

Catalogue of the papers and correspondence of

SIR DAVID CHILTON PHILLIPS FRS

(b.1924)

Compiled by Jeannine Alton

VOLUME I

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FOREWORD

The completion of this catalogue of the manuscript papers of Sir David Phillips is a significant event in the work of the National Cataloguing Unit for the Archives of Contemporary Scientists. Like all such large-scale cataloguing projects it has had a long gestation. Indeed it may almost be said to have had its origins in the earliest days of the NCUACS's Oxford-based predecessor organisation. Sir David has taken an active interest in the scientific archives project since its inception in 1973 and Mrs Jeannine Alton who has now catalogued the Phillips papers for the NCUACS was in charge of the archives work in Oxford from 1973 until the transfer of operations to the University of Bath in 1987. The more immediate impetus for the Phillips cataloguing project, however, was Sir David's resignation in 1990 from his Professorship of Molecular Biophysics at Oxford University to assume the full-time Chairmanship of the Advisory Board for the Research Councils in London. The imminence of his departure from Oxford led to discussions with Sir David about the very substantial archive in his Oxford laboratory, a detailed archival assessment of their quantity, nature and importance for a wide range of aspects of the history of science, and the development of a funding proposal for submission to the Leverhulme Trust. We were very fortunate to secure funding from the Trust for two years with an extension for a third year as the science policy interest of Phillips's career took on a greater archival importance than had originally been anticipated. Sir David has been supportive throughout with advice and encouragement and Mrs Alton's expertise and experience has magnificently met the challenge of difficult technical material, the complexity of UK and international science organisation and the piecemeal delivery of papers over an extended period.

The NCUACS would like to take this opportunity to record our gratitude to the Director of the Leverhulme Trust, Sir Rex Richards, and the Leverhulme Trustees for their support of the scientific archives work since the transfer of operations to Bath in 1987. This has taken the form of three major cataloguing projects: the papers of Sir John Kendrew (1987-1989), Sir David Phillips (1991-1994) and Professor Dorothy Hodgkin OM (1992-1994). The three collections are deposited in the Bodleian Library, Oxford where they form an indispensable corpus of material for the history of twentieth-century British science.

Peter Harper
Archivist, NCUACS
February 1994

GENERAL INTRODUCTION

PROVENANCE

The material was received at various dates between January 1991 and February 1994 from Sir David Phillips and from his former Laboratory of Molecular Biology at Oxford University.

The late date and piecemeal arrival of some of the material have made it necessary to intercalate several additional items in the body of the catalogue and to attach addenda to Sections F (Publications), G (Conferences, visits, lectures) and Section O (Advisory Board for the Research Councils).

OUTLINE OF THE CAREER OF SIR DAVID PHILLIPS

Sir David has kindly contributed the following autobiographical sketch. The original is included at A.74.

Autobiographical sketch, February 1994.

I was born on 7 March 1924 in Ellesmere, Shropshire, a small country town on the border between England and Wales. My father, Charles Harry Phillips, was a Master Tailor and a Methodist local preacher. My mother, Edith Harriet Phillips, was the daughter of Samuel Finney, one-time Secretary of the Midland Miners' Federation and Member of Parliament 1916-22: she was a London-trained midwife, the organist at Ellesmere Methodist Church and long a member of the Ellesmere Urban District Council. My unusual middle name is the maiden surname of my mother's great grandmother and it is a reminder of the family myth that we are related in some way to the Pilgrim Father, James Chilton.

A key influence on my development came from my father, who was a very academically-inclined, thoughtful person who attempted to join the Wesleyan Methodist Ministry but failed, he always said, because his written sermon was not good enough. His extempore sermons, which he constructed in his head while he was sewing, were certainly powerful enough and I have sometimes wondered whether this background affected my own preference for speaking from rudimentary notes, or none at all.

But the more formal academic influence came from my mother's side of the family. Her father was also a Methodist local preacher, this time Primitive Methodist, who taught himself New Testament Greek and his youngest daughter, my aunt Kathleen, went to Manchester University to read English. She married D.A.R. Clark, an engineering graduate of Manchester Tech (UMIST as it now is) who became a Technical College teacher, rising to be Principal of Middlesborough and then Nottingham Technical Colleges.

These members of the family were important influences but even more important were my mother's cousins, J.F. and A.H. Bagnall. These were the sons of my grandmother's brother Joe, who worked as a Post Office clerk in Manchester and was again a Primitive Methodist local preacher. Jack and Herbert both went to Manchester Grammar School. Jack went on to read engineering at Manchester Tech while Herbert won a scholarship at St Edmund Hall, Oxford, read Greats and ended as classics master at Exeter School. Of the two Jack was the influential figure. He went to work in India in the late twenties and used to come home on leave every three years. These were among the most memorable events in my childhood. This larger-than-life figure would descend on Ellesmere in a large car and waft us about the countryside exuding a great air of confidence and full of stories about the hardly dreamed of world out there. It was he, I believe, who instilled in me the thought that anything was possible.

The Bagnalls seemed the dominant family in my early life. In addition to my grandmother, Mary Ellen, and her brother Joe there were three other brothers, Ted, Sam and Will, all local preachers, who had escaped from Ellesmere and lived respectively, when I first remember them, in Blandford Forum, Birmingham and Stroud. Ted and Will were both Liberal Party election agents and Sam worked, I believe, for the Shropshire Union Canal Company. His only son, Howard, read chemistry at Birmingham University and became City Analyst of Birmingham - another role model, though not as charismatic as his cousin Jack.

My formal education was at the Church of England infants and elementary schools in Ellesmere and at the High School for Boys at Oswestry, some eight miles away on the Cambrian Railway. In 1942 I took Higher School Certificate in Chemistry, Physics and Mathematics, with subsidiary French and was awarded a State Bursary to study Physics, Mathematics and Radio Communications at University College, Cardiff, one of the constituent colleges of the University of Wales, where I took a war-time degree in June 1944. I then joined the Royal Navy for training as a Radar Officer, being posted to H.M.S. *Illustrious* in the Spring of 1945.

After demobilisation in February 1947, I returned to Cardiff where I was awarded First-Class Honours in Physics in 1948 and began research in X-ray crystallography under the supervision of A.J.C.

Wilson. As a graduate student I analysed the structures of ephedrine and one of the polymorphic forms of acridine and I played a part in developing the statistical tests for crystal symmetry that were devised in this period out of Wilson's work on the probability distribution of X-ray intensities.

After taking my PhD in 1951, I joined the National Research Laboratories, Ottawa, Canada, as a Post-doctoral Fellow in the Crystallography Laboratory led by W.H. Barnes. First as a Post-doctoral Fellow (1951-53) and then as a member of the Research Staff (1953-55), I continued studies of the three-dimensional structures of relatively small molecules, extending the analyses to involve the use of three-dimensional data, developing the method of photographic data collection and introducing the use in Ottawa of digital computers - in collaboration with F.R. Ahmed, whom I helped to recruit.

In 1955, on the suggestion of Dorothy Hodgkin, I was invited by W.L. Bragg to join the Research Staff of the Royal Institution, London, where Bragg was building up a team to work on protein crystals. On leaving Cambridge in 1954, Bragg had hoped to attract members of the Medical Research Council Research Unit at the Cavendish Laboratory (M.F. Perutz and J.C. Kendrew) to move to the Royal Institution with him, but they preferred to remain in Cambridge where their studies of haemoglobin and myoglobin had begun to develop well. They agreed to help Bragg, however, by collaborating with his new team in London. Consequently, on moving to the Royal Institution, I began to collaborate with J.C. Kendrew in his studies of myoglobin while at the same time collaborating with U.W. Arndt on the development of X-ray diffractometers. I used a semi-automatic four-circle diffractometer to measure some of the X-ray data that were used in the low-resolution analysis of the structure of sperm-whale myoglobin that was completed in 1958, and then went on to devise (with Arndt) an automatic diffractometer that incorporated an analogue computer - the Linear Diffractometer - while, at the same time, collaborating with Kendrew in extending the myoglobin analysis to high resolution. In this stage of the myoglobin work, the crystals were prepared at the Royal Institution (by V.C. Shore) and they were photographed partly in London and partly in Cambridge. The photographs were densitometered in the two centres and the final sets of data were assembled in Cambridge. The 2Å-resolution map of myoglobin - the first protein structure to be determined - was calculated in the autumn of 1959 and published in 1960.

The Linear Diffractometer was developed commercially by Hilger & Watts Ltd and was used in a number of subsequent crystallographic studies: C.C.F. Blake and I used the laboratory prototype, constructed by T.H. Faulkner in the Royal Institution workshop, to collect data to 1.4Å resolution for sperm-whale myoglobin. These data were used in a preliminary refinement of the structure at Cambridge in the period 1962-64, though the problem at this stage was beyond the power of current computers.

It was in this period, in 1960, that I married Diana Kathleen Hutchinson, who was Bragg's secretary, and we had our only child Sarah Anne, born in 1962.

In 1960, Roberto Poljak came to the Royal Institution as a post-doctoral worker and suggested that work on hen egg-white lysozyme might be successful - a proposal based upon his preliminary search for suitable heavy-atom derivatives at MIT under the guidance of Howard Dintzis, a myoglobin veteran. At this stage, I turned my attention to lysozyme and - with Bragg's encouragement - focused the greater part of the Royal Institution effort on the determination of its structure. In 1962 a promising low-resolution (6\AA) map of the enzyme was obtained - whereupon Poljak left the Royal Institution to work on genetics at the MRC Laboratory of Molecular Biology in Cambridge. At the Royal Institution, in collaboration particularly with A.C.T. North, C.C.F. Blake and V.R. Sarma, I concentrated on extending the analysis to high (2\AA) resolution and, at the same time, I initiated crystallographic studies of complexes between the enzyme and competitive inhibitors related to its substrate. These studies were carried out in collaboration with my research student, Louise N. Johnson.

By the use of the Linear Diffractometer, now fitted with three detectors, and an in-house Elliott 803 computer provided by the Medical Research Council, these studies led to the calculation of a readily-interpretable electron-density map of the enzyme early in 1965 and the proposal of its mechanism of action about a year later.

During this period of excitement arrangements were also being made for Bragg's retirement aged 75 and, as the result of proposals by Dorothy Hodgkin, J.W.S. Pringle and H.A. Krebs, I was offered a Professorship of Molecular Biophysics at Oxford. With the active support of the Medical Research Council, led by Sir H. Himsworth, I was able to take with me the greater part of the research group at the Royal Institution, with lectureships for North and Blake, and to set up a new Laboratory of Molecular Biophysics. The laboratory was associated with the Department of Zoology, headed by Pringle, and plans were agreed to house it in the new Zoology building that was then being designed.

We moved to Oxford in September 1966, being housed initially in the Old Physiology Building. In addition to the group from the Royal Institution I also recruited to University Lecturerships Drs A. Miller and R.E. Offord from the MRC Laboratory of Molecular Biology in Cambridge. Miller worked on fibrous proteins and muscle while Offord was a protein chemist so that, with North and Blake providing single-crystal expertise and with backgrounds, respectively, in physics and chemistry, we formed a reasonably well-balanced group to help extend studies of protein structure and function in Oxford. Louise Johnson rejoined us as a Departmental Demonstrator in 1967, after a post-

doctoral year at Yale.

In Oxford, I envisaged the Laboratory as a group of independent but closely interacting research teams led by the University Lecturers and myself. In particular, I attached great importance to having a lively protein chemistry group within the laboratory to interact with the structure analysts at all stages of their work from the identification of problems for research to the consideration of results and how best they might be developed in a biological context. Three of the four original University lecturers (North, Offord and Miller) left over the years and were replaced by L.N. Johnson, A.R. Rees and D.I. Stuart, of whom Rees also left for a Professorship elsewhere towards the end of my period in Oxford.

Studies of lysozyme were continued, partly to develop new methods, but a major part of the effort, especially in the early years, was aimed at a detailed understanding of the enzymes in the glycolytic pathway. My part in this was the determination of the structure of triose-phosphate isomerase together with substrate and inhibitor binding studies that revealed the structural features underlying the catalytic mechanism. This research programme also involved scientists in other Departments in Oxford who collaborated as members of the Oxford Enzyme Group of which I was one of the founders. The group was chaired initially by Sir Rex Richards and, under his leadership, concentrated on the development of NMR spectroscopy as applied to biological problems in parallel with the continuing development of X-ray crystallography - especially in the analysis of protein mobility. I became Chairman of the Group in 1984.

Also in collaboration with members of the Enzyme Group, and encouraged by Rodney Porter and Edward Abraham, in the 1980s I concentrated more on studies of immunoglobulins and β -lactamases and, through discussions with F. Brown, I stimulated David Stuart's successful analysis of the structure of Foot-and-Mouth Disease Virus.

In 1974 I was appointed a member of the Medical Research Council and the founder Chairman of the Cell Biology & Disorders Board, one of the subsidiary Boards that was set up in a general reorganisation of the Council's operating structure in that year. I served as Board Chairman until 1976, during which time the most significant events were, probably, the continuing discussions with the Departments of Health (of England and Scotland) regarding the transfer of funds from the MRC to the Departments following the Rothschild Report of 1972, and the review of the MRC Laboratory of Molecular Biology at the time of M.F. Perutz's formal retirement. This review led to the Phillips Report which proposed some re-balancing of the programme of work at LMB but successfully headed off those who were then criticising what they saw as the Council's over emphasis on Molecular Biology. I continued as a member of the MRC until 1978 and was subsequently the Royal

Society assessor on the Council until 1983.

In 1976 I was elected Biological Secretary and vice-president of the Royal Society and served in those capacities until 1983. During this time I played a part in abolishing the Society's long-standing small-grants scheme and replacing it with a scheme for the support of University Research Fellows which was designed to ensure the long-term support of highly-talented young scientists in advance of their obtaining academic appointments. Another activity was the preparation of evidence for Parliamentary Select Committees on a variety of subjects one of which, on the provision of scientific advice to government, may have had an influence on my next appointment. In this report the Society criticised the Advisory Board for the Research Councils and recommended that the Board should be reconstituted with a part-time chairman able to give two days a week to the task.

In January 1983 I was appointed Chairman of the Advisory Board for the Research Councils (ABRC) on the terms proposed by the Royal Society report, for a four-year term of office. The appointment also carried with it ex-officio membership of the Advisory Council for Applied Research and Development (ACARD) and, subsequently, of its successor body the Advisory Council on Science & Technology (ACOST). This continued until mid-1993. I was also involved from time to time in the discussions of Official Committees, whose duties are to prepare papers for meetings of Cabinet Committees.

At this time, the ABRC was responsible for advising the Secretary of State for Education and Science on the size of the science budget, which was determined annually as a part of the Public Expenditure round, and how the funds that were made available should be distributed among the five Research Councils, the Royal Society, the Fellowship of Engineering and the Natural History Museum. In addition, the Board conducted or commissioned studies on various aspects of science policy and the state of the science base that were designed to help in the formulation of sound advice.

For example, during my first term of office the Board published studies of 'Future Facilities for Advanced Research Computing'; 'High Energy Particle Physics in the United Kingdom'; the 'Evaluation of national performance in basic research'; 'Private Sector Funding of Scientific Research'; an 'International Comparison of Government Funding of Academic and Academically Related Research'; and 'Contract Researchers in Universities'. All of these promoted useful debate on topics that remained important throughout my chairmanship.

