

THE ROYAL COMMISSION ON HISTORICAL MANUSCRIPTS

Report on the records of the

OXFORD ENZYME GROUP

(1968-1990)

deposited in the Bodleian Library, Oxford

Reproduced for the  
National Cataloguing Unit for the Archives of  
Contemporary Scientists

(NCUACS 18/3/90)

THE ROYAL COMMISSION ON HISTORICAL MANUSCRIPTS

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Catalogue of historical material relating to the

**OXFORD ENZYME GROUP**

**(1968-1990)**

Compiled by Jeannine Alton

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1990

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## PROVENANCE

The collection has been brought together from several sources and over a considerable period of time from November 1987 to September 1990. The greater part was received from Sir Rex Richards, the founder Chairman of the Oxford Enzyme Group (OEG), and this was supplemented by the relevant papers of Sir David Phillips who acted as Richards's Deputy Chairman during the latter's service as Vice-Chancellor 1977-81 and succeeded him as Chairman in 1983. Additional material relating especially to the later years was given by Dr. C.M. Dobson, the group's last secretary.

As well as these principal sources, other members of OEG or those connected with its history have contributed smaller amounts of material, or written their own recollections: Professor R.A. Dwek, Professor Sir Ewart Jones, Professor L.N. Johnson, Professor J.R. Knowles and Professor R.J.P. Williams.

Sir Rex Richards's own papers are deposited in the Bodleian Library (NCUACS no. 12/5/89).

## GENERAL INTRODUCTION

The Oxford Enzyme Group was formally created, and began its regular meetings, in October 1969; its first research grants were awarded in August and November 1970. For an appreciable time before that, however, its leading members had been working both to encourage and to respond to official initiatives aimed at fostering enzyme research and to establish a climate in which collaborative research could flourish at Oxford. A major advance had been made not in Oxford but in London by D.C. Phillips and his team at the Royal Institution who had successfully analysed the three-dimensional structure of lysozyme in 1965; G. Lowe and J.R. Knowles from the Dyson Perrins Laboratory, Oxford, had been among the first to approach him for information about the model. In the following year (1966) Phillips and members of his team arrived in Oxford to start the new Laboratory of Molecular Biophysics, thus continuing the impetus to enzyme research, and a personal benefaction to him from the Dupont Company enabled him to sponsor a series of fortnightly dinners which brought together colleagues in several disciplines as a nucleus of a collaborative group. On a technical level, the large-scale and expensive facilities required for interdisciplinary research, such as NMR, X-ray crystallography and high-speed computation, were also beginning to come together at Oxford.

An important official step was taken in February 1968 when the Science Research Council (SRC) set up an Enzyme Panel as a Joint Panel of its Biological Sciences, Chemistry, and Chemical Engineering and Technology Committees; the Panel's terms of reference were: 'To examine various aspects of the enzyme field in order to discern areas where new or more research could profitably be undertaken. To consider how best to foster any desirable activities and to make recommendations for appropriate SRC support.' The Chairman of the Panel was Sir Ewart Jones, Phillips was a member, and the Technical Secretary was Knowles.

The Panel first met in February 1968 and reported in February 1969. It recommended that 'special efforts should be made, even involving methods of support novel to the Science Research Council, to foster research in this highly interdisciplinary, exciting and economically important field'. It stressed the importance of collaborative work, recognised the

requirements for high resolution NMR equipment and for facilities for the preparation of adequate supplies of pure enzymes, envisaged the need for long-term support (up to five years) and in some cases for building provision, and suggested the establishment of an Enzyme Chemistry and Technology Board with grant-giving powers, to be responsible for the support of research along these lines. The recommendations were accepted and a new Enzyme Chemistry and Technology Committee was set up in March 1969, with Jones as Chairman and G.W. Kenner, H.L. Kornberg and Phillips as members.

Already, plans for collaborative research, and bids for accommodation, had been prepared and circulated in Oxford at various dates in 1968 and 1969, the main participants in this endeavour being Phillips, Knowles, R.E. Richards and R.J.P. Williams. One of these proposals, which envisaged a three-year programme, was considered at the first meeting of the Enzyme Chemistry and Technology Committee in April 1969, at the request of its Chairman Sir Ewart Jones. By the time the five-year grants were announced, in August 1970 for a preparation laboratory, equipment and staff, and in November 1970 for an ultra high field NMR spectrometer, negotiations were well in train for accommodation for the preparation laboratory as part of the Laboratory of Molecular Biophysics located in the Department of Zoology, and with Bruker Spectrospin and the Oxford Instrument Company for the design and supply of the NMR equipment.

The documentation for these preliminary stages, extending roughly up to the award of the first grants, is preserved as 'Early History' in Section A, and is augmented by recollections of the OEG and its work contributed for the present collection by founder or long-term members.

The character of the bulk of the remaining material arises from its provenance, essentially from the chairmen of OEG: Richards 1969-83 and Phillips his successor from October 1983. The research programmes of the group as such, and the contributions of its individual members, are documented in the sequence of research applications and the reports thereon, and in the proposals, ideas and policy papers put forward at the fortnightly research and business meetings and/or submitted to colleagues for consideration. The part played here by Williams emerges as a significant one, many of the proposals, from the earliest date onwards, being in his characteristically lively and often controversial style. The continuing work on NMR and the early running of the preparation laboratory are more fully recorded, representing as they do the special responsibilities of Richards and Phillips respectively. The documentation is less full for the work of other OEG members, several of whom drew on

separate sources for their funding (mainly the Science, Medical and Agricultural Research Councils) and pursued other lines of work alongside the OEG collaboration. The latter, collaborative, aspect is very well recorded, the material encompassing the interdisciplinary drafting of grant applications, the group evaluations of projects and decisions on staffing, and the Chairmen's tasks of careful budgeting, financial administration and pleading arising from unexpected upward surges in costs - including those for the multi-funded Rex Richards Building raised to house the laboratories of molecular biophysics and immunochemistry. The meetings of the Group are well documented from the beginning in 1969 throughout the 1970s though somewhat less fully for the 1980s. The membership of the Group adapted to changes in the research interests or career structure of its members, though some remained throughout its existence. The collaborative element of what R.R. Porter described as 'a consortium' was never lost and at one time or another the following departments, laboratories or institutions all included OEG members:

- Biochemistry
- Botany
- Chemical Crystallography
- Clinical Biochemistry, Radcliffe Infirmary
- Clinical Biochemistry, John Radcliffe Hospital
- Dyson Perrins Laboratory
- Inorganic Chemistry
- Molecular Biophysics
- Physical Chemistry
- Sir William Dunn School of Pathology
- Zoology

The new building, opened in 1985 at a time of great financial constraint, is a lasting and visible mark of the success of the OEG; but it coincided with several major changes which bore on its future. In October 1983 Richards accepted the Directorship of the Leverhulme Trust to take effect on his retirement as Warden of Merton College at the end of that academic year, and accordingly resigned as Chairman; his successor, Phillips, while remaining active in the laboratory and in the affairs of OEG, took on heavy outside responsibilities as Chairman of the Advisory Board for the Research Councils (ABRC), and R.R. Porter, who was to head the MRC Immunochemistry Unit in the new building, was untimely killed in a road accident in September 1985.

