | Research Defence Society |
| RI | Royal Institution |
| RSSAf | Royal Society of South Africa |
| R&D | research and development |
| SAC | Scientific Advisory Committee (to the War Cabinet) |
| SAIS | (Royal Society Committee on) Scientific Aspects of International Security |
| SCORE | Science Community Partnership for Supporting Education |
| SEPSU | (Royal Society/Fellowship of Engineering) Science and Engineering Policy Studies Unit |
| SERC | Science and Engineering Research Council |
| SGM | special general meeting |
| SRC | Science Research Council |
| SRGC | Scientific Research Grants Committee |
| SZR | (Royal Society) Southern Zone Research Committee |
| S&T | science and technology |
| TWAS | Originally the Third World Academy of Sciences, now the World Academy of Sciences for the advancement of science in developing countries |
| UCL | University College London |
| UFC | Universities Funding Council |
| UGC | University Grants Committee |
| URF | (Royal Society) University Research Fellow |