In 1986 I agreed to serve as chairman for a second four year term and, apart from the regular business of the Board in relation to the size and distribution of the Science Budget, this period was

dominated by the preparation and publication of two reports. The first of these, entitled 'A Strategy for the Science Base' (1987) addressed fundamental issues in the organisation of university research and provoked a great deal of debate. In particular, the proposition that some universities should expect to be engaged in substantial research activity across the range of fields, while others were engaged in substantial world class research in particular fields and a third group were engaged in the scholarship and research necessary to support and develop teaching, was greeted with outrage. Nevertheless, under the influence of the Research Selectivity Exercise, initiated by the University Grants Committee (UGC) in 1985 and repeated twice since then by the University Funding Council (UFC), together with the abolition of the binary line, which admitted former Polytechnics to University status, a differentiation of universities remarkably like that proposed by the ABRC has emerged. Another major recommendation of the report, that the allocation of responsibilities between Research Councils and Funding Councils within the dual support of university research should be shifted towards the Research Councils, has been accepted by government and implemented; while a further proposal, that interdisciplinary research should be promoted by the establishment of interdisciplinary research centres (IRCs), has also been implemented to a certain extent. Numbers of the other proposals, for example that the Research Councils should develop more explicit policies for the management of research manpower in universities, re-emerged in the White Paper of 1993.

The second major report in this period arose from concern about the way in which support for biology was distributed across the Research Councils. Under the chairmanship of Mr J.R.S. Morris, a study group appointed to address this problem produced a wide-ranging report that proposed a radical reform of the Research Council system. They proposed that a single Research Council should be set up with operating divisions that would cover the responsibilities of the existing Research Councils distributed rather differently so that, for example, the responsibility for non-medical biology would be concentrated in a single division. According to these proposals, the ABRC was to be replaced by the Council of the single research council with a part-time non-executive chairman and a full-time chief executive.

In the autumn of 1989, the ABRC discussed this report and decided not to recommend its acceptance to ministers. However, they set up a small working party, comprising the heads of the Research Councils and two independent members of the Board under my chairmanship, to propose more modest changes to the existing system. Out of this process came proposals that the ABRC should be reconstituted under a full-time chairman and with a slimmed-down membership comprising the executive heads of the five Research Councils, six independent - or non-executive - members drawn from industry and academe, and two assessors - the Chief Scientific Advisor to the government and the Deputy Secretary with responsibility for the science base in the Department of Education & Science. Specifically, the Chief Scientists from other government departments were

to be removed from membership though they were to be guaranteed access to the Board for discussion of issues that particularly affected their departments.

These proposals were accepted by government and the Board was reconstituted from 1 April 1990. I accepted an invitation to be the first full-time chairman for a three-year period.

This reorganisation led to my resignation from my professorship in Oxford, a year earlier than I had expected, and my wife and I moved to London in July 1990. Meanwhile, the University had formally considered the future need for a Professorship of Molecular Biophysics and had agreed that the post should continue. Thanks to the generosity of Sir Edward Abraham, the Professorship was supported by an endowment and, at Sir Edward's suggestion, it was named the David Phillips Professorship of Molecular Biophysics. Shortly after my departure from Oxford, Dr Louise N. Johnson was appointed to the Chair.

After the reconstitution of the ABRC the major benefits arose from changes in procedure that led the heads of Research Councils to play a fuller part in the Board's business and underlined more clearly than before the responsibilities of the Research Councils themselves to support the work of highest priority in their areas of interest instead of looking to government to provide extra resources to cover new scientific opportunities of high priority. This regime continued through the Public Expenditure rounds of 1990 and 1991 alongside a continuing programme of studies, now organised under the aegis of sub-committees of the Board. These included sub-committees on Manpower, Biotechnology, Super-computing and Science Policy, all of which were supported by members of the ABRC Secretariat and generated important reports and discussion papers. In addition, an Inter-Agency Committee on Global Environmental Change (IACGEC) was set up under my chairmanship to co-ordinate the thinking of funding agencies, including the Research Councils, the Met Office, the British National Space Centre, and other government departments - who were represented by the Department of the Environment - on this important and politically prominent issue.

After the General Election of April 1992, the Prime Minister unexpectedly announced a reorganisation of the support for science and technology within government. Responsibility for the Science Budget - but not the Funding Council support for University research - was transferred from the DES to a new Office of Science & Technology within the Office of Public Service & Science under the Chancellor of the Duchy of Lancaster, Mr William Waldegrave. The head of the OST was the Chief Science Advisor, Professor W.D.P. Stewart.

Under these new arrangements, the Board continued to operate essentially as before but now submitting its advice on the Science Budget to the Chancellor of the Duchy. Almost immediately,

however, the Chancellor announced his intention of publishing a White Paper on Science & Technology in 1993 and the Board spent most of the summer and autumn of 1992 preparing its advice on the nature of this White Paper. This drew quite heavily on the 1987 Strategy Advice, the debates of 1989, which had led to the reconstitution of the Board, and the experience of the reconstituted Board. It was submitted on 30 October 1992 and proposed a revision of the Research Council system closely similar to that proposed in the Morris report.

At about this time, in view of the perceived need to improve co-ordination between the Funding Council and Research Council components of the science base, I was appointed a member of the Higher Education Funding Council for England (HEFCE) and an observer on the Welsh Higher Education Funding Council (HEFCW). These developments took place partly as a result of ABRC initiatives in holding meetings with Funding Council officials in Edinburgh and in Cardiff.

ACOST, of which I was also a member, produced advice in parallel with that of the ABRC with which the ABRC did not agree. It envisaged, for example, a separate Research Council for the advancement of scientific knowledge alongside Councils for mission orientated research. The two sets of advice were presented by the chairman of ACOST and myself to a meeting of OST ministers and senior staff on 3 November 1992 and this was the beginning of a long process of debate and drafting within the OST and government generally that led, on 26 May 1993, to the publication of the White Paper.

Recognising that the functions of the ABRC would have to continue until any changes announced in the White Paper could be put into effect, Mr Waldegrave asked me first to extend my chairmanship until 30 September 1993 and then until 31 December 1993 at which time, under the terms of the White Paper, the ABRC was to be abolished and its chairman replaced by a Director General of Research Councils.

During the period from the publication of the White Paper to the end of the year, I played the part of Acting DGRC and, in particular, conducted an urgent study of the reallocation of resources to the new Research Councils, whose boundaries and missions were closely defined in the White Paper. My advice was accepted by the Chancellor at the end of July and I spent the remainder of the year helping to implement further White Paper decisions and playing a part in the appointment of non-executive chairmen and chief executives for the new Research Councils. I retired on 31 December 1993 and Sir John Cadogan took over as DGRC.

In retirement, I remain a non-executive director of Celltech, a position I have occupied since 1982; a Trustee of the Wolfson Foundation (first appointed in 1988); an editor of the journal *Biochemistry*;

a member of the Davy-Faraday Laboratory Committee of the Royal Institution; and non-executive chairman of Finsbury Communications, the company founded by my son-in-law, Dr Paul Matthewson. Furthermore, I have agreed to be a Governor of De Montfort University and a consultant to North West Water. Finally, I am now engaged, with Sir Rex Richards, in an urgent study for the Department of Health on how research might be safeguarded if the Hammersmith Hospital were transferred to the Charing Cross or the Charing Cross to Hammersmith.

DESCRIPTION OF THE COLLECTION

The material is presented as shown in the List of Contents. Additional explanatory notes, information and cross-references are appended where appropriate to the separate sections, sub-sections and individual entries in the body of the catalogue. The following paragraphs are intended only to draw attention to items of particular interest.

Section A (Biographical and autobiographical), though not extensive, covers in varying detail the principal stages of Phillips's career from schooldays onward; it includes many offers of appointments not otherwise documented as well as the known public honours he received. It also includes several autobiographical accounts prepared by Phillips at various dates; similar occasional accounts occur elsewhere in the collection and attention is drawn to them in the catalogue entries.

Section B (Diaries and notebooks) is of interest for a series of notebooks which constitute a general journal of considerable value in several regards. The books, covering the years 1960-90 (with an unexplained gap from 1976 to 1984), contain Phillips's notes on scientific research projects and progress, interviews and discussions with colleagues, staff and visitors in the laboratory, salaries, funding and laboratory requirements, aides-mémoire on telephone conversations or letters received, drafts for lectures or conference papers, comments on theses or papers sent for comment, notes taken at lectures, seminars or conferences, and in the later years notes of ABRC or Research Council meetings and discussions on science policy.

Section C (Research notebooks and notes) provides records, some by collaborators and not always in full detail, for all stages of Phillips's career from his post-doctoral appointment in 1951 at the National Research Laboratories Ottawa. The material is presented by topic. These include the development at the Royal Institution London (with U.W. Arndt) of the semi-automatic and later of the linear diffractometer, and collaborative work with J.C. Kendrew (later Sir John) and his team at Cambridge on the structure of myoglobin. Phillips's most widely known achievement, the structure of lysozyme and its mechanism of action, on which he continued to work for most of his career, is

documented here by his detailed records of the co-ordinates. Later projects at Oxford such as the successful analysis of triose phosphate isomerase (TIM) are also documented.

However, not all Phillips's research career is fully covered by the surviving material in this collection. His activity as a founder member and later chairman of the Oxford Enzyme Group (OEG) can be found in the collection of the OEG papers held in the Bodleian Library, and a detailed record of all stages of the myoglobin project is contained in the manuscript collection of Sir John Kendrew also held in the Bodleian Library.

Section D (The Royal Institution) is relatively short, but contains records not only of the important decade in Phillips's career from his appointment as a Research Fellow in 1956 by W.L. Bragg until his appointment at Oxford in 1966, but also of his continuing involvement with the Institution as Manager, member of Council, lecturer and active participant in its affairs including the award of its Actonian Prize in 1991. For the early period the material is mainly correspondence, on the equipment and research projects referred to in relation to Section C, and on the events surrounding the successful lysozyme analysis. Several of Phillips's long-term colleagues at the Institution accompanied him to Oxford, in particular C.C.F. Blake, A.C.T. North and L.N. Johnson.

The Director of the Royal Institution throughout Phillips's decade there was W.L. Bragg (Sir Lawrence Bragg). Their mutual affectionate regard can be seen both in this Section and *passim* elsewhere in the collection.

Section E (Oxford) shows Phillips moving to a wider stage. As the University's first Professor of Molecular Biophysics from 1966 he had the responsibility of setting up and running a new department and of establishing the subject as an integral part of Oxford science. There were difficulties to be overcome both before and after the move from London, notably over the status and salaries of the team-members hitherto paid by the Medical Research Council, delays over the promised new Zoology Department building in which the Laboratory was to be housed, and the assurance of continued funding from MRC and other outside bodies for powerful computing capacity and for specific research projects. The Chair also carried with it the obligation to participate in the general administration of the University through faculty and inter-faculty boards, the organisation of syllabuses, teaching and advanced study, appointments and elections to posts in the Laboratory and in the University at large. All these activities are well documented. Phillips's success can be gauged in part from the very large number of requests to work, visit, conduct collaborative projects or consult with him and his colleagues. Many of the documents relating to these matters bear annotations, comments or information from the Laboratory team, since Phillips continued there the practice he had begun on a more limited scale at the Royal Institution of circulating all but personal

communications to senior laboratory members, to keep them fully informed of events and to solicit their advice or views.

Although Phillips's Chair carried with it a Fellowship of Corpus Christi College, he did not play a particularly active part in college life, choosing rather to give his time and energy to the scientific world at Oxford and outside.

Section F (Publications) includes some drafts and material for Phillips's own scientific papers, though fewer than might be expected. During his most active research period he was a reluctant writer and rarely kept documentation once a paper was published. His major papers on lysozyme are, however, well documented, especially his 1966 article in *Scientific American* which was illustrated by hand-drawn diagrams specially commissioned from the artist Irving Geis. This was a rare solution to the recurring problem of presenting three-dimensional results on the printed page, which in the 1960s and 1970s usually involved red-green diagrams and filter spectacles for the reader.

Also of interest is the extensive material assembled by Phillips for his Memoir of W.L. Bragg written for the Royal Society and published in 1979.

Phillips found time to act as referee or editorial consultant to many publishing houses though he was obliged to decline very many requests to undertake such work. Specialist journals with which he had long connections as contributor, editor or consultant include *Acta Crystallographica*, *Biochemistry*, *EMBO Journal* and *Journal of Molecular Biology*. The principal publishing houses with which he was involved were IRL Press, Medical and Technical Publishing Company and Oxford University Press. His editorial and advisory work for the Royal Society is documented in Section L.

Section G (Conferences, visits, lectures) is the most extensive in the collection, reflecting Phillips's close involvement in the diffusion of scientific information and his success therein. The time-span covered is 1957-93, including an addendum for items received at a late date. The introduction to Section G describes in more detail the content of the material and its interest as witness to the evolution of Phillips's research, the range of audience addressed, and his gifts as a refreshing speaker on technical and, later, science policy topics.

Section H (Radio, television, films) is very short and not a full record of Phillips's activity in these fields. It does, however, document his work for the Open University, including a prize-winning film on lysozyme.

Section J (UK societies, organisations, consultancies) records, in varying detail, Phillips's involvement with over a score of such organisations. Attention is drawn in particular to the material on the British Crystallographic Association which includes many of the founding and fund-raising early papers of the Association, the CIBA Foundation which was one of Phillips's major commitments (he served on the Council of the Foundation for sixteen years), and Celltech, an enterprise set up to exploit discoveries in biotechnology.

Section K (International societies, organisations, consultancies), while containing similar material concerning overseas organisations, includes a higher proportion of work on advisory boards or scientific councils of laboratories and institutions relating to their research programmes. Examples are the Basle University Biozentrum, the Committee for the European Development of Science and Technology (CODEST), the Harvard-Monsanto Research Agreement (an experiment in collaborative research between industry and academia), the 'Single-crystal intensity measurement programme' and other affairs of the International Union of Crystallography, the International Union of Pure and Applied Biophysics (IUPAB), the Max-Planck Institute of Biochemistry Scientific Council, and the Weizmann Institute Israel.

Section L (The Royal Society) provides useful documentation of Phillips's long association with the Society, notably his service as Biological Secretary 1976-83. It includes work on various committees, sometimes as chairman, overseas visits and delegations, editorial and advisory work for the Society's publications, material on the organisation of the Fellowship and its Sectional committees, elections and awards, and general correspondence of the Society's affairs.

Section M (Science Research Council) is short, relating mainly to the Cray Computer and the Daresbury Laboratory.

Section N (Medical Research Council) is an extensive record of Phillips's service as a Council member 1974-78 and a Royal Society 'Attending Assessor' 1976-83. The introduction to the Section outlines more fully his wide-ranging work for the Council as Chairman of the Cell Board and member of many committees, working parties and delegations such as those set up to consider the Cambridge Laboratory of Molecular Biology, the European Laboratory of Molecular Biology (EMBL) and the National Institute for Medical Research (NIMR).

Section O (Advisory Board for the Research Councils) (ABRC) records Phillips's career as government adviser, from his appointment as part-time Chairman of ABRC in January 1983 through his appointment as full-time Chairman from April 1990 (when he resigned his Oxford Chair) to the period following the General Election of May 1992. Immediately after the election, changes were

announced in government organisation for education and science which meant that responsibility for science and technology was transferred from the Department of Education and Science (to whose Secretaries of State Phillips had hitherto addressed the ABRC's advice) to the newly-created Office of Science and Technology under the Chancellor of the Duchy of Lancaster. Phillips's extended period of service as ABRC Chairman ended in September 1993, but he remained as acting Director-General of the Research Councils until December 1993.

Section P (Correspondence) is extensive. Always conducted in easy and friendly terms, it is primarily concerned with projects in protein research. It includes useful exchanges with colleagues on myoglobin and lysozyme. There is also further material relating to W.L. Bragg.

Section R (References and recommendations) is also extensive and demonstrates the international respect in which Phillips was held by the many requests for advice or evaluation on appointments from universities and institutions worldwide. There is also a very large number of research grant assessments.

Conditions of restricted access apply to this and to other Sections of the collection.

ACKNOWLEDGEMENTS

Thanks are due primarily to Sir David Phillips for initially allowing his papers to go forward for cataloguing and for making additional material available on a continuing basis. He has been generous with his time and attention for consultation, and, in addition to the autobiographical account quoted above, has made invaluable comments on the catalogue drafts throughout the lengthy process of compilation. Lady Phillips has also contributed much valued information and advice.