The last chapter in the history of OEG, more suitably viewed perhaps as the opening of a new volume, began in 1987 with the publication of the ABRC report *A Strategy for the Science Base* which recommended the creation of a small number of strongly-supported Interdisciplinary Research Centres to concentrate research efforts on specific topics in a limited number of universities. This concept over-rode departmental and even university boundaries and met with considerable academic opposition; it was, however, officially welcomed and machinery was rapidly set in motion via the research councils. During the later months of 1987 bids were invited for a centre in molecular science; the first draft of the Oxford bid was written by Phillips, drawing on the work of OEG and material provided by its members. This document was the basis of discussions and modifications by, among others, J.E. Baldwin and C.M. Dobson and the approval of the university authorities. After an SERC site visit in November and further modifications, the final bid was sent in before Christmas. In February 1988 the bid was accepted and the Oxford IRC began officially in October 1988 as the Oxford Centre for Molecular Studies with J.E. Baldwin as Director and an initial budget of £8 million. The Farewell Dinner of OEG had been held in March, though many of its members continue their collaborative work within the new organisation. Like the early history in Section A, this concluding episode is quite well documented in Section J from material provided by Phillips and C.M. Dobson.

## ACKNOWLEDGEMENTS

I am very grateful to all those who have contributed material and been so generous with their time in answering questions, identifying documents and providing information. In particular, Sir Rex Richards and Sir David Phillips have put their unique knowledge of OEG freely at my disposal, and found time to read and comment on the catalogue.

My thanks also go to Peter Harper, Archivist NCUACS, for his careful attention to the draft catalogue.

Jeannine Alton  
Oxford 1990.

## SECTION A

## EARLY HISTORY

A.1-A.11

- A.1 Historical recollections assembled for the present collection, from:
- E.R.H. (Sir Ewart) Jones, June 1989. Includes a copy of his and R.S. Nyholm's Minority Report on the proposed European 300 GeV Accelerator of July 1967 which led to the setting up of the SRC's Enzyme Panel.
- J.R. Knowles, May 1989.
- R.J.P. Williams, 'The Enzyme Group (R.J.P. Williams Memories)', March 1990.
- L.N. Johnson, March 1990.
- R.A. Dwek, 'Memories of the Enzyme Group', March 1990.
- R.E. Richards, June 1990.
- A.2 Draft Report of the Enzyme Panel (largely written by Knowles, see A.1) and published version February 1969 under the title *Enzyme Chemistry and Technology* (some annotations).
- SRC letter March 1969 accompanying report and announcing special support for Enzyme Chemistry and Technology.
- A.3 Preliminary Ideas for enzyme research in Oxford 1968.
- Includes a draft paper by R.J.P. Williams August 1968 on 'Enzyme Project', with manuscript amendments and additions by Phillips and retitled 'Draft proposal for the development of enzyme studies in Oxford' circulated by Phillips on 31 October to colleagues in Oxford; with an accompanying paper, also by Phillips 'Note on the proposal to allocate space in Old Physiology [a site in Oxford] for inter-departmental work on enzymes.'
- Both these papers were prepared for discussion by the Biology Faculty Board.
- A.4 Papers, correspondence and ideas 1969. Not all the material is dated but it covers roughly April-July 1969.
- The main document is a paper 'Enzyme Research in Oxford' prepared by Williams for consideration by SRC's Enzyme Chemistry and Technology

Committee at its first meeting on 22 April 1969. A Minute of the meeting is also included. The Committee approved the document, and specific proposals for a formal grant application were initiated; Phillips circulated colleagues in May asking for ideas for collaborative research and replies are included from C.C.F. Blake, G.K. Radda and A.R. Peacocke.

Phillips's letter to Richards hopes that he will become chairman of 'the local steering committee' (later the OEG).

- A.5 Draft application composed by Williams, Radda and Richards based on colleagues' suggestions, for consideration by Oxford General Board of Faculties on 15 July 1969 before final submission to SRC. The application envisages a three-year grant, starting January 1970, and a Varian spectrometer for NMR work. See Section C for more detailed information on choice of instrument.

Two copies, one to Phillips with a covering letter explaining the background, with revisions and amendments by him, K. Dalziel and others.

- A.6 Five-year grant application sent to SRC, and 'Outside Grant' application notified to University, both sent in the names of Richards, R.R. Porter and J.W.S. Pringle 10 September 1969.

Two copies of application, one with some notes and revisions by Richards, the other with notes and revisions by Phillips.

**Note**

The application bore the general title 'Structure and Function of Enzymes, especially those of the glycolytic pathway' and included plans both for the enzyme preparation laboratory and for NMR research and instrumentation. Partly because of the high costs of the latter, and difficulties in deciding the best sources of supply and design, the two elements of the application were eventually dealt with in separate grants. See A.10.

Material relating to the Enzyme Preparation Laboratory and to NMR spectrometry is listed in Sections B and C respectively.

- A.7 Notes and correspondence October-November 1969, under the general heading 'Notes on Enzyme Application 28/10/69' arising from queries and requests for clarification raised by SRC. Mainly by Richards and Phillips, but also includes information on their research funding and intentions from G. Lowe, G.T. Young, R.J.P. Williams, K. Dalziel, G.K. Radda, A.R. Peacocke, S.G. Waley, E.A. Newsholme.

Richards's reply to SRC, with answers to the queries, is dated 5 November.

Correspondence with University authorities on level of support or takeover is also included.

A.8 SRC visit to Oxford 11-12 December 1969.

Includes arrangements, timetable, notes and drafts for presentations (Includes a paper by J.R. Knowles and R.E. Offord on 'Enzyme Isolation and Development Laboratory' written 'to tighten the case for the Enzyme Preparation Laboratory'), Richards's letter to OEG colleagues summarising the discussions, correspondence ensuing with SRC January-May 1970, draft and revised minutes of meeting, revised list of equipment for Preparation Laboratory, letter from Richards on NMR apparatus, allocation of research studentships to OEG.

A.9 Notes and research ideas arising from SRC visit in December 1969, not all signed or dated, mainly by Richards but includes material from A.R. Peacocke, J.R. Knowles, K. Dalziel.

A.10 Award of grants, formal announcements, press releases.

The grants were:           Structure and function of enzymes, particularly of the glycolytic pathway (no. SR/7824) August 1970.

Ultra high field NMR spectroscopy (no. SR/9479) November 1970.

A.11 OEG dinners.

The early meetings of the OEG were at dinners where scientific discussions could take place in an easy atmosphere which greatly helped collaboration. L.N. Johnson recalls these as a particularly useful feature of the group's beginnings (A.1). The dinners, held in various colleges, were funded in the first instance by Phillips from an unconditional research grant made to him in 1968 by Du Pont de Nemours.

The folder includes some documentation for these dinners 1969-70, and also, to complete the story, for the farewell dinner on 14 March 1988 'to commemorate the end of the Group in its present form and its transformation into an Interdisciplinary Research Centre for Molecular Sciences'.

SECTION B	ENZYME PREPARATION LABORATORY	B.1-B.8
B.1	Accommodation in Department of Zoology	1969-76
	Correspondence, memoranda, architects' plans etc. exchanged with J.W.S. Pringle (Linacre Professor of Zoology), University Surveyor and others. Mainly 1969-72 but includes a little routine correspondence to 1976.	
B.2	Equipment	1969-72
	Miscellaneous lists of equipment, books, furniture. Applications to Equipment Committee of General Board, correspondence.	
B.3	Constitution and organisation	1970
	Draft prepared by Phillips, comments and revisions by K. Dalziel, J.R. Knowles, R.E. Offord, appointment of Research Assistant (M. Iqbal) for Laboratory.	
B.4	Research and administration	1971-80
	Meetings and minutes of Prep. Lab. Subcommittee, research proposals and requirements for enzymes submitted by members of OEG, costings and estimates, progress reports on current research and future projects, note on cost of enzyme preparations to be charged to users from 1 October 1976 when SRC funds for recurrent expenses came to an end, correspondence.	
B.5	The future of the Prep. Lab.	1980-83
	Correspondence and papers on the continuation and the location of the Prep. Lab. and its service; Includes costings and budget, possible development of 'macromolecules' teaching course, ballot of OEG members, and undated (perhaps 1979) application to Oxford University for support for the laboratory.	
B.6	L.N. Johnson's reports on current research and future projects, mainly prepared for OEG grant applications but also referring to work of Prep. Lab. and its future.	1979, 1981 and undated.