Mrs Pam Batchelor, Phillips's former secretary at Oxford, was very helpful in overseeing and advising on the transfer of material from the laboratory.

Members of the NCUACS, Peter Harper and Timothy E. Powell, and of the staff of the Department of Western Manuscripts of the Bodleian Library have helped at all stages with advice and information.

Hazel Gott has earned much gratitude for the patience and skill she has brought to the processing and revising of the catalogue.

Jeannine Alton
BATH 1994

SECTION A

BIOGRAPHICAL AND AUTOBIOGRAPHICAL

A.1-A.75

A.1-A.60 CAREER, HONOURS AND AWARDS

A.61-A.68 SHORTER PERSONAL CORRESPONDENCE

A.69-A.75 MISCELLANEOUS BIOGRAPHICAL MATERIAL

Biographical and autobiographical

CAREER, HONOURS AND AWARDS

Family and early education

A.1 Audited accounts of C.H. Phillips (Phillips's father), a Master Tailor working in Ellesmere, Shropshire. 1936, 1937.

Arrangements 1963 for an amplification system to be installed in the Methodist Chapel, Ellesmere, in memory of C.H. Phillips, who had been a lay preacher. Phillips's mother had been an organist there.

Phillips's Certificate of Baptism and Adult Membership of the Methodist Church 1958; the relatively late date of the ceremony is because of C.H. Phillips's wish to allow his son freedom of choice.

Brief correspondence 1969 about Wesley Memorial Church Oxford.

A.2

Oswestry County High School for Boys 1935-42.

Award and conditions of Special Place 1935.

School reports 1937-42.

School Journal 1937-38.

A.3

Examination and Scholarship Examination papers 1939, 1940, 1942, and Certificates.

Prize-givings 1936-39.

Royal Navy 1944-47

A.4

Arrangements for training, service as Assistant Radar Officer on HMS 'Illustrious' with rank of Sub-Lieutenant, Order of Release 1947.

Biographical and autobiographical

University College of Wales, Cardiff 1942-44, 1947-51

A.5 Award of University Scholarship 1942, Postgraduate Scholarship 1948, conference expenses.

Award of DSIR Maintenance Allowance 1948.

Examination papers 1942-44, 1948.

Records of dues and fees 1942-44, 1946-51.

A.6

Research reports 1948-49, 1950, on 'Crystal structure of compounds related to certain alkaloids' Phillips's doctorate work, supervised by A.J.C. Wilson.

Arrangements for conferral of degree 1951, with letter of congratulation.

Also included is Phillips's election as Associate of Institute of Physics (q.v.) 1950.

A.7

Phillips's Thesis. Two early publications (*Acta Cryst*, 3, 210-214 and 398) are included as appendices.

Career and appointments 1948-59

A.8

Offers of appointment, interviews etc. at ICI. 1948-51

Interview, Department of Physics Cambridge. 1951

Travel to Canada, Immigration cards. 1951-54

Application for appointment as Lecturer in Physics, Cardiff, and correspondence. 1954

Brief notes on Phillips and his qualifications, probably compiled by Bragg for Trustees of Royal Institution and concluding 'Proposed to offer him a Fellowship for three years at a starting salary of £800 p.a. together with F.S.S.U. benefits', n.d. [1955]. See D.1.

Offer of appointment to run new x-ray crystallography section at National Physical Laboratory (declined by Phillips 'being employed already at a more senior level by the Medical Research Council'). 1959

Biographical and autobiographical

Medical Research Council

A.9 Appointments, salary, promotions. 1959-65

Appointment at Oxford 1966

Miscellaneous personal items. For fuller documentation on Phillips's appointment, his laboratory and his university and college commitments, see Section E.

A.10 Membership of Congregation and Halifax House. 1966

Removal arrangements.

Car.

Pension arrangements FSSU/USS. 1966-90

Association of University Teachers (AUT). 1970-90

Letters of congratulation on appointment. 1966

Fellowship of the Royal Society 1967

A.11 Folder of reprints with a manuscript note by Phillips 'Papers submitted in support of my candidature for election to R.S. Proposed by W.L. Bragg 1966/7'.

A.12 Letters of congratulation A-M. Includes Phillips's list of letters and personal messages.

A.13 Letters of congratulation N-Z.

Biographical and autobiographical

Offers of appointments 1961-69

A.14	Purdue University Indiana.	1961
	Biophysics Research Division University of Michigan.	1963-64
	Chair of Chemical Crystallography, University of Sussex.	1965
	University of California Berkeley.	1965
	Department of Biochemistry, Duke University North Carolina.	1966
	Department of Chemistry, Columbia University New York.	1968
	British Committee for Jews in Arab countries.	1969

Honours and elections 1968-70

A.15	American Academy of Arts and Sciences.	
	Election as Honorary Foreign Member 1968, correspondence 1970 on possible closer relations between Academy and Royal Institution.	
A.16	American Society of Biological Chemists.	
	Election to Honorary Membership 1969.	

Offers of appointments 1970-78

A.17	Agricultural Research Council.	1970
	Chair of Chemistry, University College London.	1972
	Secretary, Science Research Council.	1972
	Chair of Biochemistry, Imperial College London.	1972-74
	Professorial Fellow, University College of Swansea.	1975
	Principal, St Edmund Hall Oxford.	1978

Biographical and autobiographical

Honours and elections 1974-79

- A.18 Honorary D.Sc. Leicester, July 1974, and membership of Convocation, November 1974.

Correspondence 1973-74, arrangements, citation.
- A.19 Honorary D.Sc. University of Wales (conferred at Swansea) July 1975.

Correspondence 1975-76, arrangements.
- A.20 Award of a Royal Medal of the Royal Society November 1975.

Notification of award, letters of congratulation.
- A.21 Letters of congratulation on appointment as Biological Secretary, Royal Society 1976 (also includes miscellaneous congratulations on earlier elections to the Council 1971, and as a Vice-President 1972 of the Society).
- A.22 Honorary D.Sc. University of Chicago 9 June 1978.

Correspondence 1977-78, arrangements. See G.196 for material on the Clark Lee Memorial Lecture given at Chicago during Phillips's visit.
- A.23 Award of Charles Léopold Mayer Prize, Institut de France (jointly with D.M. Blow), 1979.

Brief correspondence and arrangements, letter of congratulation.

Knighthood 1979

- Awarded in the Birthday Honours, June 1979.
- A.24 Notification.

Biographical and autobiographical

- A.25-A.27 Letters and messages of congratulation, some with recollections, and some referring to Phillips's Memoir of W.L. Bragg.
- 3 folders.

Honours and elections 1981-87

- A.28 University College Cardiff.
- Election to Fellowship 1981, award of Centenary Medallion 1985. Includes some material on the affairs and organisation of the College 1983, 1988.
- A.29 Honorary D.Sc. University of Exeter, 26 April 1982.
- Brief correspondence only.
- A.30 Honorary D.Sc. University of Warwick, 16 July 1982.
- Brief correspondence only, and a little later material 1987.
- A.31 Honorary Doctorate, University of Essex, 14 July 1983.
- Correspondence, arrangements.
- A.31A Honorary D.Sc. University of Birmingham 11 July 1987.
- Correspondence, arrangements.
- A.32 Portsmouth Polytechnic.
- Election to Honorary Fellowship 1984.
- Correspondence, arrangements, continuing correspondence on affairs of the institution 1985-92.

Biographical and autobiographical

Offers of appointments 1981-88

A.33	Exeter College Oxford.	1981
	Wadham College Oxford.	1982
	National Radiological Protection Board.	1983
	Polygen Corporation.	1985
	Initiative Development Fund.	1985
	Active Memory Technology (AMT) Technical Committee.	1988

Advisory Board for the Research Councils (ABRC) 1983

- A.34 Letters of congratulation on appointment as Chairman ABRC 1983, some also referring to Phillips's Biological Secretaryship of the Royal Society which he resigned on election to ABRC.
- The principal material relating to Phillips's appointments and service with ABRC is in Section O.

National Academy of Sciences (NAS) 1986

- A.35 Notification of election as Foreign Associate, arrangements for affiliation, 'signing in' etc., April 1985 - June 1986.
- A.36 Letters and messages of congratulation.

Wolf Prize 1987

The Wolf Foundation prize in Chemistry for 1987, to the value of \$100,000, was awarded jointly to Phillips and D.M. Blow by the President of Israel Dr. Chaim Herzog, at ceremonies at the Knesset in Jerusalem on 31 May 1987.

Biographical and autobiographical

- A.37 Notification of award, information on Wolf Foundation and on prizes, arrangements for ceremony and for lectures given in Israel during visit, travel schedule, press releases etc. A little later correspondence with Wolf Foundation 1990 is included.
- A.38 Correspondence 1986-88 with Israeli Embassy London on receptions given for Wolf Prizewinners, including that given for Phillips and Blow 1987.
- A.39 Letters and messages of congratulation A-M.
- A.40 Letters and messages of congratulation N-W.

Harvard University 1989

- A.41 Appointment as Visiting Professor of Biochemistry, January-June 1989. Phillips gave the Dunham Lectures during his tenure of the Professorship. (See G.365-G.367).
- Notification, a little personal correspondence 1988-90.

Knight Commander of the British Empire 1989

- A.42 Notification of KBE awarded in New Year Honours January 1989.
- A.43 Letters and messages of congratulation, from individuals, institutions and organisations A-F.
- A.44 Similar material G-P.
- A.45 Similar material R-W and unidentified.

Biographical and autobiographical

Honours and elections 1989-90

- A.46 Honorary Fellowship, Sheffield City Polytechnic, 11 September 1989, conferred during the Inaugural Ceremony of the British Association's Annual Meeting (see also G.374).
- Correspondence, arrangements, citation, and a little further correspondence on the affairs of the Polytechnic 1990-91.
- A.47 Election to Foreign Membership, Royal Swedish Academy of Sciences, September 1989.
- Notification, brief correspondence only.
- A.48 Honorary Doctorate, Weizmann Institute of Science 12 November 1990.
- Correspondence, arrangements, letters of congratulation.
- A.49 Awards Ceremony, Hatfield Polytechnic, 24 November 1990.
- Phillips, as 'Distinguished Guest', made the awards and addressed the assembly.

Leaving Oxford 1990-91

- Phillips took up an appointment as full-time Chairman of the restructured ABRC from 1 April 1990, and retired from his Professorship of Molecular Biophysics and his Professorial Fellowship at Corpus Christi College from 31 March.
- A.50 Letters of resignation January 1990, miscellaneous shorter correspondence.
- A.51 Letters from colleagues on appointment and resignation, some with recollections and information.

Biographical and autobiographical

- A.52 Material relating to meeting on 'Protein Structure & Function' in honour of Phillips, held at Oxford 1-3 July 1991.

Programme, timetable, Phillips's notes for his speech of thanks, a little correspondence. See also G.427.

Honours and elections 1991-93

- A.53 Aminoff Prize, Royal Swedish Academy of Sciences, 1991.

Notification of Prize (February), arrangements for delivery of Aminoff Lecture in November, correspondence.

- A.54 Election to Honorary Fellowship of the Royal Society of Edinburgh, 1991.

Notification of election March 1991, information, invitations and correspondence 1991-92.

- A.54A Election to Honorary Fellowship of the Royal College of Physicians 1991.

Notification of election (March), arrangements for admission.

- A.55 Opening of the David Phillips Building, Polaris House, Swindon, September 1991.

The building, intended to house the (then) Agricultural and Food Research Council and the Economic and Social Research Council, was opened by Simon Coombs MP representing the Secretary of State Kenneth Clarke. Material includes Secretary's 'Statement' on the opening and a personal letter from him to Phillips regretting his absence.

- A.56 Actonian Prize of the Royal Institution, December 1991.

The prize of £105 awarded every seven years, was instituted in 1838 by Mrs. Hannah Acton, and was awarded to Phillips for his work on the structure of lysozyme.

- A.57 Honorary Membership, British Biophysical Society 1992.

Information only.

Biographical and autobiographical

- A.58 Special Achievement Award, made at 1993 Miami Bio/Technology Winter Symposium, January 1993.
- Information only. See G.437.
- A.59 Press-cuttings 1965-93.
- A.60 DES Press-releases various dates 1974-85.

SHORTER PERSONAL CORRESPONDENCE

Family and old friends

Mainly letters of congratulation on various achievements in Phillips's career, from members of his family, old school friends, teachers and acquaintances from Ellesmere, college contemporaries etc. Many of the letters bear an identification supplied by Phillips of the writer's relationship or connection with him or his family.

- A.61 Appointment at Oxford.
- Fellowship of the Royal Society.
- A.62 Knighthood.
- A.63 Royal Institution Lectures.
- K.B.E.

Personal

These are single letters or brief exchanges only, often in reply to letters of congratulation, condolence or thanks, but often with some personal content. In chronological order.

Biographical and autobiographical

A.64 1950s (few only).

A.65 1962-69.

A.66 1972-79.

A.67 1980-89.

A.68 1990-93.

MISCELLANEOUS BIOGRAPHICAL MATERIAL

Social invitations and occasions

Invitations, seating plans, information etc., some with a little correspondence.

A.69 Oxford 1966-85.

A.70 UK 1970-93.

Subscriptions

A.71 Subscriptions, donations, contributions 1967-92.

A.72 Miscellaneous biographical notes and cvs, prepared at various dates c.1965-93.

Biographical and autobiographical

- A.73 Engagement and meeting schedules, various dates 1971-88.
- Includes summary account of committees, commitments and activities at Oxford 1971, 1987, 1988, chart of time given to Royal Society, University Grants Committee and CODEST 1977-86, schedules of ABRC, ACARD, Celltech and other official meetings 1985-88.

- A.74 Miscellaneous autobiographical notes and accounts.

Photographs

- A.75 Photographs, of Phillips, colleagues, department, conferences and visits.

SECTION B

DIARIES AND NOTEBOOKS

B.1-B.50

B.1-B.19 DIARIES

B.20-B.47 NOTEBOOKS

B.48-B.50 MISCELLANEOUS

INTRODUCTION

The diaries at B.1-B.19 are all hardbacked desk diaries 1972-1989, 1991 (1990 lacking). They are essentially annual records of engagements with entries by Phillips and secretaries, covering all scientific, academic, travel and official aspects of his schedule. Attention is also drawn to A.73 which consists of additional meeting arrangements and planning schedules chiefly relating to ABRC and other official commitments of the 1980s which were originally kept as loose pages in the appropriate annual diary.

The notebooks at B.20-B.47 are a separate sequence of hardbacked, spiral- or ring-bound notebooks 1960-90. Although the early books are in part similar to the laboratory research notebooks in Section C, the content is always more heterogeneous and not confined to work on a specific research topic. Scientific matters, data, ideas and results continue to feature extensively throughout the books, but in the course of time, and with Phillips' evolving responsibilities other material is included and the sequence thus constitutes a general journal of considerable interest. The contents may include: interviews and discussions with colleagues, research students and laboratory staff on research projects and progress; laboratory requirements, preceding and following the move to Oxford; notes of telephone discussions, letters received or to be dealt with; notes on or discussions with visitors to the laboratory; notes or drafts for lectures and conference papers, or on theses and papers sent for comment; notes taken at meetings of lectures, papers, discussions; in the later books, notes of ABRC or research council meetings and discussion on science policy.

The books are kept somewhat informally; most entries (not all) are dated but may be scattered through the book, both ends of which are sometimes used. Occasionally a volume may be devoted to a specific conference or lecture series (B.30, B.34, B.37, B.39, B.40) but this is exceptional. There

Diaries and notebooks

is a gap in the sequence between 1976 and 1984 which is unaccounted for. The books are presented in chronological order from the earliest identifiable entry but do not necessarily conform to a calendar year.

These notebooks are thus an essential complement to other sections of the collection, in particular C (Research), G (Lectures and Conferences) and O (ABRC). Cross-references have been given, or a mention made in the entry, where possible, but it has not been practicable to do so for all the material.

Diaries and notebooks

DIARIES

B.1	1972	B.11	1982
B.2	1973	B.12	1983
B.3	1974	B.13	1984
B.4	1975	B.14	1985
B.5	1976	B.15	1986
B.6	1977	B.16	1987
B.7	1978	B.17	1988
B.8	1979	B.18	1989
B.9	1980	B.19	1991
B.10	1981		

NOTEBOOKS

- B.20 Spiral-bound notebook. 'DCP Diary 1960' on cover.
- Entries run 23 February - 6 December 1960. Work on myoglobin crystals, radiation damage, beryllium. A few entries in another hand.
- B.21 Spiral-bound notebook. 'D.C. Phillips Diary Feb 1961 - Aug '63' on cover.
- Dated entries run 7 February 1961 - 15 March 1963. Work on sperm-whale and seal myoglobin, lysozyme (first entry 26 May 1961), radiation damage, acridine, outlines for experimental programme, diary of laboratory activities Sept-Oct, computer programs.
- B.22 Spiral-bound notebook. 'D.C. Phillips Diary August 1963 - ' on cover.
- Entries run 22 August 1963 - 29 June 1964. Includes diary entries of laboratory activities, visitors, drafts for papers, mentions of move to Oxford, notes of requirements, calculations and measurements, work on radiation damage, chymotrypsin, linear diffractometer, lysozyme.

Diaries and notebooks

- B.23 Spiral-bound notebook. 'Diary 3 1964' on cover.
- Entries run 2 July 1964 - 14 January 1965. Includes notes on Oxford laboratory space and equipment requirements, continuing work on myoglobin and lysozyme, draft on single-crystal measurement programme (G.10, K.24-K.27), talks at Sheffield and Cambridge etc.
- B.24 Spiral-bound notebook. 'Diary 4 1965' on cover, with note 'crystallisation experiments at back'.
- Entries run 18 January - 25 October 1965. Includes the final stages of the lysozyme structure, notes for Phillips's talk at Atlantic City April (G.11) and September and other talks and papers, attempts at model building July-September.
- B.25 Spiral-bound notebook. 'D.C. Phillips. Lab. Diary 5 1965' on cover.
- Entries run 27 October 1965 - 27 January 1966. Work on model building, sequencing, drafts for talks, Royal Institution Discourse (G.15), protein folding, notes on theses, papers, visits, laboratory meetings, Oxford move.
- B.26 Spiral-bound notebook. 'D.C. Phillips. Lab. Diary 1966' on cover.
- Entries run 24 January - 5 December 1966. Includes notes etc. on protein interactions, notes on work by colleagues, drafts for lectures, papers and conferences, notes on move to Oxford, teaching commitments, apparatus.
- B.27 Spiral-bound notebook. 'Mainly lectures 1966-67' on cover.
- Entries run 22 November 1966 - 13 February 1967. Many pages have been removed, perhaps drafts for lectures. Includes notes on committees, travel arrangements, diagrams, lecture on 'Molecular aggregates', drafts.
- B.28 Spiral-bound notebook. 'Feb. 1967 - June 1967' on cover.
- Entries run 17 February - 29 May and 1 page dated 17 October 1967. Includes staff discussions, notes on personnel, papers, grant applications, outline for six papers to be published on 'Crystallographic studies of lysozyme' with authors and contents, myoglobin model building, notes for lectures and papers.

Diaries and notebooks

- B.29 Spiral-bound notebook. 'June 1967 - ' on cover.
- Various dates 9-22 June 1967, 27 May 1968 (1 page only). Most pages undated. Includes lectures and discussions at meetings, diagrams and structures, committee notes.
- B.30 Small hardbacked notebook.
- Notes of three scientific meetings, at Hirschegg 18-22 March 1968 (includes notes of Phillips's talk) (G.42). Elmau 17 April - 4 May 1968 (G.43), Bürgenstock 29 April - 3 May 1968 (G.44).
- A note by Phillips about the material, dated 11 July 1988, is stuck onto the front of the book.
- B.31 Spiral-bound notebook.
- Very mixed content. A few pages bear dates 10 March, 17 August 1970, 8 November 1971, 4 May - 5 June 1972, but most are undated and some pages are missing. Notes on visits and projects by colleagues, on α and β lactalbumin, on Oxford Enzyme Group.
- B.32 Spiral-bound notebook. 'D.C. Phillips. Sept 1970' on cover.
- Entries run 1 October 1970 - 28 June 1971. Notes on work by F.M. Richards, D.M. Blow and others, notes of meetings, projects, lecture to schoolchildren (G.83), work on TIM (triose phosphate isomerase), notes for the Harvey Lecture (G.86), arrangements for MRC visitation 3 March 1971, discussions with colleagues.
- B.33 Hardbacked notebook.
- Entries run 10 May 1971 - 12 January 1972. Not all pages used. Notes of talks by colleagues, perhaps at Oxford Enzyme Group meetings.
- B.34 Spiral-bound notebook.
- Mainly notes and drafts for lectures at Sydney August-September 1971 (G.94).

Diaries and notebooks

- B.35 Spiral-bound notebook. 'D.C. Phillips. September 1971' on cover.
- Entries run 15 September 1971 - 28 September 1972. Mainly notes on research in hand, lectures, discussions. Includes brief notes for 'Bragg Book' on 'The development of X-ray analysis'. See also P.26, P.27.
- B.36 Spiral-bound notebook. 'Staff meetings' on cover.
- Entries run 9 October 1972 - 6 December 1973. Meetings and discussions with colleagues and staff, some informally as well as general meetings, on research, teaching, computing, equipment, theses.
- B.37 Spiral-bound notebook. 'D.C. Phillips. Erice and Bürgenstock' on cover.
- Notes, drafts etc. on Conferences at Erice 28 March - 10 April 1976 (G.173) and Bürgenstock 9-15 May 1976 (G.175).
- NB. There are no surviving notebooks between 1976 and 1984.
- B.38 Spiral-bound notebook. 'Desk notes Sept 1984 - ' on cover.
- Entries run 19 October 1984 - 21 May 1985, 6-25 February 1986. Material is mainly of meetings on science funding, official policy, organisation of research councils and ABRC, Parliamentary and Scientific Committee, official visit to Holland.
- B.39 Spiral-bound notebook. 'ABRC Lectures 1985' on cover.
- Mainly manuscript of lecture to British Association 'Science Audit', August 1985 (G.311).
- B.40 Spiral-bound notebook. 'Talloires meeting on "Dynamics of Protein Molecules" 31 Aug - 4 Sept 1985' on cover.
- Full notes of papers and discussions (G.312).

Diaries and notebooks

- B.41 Spiral-bound notebook.
- Entries run 22 October 1985 - 30 June 1987. Material includes drafts for lectures, meeting of CODEST 11 February 1987, welcome talk for laboratory Open Day 30 June 1987 (G.338).
- B.42 Spiral-bound notebook.
- Entries run 31 January - 23 April 1986. Notes on laboratory and research, and on ABRC matters.
- B.43 Spiral-bound notebook.
- Entries run 2 July 1986 - 5 April 1987. Both ends of book used. Material includes research and laboratory activities, interviews and discussions, notes on appointments, note dated 9/1/87 on meeting in Cambridge to discuss MRC programme on AIDS research (G.357).
- B.44 Spiral-bound notebook.
- Entries run 8 October 1986 - 21 May 1987 with many undated pages. Includes notes for prizes or awards, notes on research councils, on Cambridge AIDS meeting dated 17 January 1987 (G.357), miscellaneous research.
- B.45 Spiral-bound notebook. 'Desk Journal April 1987 - ' on cover.
- Entries run 22 April 1987 - 5 August 1988. Mainly journal of laboratory activities, interviews, appointments, teaching and research programme, lectures, grants and salaries, but also notes on ABRC and research councils matters, on Interdisciplinary Research Centre and other university affairs.
- B.46 Spiral-bound notebook. 'Desk Note Book August 1988 - ' on cover.
- Entries run 10 August 1988 - 2 February 1990. Miscellaneous material on current research, notes for talks, journal of personal and lab. activities, notes on ABRC meeting at Studley Park October 1989. See O.119.

Diaries and notebooks

B.47 Ring-back Filofax binder of small format notes.

Mainly notes for lectures and conferences 1989 - November 1990 including Dunham lectures (G.365-G.367), Woods Hole conference (G.372) talks at Zürich (G.378) and City University (G.381), Phillips's notes on radio and TV programmes on science and technology.

MISCELLANEOUS

B.48 Small spiral-bound notebook of miscellaneous editorial expenses. At front of book: *Journal of Molecular Biology* 1966-77. At rear of book: Royal Society 1972-76.

B.49 Hardbacked cash book. Accounts 1972-78 for Phillips's private research grants (see E.120-E.125).

B.50 Spiral-bound notebook. Notes of meeting of Fachbeirat, Max-Planck-Gesellschaft, 17-20 April 1983 (see K.42).

SECTION C

RESEARCH NOTEBOOKS AND NOTES

C.1-C.60

C.1-C.50 NOTEBOOKS

C.1-C.4	Acridine
C.5-C.15	Myoglobin
C.16-C.22	Lysozyme
C.23-C.41	Triose phosphate isomerase (TIM)
C.42, C.43	α -Lactamase
C.44, C.45	β -Lactamase
C.46	Low temperatures. Heat exchanges
C.47, C.48	Fc, Fv Immunoglobulin fragments
C.49, C.50	Miscellaneous topics

C.51-C.60 NOTES AND CORRESPONDENCE

C.51	Seal myoglobin
C.52	Protein analysis
C.53	Radiation damage
C.54	Haem groups
C.55, C.56	Protein folding
C.57	Receptors
C.58	TIM
C.59	Rubisco
C.60	TIM

Research notebooks and notes

The material is presented, as far as ascertainable, in chronological order by topic, following the earliest identified date on the records, though it is recognised that several lines of research were normally proceeding in parallel at different rates of progress.

For archival convenience, notebooks (C.1-C.50) and loose pages or folders of notes (C.51-C.60) are listed separately although their content may be related. Both types of material may include work by collaborators or research students (identified where possible) as well as by Phillips; this is especially the case with the long-term collaborative projects on myoglobin, lysozyme and triose phosphate isomerase (TIM).

Titles and descriptions in inverted commas are those given on the documents, which are Phillips's work unless otherwise stated.

Research notebooks and notes

NOTEBOOKS

C.1-C.4

Acridine

Four notebooks of work carried out at the National Research Laboratories, Ottawa, 1951-55.

C.1

From 23 November 1951. Latest date 23 November, no year. Observations, measurements, intensities, almost all on acridine, but includes work on isospartane and anthracene.

C.2

'Acridine IV and II', from 14 August 1953.

A few pages only bear dates, 12 December 1954, 20 January 1955.

C.3

'Acridine III', from 17 September 1954.

Observations, reflexions etc. No pages dated.

C.4

'Acridine IV'

Structure factors, calculations, mainly by Phillips but some in collaborator's hand (perhaps D. Donaldson). Experiments not dated, but some loose pages of calculations and contour maps at rear of book bear various dates October 1954 - May 1955.

C.5-C.15

Myoglobin

Phillips headed the group working at the Royal Institution, in collaboration with the team at the MRC Molecular Biology Research Unit in Cambridge, on the analysis of myoglobin by X-ray diffraction. The overall director of the project was J.C. Kendrew, based in Cambridge but also at that time Reader at the Davy Faraday Laboratory.

Research notebooks and notes

Visits and exchanges of materials and results were frequent and the project culminated in successful three-dimensional models of myoglobin at 6.Å in 1957 and at 2.Å in 1959. Detailed records of every stage of this work can be found in the papers of J.C. Kendrew held in the Bodleian Library Oxford, which include correspondence and information received from Phillips and the R.I. team.

The surviving material relating to this pioneering project in Phillips's own papers is relatively scanty. The correspondence with Cambridge colleagues at C.52 should also be consulted for further information.

- C.5 Notebook of same format as C.1-C.4 above, and with a 'Royal Institution' label stuck over the original from the National Research Laboratories Ottawa. Pages numbered 1-204. Work at the Royal Institution begins on p.28 and runs 17 February - 18 October 1956 consisting of measurements and reflexions at various settings of crystals, mainly of anthracene but also of seal myoglobin, oxyhaemoglobin, beryllium acetate. Almost all by Phillips but some in the hand of U.W. Arndt.
- C.6 'Linear Diffractometer Book I Setting-up procedures'.
- Entries run 31 December 1958 - 11 February 1960. Tests, diagrams, results with anthracene, metmyoglobin, beryllium acetate.
- NB. There is no 'Book II' or later.
- C.7 Notebook. Some pages removed at front.
- Entries run 8 December 1958 - 24 January 1960. Diffractions of various crystals, including (at back of book) work on myoglobin at 2.Å.
- C.8 Notebook in various hands.
- Begins with 'Autocode programming of Mercury', includes work on myoglobin, 'Model Helix', atomic coordinates, 'Recrystallisation of myoglobin 10 December 1959' etc. Mainly in unidentified hand, with some later notes and calculations by Phillips and V.C. Shore.
- C.9 Small notebook of V.C. Shore.
- Notes on preparations of myoglobin and haemoglobin. Including material from notebook of H.M. Dintzis (one of J.C. Kendrew's collaborators) 1955.

Research notebooks and notes

- C.10 Notebook of V.C. Shore. 2 December 1957 - 18 November 1958.
- Work on heavy atoms in myoglobin and metmyoglobin. Some in another hand.
- C.11 Notebook of V.C. Shore. 9 July 1958 - 20 July 1959.
- Similar material. Includes brief notes by J.C. Kendrew, and summary tables of crystals at back of book.
- C.12 Notebook of K.M. Wade. 22 September - 18 November 1958.
- Preparation and examination of myoglobin. Some notes by V.C. Shore.
- C.13 Notebook of S. Nind. Book I. 3 October 1958 - 4 July 1960.
- Work on myoglobin crystals.
- C.14 Notebook of S. Nind. Book II. 18 July 1960 - 20 June 1961.
- Experiments from 5 December 1960 onwards are by Phillips and there are further notes and calculations by him at back of book.
- C.15 Notebook by V.C. Shore and another. 18 November 1958 - 14 July 1960.
- Preparation and examination of myoglobin and metmyoglobin.
- C.16-C.22 **Lysozyme**

This was the first enzyme structure to be determined by X-ray analysis, and Phillips's most widely known research achievement. Amid mounting excitement, the model was completed at the Royal Institution in time for Bragg's 75th birthday in March 1965. Phillips gave his first paper announcing the news in April (G.11); the more detailed published papers aroused intense and continuing interest (F.7, F.10-F.12). References in correspondence throughout the collection are too numerous to be listed here, but attention is drawn especially to contemporary correspondence with R. Diamond (P.63) and R.E. Dickerson (P.64, P.65).

Research notebooks and notes

The molecule used for the original project at the Royal Institution was hen egg-white; after his move to Oxford Phillips continued to work on the structure of different types of lysozyme, which remained one of the chief topics of research and publication by him and his coworkers.

Work at the Royal Institution.

Ledger-type notebooks of lysozyme coordinates, all by Phillips or checked by him. None dated.

C.16 Coordinates 1-50.

C.17 Coordinates 51-99.

C.18 Coordinates 100-129, with some later discussions or improvements 1970, 1979 at back of book.

Work at Oxford

C.19 Ledger-type notebook 'Hen lysozyme: Conformation'. Notes and tables by Phillips, beginning 21 July 1967.

Three spiral-bound notebooks.

C.20 'Lysozyme'. Both ends of book used. Notes, diagrams, ideas, discussions with colleagues and research students, 29 March 1973 - 9 November 1981.

C.21 'Lysozyme/writing'. Few pages used. Notes, diagrams, meetings of 'Lysozyme Club' March 1975, 1 page later notes 16 November 1981.

C.22 'Lysozyme 1984'.