B.7, B.8

Technical staff. Appointments, grading and re-grading. Various dates 1971-81.

## SECTION C

## NMR SPECTROMETRY

## C.1-C.11

## INTRODUCTION TO SECTION C

The provision of NMR facilities had been recognised as an essential requirement of enzyme research in the SRC's Enzyme Panel report and was a major feature of the OEG's grant application. The considerable capital cost of equipment necessitated particularly careful preliminary enquiries, comparisons and budgeting; R.E. Richards bore the main responsibility for this both as Chairman of OEG and as active participant in NMR research, and the SRC on its side undertook additional vetting of the proposal.

Richards's note 'Magnetic Resonance equipment for the Oxford Enzyme Group' (Included at C.1), prepared for the SRC High Field NMR Panel meeting on 4 June 1970, sets out very clearly the considerations weighing on the choice of instrument. Briefly the choice was between a complete instrument to be purchased from the American firm Varian Associates, and a composite deal with Bruker Spectrospin (for the spectrometer) and Oxford Instruments (for the magnet). The second solution was adopted and proved extremely successful. The Oxford group itself undertook much of the development, increasingly powerful magnets were constructed over the years in collaboration with Oxford Instruments, and the work was rewarded materially by various awards and patents, and scientifically by its contribution to the development of whole-body scanning in medicine.

- C.1 Correspondence and papers September 1969-November 1970  
Correspondence with colleagues and firms; Richards's notes on machines, costs, research projects; background information sent by colleagues on choice and performance of instruments; SRC queries and additional information; Richards's note on choice of instrument (undated, probably prepared for SRC committee meeting in June 1970); letter of notification of grant November 1970.
- C.2 Miscellaneous information assembled by Richards from colleagues on choice of instrument, value of NMR studies in biological research etc.
- C.3 Varian Associates May 1969-June 1970  
Correspondence, information, quotations and specifications.
- C.4 Richards's tagged folder of correspondence exchanged between M.E. Wood (Oxford Instruments) and SRC in answer to queries raised by the Council, September 1970 (photocopies); original copy of tender by Bruker June 1970. Relates to more detailed correspondence at C.5 below.
- C.5 Oxford Instrument Company 1970-73, 1975  
(from 1971 Oxford Instruments)  
Correspondence, quotations and specifications, contract, notes of meetings exchanged between Richards, the Company and Bruker Spectrospin about construction and testing of machines. Also a little correspondence with SRC on funding, and later with NRDC on development and royalties for Richards's research.
- C.6 Oxford Instruments 1977, 1980, 1981  
Correspondence and proposals with the Company and others on various developments and improvements in NMR equipment, patents and royalties, continuing collaboration with Richards, clinical applications.
- C.7 Bruker Spectrospin 1970-71  
Correspondence, visits, meetings, quotations and specifications for spectrometer and other equipment, negotiations with SRC and final accepted tender etc.

- C.8 Bruker Spectrospin 1972-74  
Similar material, relating to improvements and development by Richards's Oxford group and by Bruker, purchase of new equipment, specifications and quotations, notes and reports on machines, costings, visits by Richards and members of the Oxford group, funding and payment.
- C.9 Correspondence with colleagues on relative merits of spectrometers, choice of Bruker machine 1970-71.
- C.10 Bruker-Physik 1978  
Correspondence on proposed collaboration between Bruker and Oxford Instruments for exploitation of NMR and Magnet System Technology.
- C.11 Miscellaneous descriptions, brochures etc. of Bruker equipment and models.
- Note Later grant applications and other material relating to NMR research can be found in Section D.

## SECTION D

## GRANT APPLICATIONS AND FUNDING

D.1-D.55

## INTRODUCTION TO SECTION D

The material in this section relates to the principal grant applications made by the OEG as such, arising from or as continuations of the initial five-year grants of 1970 dealt with in preceding sections.

It may include ideas for projects, comments, drafts and revisions, the formal application as sent, negotiations or correspondence with the funding body, administrative arrangements, interim or final reports on research undertaken. It is presented as far as possible in chronological order, though this is sometimes blurred by overlapping datelines, and identified by the grant number allocated by the funder when this is known.

The SRC continuation grant B/RG/7900 awarded in August 1975 agreed the 'suggestion to vet and comment on all individual applications emanating from the Group' and some of these are included at D.15-D.21. There is also a certain amount of material relating specifically to NMR instrument development and its clinical implications at D.22-D.33. Other than these instances, however, there is no documentation here for the considerable additional research funds drawn on by OEG members for projects other than those centring on the collaborative work of the group itself.

Many ideas for research topics, some only brief suggestions, others more fully elaborated, can be found in Section E.

Brief information on the administration of the grants is in Section G.

Additional reports on research can be found in Section H.

The material is presented as follows:

D.1-D.44	Research Councils
D.45-D.48	Oxford University
D.49	E.P. Abraham Research Fund
D.50	National Research Development Corporation
D.51-D.55	Visitations and Inspections

**D.1-D.44 Research Councils****SRC B/SR/9479 and B/SR/7824**

- D.1 Correspondence with SRC on implementation of these initial grants, including staff and equipment costs, delays in delivery of equipment, amendments to terms of grants, supplementary awards, appointments of research staff, interim and final reports on grants with summary reports on Enzyme Preparation Laboratory and on NMR Laboratory sent to SRC. 1972-75.

**SRC (no number)**

- D.2 Brief correspondence and photocopy of application to SRC, sent September 1971, by Richards for funds to invite R. Freeman (then at Varian Associates California) to assist in instrument development and research applications of NMR work.

**Wellcome Trust 4661/1.2**

This was for the purchase of a second computer to speed up the data handling of NMR results. A Bruker Nicolet BNC-12 was purchased.

- D.3 Correspondence with colleagues, preliminary negotiations and drafts, correspondence with Trust on application, grant, report etc. 1972-74.
- D.4 Draft and final version of proposal July 1972 (by Richards, Phillips, Radda and Williams).
- D.5 Draft and final version of 'First report to the Wellcome Trust' on use of equipment (undated, but sent February 1974).

## SRC B/RG/7900

This was the continuation of the initial grants and involved considerable long-term planning and collaborative discussion. Richards circulated all members of OEG in July 1973 to obtain their views on the general advisability of maintaining the group and making a new application for funds (see E.28 for circular and replies) and more specific enquiries about collaborative projects were also made during 1973 and 1974 (see D.6, E.29, E.30). From March 1974 the new grant application was put together from proposals and comments; the final version was sent to SRC in September. A Council visitation to Oxford was held on 11 November and after delays mainly relating to the provision of a computer the award of a grant to the value of £223,620 was announced in July 1975 for research on 'Structural mobility of enzyme groups and sub-units in catalysis and control.'

The history of this grant is very fully documented in the folders below.

- D.6 Preparatory papers. Replies by OEG members to letter circulated February 1974 by G. Lowe asking for details of research programmes and collaboration, to be used in formulating new grant application.
- Includes proposals received from L.N. Johnson, R.E. Richards and G.K. Radda, I.D. Campbell, K. Dalziel, R.A. Dwek, R.J.P. Williams, S.G. Waley, G. Lowe, H.A.O. Hill, E.A. Newsholme, R.E. Offord, P. Esnouf, R. Cecil, D.C. Phillips.
- D.7 Drafts for Richards's 'letter of intent' outlining proposal, sent to SRC 6 May 1974 (see D.10). Notes and drafts (March), version circulated for comment 3 April, comments or revisions by Phillips, Knowles, Radda.
- D.8 Richards's notes, mainly on finance, and estimates submitted by others, for grant application.
- D.9 Drafts, notes, ideas and comments for grant application, mainly by Williams, but including contributions from Lowe, Waley, Campbell, Hill, Radda and others.
- D.10 'Letter of intent' sent by Richards to SRC 6 May, formal application sent 11 September and a little related correspondence.

- D.11 Correspondence and arrangements for SRC visitation to discuss application (11 November), timetable of events, details of additional research grants held by OEG members, use of NMR facilities, budgeting etc.
- D.12 Correspondence with SRC, Bruker Spectrospin and others on purchase of computer from new OEG grant, official letter of award 8 July 1975, a little correspondence on administration of grant (to April 1976).
- D.13 OEG Report on grant B/RG/7900 1974-78. 35pp. typescript draft, with manuscript notes and corrections in several hands.
- D.14 Additional application under grant 7900 for a Nicolet 300 MHz spectrometer to replace the old 270 MHz instrument. Sent in the names of Richards, Williams and I.D. Campbell. No date, but Richards's circular to OEG members on the subject is dated 6 April 1979.
- Note** During consideration of the application for grant 7900, Richards had offered to comment, on behalf of OEG, on any individual applications emanating from members of the group with special reference to their relevance to OEG's overall programme. This was welcomed by SRC and written into the eventual letter awarding the grant. Some of these are included below at D.15-D.21 with correspondence or comments by Richards or by other OEG members.

SRC B/RG/9472	May 1975	K. Dalziel
SRC B/RG/89796	May 1975	E.A. Newsholme
SRC B/RG/87754	May 1975	G. Lowe

D.15 Copies of applications, comments by Richards.

SRC (no number)	December 1975	G.K. Radda
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D.16 Copy of application, comments by Williams, Phillips, L.N. Johnson.

SRC B/RG/62539 January 1976 H.A.O. Hill

D.17 Copy of application, comments by Radda.

SRC (no number) February 1976 G. Lowe

D.18 Copy of application, comments by Radda and Williams.

SRC (no number) April 1976 E.A. Newsholme

D.19 Copy of application, comments by Radda and P.J. Randle.

SRC (no number) December 1976 G. Lowe

D.20 Copy of application, comments by Radda.

SRC (no number) March 1979 G. Lowe

D.21 Copy of application.

## SRC B/RG/8660.3

This was a three-year grant made to Richards, D.I. Hoult\* and I.D. Campbell May 1975-September 1978 for the development and construction of a high resolution Fourier transform NMR spectrometer at 470 MHz. Collaboration continued with Oxford Instruments who manufactured the magnet, and there was close involvement with the SRC Rutherford Laboratory for the manufacture of the niobium-tin core.

The project was very successful and resulted in commercial patents as well as many technical and scientific papers.  
See D.28 *et seq.* for continuing research project.

\* From November 1977 Hoult took up a position at National Institutes of Health Bethesda, his place being taken by D.G. Gadian.

- D.22                    Application to SRC and to Oxford University December 1974, press release.
- D.23                    Miscellaneous short notes by Richards on costing, grant extension, research possibilities etc. Undated but related to this project.
- D.24                    Correspondence February 1975 - March 1979, with SRC, Oxford Instruments, Rutherford Laboratory, NRDC and others on collaborative arrangements and progress, research staff, patenting.
- D.25                    Oxford Instrument's quotation 'To design, manufacture and commission a 470 MHz NMR magnet system' June 1975.
- D.26                    Minutes of meetings held 4 June 1975 - 19 July 1978, numbered 1-39, held between Richards's group, Oxford Instruments and the Rutherford Laboratory during the course of the project. When Richards was able to attend in person, his manuscript notes may accompany the minutes.  
  
Also includes Progress Reports and a little correspondence, and photographs of the team with the completed machine.
- D.27                    Report on grant.

## SRC GR/A/5304.8

This was a 'special grant' of £97,200, to run 1 October 1978 - 30 September 1982, made to G.K. Radda in association with R.E. Richards and D.G. Gadian, for '<sup>31</sup>P NMR and biochemical studies of living tissue'. It was proposed 'to study perfused, beating heart, intact skeletal muscle, perfused kidney and the adrenomedullary catecholamine storage system by phosphorus NMR and biochemical methods'.

This was a development of previous work conducted under various research grants, and final reports or progress reports are included as appendices in D.28 for the following:

B/RG/8624.5, Radda and Richards, <sup>31</sup>P NMR in biological systems.  
B/RG.53827, Radda, Fluorescence relaxation studies.  
B/RG/8660.3, Richards, Campbell, Hoult, 460 MHz high resolution NMR.  
GR/A/0910.6, Radda, Regulation of glycogen metabolism.

The project coincided with Richards's appointment as Vice-Chancellor, and D.28 also includes a 'Statement' by him explaining that the application was therefore submitted in the name of G.K. Radda, but affirming his intention to maintain a close interest in the work in the time available to him.

- D.28                    Application and appendices, letter of award.
- D.29                    Reports of meeting, proposal, brief correspondence on possible collaboration of Rutherford Laboratory and OEG in development of NMR techniques (relating to whole organ study) 1977-79.
- D.30                    Application by Radda for supplementation of grant to allow purchase of Nicolet data processing system March 1979.
- D.31                    Application for continuation of grant, under same title and by same applicants, undated but about October-November 1979 (introductory remarks state that the project 'has been fully operative for only just over one year'), written at request of SRC to enable it to be considered at same time as the main OEG application (D.34, D.35).

## SRC GR/A/7175.2

Application by Richards and Campbell for two-year postdoctoral assistant for NMR biological studies, especially with 460 MHz instrument.

D.32 Correspondence, letter of award 1978.

## MRC (no number)

D.33 Application by Radda and Gadian for project on 'Clinical studies on organ failure by  $^{31}\text{P}$  NMR', sent May 1980, to start January 1981.

## SRC GR/B/26602

This was the OEG's successor grant to the major grant B/RG/7900 (1975-80). It was sent in to SRC in April 1979 and awarded to Richards in April 1980 for 'NMR studies of proteins', to the value of £270,350. Although support was provided in the first instance for four years, it was on a 'rolling' system whereby there was a review after two years and the opportunity to apply for support for a further four-year period. See below for subsequent applications.

D.34 Brief correspondence, application as sent, letter of award.

D.35 Earlier (incomplete) drafts of application, one with corrections by Phillips.

## SERC GR/C/1383.5

This was the replacement grant for GR/B/26602, sent in 11 March 1982. An SERC review panel visited Oxford on 24 May and a grant of £331,133 was made on 13 September, under the continuing title 'NMR studies of proteins', for 'study of the structure and function of enzymes and proteins, and the development of physical methods'.