Brief notes of research in hand, June, October 1984. Most of the book relates to ABRC work on research funding, drafts for papers or talks, notes of discussions, 'Pull-through' scheme etc. See O.84, O.85.

Research notebooks and notes

C.23-C.41

Triose phosphate isomerase (TIM)

This became one of the principal enzyme analysis projects of Phillips and coworkers at Oxford from the 1970s. The successful structure was first announced by Phillips at a Biochemical Society meeting in Cambridge 9 April 1975 (G.153) and published as a collaborative paper in *Nature*, **255**, 1975 (F.18-F.20). Many subsequent collaborative papers on TIM were published; I.A. Wilson and P.S. Rivers are the chief collaborators whose work remains with that of Phillips in the present collection though there are frequent references to others.

All the material is in spiral-bound notebooks, and consists of hand-written notes, tables of coordinates, sequences, active sites, some notes of meetings, discussions, drafts or summaries for papers.

Phillips's notebooks.

C.23

'TIM 1 1971' 11 February 1971 - 10 April 1972.

C.24

'TIM 2 1972' 17 March 1971 - 11 April 1973.

Both ends of book used.

C.25

'TIM 3 1973' 22 December 1972 - 2 October 1974.

C.26

'TIM 4 1974' 29 October 1974 - 18 June 1978.

Includes Phillips's table of sequences with a note 'Completed 29/10/74', information and notes from Rivers etc.

C.27

'TIM 5 Dec. 1975' 10 December 1975 - 7 December 1980.

C.28

'D.C. Phillips Oxford'.

First pages and last page in book are notes on the life of W.L. Bragg, probably for Phillips's *Memoir*. (F.25-F.43).

Notes etc. on TIM run 29 June 1977 - 5 April 1978.

Research notebooks and notes

- C.29 Notebook. January 1979 - 18 February 1980.
- Includes draft note by Wilson on loops.
- I.A. Wilson's notebooks.
- Few books or entries are dated. Information on subject-matter and approximate dates have been supplied by Phillips.
- C.30 Notebook 9 March - 1 September 1973.
- C.31 Notebook 18 May - 2 October 1973.
- C.32 Notebook 29 May 1974 - 27 January 1975.
- Includes notes on conference papers or lectures, and extensive tables on TIM subunits etc.
- C.33 Notebook c.1975-76.
- A₁, A₂ coordinates. Residues.
- C.34 Notebook c.1975-77. Both ends of book used.
- Active sites of TIM. Includes information 1977 from Rivers.
- C.35 'IAW. Model building studies TIM'.
- Atomic coordinates. Substrate binding. Work probably related to collaborative paper 'Atomic coordinates for triose phosphate isomerase from chicken muscle', *Biochem & Biophys. Res. Comm.*, **72**, 1976, a copy of which is bound in.
- C.36 Not used.

Research notebooks and notes

- C.37 Notebook c.1976.
Comparative tables of 249 coordinates.
- C.38 'TIM COORDS A₁, 1-199'.
- C.39 'TIM COORDS A₁, 200-248'.
- C.40 'TIM COORDS A₂, 1-174'.
- C.41 'TIM COORDS A₂, 175-248'.
- C.42, C.43 α -lactalbumin
- C.42 'α LAC. 1 1971' 12 January 1971 - 27 January 1975.
Clipped into front of book are pages of earlier work on the subject, some dated in February 1968.
- C.43 'α LAC. 2 1975'. Both ends of book used.
At front of book entries run 3 February 1975 - September 1979. At back of book entries, some on penicillinase, run 20 March - 26 June 1978.
- C.44, C.45 β -lactamase
- C.44 'β-LACTAMASE Dihydrofolate reductase'. Both ends of book used.
At front of book entries run 22 May 1974 - 4 July 1985; the first entry for 4 July 1985 reads 'Gap without notes in this book covered by work in theses by Rosemary Todd and B. Samraoui leading to a partially interpretable map at 2.5Å resolution.' At rear of book are notes on Fc (immunoglobulin fragment) dated 10 July 1974.
- C.45 'B-lac. 1985' 29 May 1984 - 4 February 1985.
Few pages used.

Research notebooks and notes

- C.46 **Low temperatures. Heat exchanges**
- Notes etc. by Phillips and J. Neve on heat exchanges 1 February - March 1974, and with T. Fink on low temperatures 25 March - 20 July 1974.
- C.47, C.48 **Fc, Fv Immunoglobulin fragments**
- C.47 'Fc 1 1974' 3 February 1975 - 19 January 1979.
- Includes information from M. Lewis, one of the collaborators in the paper 'Crystallographic studies of immunoglobins ...' *J. mol. Biol.*, **135**, 1979.
- C.48 Notebook 26 January 1979 - 18 September 1981.
- Work related to collaborative paper 'Crystallization of the Fv fragment of mouse myeloma protein M315', *Biochem. J.* **181**, 1979.
- C.49, C.50 **Miscellaneous topics**
- C.49 Notebook inscribed 'Folding' but including notes on various topics. Entries run 30 October 1972 - 21 March 1979.
- C.50 Notebook, only one page dated 5 December 1983.
- Work mainly on enzyme vibration, perhaps related to publication with D.I. Stuart 'On the derivation of dynamic information from diffraction data', 1985.

NOTES AND CORRESPONDENCE

- C.51 **Seal myoglobin**
- Folder of graphs and measurements June 1956, with a manuscript note by Phillips on cover 'Measurements to establish absolute scale (for Helen Scouloudi) 1956 (earliest work at RI).'
- Notes and discussions with H. Scouloudi and others 10 May 1973 - 10 October 1975, and 1 page 22 January, 4 February 1985.

Research notebooks and notes

C.52

Protein analysis

General correspondence February 1957 - 27 July 1967 (and undated), mainly exchanged with members of the MRC Unit at Cambridge and colleagues in other departments of the University on all aspects of ongoing protein crystallographic projects e.g. anthracene, myoglobin, lysozyme, protein folding, radiation damage. Data and calculations may also be included. Some reference is also made to other matters e.g. Phillips's move to Oxford.

C.53

Radiation damage

Experiments, data etc. on work in collaboration with C.C.F. Blake, few dated, but mainly 1960-62 and related to joint paper 'Effects of X-irradiation on single crystals of myoglobin', 1962 (see G.5). Includes letter on the subject from W.L. Bragg.

C.54

Haem groups

Data, measurements etc. Includes letter May 1961 from Phillips to H.C. Watson, and his 'Summary' of 'Haem Group Studies' 2 June 1965, 6pp paginated A-F.

There is additional work by Phillips on this topic in the papers of J.C. Kendrew.

C.55, C.56

Protein folding

Correspondence, drafts, data, experiments etc. on work in collaboration with P. Dunnill c.1964-67. Phillips's undated later note on the original file cover reads 'Notes on protein folding with Peter Dunnill. Did not appear as paper but mentioned in Sci. Am. article, 1966.'

C.55

Ideas, notes, graphs, drafts for research projects and papers, mainly by Dunnill but including work by Phillips. Undated.

C.56

Mainly correspondence and drafts for possible publications c.1965-67, several undated. Includes comments by M.F. Perutz June 1966 on a draft paper submitted to him by Phillips and Dunnill.

Research notebooks and notes

- C.57 Shorter notes on work with A.R. Rees on receptors, 19 October 1976 - 24 January 1979.
- C.58 Brief correspondence and data on TIM, from P. Rivers, 1977.
- C.59 Brief notes on Rubisco June 1984.
- C.60 Correspondence and drafts on TIM 1978-83, 1986.

Mainly with coworkers A. Bloomer, C.I. Pogson, I.A. Wilson on proposed publications on TIM. Includes draft for low resolution paper on TIM submitted to *Proc. Roy. Soc.* but not accepted.

SECTION D

ROYAL INSTITUTION (RI)

D.1-D.16

INTRODUCTION

Much of Phillips's most important research, and the foundation of his career, were achieved at the Royal Institution, where he was appointed as a Research Fellow by W.L. Bragg from January 1956 and which he left to become the first Professor of Molecular Biophysics at Oxford in 1966. From November 1959 he was a salaried member of the External Staff of the Medical Research Council (see A.10). Phillips's own account of the principal research projects in which he was engaged at the Royal Institution is included in the General Introduction.

The growing reputation of Phillips and his team can be seen from the annual increase in requests to visit the laboratory and in scientific exchanges (D.5-D.9) though these remain on a small scale compared to the rapid expansion of a major university department which followed the move to Oxford. Additional exchanges of ideas during the Royal Institution period can be found in the correspondence files for the relevant dates with long-term colleagues, particularly U.W. Arndt and A.C.T. North. Phillips's own research files and notes are at B.20-B.26, C.5-C.18, C.51-C.56.

Phillips never lost touch with the Royal Institution, becoming Manager, Fullerian Professor and Member of Council; these later contacts are recorded at D.13-D.16. His many contributions to the Institution's lecture and teaching programme culminated in his very successful Christmas Lectures of 1980-81 (see G.224-G.228). In 1991 he received the Institution's Actonian Prize (see A.56).

The Director of the Institution throughout Phillips's decade there was Sir Lawrence Bragg. They shared a mutual affectionate regard, the elucidation of lysozyme shortly before Bragg's retirement being seen in some sense to crown Bragg's Directorship as well as Phillips's research. The move to Oxford, in which Bragg among others played both an initiatory and a continuing role, also took on something of the aspect of the handing-on of a torch. Phillips, for his part, contributed several articles and celebratory tributes to Bragg, edited and saw through to publication the book *The Development of X-ray Analysis* left unfinished at Bragg's death (P.26, P.27), wrote the *Biographical Memoir* for the Royal Society (F.25-F.43) and, with J.M. Thomas, edited a commemorative volume for Bragg's centenary: *Selections and reflections: the legacy of Sir Lawrence Bragg* (P.28, P.29).

Royal Institution (RI)

- D.1 Phillips's appointment at the RI. Correspondence with Bragg offering a three-year appointment as Research Fellow and discussing likely personnel at the RI and possible lines of research. Also letter from U.W. Arndt on projects in hand and plans for apparatus design. March-August 1955.
- D.2 Miscellaneous career, social and personal items, up to Phillips's move to Oxford and including some exchanges of farewell good wishes. 1957-66.
- D.3 Research Grant from National Institutes of Health, Bethesda USA

Includes Phillips's notes on equipment and personnel required 1958, correspondence with Bragg re closure of grant 1971.
- D.4 Miscellaneous correspondence on Linear Diffractometer: Phillips's appointment as consultant to Hilger and Watts 1960, recommendation for 'Achievement Award' 1966, royalties, MRC's ex gratia payments scheme 1970, end of NRDC patent 1970.
- D.5 Correspondence, exchange of information, visits etc. on diffractometry and apparatus 1958-65.
- D.6 General scientific correspondence 1957-66.

Includes: correspondence on anthracene research and publications 1957-58; article on work at the RI, submitted to Phillips for comment and extensively revised by him 1960; work on radiation damage 1961; teaching of X-ray crystallography 1965 and other topics.
- D.7 Shorter correspondence: requests or thanks for reprints, information, data, permission to photograph or borrow models, received by Phillips. 1957-66.
- D.8 Shorter correspondence: Phillips's requests for information on research, apparatus, models, teaching and lecture material 1958-66.
- D.9 Requests to visit Phillips's laboratory, arrangements and thanks. Includes correspondence 1965 with J.R. Knowles and G. Lowe arranging a visit (4 June) to study lysozyme model; this meeting was an important factor in the future setting-up and development of the Oxford Enzyme Group. 1957-65.

Royal Institution (RI)

- D.10 Requests to work in laboratory 1959-66.
- D.11 Congratulations on the successful lysozyme analysis 1965.
- Includes letters from colleagues, and also invitations from Bragg to a 'Coming-out party' at the RI and from M.F. Perutz to a Cambridge College Feast.
- Also included here is a little later correspondence about the deposit of the original lysozyme model and electron density maps in the Science Museum London 1980.
- D.12 Shorter personal correspondence 1959-64.
- D.13 Correspondence on RI affairs 1966-68.
- Material includes retirement parties for Bragg, final report on Phillips's work, official congratulations on Phillips's election to Royal Society.
- D.14 Correspondence on RI affairs 1969-71.
- During this period Phillips was a Manager of the Institution; there is no record of his appointment but a letter of thanks on the completion of the term of office is included, dated 3 May 1971.
- Material includes papers and ideas on the future of the Institution, possible collaboration with American Academy of Arts and Sciences, minutes of Visitors Committee Meeting 8 June 1970 at which Phillips's suggestions for the future of the RI were discussed, membership drive, arrangements for lectures and teaching at International Science School Sydney (see G.94).
- D.15 Correspondence on RI affairs 1973-89.
- Includes material on grant from Nuffield Foundation for organisation of Bragg papers at the RI, Phillips's service on various RI committees, appointment as Fullerian Professor 1979-85, lectures and discourses ('Proteins: the machine tools of life' 1979, 'Blueprints and machine tools in the living cell' 1984), Phillips's election to Council 1987, membership and funding appeals.
- D.16 Correspondence on RI affairs 1990-91.
- Funding, Faraday Bicentenary Celebrations, Silver Jubilee of lysozyme structure.

SECTION E

OXFORD

E.1-E.173

E.1-E.19 PHILLIPS'S CAREER AT OXFORD

Introductory note

E.1-E.6 Appointment

E.7-E.9 Corpus Christi College

E.10-E.12 Wolfson College

E.13-E.15 Clubs and Societies

E.16-E.19 Miscellaneous

E.20-E.41 BIOLOGICAL AND AGRICULTURAL SCIENCES BOARD

E.42-E.53 INTERFACULTY AND UNIVERSITY COMMITTEES

E.54-E.138 LABORATORY OF MOLECULAR BIOPHYSICS (LMB)

Introductory note

E.54-E.69 Academic Organisation

E.70-E.96 Lectures and Teaching

E.97-E.109 Equipment Grants

E.110-E.119 Research Councils' Grants

E.120-E.127 Firms and Foundations Grants

E.128-E.138 General scientific correspondence

E.139-E.173 ELECTORAL BOARDS AND APPOINTMENTS

E.139-E.165 Oxford University

E.166-E.173 Laboratory of Molecular Biophysics

Oxford

PHILLIPS'S CAREER AT OXFORD

Phillips's official arrival on 1 October 1966 as Professor of Biophysics followed several years of complex and often exasperating negotiations. The story has already been told from the viewpoint of some of those involved; J.W.S. Pringle, for example, in his valedictory lecture as Linacre Professor in 1979 (manuscript in the Bodleian Library, CSAC 117/8/86 item A.3) and H.A. Krebs who compiled his own documentary account which is included here at E.6.

Some of the issues involved can be relatively simply stated, though their resolution proved altogether more difficult. Some of Oxford's leading scientists, notably D.C. Hodgkin and H.A. Krebs, were anxious to strengthen molecular studies in the University, though a tentative approach in 1958 to M.F. Perutz about a possible transfer of his MRC Unit from Cambridge came to nothing, as did discussions between D.C. Hodgkin and Phillips in 1961 (see E.1). By 1963, when J.W.S. Pringle was in post as Linacre Professor, he reopened negotiations more actively, with the avowed aim of incorporating biophysics, preferably by the complete transfer of Phillips and his team to Oxford, as an element of the Zoology department for which an extensive new building had been promised. Other factors now came into play. The timing of any move was at least partly contingent upon the retirement of Sir Lawrence Bragg from the Royal Institution where Phillips and his team were then working. The Medical Research Council was Phillips's chief source of research support and its continuance had to be ensured. The Council also met the salaries of Phillips and other key members of his team, on scales considerably above those paid by the University; this was a cause of particularly protracted and acrimonious negotiations over which the whole project nearly foundered. Building delays and additional expenses were a further frustration; accommodation for Phillips's team was financed by the Nuffield Foundation but the building was not complete by the time of his arrival and the department started work in temporary space in the Old Physiology Department.