- D.36 Correspondence with Bruker GMBH on provision of 600 MHz instrument at preferential price, with SERC on application and review panel visit, copy of application as sent, letter of award. Also includes Richards's letter to SERC of 20 December 1983 informing them of his resignation as Chairman, OEG, and replacement by Phillips.
- D.37 Drafts for application, including suggestions by Williams, comments and corrections by Phillips, Richards's manuscript draft, miscellaneous contributions by other OEG members.

## SERC GR/C/9426.1

This was the next replacement grant, sent in by Phillips and Williams on 8 December 1983. An SERC 'Site Visit' took place on 24 February 1984 and a grant of £526,167 was made on 3 August 1984 under the general title 'Studies of Proteins', for a 'Study of the structure and function of enzymes and proteins using NMR'.

**Note** During the drafting and discussions preceding the application, work on site-directed mutagenesis in  $\beta$ -lactamase was being undertaken by S.G. Waley with the approval of D.C. Phillips. R.J.P. Williams, who was largely responsible for the form of the application, questioned the value of this research, which was however included in the application under 'Other enzymes under study'. See E.32-E.34 for additional material.

- D.38 Application as sent, letter of award.
- D.39 Drafts, ideas, correspondence, circulars to OEG members May-November 1983 about application, mainly by Williams, but including contributions from C.M. Dobson, G. Lowe.

D.40 Correspondence, papers, arrangements etc. for 'Site Visit' by SERC review panel on 24 February 1984. Includes material on principal NMR achievements and equipment at Oxford.

D.41 Correspondence (mainly photocopies) July-December 1984 conducted by Williams with SERC, Oxford University, Bruker Spectrospin on funding and equipment for adequate continuation of NMR activities under grant 94261.

Included here is a draft application to SERC on 'Bio-engineering, NMR and Bio-sciences', undated and unsigned, but related to grant and with manuscript corrections and additions by Williams.

#### SERC GR/D/86171

This was the next replacement grant, for £391,899, sent in 'to study the structure and function of proteins using high resolution NMR' by Williams, Campbell and Dobson in January 1986. A 'Site Visit' took place on 9 May.

D.42 Copy of application, correspondence and papers June 1985 - May 1986 exchanged with OEG members, SERC etc. about application and site visit; includes Williams's letter to Phillips of 9 December 1985 suggesting that the NMR group should 'go it alone only under the general umbrella of OEG'.

#### SERC GR/E/09146

D.43 Application for 600 MHz spectrometer console, made by Campbell, Dobson and Williams, related to work on GR/D/86171, and notification of grant of £109,250.

**SERC GR/E/94838**

This was the renewal grant for GR/D/86171 sent in 'To study the structure and function of proteins using high resolution NMR' by Campbell, Dobson, Dwek and Williams, for the period 1988-91. This grant was not made, or more correctly was subsumed into the IRC grant. (See Section J).

- D.44 Copy of application, letter from SERC explaining situation regarding OEG funding and IRC grant.

**SERC (no number)**

Application for three-year grant 'To investigate the structure and function of proteins and their glycoconjugates by NMR and computer based techniques', by Campbell, Dobson, Dwek and Williams.

- D.44A Copy of application (undated, but proposed starting date is 1 January 1988), reports and statements by Dwek on oligosaccharide research programme. December 1987 - February 1988.

**D.45-D.48 Oxford University**

- D.45 1973  
Draft paper, correspondence exchanged between Richards and university on possible support for OEG from General Board, May-November 1973.

- D.46 1973  
Brief correspondence on possible support for OEG from university's E.P. Abraham Research Fund

- D.47 1983  
Grant from university's Equipment Fund towards purchase of new computer.

D.48                    1985-88  
Correspondence and papers August 1985 - January 1988 (some photocopies) mainly exchanged between Williams and university authorities but also with colleagues and Oxford Instruments on equipment and funding to cover shortfall in SERC funding, new equipment, future of OEG, application by NMR section of OEG for consideration by Equipment Fund of UGC, notes of meetings, finance etc. Some of this material relates to later OEG grant applications.

**D.49    E.P. Abraham Research Fund**

See also brief correspondence at D.46

D.49                    Request for grant towards 500 MHz superconducting magnet to be supplied by Oxford Instruments. 1980.

**D.50    National Research Development Corporation (NRDC)**

Later British Technology Group (BTG)

D.50                    Miscellaneous notifications, brief correspondence etc. on various patents, revenue sharing agreements and special accounts, relating to Richards's research group and NMR development. Various dates 1977-84.

**D.51-D.55    Visitations and Inspections**

These relate to SRC visits to Oxford during the course of agreed research grants, to observe progress and meet members of OEG.

D.51                    18 October 1971  
Visit of representatives of SRC Enzyme Chemistry and Technology Committee.  
Correspondence, arrangements, SRC report on visit.

D.52, D.53

4-5 January 1973

This was a two-day symposium sponsored by OEG at the request of SRC Enzyme Chemistry and Technology Committee. The purpose was to bring together all those receiving SRC grants in the enzyme chemistry field so that they might be made aware of the work currently in progress at Oxford and to provide an opportunity for discussion.

D.52 Draft and final programme, guest list, arrangements, correspondence, circulars to OEG members, miscellaneous notes on organisation by Richards, letters of thanks.

D.53 Brief correspondence and synopses of talks given at meeting by OEG members, sent at SRC request. Includes contributions from L.N. Johnson, Radda, Newsholme, Campbell, Williams, Lowe, Dalziel, Phillips.

D.54

2 July 1974

Brief correspondence and arrangements.

D.55

20 February 1980

Draft programme of events.

## SECTION E

## MEETINGS, MEMBERSHIP, RESEARCH

E.1-E.35

## INTRODUCTION TO SECTION E

The first meeting of the OEG was held on 20 October 1969. Among the decisions then taken were that policy decisions should be settled by vote, that new members could be elected (including members from other universities) and that the post-doctoral research appointments allowed for under the SRC grants should be allocated by the group on the basis of bids submitted by members. It was also decided that the group should meet regularly on Monday evenings throughout the term for dinner and scientific discussion.

This system obviously and rightly laid great weight on the collaborative nature of the group. It was especially successful in the early years as the allocation of a research assistant depended on group agreement, but it continued to operate throughout the history of the OEG and particularly when grant applications called for new directions for collaborative work. The Monday meetings also continued, for business and policy decisions and for scientific presentations and talks.

All these aspects of OEG activity are well represented here. There are the minute books and circulars (E.1-E.12) and some correspondence on membership (E.13, E.14). The early applications for postdoctorals on the basis of research projects agreed by the group are shown (E.15-E.23); of interest also is the chronological sequence of documents under the heading 'Projects, ideas and policy' (E.24-E.35). These reflect the corporate decision-making of the early days, and though not necessarily identified with a specific appointment or grant application may be preliminary thoughts additional or complementary to them.

There is some inevitable overlap with information elsewhere relating to grant applications, building and accommodation, the development of the Interdisciplinary Research Centre and the like.