Although the material presented below gives a full and interesting account of the story, some episodes are only lightly touched on. An example is the successful initiative by Bragg in obtaining money from two of his personal friends, Sir Kenneth Lee and Colonel Harold Hemming, to help finance Oxford Fellowships for members of Phillips's team; this is referred to only scantily in E.2. (See also P.24). The 'Lee-Hemming benefaction', as it was known, was originally associated with St. Peter's College, and intended for the support of K.C. Holmes, considered a key member of the group along with A.C.T. North. Considerable consternation arose when Holmes decided at a very late stage (May 1966 see P.112) to withdraw from the Oxford project and accept a post in Germany; the benefaction was eventually transferred to Wolfson College for the support of C.C.F. Blake and A. Miller (E.7, E.10).

Holmes was not alone in receiving offers of posts elsewhere; Phillips considered a move to Edinburgh when progress seemed at a standstill, and also received many attractive offers from America (see especially his letter of 14 May 1965 in E.2).

Oxford

Phillips's own chair carried with it Fellowship of Corpus Christi College; for his arrival there and subsequent college life, see E.7-E.9.

Miscellaneous personal items relating to Phillips's Oxford career are at A.10.

Appointment

E.1 Heavily-revised manuscript draft of letter from Phillips to D.C. Hodgkin 23 November 1961, following a meeting and discussion with her on possible transfer to Oxford and other possible career moves.

Letter from J.C. Kendrew to Phillips 2 December 1961 also about discussions with D.C. Hodgkin.

E.2 Phillips's folder of correspondence and papers relating to his appointment. The material runs 29 March 1963 to 17 February 1967 and includes correspondence with academic colleagues (primarily J.W.S. Pringle but also H.A. Krebs, D.C. Hodgkin and others), Oxford University (mainly the Registrar Sir Folliott Sandford), the Medical Research Council (Secretary Sir Harold Himsworth).

Some of the key dates are:

29 March 1963: preliminary approach by J.W.S. Pringle to Phillips about his possible acceptance of a Readership at Oxford.

31 October 1963: approval in principle from Himsworth (MRC) of move to Oxford.

17 March 1964: agreement by Oxford General Board to finance a Professorship of Molecular Biophysics for Phillips, with effect from 1 October 1967.

Trinity Term 1964: lectures by Phillips and A.C.T. North on 'Structure and function of biological macromolecules', undertaken partly as publicity for the subject and personnel. (See E.86)

25 May 1964: Phillips's submission of his plans and budget for staff, accommodation, teaching and research, with comments from J.C. Kendrew and M.F. Perutz.

1 March 1965: MRC letter to Vice-Chancellor setting forth conditions of support for Phillips and his team at Oxford (photocopy).

23 March 1965: formal offer of appointment as Professor.

Oxford

8 April 1965: Phillips's reply, deferring his acceptance pending solution of the salary discrepancy for members of his team, especially K.C. Holmes and A.C.T. North.

13 May 1965: Pringle's memorandum to Faculty Board summarising current situation, sources of support, and outstanding problems.

Michaelmas Term 1965: lecture course on molecular biology by Phillips, North and Holmes (the latter not very successful).

January-February 1966: negotiations with Edinburgh University.

2 March 1966: Phillips's acceptance of appointment from 1 October 1966.

14 June 1966: reference to 'Lee-Hemming' benefaction during salary and Fellowship negotiations.

E.3 Notes, summaries and handouts for lectures on molecular biophysics, given Michaelmas Term 1965 by Phillips, North and Holmes. There is a manuscript headnote added in 1990 by Phillips 'Earliest lectures in Oxford 1965', though in fact he and North had given a course in Trinity Term 1964 (text at E.86).

E.4 Correspondence October 1964 - March 1965 on grant from Nuffield Foundation for accommodation for Phillips's group in Department of Zoology.

E.5 Proposed research programmes to be conducted in the new department, drawn up in preparation for move by K.C. Holmes, A.C.T. North and C.C.F. Blake.

E.6 'Documents concerning the history of molecular biophysics at Oxford', 132pp.

A compilation by H.A. Krebs, September 1971, sent to Phillips 28 October 1971. It includes some original documents, carbons or photocopies of letters, but is mainly a typescript account of the negotiations, with comments and linking passages by Krebs and including transcripts of University and Faculty Board meetings. From May 1963 some overlap occurs with documents in Phillips's own file (E.2) which remains a fuller record of developments, but Krebs's material has been retained as a unit and is particularly useful for the early stages.

Oxford

Corpus Christi College

Phillips was allocated a Fellowship at Corpus in July 1965. His commitments to the Laboratory and to scientific organisations outside Oxford did not enable him to play a particularly active part in the life of the college.

E.7 General correspondence 1965-78, 1984-85, 1989 with successive Presidents and Fellows, on Phillips's Fellowship and general college affairs. His letter of 8 July 1966 gives a clear account of the 'Lee-Hemming' benefaction and the difficulties arising from K.C. Holmes's decision not to join the Oxford team. Correspondence 1989 refers to D.C. Hodgkin's seminar on 'Chemistry in Oxford' for the history of the university.

E.8 Presidency 1985.

E.9 External Funding Committee 1986-90.

Papers and correspondence. Includes Phillips's draft proposals for a Senior and Junior Research Fellowship 'for work on the interface between chemistry and biology' 1988, various appeal arrangements.

Wolfson College

E.10 Correspondence 1967-68 about the Lee-Hemming benefaction, which was transferred from St. Peter's to Wolfson College: C.C.F. Blake and A. Miller were appointed 'Lee-Hemming Research Fellows'.

Correspondence 1969, 1971 on possible links between Wolfson and graduate students from abroad.

E.11 Correspondence 1975-76 on the Guy Newton Research Fellowship at Wolfson and the possibility of some of the E.P. Abraham benefaction to the University being associated with the Wolfson funds as a support grant for laboratory expenses, and also the allocation to Wolfson of one of the E.P. Abraham Fellowships. See also E.47.

E.12 Miscellaneous shorter correspondence 1979-83.

Oxford

Clubs and Societies

E.13 Natural Science Club

Phillips's election 1971, brief correspondence on meetings and nominations, retirement 1990.

E.14 Ashmolean Club

Phillips was elected to the Club in 1972 and hosted one of its dinners at Corpus in February 1977. In 1978 he took over as Secretary from Sir Ewart Jones and was succeeded in 1990 by M.G. Gelder. The surviving material covers the years 1972-78, 1990-91 only.

E.15 Oxford University Development Office

Correspondence and papers on meetings and projects 1986-88.

Miscellaneous

E.16 Sabbatical leave 1976-77.

Special leave to cover ABRC visits abroad April-May 1986.

Sabbatical leave 1989-1990.

E.17 Correspondence May 1989 about the endowment of the chair of molecular biophysics by the E.P. Abraham Trustees and the proposal to name it after Phillips.

Letter of thanks to Phillips 1974 for his Chairmanship of the Biology Board.

E.18 List of Phillips's commitments: university and departmental committees, lectures, research students, outside committees, editorial boards etc., compiled 1971 perhaps for new secretary. Retained as an account of the obligations undertaken, not all of which are documented elsewhere. See also A.73.

E.19 Not used.

Oxford

BIOLOGICAL AND AGRICULTURAL SCIENCES BOARD

Nominating Committee for Examiners in Biological Sciences

E.20 Correspondence and nominations 1971-73.

Panel on Training of University Teachers

E.21 Correspondence and papers 1971, 1983-86. Phillips was appointed to the 'panel' on its formation in 1970. Later correspondence is on meetings which he was usually unable to attend.

Biology Preliminary Course and Examination

At its meeting on 6 June 1972 the Board set up an *ad hoc* committee (sometimes also referred to as a sub-committee and a steering committee) 'to consider possible changes to and developments of the Biology Preliminary Course and Examination'. Phillips was the Convenor and the members were H. Harris, R.R. Porter, F.R. Whatley and D.L. Lack (later replaced by C.M. Perrins). D.C. Smith joined the committee later.

Background material was assembled including current syllabuses at Oxford and Cambridge (E.22) and recent reports from examiners incorporating the results of undergraduate questionnaires (E.23). Phillips also put out a circular in October 1972 requesting opinions from teachers and undergraduates which, together with his notes and some brief correspondence, are held at E.24.

An Open Meeting to discuss the proposed revision was held on 1 May 1973, after which Phillips drafted a report for consideration by the Board on 8 May. The proposals were circulated for comment to sub-faculty boards with the result that at its 12 June meeting the Board agreed to refer back the proposals to the sub-committee; one of the stumbling-blocks was the incorporation of biochemical studies into the examination. Phillips's second report to the Board, 8 November, proposed the setting up of working parties to prepare specific reports which were received during the early part of 1974 (E.27), and an agreed syllabus for the course and regulations for the examination were submitted to the Board in May 1974.

Oxford

- E.22 Setting-up papers June 1972
- Arrangements for preliminary meeting 28 June, background information on current syllabuses at Oxford and Cambridge.
- E.23 September-December 1972
- Information, comments and suggestions from examiners in recent Biology Preliminary Examinations. Arrangements for meetings on 27 November and 11 December (M.G. Ord attended *vice* R.R. Porter who was in Stockholm to receive a Nobel Prize, and contributed a proposal for a Cell Biology Course). D.C. Smith was also invited to attend.
- E.24 Phillips's circular 19 October 1972, comments, correspondence and replies received from faculty boards, senior and junior members (some manuscript, some typed-up for the committee), Phillips's abstracts of comments, October 1972 - February 1973.
- E.25 Open meeting 1 May 1973 to discuss revision of courses and examination.
- Includes Phillips's draft and final notice and arrangements for meeting, notes taken at meeting, comments and suggestions by B.F. Dainton.
- E.26 Papers, reports and correspondence May-November 1973.
- Includes draft and final version of sub-committee report to the Board, sub-faculty comments, draft and final version of second sub-committee paper 8 November. Phillips's accompanying letter to E.T.R. Jones sets out the current state of affairs very succinctly.
- E.27 Reports and comments by working parties, consultative committees etc. on proposals, several annotated by Phillips, various dates January-May 1974.
- E.28 Notes and drafts for proposed revised course and examination in biology, and draft legislation, submitted to Board in Trinity Term 1974.

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- E.29 Biology Preliminary Steering Committee (Chairman G.B. Masfield)
- Minutes of meetings some annotated by Phillips October 1972 - February 1975, including discussions of various stages of the revision committee and its work. The Steering Committee met for the last time in February 1975 and was replaced by the Management Committee (E.31 below).
- Includes a little correspondence and papers.
- E.30 Reports of the working parties on the main subjects for the Biology Prelim.
- E.31 Biology Preliminary Management Committee
- Phillips served on this from 1975 but the remaining material dates only from May 1977 (the extension of his appointment to October 1980) and is mainly suggestions for revised reading lists. Includes letter on later revision of course 1984.

Review of Departmental Activities and 'Forward Look'

Documents, reports, correspondence and papers dealing with budgeting, allocation of new money, filling or redeployment of academic posts, current and future activities prepared for the Faculty Board for consideration by the General Board.

Phillips was at this time (1972-74) Chairman of the Faculty Board and the material deals with Board meetings as well as the detailed submissions prepared by the Laboratory of Molecular Biophysics (for which he was responsible) and the Department of Zoology.

- E.32 Information, drafts and papers prepared for a sub-faculty of Zoology meeting 3 October 1973 to discuss the reply to be submitted to the Faculty and General Boards, including papers by E.B. Ford, J.W.S. Pringle and Phillips.
- E.33 Papers, heavily annotated, for meeting 12 November 1973.
- E.34 Similar, annotated papers for meeting 10 May 1974.

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- E.35 Submissions, information and statistics prepared for meeting on 20 November 1974.
- E.36 Detailed tables and statistics on graduate and undergraduate teaching load in LMB prepared for Faculty Board questionnaire November 1974.
- E.37 Meeting 4 June 1975 on vacant posts.

Ad hoc Committee on the Future of the Professorship of Biomathematics

- E.38 Papers and correspondence 1975.

Committee to review the Department of Forestry and the Chair of Forest Science

This was set up in view of the retirement of J.L. Harley due in September 1979, to decide on the retention or abolition of the post, teaching, syllabus and research projects. The review board met in November 1975, January, February and March 1976; the Chairman was W.F. Bodmer and the members were J.H. Burnett, F.R. Whatley, K.E. Hunt and Phillips.

- E.39 Papers, correspondence, annotated drafts and final version of report.

Committee to review the future of the Departments of Entomology and Zoology

This was set up by the Faculty Board at the request of the General Board to review the future of the Departments in view of the impending vacancies in the Hope and Linacre Chairs. The committee met in November 1975 and February 1976; the Chairman was W.F. Bodmer and the members were J.L. Harley, H. Harris, J. Mandelstam, G.B. Masefield and Phillips.

The material should be consulted in conjunction with the more extensive correspondence and submissions in the departmental files at E.66-E.69.

- E.40 Papers, correspondence, arrangements for meetings, annotated drafts for report.

Oxford

Faculty Board representative on Physiological Science Board

- E.41 Letter of invitation to serve 1975, miscellaneous papers and correspondence.

INTERFACULTY AND UNIVERSITY COMMITTEES

Computing

See also E.55

- E.42 General Board *ad hoc* committee on computing.

Brief correspondence only, mainly on the situation regarding ICL computer; includes notes from A.C.T. North, D.H. Wilkinson 1969.

- E.43 Committee for the computing service 1973-77.

Phillips was invited to serve as representative of the Heads of Science Departments Committee (*q.v.*) for two years from 6 November 1973, his appointment being renewed to Michaelmas Term 1977 when he was succeeded by J.S. Rowlinson.

Correspondence, submissions and papers on computing requirements, meetings, time allocations etc.

See E.45 below.

- E.44 Sub-faculty of Computation

Phillips was rarely able to attend meetings. P.R. Evans of LMB was a member and spoke for the Laboratory.

Miscellaneous papers and meetings 1974-75.

- E.45 Computing Council

This came into being on 1 August 1983 to replace the existing Computer Services Committee and its Standing Committee. Phillips served as representative of the Heads of Science Departments Committee.

Papers and correspondence 1983.

Oxford

Biological Council

This was an inter-faculty body of which Phillips was a member, and Chairman 1975-76.

- E.46 Inter-faculty committee of the Biology, Medicine and Psychology Boards, set up in 1972 by the Biological Council to consider the future structure and functions of the Medicine Board. Phillips was one of the nominees of the Biology Board and the Convenor was Sir Richard Doll. The committee met on 2 December 1972 and the Biology Board representatives met in Phillips's room the previous day.

Correspondence, arrangements, meeting notes, draft report.

- E.47 General correspondence and papers, minutes and reports of meetings of Biological Council 1972, 1975-79.

Material October 1975 - February 1976 refers to the E.P. Abraham Research Fund (see also E.11); material March 1976 refers to siting of NERC Unit of Invertebrate Virology; material July 1976 refers to chair of Forest Science.

- E.48 Biological Council Working Party to consider impending vacancies in Biological and Physiological Sciences.

The Working Party was set up in June 1981 with Phillips as Chairman and H. Harris, P.J. Randle, D.J. Weatherall and F.R. Whatley as members. The impending vacancies were in the chairs of Anatomy and Pharmacology and the Whitley Chair of Biochemistry. The Working Party met on 3 December.

Papers and correspondence, submissions (some annotated) to working party, Phillips's manuscript notes and draft report. This was considered at a meeting of the Biological Council on 8 December and various amendments were made; a copy of the amended version is also included.

- E.49 Report on main research groups and major items of equipment at LMB, prepared October 1982 for Biological Council Working Party on sharing of facilities. See E.55 for similar material.

Heads of Science Departments

- E.50 Standing Committee

Miscellaneous papers and correspondence 1974-87.

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E.51 Patents Committee

Miscellaneous papers and correspondence 1978 in reply to questionnaire (LMB's reply mainly compiled by R.E. Offord).