The material is presented as follows:

E.1-E.12	Minutes and circulars
E.13, E.14	Membership
E.15-E.23	Staff and appointments
E.24-E.35	Projects, ideas and policy

**E.1-E.12 Minutes and circulars**

- E.1** Minute book  
Meetings 2 October 1969 (first meeting) to 16 June 1975.  
The first secretary was L.N. Johnson; G. Lowe was secretary from January 1973 to June 1975.
- E.2** Minute book  
Meetings 20 October 1975 to 7 March 1983.  
I.D. Campbell was secretary October 1975 to June 1981, S.G. Waley October 1981 - March 1983, C.M. Dobson from March 1983 to 1988.
- E.3** Meetings notebook  
This notebook was received from C.M. Dobson, last secretary of the OEG. The material is less formally presented than that in E.1 and E.2; it consists mainly of notes of research papers and discussions at meetings, with some brief notes on business matters, grant applications, SRC Visits and, in 1987 and 1988, discussions on the bid for the Interdisciplinary Research Centre. There are no written-up minutes as such.
- At front of book are notes on research seminars in the Inorganic Chemistry Laboratory (27 February, 27 October, 18 December 1981 and undated), notes on an SRC grant meeting (probably for OEG) and OEG meeting 7 March 1983.
- At rear of book are notes, not all dated, on fortnightly OEG meetings 16 November 1981 to 22 February 1988 and the announcement of the successful bid.
- E.4-E.12** Agendas, circulars, minutes. 29 September 1969 - 22 February 1988.
- There are loose papers, some typed, some as manuscript notes or drafts, and including a little informal correspondence about meeting arrangements, matters to be discussed or arising from discussions.
- They are not a complete set, but often complement the material in the bound volumes by supplying missing minutes and also filling in some of the background.
- The material is presented chronologically, with a brief indication of any material of particular interest.

- E.4 1969-70
- E.5 1971-72
- E.6 1973
- E.7 1974-76
- E.8 1977-83. Includes letter of congratulation to Richards from G.J. Warnock (Vice-Chancellor) on EPIC award made to Richards and his group, not otherwise documented here.
- E.9 1984. Includes drafts and circulars on nominations for new members and on group projects and meetings, and correspondence arising.
- E.10 1985
- E.11 1986. Includes notice of meeting (27 January) to discuss papers on NMR facilities and funding (by Williams) and on gene-manipulation (by G. Lowe).
- E.12 1987-88 and undated.

**E.13, E.14 Membership**

- E.13 Elections and resignations 1969-87 (with a little correspondence).
- 1969 H.L. Kornberg
- 1973 R.A. Dwek
- 1974 D.C. Hodgkin (resignation)  
G.T. Young (resignation)

1975	F.R. Whatley P.J. Randle M.J. Adams J.M. Brown
1980	J.E. Baldwin M. Sternberg
1983	M. Sternberg (resignation)
1984	(associate members) T.W. Rademacher S. Homans K. Brindle R.A.J. Challiss B.A. Levine C. Redfield P.J. Goodford B. Sutton N. Walton
1985	A.R. Rees
1986	G.K. Radda (resignation)
1987	R.A.J. Challiss (resignation)
1987	F.E. Baralle D.H.L. Bishop A.J. Pratt K.B.M. Reid D.I. Stuart G.L. Taylor A.F. Williams

E.14                    Miscellaneous membership lists and updates 1970-87.

#### E.15-E.23    Staff and appointments

Applications and evaluations by OEG members, either individually or as small *ad hoc* committees, relating to bids for postdoctoral research assistants, or for extensions thereof. Includes statements of proposed research, comments and evaluations, appointments, salary scales, budgeting etc. The sudden and very rapid rate of inflation in the early 1970s caused great anxiety to those responsible for implementing the grants and some supplementation had to be sought. See also G.1, G.2.

- E.15                    1969  
Research proposals and requests for research assistants submitted by members of the OEG (few dated, c.October-November 1969), circulated by Richards, with evaluations and comments by others.
- E.16                    1971  
Bids and research projects, report by review sub-committee (Dalziel, Knowles, Phillips, Williams), correspondence and arrangements about appointments and costs.
- E.17                    1972  
Bids and research projects, comments by colleagues and by review sub-committee (Dalziel, Radda, Williams), correspondence.
- E.18                    1973  
Similar material: bids, and comments from colleagues and from review sub-committee, correspondence, budgeting.
- E.19                    1974 - January 1975
- E.20                    Applications, proposals, correspondence for research studentships for OEG projects. 1971-74.
- E.21                    Requests to work at OEG 1970, 1971, 1972, 1974, 1982.
- E.22                    Requests from OEG colleagues for travel and conference expenses, entertainment of visitors arising from OEG projects, normally addressed to Richards and passed on by him for approval or advice to other members. 1972-77.
- E.23                    Later appointments.  
1982-83. Replacement for D.G. Gadian on his move to Royal College of Surgeons as Head of Physics.  
  
1983. 'New Blood' appointments for new Enzyme Group Building; includes draft proposal by Williams.

**E.24-E.35 Projects, Ideas and policy**

- E.24 Correspondence 1969-72 with enzyme scientists and suppliers outside Oxford, on possible collaboration, matters of mutual interest etc., mainly relating to Preparation Laboratory and arising from press announcements of SRC grants.
- E.25 Replies by OEG members to request by Richards about collaborative projects currently in hand. From Waley, Esnouf, Peacocke, Williams, Johnson, A.C.T. North. 1970-71.
- E.26 Correspondence and papers on possible collaboration with J.W.S. Pringle on operation of analytical centrifuge. 1971.
- E.27 Purchase of oscilloscope for T-jump apparatus. 1972.
- E.28 Richards's circular letter of 17 July 1973 to all OEG members on the future of the group, with reference to possible application for continuing SRC support, with replies from members and Richards's analysis of them.
- E.29 Richards's circular letter of 16 July 1973 to OEG users of NMR facility, asking for information on projects to be studied and time required, with special reference to future plans, and members' replies. Also included here is an undated note: 'Some thoughts on the uses of P<sup>31</sup> NMR' probably by Radda.
- E.30 J.R. Knowles's circular letter of 4 January 1974 to all OEG members, seeking opinions on form and content of Monday evening meetings, research interests, future collaborative programme and drafting of grant application, and members' replies.
- E.31 Letters, memoranda, ideas for projects, grants, work in new building etc. by R.J.P. Williams, some circulated to all OEG members, some addressed to D.C. Phillips. Various dates 1982-85 and several undated. Includes Richards's circular letter to OEG members 14 September 1983 announcing his retirement as Chairman of OEG on appointment as Director of Leverhulme Trust and Williams's letter of 24 August to Phillips asking him to become Chairman.

E.32-E.34 Co-ordinated programme in protein engineering.

This was a combined SERC and Celltech Initiative 'in the general field of site specific mutagenesis and its implications for science and industry'. Phillips was closely involved with this in view of his own academic interests, Chairmanship of the OEG and membership of the Board of Celltech.

E.32 August-November 1983

Papers and correspondence exchanged between Phillips, SERC, Celltech and colleagues, background information on proposed initiative and preliminary meetings, draft of grant application by Johnson, Waley and others on 'Site-directed mutagenesis'.

E.33 Papers and correspondence relating to 'Workshop' on protein engineering organised by SERC and held in London on 17 November 1983. Phillips chaired a session. Material includes programme, Phillips's notes of discussions, background information from SERC and from Celltech, correspondence.

E.34 May-July 1984

Correspondence with SERC on programme, and with R.J.P. Williams (unfavourable), and copies of draft research proposals by Waley, Phillips, Rees, Lowe.

E.35

Correspondence and drafts December 1985 - January 1986 relating to an application under protein engineering project by G. Lowe, A. and S. Kingsman.

## SECTION F

## ACCOMMODATION AND BUILDING

F.1-F.10

For information on accommodation for the Enzyme Preparation Laboratory in the Department of Zoology see B.1.