Telecommunications Policy Group

E.52 Phillips was asked to serve as a representative of the Heads of Science Departments Committee on this group set up in January 1984 to consider the future needs of the university with regard to telecommunications. The chairman was G. Stafford.

Papers, correspondence, arrangements for visits and presentations, Phillips's notes, report of the group May 1985.

Industrial Liaison Officer

E.53 Correspondence and papers on possible joint initiative for commercial exploitation of innovation in university research, May-June 1985. Includes correspondence from M.F. Wood.

LABORATORY OF MOLECULAR BIOPHYSICS (LMB)

Throughout Phillips's tenure of the chair of molecular biophysics his laboratory was incorporated in the Department of Zoology, though he exercised independent control of research, teaching and budgeting, and even though his department was at first physically housed in temporary accommodation in the 'Old Physiology' building and was later separately lodged in the Rex Richards Building. From October 1991 the Laboratory became a sub-department of the Department of Biochemistry.

For these historical reasons therefore - fully documented at E.1-E.6 - close contacts existed between Phillips and J.W.S. Pringle, Linacre Professor of Zoology; meetings, estimates, staff returns, relations with the University, lecture arrangements and the like went forward in tandem wherever possible. Pringle retired in 1979 and his successor was T.R.E. Southwood who was on particularly friendly terms with Phillips.

In his own laboratory Phillips continued the practice which he had begun on a limited scale at the Royal Institution, of circulating all but personal communications to his staff, to keep them fully informed of events and also

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to solicit their views and comments and to enlist their help. Many documents, here and throughout the collection, have a list of initials of those circulated and, often, their replies. It has not been possible to index these relatively brief communications, though they have considerable value in showing Phillips's style as head of department and were also of great practical help to him in framing replies, policy-making and the like. Only separate letters or papers of some substance appear in the index. Members of the laboratory staff principally involved at various dates are, in alphabetical order:

M.J. Adams
R. Aschaffenburg
C.C.F. Blake
L.N. Johnson
A. Miller
A.C.T. North
R.E. Offord
A.R. Rees
C.D. Rodgers
D.I. Stuart
S.G. Waley

Academic organisation

Equipment and administration

N.B. Major items of equipment were purchased from outside grants. See E.96-E.109.

E.54

Lists of equipment and furniture required for LMB in 'Old Physiology' and in new premises in Zoology, and supplementary equipment for the latter, submitted for purchase through University Grants Committee.

Includes estimates from various members of LMB and a little correspondence on the purchase of major items - scintillation counter, ultracentrifuge, diffractometer, spectrophotometer. Various dates 1966-70.

Oxford

- E.55 Correspondence, memoranda, information etc. 1966-86 on computing requirements, equipment, time allocation and policy in relation to the needs of LMB. Mainly with University Computing Service about all aspects of its provision and development of computing facilities for the university and the department (which used about 10% of the university's computing resources). See also E.42-E.45

Various statistical returns compiled for the university and UGC with details of LMB staff, work and equipment are included. See similar at E.49, E.57.

- E.56 Correspondence with J.W.S. Pringle on departmental and other matters 1966-76.

- E.57 General correspondence with University Registry on affairs of LMB, mainly statistical returns on numbers, sources of support, take-up of awards, teaching load etc. with detailed information on personnel and research in hand.

Includes Phillips's letter 23 May 1969 on proposal to locate European Molecular Biology Laboratory in or near Oxford.

- E.58 Miscellaneous information on staff of LMB in temporary accommodation in 'Old Physiology' and in 3 South Parks Road before completion of Zoology Department, with lists of research students and research in progress. 1967-71.

- E.59 Lists of new students and supervisors, visitors to laboratory 1977-86.

Notes, recommendations and comments by Phillips and others for various laboratory meetings 1972-79 and undated.

See B.36 for notebook on laboratory meetings.

Finance

This material refers primarily to Oxford University General Board allocations, though some reference is made to outside grants and support which are dealt with more fully at E.96-E.127.

Oxford

E.60 Submission for 1972-77 Quinquennium; drafts, proposals, correspondence 1970. Phillips's covering letter with his submission rehearses the history of his coming to Oxford and the case for senior posts for members of his group.

E.61-E.64 General Board allocations 1972-78; financial statements, estimates and costings by members of LMB, submissions for equipment made to Phillips for authority etc. E.64 includes summary of funding from all sources 1972-81.

4 folders:

E.61	1972-74	E.63	1975-76
E.62	1974-75	E.64	1976-78

E.65 Financial statements, estimates, a little correspondence and other papers on departmental affairs, prepared for meetings of HODAG (Head of Department's Advisory Group), chairman T.R.E. Southwood 1980-83.

The Hope and Linacre Professorships

See also E.40.

The impending retirements of the Hope Professor of Entomology (G.C. Varley) in 1978 and of the Linacre Professor of Zoology (J.W.S. Pringle) in 1979 led the University to consider the future of the departments, and the duties and responsibilities of the Professors. A committee was set up by the Biology Board, chaired by W.F. Bodmer; it began taking evidence in Hilary Term 1976 and its report was communicated by the Biology Board to the General Board in Trinity Term 1976. It recommended, *inter alia*, the integration of the academic and teaching responsibilities of the Hope chair within the Zoology Department, and the official establishment of the chair of Molecular Biophysics (hitherto *ad hominem*); it envisaged that the Headship of the enlarged Zoology Department should rotate between the three Professors. Subsequent enabling legislation proposed by Council aroused considerable controversy and was formally opposed.

At a special meeting of the Zoology Departmental Committee on 6 March 1975 a 'Defence Committee' was set up 'to protect the long-term interests of the Department'. Phillips was Chairman, and the Committee - renamed 'Development Committee' - met on 3 and 25 September to consider the following questions:

1. Whether the Professorship should be altered or abolished;
2. Whether there are any other changes which may be desirable in the decree governing the post;

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3. What particular qualifications the next holder of the post should have;

and to provide information on the current resources and accommodation of the Department, and on teaching, syllabuses, and major research projects.

A paper by Phillips was tabled at the Departmental Committee meeting on 29 September and the complete information sent to Bodmer on 13 October.

The implementation of the 'Bodmer report' involved often agonising consideration of the space problem consequent on the proposed incorporation of the Hope Professor and his group within the Department. The Development Committee met in March 1977 to draft recommendations which were sent to the University on 22 April.

- E.66 Minutes of Departmental meeting 6 March 1975, recording setting up and membership of 'Defence Committee'.

Papers and correspondence May-October 1975.

Arrangements for Development Committee meetings, notes and material by Phillips and other members of the Committee, draft and final submissions, which included the recommendation of a rotation of the chairmanship of the department.

- E.67 Development Committee meetings to discuss use of space in Zoology 25 May and 8 June 1976. Brief correspondence *re* arrangements, notes by Phillips.

Development Committee meeting 'to discuss the possibility of integrating the academic part of the Hope Department into the Department of Zoology', 23 March 1977. Correspondence, suggestions and submissions by members of Committee (D. McFarland, C. Perrins), Phillips's notes and calculations, draft and final version of recommendations sent to University 22 April.

- E.68 Material relating to University's proposed Resolution and opposition to it, including 'flysheets', and papers presented at Zoology Sub-Faculty meeting 29 September 1977.

- E.69 Correspondence and papers 1979-80 relating to allocation of space to the Psychology Department, and interdepartmental meetings on the subject, 24 June, 8 August 1980. Includes copies of 'Bodmer reports'.

Oxford

Lectures and Teaching

Committees and proposals

- E.70 Biology Board *ad hoc* committee on increased cooperation in teaching between departments 1973. Letter from chairman (W.F. Bodmer), comments from LMB staff.
- E.71 Co-ordinating committee for Crystallography
- This was set up jointly by H.M. Powell and Phillips, partly as a result of correspondence from J.S. Rollett, to bring together crystallographers working in several departments and laboratories in Oxford, in order to discuss problems of common concern such as collaborative teaching programmes, purchase, service and use of apparatus. The first meeting was on 14 December 1973; Phillips was chairman until 21 November 1975.
- Papers and correspondence, including setting-up papers, membership lists, teaching and lectures, equipment surveys, Phillips's notes etc. 1973-77
- E.72 Final Honours School in Pure and Applied Biology
- Draft legislation was proposed by the Faculty Board in 1977, and in greater detail in November 1981. In January 1982 the Board asked Phillips and T.R.E. Southwood to initiate discussions on the options proposed for the new courses in, respectively, Cell biology and Ecology.
- Material includes proposals, drafts and comments 1977-86, Southwood's report for 'ecology group' of 19 February 1982, minutes of Teaching Committee 17 October 1979, 12 May and 2 June 1982, 9 May 1986.
- E.73 Submissions, correspondence, notes relating to meeting called by Phillips to discuss cell biology options in proposed new course, February 1982.
- E.74 Shorter correspondence on lectures, teaching, proposed new courses at Oxford. Various dates 1967-88.
- Similar ideas for new teaching courses elsewhere than Oxford may be found in the general LMB correspondence at E.133.

Oxford

Includes:

Phillips's lectures for Applied Physics course 1967.
Proposed M.Sc. course in Industrial Biology 1970.
Outline of proposed course in Biochemistry, Chemistry and Engineering Science 1972.
Reading list for Biology Honours course 1974.
Meeting on Energy Studies 1974.
'Block teaching' in Macromolecules 1980.
Physics and Biophysics 1983, 1988.
Structure of undergraduate science course 1986.

Courses

This is miscellaneous material dealing with specific courses given by members of LMB, including Phillips, usually as components of other Honours Schools teaching. It may include correspondence and arrangements as well as teaching material.

Phillips's own lecture notes and material are at E.86-E.96.

- E.75 Biophysics Course. Outline for 16 lectures and practicals. Latest reference 1966.
- List of postgraduate lectures on 'The Structure and Physical Chemistry of Biological Macromolecules' given by Phillips, R.E. Offord and A.C.T. North Michaelmas Term 1968.
- E.76 Material on the teaching of mathematics for the Biology Prelim: correspondence, arrangements and payment for lectures and demonstrations, lecture schedules, abstracts and problems, circulars and information, comments on course. 1970-73, 1977-86
- E.77 Reading list, problems and answers prepared for mathematics for Biology Prelim course 1972.
- E.78 Material on Molecular Biophysics, offered as a Supplementary Subject in the Sub-Faculty of Chemistry. Phillips first floated the idea in 1969 and after various drafts and negotiations it was offered for the first time in Hilary and Trinity Terms 1973. Includes correspondence, draft proposals, syllabus and lecture synopses, comments on course by R.E. Offord. 1969-73, 1977

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- E.79 Information on course content 1973, 1974, lists of those attending 1973-76.
- E.80 Arrangements for Phillips to lecture on 'Crystallographic studies of enzyme interactions' for Honours School of Biochemistry 1972-73.
- E.81 Summer School on 'The Structure and Function of Proteins', with special reference to model building, organised at LMB for postgraduates July 1974, November 1975.

Projects, participants etc.
- E.82 Miscellaneous correspondence and teaching material for courses in Biological Chemistry and Biological Physics for the Biology Prelim 1975, 1976.
- E.83 Correspondence, outlines of courses, arrangements for lecturers and timetabling on Biological Chemistry for Chemistry Prelim, 1977-86. Includes Phillips's letter 9 November 1977 suggesting the course and summaries of his own contributions, comments and suggestions from LMB staff etc.
- E.84 Correspondence, lecture synopses etc. for the course on 'Structure and Function of Macromolecules' (later 'Structural Molecular Biology', see letter of 12 August 1976 and E.85) given by members of LMB for the Zoology Honours course, 1976-82.

Phillips lectured on molecular folding.
- E.85 Lecture synopses, reading lists, examination questions etc. for the option on 'Structural Molecular Biology' for the Zoology Honours course 1982-83, 1987.

Phillips's lectures

This material is presented in chronological order of the earliest ascertainable date, though it may extend over several years of updating and cannibalising.

E.86 is of special historical interest as the record (almost all in Phillips's manuscript) of the course given by him and A.C.T. North in Trinity Term 1964 during negotiations for the move to Oxford.

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- E.86 'Lecture notes May-June 1964'
- 'Structure and function of biological macromolecules'. Course given at Oxford May-June 1964 by Phillips and A.C.T. North. Includes some background information. The folder preserves Phillips's order and title.
- E.87 'Lecture notes'
- Folder of miscellaneous material of various dates, some dated or with paginated sequences, others brief notes only. The earliest lectures are 1966 and the latest 1979. Many of the subjects discussed in the preceding folders occur here e.g. macromolecules, biochemistry and biophysics options etc. but they are not in chronological order.
- E.88 'Biology Prelim Maths 1'
- Lectures and teaching material 1970-79.
- E.89 'Biology Prelim Maths 2'
- Detailed notes for course of eight lectures given in Hilary Term 1972.
- E.90 Untitled folder of miscellaneous lecture notes of various dates, some dated or with paginated sequences, 1975-82.
- E.91 Two lectures 1979 (on Water and Weak Interactions), undated [1980s] lecture for course on Structural Molecular Biology.
- E.92 'Biology for Chemists : Year 1'
- Detailed notes for course of lectures, with Phillips's note and evaluation of lectures offered in 1980 and 1984.
- E.93 Detailed notes for Zoology Honours course 1982, lectures 2, 3/4, unnumbered.

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- E.94 Synopsis of lectures [by A. Miller] and viewgraphs by Phillips, on Macromolecules, Hilary Term 1982.
- E.95 'Zoology lectures 1987'
- Set of detailed viewgraphs for course.
- E.96 Notes and viewgraphs for lectures on molecular structure, n.d. [1980s].

Equipment Grants

Almost all of these were made by the Medical Research Council, whose continuing support for Phillips's research had been a pre-condition of his move to Oxford. Preliminary enquiries were often under way before all the negotiations were completed and were therefore ready to be activated as soon as agreement was reached. Even so, there were many delays and frustrations caused by amalgamations and mergers of firms, late deliveries, faulty design and especially by dilatory and inadequate servicing arrangements. In this respect, the material is an illuminating reflection on academic-industrial relations.

The principal requirements were for powerful computing capacity (MRC grant 53, E.97-E.101) and for X-ray diffraction equipment (E.102-E.107).

The folders may include specifications, drafts and ideas for grant applications, formal applications and reports on project results, correspondence with firms, research councils and colleagues, and frequent memoranda from LMB staff about problems with the equipment.

Argus 500 Computer

The instrument was purchased for LMB from Ferranti Ltd. by the Medical Research Council via HMSO. This was not the subject of a formal grant application by Phillips; the Council's letter of 28 October 1966 to HMSO sets out the decision to order. The departmental number assigned to matters relating to the Argus was MRC 53. After several site testings, the machine was accepted in March 1969. Troubles arose with faulty or incompatible equipment, in particular the Tally paper tape punch, and with poor maintenance. The department eventually wrote its own software after protracted delays by the firm (letters of 31 July 1969, 2 February 1970).

The correspondence is conducted principally with HMSO and MRC, and the suppliers Ferranti, Ampex (tape deck) and Faul-Coradi (successor of Hilger Electronics); most of it was by A.C.T. North until 1972, and by Phillips thereafter.

Oxford

E.97 Correspondence and papers March-December 1966

Includes memorandum by Phillips and A.C.T. North on the provision of computer facilities for the 'Molecular Biophysics Group', preliminary negotiations with MRC and Ferranti, specification of apparatus (14 October) and decision to order (28 October).

E.98 October 1967 - April 1980

Correspondence, specification, quotations etc. covering building, testing, acceptance and maintenance of Argus, link to diffractometer, tape punch and tape deck. Letters of 2 February 1970, 8 July 1970, 15 June 1972 set out the problems and deficiencies of the equipment.

Correspondence 1980 concerns the disposal of the Argus, which was replaced by a PDP 11/70 workstation supplied by the Science Research Council.