**Biochemistry Department**

- F.1 Arrangements for Richards to move his NMR equipment into space made available by R.R. Porter in the Biochemistry Department. The move arose because of Richards's election as Warden of Merton and consequent resignation as Dr. Lee's Professor of Chemistry.

Correspondence, plans, lists of equipment. 1969-71.

- F.2 Correspondence and plans 1976, 1977 from University Surveyor on possible new building for Richards's equipment on Biochemistry Department forecourt.

**Dyson Perrins Laboratory**

- F.3 Brief correspondence 1980, 1982 on the provision of space in the Dyson Perrins Laboratory for the OEG's 300MHz spectrometer.

**New Building (The 'Rex Richards Building')**

Although NMR spectroscopy had been one of the most conspicuous successes of the OEG, space for the work, and especially for the housing of the increasingly powerful magnets, had always been provided in the Biochemistry Department as an act of generosity by the Whitley Professor R.R. Porter (F.1). By the late 1970s the situation had become unacceptably cramped for all concerned and it was felt that NMR needed space provision of its own. The first plan was for a small building in the forecourt of the Biochemistry Department (F.3) but this did not develop. From 1978 negotiations began with the university and with the SERC and MRC for a new building to be erected on an excellent site adjacent to the Departments of Biochemistry and Physical Chemistry. A two-storey building with

basement was envisaged; this would accommodate the NMR equipment and some other OEG work, and the Immunochemistry Unit headed by Porter whose research the MRC wished to continue to support after his retirement. In view of the importance of the site however - one of the few spaces remaining in the heavily-congested Science Area - the building was designed to take another two floors and these were eventually agreed for the completed laboratory. The occupant of the additional space was Phillips's Laboratory of Molecular Biophysics whose former quarters in the Department of Zoology were taken over by the Imperial Cancer Research Fund, the rent therefrom being put towards the cost of the new laboratory.

The Research Councils were enthusiastic about the proposed building from the start and gave financial support; funding remained however a constant difficulty in view of escalating costs. Other appeals were made, and generous contributions were received from the Wolfson Foundation and the E.P. Abraham Research Fund; the grant of £750,000 from the Wolfson Foundation was crucial in enabling the building to proceed.

- F.4 Preliminary negotiations March-November 1978
- Correspondence between Porter and MRC, views of Williams and Radda, draft and final version of Porter's request to university to make an approach to the MRC and SRC, space requirements etc. Also includes copy of Porter's letter of 15 March to ICI on possible collaboration with NMR group.
- (NB. Some of these documents are photocopies.)
- F.5 Notes, calculations, plans etc. for the possible accommodation of Molecular Biophysics in the proposed new building, mainly by Phillips but including ideas and proposals from other members of the Laboratory. Includes copy of Phillips's letter to the University Surveyor setting out plans and alternatives, 20 November 1978.
- F.6 Drafts and proposals submitted by members of OEG for NMR and other protein research, discussed at OEG meeting November 1978 and used as basis of the letter of application, drafted mainly by Phillips, Williams and Radda, to be sent to SRC and MRC as application for funds for new building January 1979. Includes correspondence from Williams and Radda.
- F.7 Copy of proposal as sent 24 January 1979, continuing correspondence and negotiations with MRC and SRC, January 1979 - January 1980.

- F.8 Appeals for additional help with funding for new building, to Wolfson Foundation and to E.P. Abraham Cephalosporin Trust (by Richards) and to Unilever (by Porter) 1980, and some continuing correspondence on funding and on Richards's resignation from Oxford 1981-84.
- F.9 Miscellaneous site and building plans, correspondence and meetings with University Surveyor and staff.
- F.10 Miscellaneous papers of university General Board, Buildings Committee and Heads of Science Departments Committee meetings relating to new building 1978-81.

## SECTION G

## ADMINISTRATION AND FINANCE

G.1-G.6

This consists of correspondence and papers exchanged mainly between Richards and Phillips for OEG, and officials at SRC and Oxford University central and departmental offices. It relates to financial disbursements against the grants for staff and equipment, and includes staff lists and financial statements of various dates.

It is presented with reference to specific numbers of grants as far as possible.

**B/SR/9479 and B/SR/7824**

G.1 Includes reference to supplementations awarded in September 1973 and September 1975 to cover inflationary costs of salaries. 1970-76.

G.2 Calculations on staff costs, salary increases, budgeting etc. by Richards and Phillips; a little correspondence from OEG colleagues is included.

**B/RG/7900**

G.3 Correspondence and papers, arrangements, salaries.

**GR/B/26602**

G.4 Brief correspondence and papers 1981, 1983.

G.5 Miscellaneous claim forms for salaries and equipment submitted to SRC on grant B/SR/9479.

G.6 Financial statements and accounts of OEG sent by Oxford University Chest for grants B/SR/7824, B/SR/9479, B/RG/7900, GR/B/26602, GR/C/13835.

## SECTION H

## REPORTS AND PUBLICATIONS

H.1-H.14

H.1

OEG Newsletter No.1 June 1971

This was intended for circulation among group members and in confidence to a very limited number of others, and not for general publication. The individual reports were reproduced without editing from the notes provided by the contributors.

H.2-H.4

'SRC report from the Oxford Enzyme Group 1970-71'

This was a report on the first year's work, sent to SRC November 1971.

H.2

Duplicated typescript version as sent.

H.3

Draft with various manuscript corrections, 45pp.

H.4

Original material contributed by M. Iqbal, E.A. Newsholme, I.O. Walker, R.J.P. Williams, C.C.F. Blake, A.C.T. North, A.R. Peacocke, L.N. Johnson, G.T. Young, H. Scouloudi, R. Cecil, S.G. Waley, K. Dalziel.

H.5

Report to Faculty of Biological and Agricultural Sciences on the Laboratory of Molecular Biophysics. Includes material on involvement with OEG. By D.C. Phillips, October 1973.

H.6-H.8

Oxford Enzyme Group Report 1970-74 sent to SRC August 1974.

H.6

Report as sent to SRC, 63pp. typescript.

H.7

29pp. typescript draft, with extensive manuscript revisions and additions by Richards and Phillips.

- H.8 Information and drafts contributed by I.D. Campbell, K. Dalziel, G.K. Radda, R.A. Dwek, I.O. Walker, E.A. Newsholme, A.C.T. North, H.A.O. Hill, M.P. Esnouf, S.G. Waley, G. Lowe, J.R. Knowles, H. Scouloudi, L.N. Johnson, R.E. Richards, with miscellaneous editorial indications by Richards.
- H.9 Final report on B/SR/7824.2 and B/SR/9479.2 (to 1975). Sent March 1977. This is a short summary of the activities of the Enzyme Preparation Laboratory and the NMR Laboratory up to October 1975, and a full list of publications of the work of the Oxford Enzyme Group relating to these grants. The full research report submitted in August 1974 is at H.6.
- H.10 Report on B/RG/7900 (1974-78). 35pp. typescript, plus 2pp. 'Enzyme Group Report 1974-78' and 2pp. 'Research Proposals 1979-1984' both by Phillips.  
  
Report on GR/D/86171 (1986-88). 26pp. typescript and 'Research update' by Williams and Dwek August 1986.
- H.11 Miscellaneous lists of publications by members of OEG, various dates 1970-75, 1980-85.
- H.12 Publications and publicity.  
  
1971. Brief correspondence on MRC support for enzyme research arising from published article.  
  
1983. Correspondence, arrangements, information relating to visit to OEG laboratories as part of visit by *Paris Match* journalists to Oxford.  
  
1985. Drafts, correspondence and information from colleagues for 'Research Profile of the Oxford Enzyme Group' written at the request of University Grants Committee by D.C. Phillips.
- H.13 Short articles on OEG by L.N. Johnson (1971), G.K. Radda and R.J.P. Williams (1976), R.J.P. Williams (1985), and on Interdisciplinary Research Centre by R.J.P. Williams (1989).
- H.14 Miscellaneous SRC publications on enzyme chemistry and technology.

## SECTION J INTERDISCIPLINARY RESEARCH CENTRE (IRC)

J.1-J.15

## INTRODUCTION TO SECTION J

The moves towards the setting up of the IRC were conducted with great urgency in the later months of 1987. The SERC's 'letter of Intent' to create a number of such centres was circulated on 28 July inviting outline proposals by 30 September, in itself a period coinciding with conference and vacation arrangements. There followed a series of deadlines, each preceded by great activity of drafting, revising and discussion, with OEG members contributing memoranda, proposals and budgets some of them faxed in from abroad. The first draft document was circulated on 3 September, then amended and redrafted in consultation with academic and university administrative colleagues at meetings on 18 and 24 before the 'final' submission on 30 September. On 12 November began a time of preparation for the scientific presentations, organisational and financial arrangements in readiness for the SERC visit on 20 November. Following this the SERC asked for a more detailed submission on the proposed management structure and research programme, to be sent in by 31 December. Once again colleagues were circulated, information assembled and drafts prepared, and a meeting was held on 13 December under the chairmanship of J.E. Baldwin, Director designate of the IRC; the subsequent stages of drafting were accomplished by 18 December when the latest version was sent in to the university offices and, after a final meeting on 22, was submitted to SERC on 24 December.

The pace of activity imposed by this timetable and by the very considerable sums of money at stake, is well reflected in the surviving papers with their combination of rapid fragmentary notes and multiple, often longhand, drafts of key documents. It may also in part explain a degree of confusion as to the name of the institution towards which all the endeavour was bent. The initial SERC papers refer to an 'Interdisciplinary University Research Centre for Molecular Sciences'; the usual working title for the early drafts is University Research Centre (URC) in Molecular Sciences, though Molecular Sciences Research Centre, University Centre for Protein Research and other permutations are used. The first meeting of the Management Committee on 2 February 1988 called itself the 'Oxford Centre for Protein Research', and the following October saw the official opening of the Oxford Centre for Molecular Sciences.

J.1 July 1987

SERC's letter and papers on intention to set up URCs 'in areas of interdisciplinary strategic research' (the list of topics included molecular sciences), OU Secretary of Faculties letter nominating Phillips to co-ordinate discussion on possible bid in this field.

J.2 August 1987

Phillips's circular to OEG members asking for ideas and reactions; drafts, suggestions, information, correspondence sent by colleagues to assist him in drafting application. Includes material from L.N. Johnson, R.J.P. Williams, T.R.E. Southwood, G.K. Radda, H. Saibil, A.R. Rees, J.E. Baldwin, E.M. Southern, H.A.O. Hill, G.G. Roberts.

J.3 August 1987

Manuscript draft papers on 'Centre in Molecular Sciences' and on 'NMR and the Oxford Enzyme Group' by C.M. Dobson, sent to Phillips. Only one page dated 19 August.

J.4 August 1987

20pp. manuscript and typescript early version of Phillips's draft proposal ('Proteins play a central role in biology ...').

J.5 September 1987

Phillips's draft proposal ('Proteins play a central role in biology ...') sent to OEG members and to OU on 3 September, comments and/or information from K.B.M. Reid, E.A. Newsholme, W.G. Richards, J.S. Rowlinson, R.J.P. Williams, G. Lowe, G.G. Brownlee, J. Evans.

J.6 September-October 1987

Notification of meeting to discuss bid on 18 September, revised draft with manuscript corrections by Baldwin and another, notification of further meeting on 24 September, further revised draft annotated by Phillips, copy of final version circulated 28 September.

J.7

Notes, manuscript and typescript drafts by C.M. Dobson for his 'Proposal for a University Centre for Protein Research'. Includes copies of Phillips's draft proposal annotated by Dobson in preparation for his draft which was perhaps prepared for one of the September discussion meetings.

## J.8 October-November 1987

Correspondence and papers, OEG meetings etc. mainly related to preparations for SERC visit to discuss bid on 20 November. Includes full list of shortlisted URC proposals in UK, timetable of visit, arrangements for scientific presentations by talks and posters and rehearsal on 16 November. The notes of the meeting between university and SERC representatives, following the scientific presentations on 20 November, include points to be made or stressed in the university's next document and an indication that J.E. Baldwin would probably be the Director of an Oxford URC.

## J.9 3 December 1987

Material circulated by J.E. Baldwin for a meeting of the Management Committee on 13 December to prepare a revised version of the application to comply with SERC's requests. Includes a questionnaire on levels of research commitment, funding and staff, and a draft document on the proposed organisation of the centre. Typescript versions as circulated, extensive manuscript drafts by Dobson, a few by Baldwin.

## J.10 4-11 December 1987

Information and correspondence from OEG members sent in answer to questionnaire, some direct to Baldwin, some via Phillips.

Includes material received from:

L.N. Johnson (her paper on protein crystallography, presented at the SERC visit and reproduced in the final submission).

A.R. Rees (Immunology).

R.A. Dwek (glycobiology).

C.C.F. Blake (blood clotting and fibrinolysis).

W.G. Richards (collaboration with industry).

D.I. Stuart (virus structure, and crystallographic data facilities).

G.L. Taylor (computing requirements, and VAX processors).

I.D. Campbell and others (NMR in the URC).

Unsigned communications.

Also included here is a letter sent to Baldwin from seven members of the Laboratory of Molecular Biophysics expressing disquiet at some aspects of the proposed management structure.

- J.11 C.M. Dobson's talk on NMR spectroscopy, presented at the SERC visit and reproduced in the final submission.
- Notes and Ideas.
- 14pp. manuscript version.
- 11pp. typescript with manuscript corrections by Dobson and by R.J.P. Williams.
- J.12 C.M. Dobson's paper ('The Centre will be based on ... ') presented as a 'Draft for Discussion' at the 13 December meeting.
- Notes and Ideas, including version of 3 December with further manuscript annotations.
- 5pp. 'Draft for discussion' annotated by Phillips.
- 3 further versions, all with annotations, probably produced following the meeting.
- Note.** All these versions envisage four 'core facilities' and therefore precede the final submission which lists six.
- J.13 13-22 December 1987
- Notes, schedules, drafts and material for the final submission, mainly by Dobson and Baldwin but including a few comments and revisions by L.N. Johnson, R.J.P. Williams, and incorporating edited versions of several of the contributions in J.10. Includes copy of Baldwin's letter 18 December forwarding the document to the University, and a copy of a letter from T.R.E. Southwood 22 December on the position of the Laboratory of Molecular Biophysics which was not assigned to the centre in the submission.
- J.14 Copy of the bid as submitted on 24 December.
- J.15 January-February 1988
- Includes copies of OU 'Notes' and SERC 'Minutes' of a meeting at Oxford 1 February to discuss the bid with special reference to administrative and management issues, and of Minutes of the first meeting of the Management Committee on 2 February.
- The decision to create the Oxford centre was officially taken at the SERC Council meeting on 10 February.
- The OEG's farewell dinner was held on 14 March (see A.11).

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