Photoscan Microdensitometer

Equipment supplied by Optronics International Inc. via their UK agent Stanley Laboratories, for rapid measurement of X-ray diffraction intensities, to be used in conjunction with the Argus computer. It was the object of an application to MRC in the name of A.C.T. North and shared the same departmental number, MRC 53, as the Argus.

The initial negotiations were conducted by A.C.T. North and later by Phillips; the chief user was M.J. Adams. The equipment was installed in July 1970 - before the application to MRC and its granting - and was the source of continual faults and complaints, which led Phillips in a letter to the manufacturers in August 1975 to describe it as 'without doubt the most unsatisfactory scientific instrument it has been my misfortune to buy'.

E.99 December 1968 - June 1971

Preliminary enquiries with Optronics and their UK agent, specifications, order, import arrangements, application to MRC 23 November 1970, grant award 24 May 1971.

E.100 February 1973 - November 1979

Mainly on unsatisfactory performance of equipment, successive maintenance visits. Includes various statements from users in LMB, summaries of events, letters to colleagues and to supplier. From 1977, when D.J. Marsh took over the engineering responsibility for the instrument, the faults were dealt with and performance became satisfactory: his report is dated 10 February 1977.

Oxford

Computer controlled display system

Equipment supplied by Sintrom Electronics and to be used in conjunction with the Argus computer. It was the object of an application to MRC by Phillips and shared the same departmental number, MRC 53, as the Argus.

E.101

Draft and notes for application on 'The use of a computer-controlled display system in the study of molecular conformations' submitted May 1973, approved August 1973, negotiations with supplier, report to MRC on results of project December 1977.

Four-circle diffractometer

Equipment supplied by Hilger Electronics (Scotland) and Ferranti Ltd. This was the object of a major MRC grant (MRC no. G 969/347/B, departmental no. MRC 46) made to Phillips 1969-72 for 'Improvement of X-ray diffractometers for the crystallographic analysis of macromolecular structures'. The apparatus comprised:

1. 4-circle diffractometer, supplied by Hilger Electronics.
2. Buffer unit for interface to Argus computer, supplied by Hilger Electronics.
3. Magnetic tape decks, supplied by Ferranti Ltd.

Although preliminary enquiries and specifications had been under way since 1966, this grant was also subject to delays in supply, delivery, setting-up and maintenance. The case was greatly complicated by industrial upheavals. Hilger & Watts (the original firm) was incorporated in Rank Precision Industries, which sold off Hilger Electronics to Faul-Coradi Scotland Ltd. There were also moves of key personnel.

E.102

November 1966 - November 1969

Preliminary specifications and quotations from Hilger & Watts, Phillips's notes and drafts for MRC application (sent June 1969), letter of award November 1969.

E.103

November 1969 - February 1973

Negotiations with suppliers, difficulties and delays, service and maintenance, minor administrative and accounting correspondence, progress and final reports to MRC August 1971, September 1972.

Oxford

Unilever 4-circle diffractometer

- E.104 Correspondence 1969-70 about purchase of a Hilger & Watts 4-circle diffractometer from Unilever. Includes enquiry from Phillips about possibility of funds from British Empire Cancer Campaign; the instrument was eventually bought from university funds.

Rotating Anode Generator

- E.105 This was the object of an MRC Special Equipment Grant for X-ray diffraction studies (MRC no. G 975/573/C). Material includes enquiries and discussions, notes, projects, copy of application (sent May, approved August 1975), arrangements for research visits to Daresbury Synchrotron and to DESY installation Hamburg, 1971, 1974-78. Includes report to MRC November 1978, and correspondence 1985 on the sale of the apparatus to A. Miller, Edinburgh University for £25,000.

Arndt-Wonnacott Oscillation Camera

- E.106 Apparatus supplied by Enraf-Nonius Holland, on an MRC grant G 974/891/C to Phillips and L.N. Johnson for 'X-ray crystallographic studies on phosphorylase, Fc fragment of rabbit immunoglobulin and other biological molecules'.
- Includes grant application and statement of research, sent December 1974, awarded March 1975.
- E.107 Application for a second oscillation camera, made by C.C.F. Blake (MRC no. G 977/565/C). Includes preliminary discussions, grant application and statement of research, sent June 1977, awarded July 1977.

Oxford

Miscellaneous

- E.108 Shorter correspondence with suppliers on purchases and maintenance.
Y290 diffractometer 1967.
Flying Spot microdensitometer 1969.
Five-circle diffractometer 1978, 1979.
Stereoscopic viewer (Leeds University) 1983.
Disk drive 1987.
- E.109 Letters of thanks for equipment lent or given to others 1974-89.

Research Councils' Grants

Medical Research Council (Grant no. G 972/604/B)

This was Phillips's principal ongoing programme grant for 'Studies of the three-dimensional structures, interactions and functions of biologically important molecules and molecular systems'.

- E.110 Research reports 1972-77, 1977-81, application for continuing grant 1982.

Agricultural Research Council

- E.111 Grant to Phillips and F.R. Whatley for project on 'The structure of ribulose *bis*-phosphate carboxylate', for three years from October 1979.
Includes application and statement of research March, award August 1979, correspondence 1979-82.
- E.112 Continuing grant no. AG 43/128 awarded August 1983 to Phillips, Whatley and M.J. Adams for three years from 1 October 1983.
Includes application and statement of research, correspondence, final report to AFRC December 1986.

Oxford

Science Research Council

- E.113 Grant no. GR/A/8842.2, awarded to Phillips, M. Sternberg and F. Cohen for two years for research on 'Analysis and prediction of protein structure' using IBM 360/165 at Rutherford Laboratory (180 hours computing time), June 1979 - May 1981.

Includes application and statement of research, correspondence, final report.

Medical Research Council

- E.114 Grant no. G 979/665/C awarded to Phillips for three years for research on 'Structural studies of immunoglobins and complement activation', from October 1979.

Includes application and statement of research, brief correspondence, final report December 1982.

Science Research Council

- E.115 Grant no. GR/B/48956 awarded to Phillips and C.C.F. Blake for three years for research on 'An investigation of the structures and dynamic properties of enzyme-substrate complexes at sub-zero temperatures', from October 1980.

Includes application and statement of research, final report June 1984.

North Atlantic Treaty Organisation (NATO)

- E.116 Grant no. RG 014/80 awarded to Phillips for 'Use of the DORIS synchrotron source at EMBL Hamburg in the study of single crystals of proteins' for one year from May 1980.

Includes application and statement of research, brief correspondence, final report July 1984.

Oxford

Science and Engineering Research Council

- E.117 Grant no. GR/C/48622 awarded to S.J. Perkins and Phillips for 'Scattering studies on proteins with emphasis on the complement cascade and proteoglycans' from 1 July 1983 - 30 June 1985 extended to March 1986, including beam-time on Daresbury Synchrotron.

Includes application and statement of research, notification of award and assessment of final report.

Medical Research Council

- E.118 Grant no. G 8411979 CB awarded to Phillips for 'Crystal structure analyses of β -lactamase...' for three years from October 1984, including beam-time on Daresbury Synchrotron.

Includes application and statement of research, brief correspondence and arrangements, final report.

Medical Research Council

- E.119 Grant no. G 8405890 CB awarded to N.K. Rogers and Phillips for 'Electrostatic interactions in globular proteins' for two years from 1 October 1984.

Includes application and statement of research, notification of award.

Firms and Foundations' Grants

See also the cashbook recording Phillips's industrial grant accounts at B.49.

Helen Hay Whitney Foundation

- E.120 Correspondence 1968-69 on possible research fellows funded by the Foundation at LMB.

Oxford

Dupont de Nemours

An unrestricted grant of \$3000 (later \$4000) per annum for three years, made to Phillips in 1968, until 1972. He used it for the general academic purposes of the laboratory staff such as attendance at conferences, thesis binding, casual research or technical assistance etc., and also for many of the first dinner-discussion meetings of the Oxford Enzyme Group.

E.121

Correspondence and papers with the firm, colleagues, departmental and university accountants on award, renewal and spending of grant 1968-74.

Merck Sharp and Dohme

An unrestricted grant of £1,250 made to Phillips via the President of the company (M. Tishler) in 1968, used for small items of academic expenditure such as conference expenses, thesis binding or research grant supplements etc. The company also made a grant towards the support of R.E. Offord in December 1969.

E.122

Correspondence with officers of the company and others about award and spending of grant 1968-75.

Nuffield Foundation

E.123

Brief correspondence 1969 on possibility of support for Oxford Enzyme Group dinner-discussions. (Refused: dinners supported from Dupont funds.)

Hoffmann-La Roche (Roche Products Ltd.)

After negotiations, the company made a grant of £1000 per annum for three years to Phillips, C.A. Vernon and R.A. John, for research in aspartate transaminase, as from January 1970. Correspondence 1970 also discusses research in polymixin structure.

E.124

Correspondence on award and spending of grant 1969-75.

Oxford

Shell International

An unrestricted grant for the general support of Phillips's research programme, of £1000 per annum for three years from January 1970. Phillips used the major part of it to support A.C.T. North's Fellowship.

- E.125 Correspondence on award and spending of grant 1969-72.

The Turner Foundation

- E.126 Correspondence and papers 1974 about support from the proposed Foundation.

E.P. Abraham Cephalosporin Fund

- E.127 Correspondence 1984-85 about support for workers on Phillips's β -lactamase project (see E.118).

General Scientific Correspondence

- E.128 Suggestions for research projects, ideas for possible collaborative work, in Oxford, UK and overseas, many with comments from LMB members 1968-89.

Some similar material, more sketchily presented, is in 'Shorter scientific correspondence' at P.293-P.296.

- E.129 Model-making 1969-89.

- E.130 Visits to the laboratory: requests, arrangements, letters of thanks from colleagues wishing to see or use models and equipment, review research in progress etc. Includes some scientific information and discussion, exchanged with Phillips and other LMB members. 1967-89.

Oxford

- E.131 Lectures or seminars: invitations or offers to give or attend lectures, arrangements etc. 1969-89.
- E.132 Requests and arrangements to visit or consult Phillips, on scientific, official or personal matters. 1967-88.
- E.133 Requests for advice from Phillips on teaching in schools and university departments. Includes draft syllabuses etc. on Physical Biology at Leicester University, Cell Biophysics Houston, Mathematics for Biologists, Sixth Form General Studies Thame, Physics and Biology Copenhagen, Biophysics. 1971-80. See also E.74.
- E.134 Requests to work, spend sabbaticals etc. in LMB, arrangements, letters of thanks. Mainly from senior scientists, but includes some undergraduates or sixth-formers working during vacations. Most of the correspondence includes information about research projects. 1967-85.
- E.135-E.137 Requests to work as post-doctoral or research students at LMB, some with research plans, recommendations, comments from LMB members etc. Requests declined or withdrawn, or places found elsewhere. In chronological order of first letter.
- E.135 1967-71
- E.136 1972-74
- E.137 1975-80, 1987
- E.138 Miscellaneous shorter correspondence on academic and administrative affairs of LMB 1966-85.

Oxford

ELECTORAL BOARDS AND APPOINTMENTS

Oxford University

- E.139 George Eastman Visiting Professorship 1971
Recommendations.
- E.140 Biology Faculty Board: Readerships Committee 1972
Nominations.
- E.141 Board of Electors to the Readership in Chemical Crystallography 1971-2
Invitation to serve, recommendations, report.
- E.142 Biology Faculty Board: Readership in Animal Behaviour 1973
Mainly correspondence on college bids for fellowship held with the appointment, sent to Phillips as Chairman of Faculty Board.
- E.143 Board of Electors to the Professorship of Forest Science 1973-78
Invitation to serve (to 1978), recommendation 1978.
- E.144 *Ad hoc* Committee: Waynflete Professorship of Chemistry 1974-76
Convenor: J.S. Rowlinson. Phillips and R.R. Porter were Biology Board representatives. Invitation to serve, draft and final memorandum on the Dyson Perrins Laboratory.
- E.145 Board of Electors to the Sherardian Professorship of Botany 1974-82
Invitations to serve and renewal only.

Oxford

- E.146 Biology Faculty Board: Degree Panel for D.Sc. applications 1972-76

Appointment, recommendations.
- E.147 Biological Sciences Short-listing Committee for IBM Research Fellowships
1975-76

Invitation to serve, recommendations.
- E.148 Merton College Junior Research Fellowship 1976

Brief correspondence only.
- E.149 Department of Nuclear Physics Appointments Committee 1976-87

Material on various appointments as research officers, university lecturers
etc. mainly 1976. Phillips was rarely able to attend interview and
appointments meetings and resigned in 1987 from pressure of other
commitments.
- E.150 Biology Board *ad hominem* Readership 1977

Recommendation.
- E.151 Hope Professorship of Zoology 1978

Recommendation.
- E.152 Board of Electors to the George Eastman Visiting Professorship 1979-89

Invitation to serve (to 1984) 1979, renewals (to 1989), 1984 and 1989 (to
1994), recommendations and nominations, Phillips's notes and
correspondence with colleagues.
- E.153, E.154 Biology Board Committee for the University Lectureship in Zoology 1979.

Oxford

- E.153 Arrangements, recommendations, extensive notes by Phillips and others, link with Fellowship at St Hugh's College.
- E.154 Applications.
- E.155, E.156 Board of Electors to the E.P. Abraham Professorship of Chemical Pathology 1979
- E.155 Invitation to serve (to 1983) 1978, details of post, arrangements for meetings 24 April, 6 July 1979, Phillips's notes and correspondence.
- E.156 Applications and information.
- E.157 D.Sc. application 1980.
- E.158 Board of Electors to the Professorship of Biomathematics 1981
Invitation to serve (to 1986) only.
- E.159 Board of Electors to the Readership in Mineralogy 1981
Invitation to serve (to 1986) only.
- E.160 Up-grading recommendation 1982
- E.161 D.Sc. application 1983
- E.162, E.163 Search Committee for Directorship of University Computing Service 1983
- E.162 Invitation to serve, correspondence, Phillips's notes and recommendations about this appointment and also that of Director of the Computing Teaching Centre.

Oxford

- E.163 Applications and information.
- E.164 Junior Research Fellowships, Magdalen and Green Colleges 1984
Recommendations.
- E.165 *Ad hominem* Professorships 1985
Correspondence, recommendations.

Laboratory of Molecular Biophysics

- E.166 Biology Board Review Committee to consider the reappointments of A.C.T. North, C.C.F. Blake and A. Miller. Phillips was the Convenor and the committee met on 2 June 1971 and recommended reappointment as University Lecturers to retiring age.

Brief correspondence, statements of research 1971.
- E.167 Recommendations for ICI Fellowships at LMB 1972.
- E.168 Lecturership in Molecular Biophysics 1972

This was a replacement for A.C.T. North following his appointment to the Chair of Molecular Biophysics at Leeds. L.N. Johnson was appointed. Material includes North's letter of resignation, memoranda by him and other LMB members on their existing research and teaching responsibilities, and suggestions for possible new developments, arrangements with University and college authorities for the appointment, correspondence.
- E.169, E.170 Lecturership in Molecular Biophysics and Official Studentship at Christ Church 1980

This was a replacement for R.E. Offord following his appointment as Professor of Clinical Biochemistry at Geneva. A.R. Rees was appointed.

Material includes arrangements with University and college authorities on financing, advertising and proceeding with appointment, interviews, correspondence. 2 folders. Applications and recommendations at E.170.

Oxford

E.171, E.172

'New Blood' Lecturership in Molecular Biophysics and Fellowship at Hertford 1985

This was one of the posts made available by the special three-year programme of additional science expenditure announced by the DES in November 1982.

Material includes correspondence and memoranda and applications for 1983-84 and 1984-85 as well as the application for a lecturership in Structural Molecular Biology 1985-86 which is the principal topic. Drafts and suggestions for application, description and advertisement of post, arrangements for appointment, correspondence, Phillips's notes. D.I. Stuart was appointed. 2 folders. Applications and recommendations at E.172.

E.173

University Lecturerships 1985

Correspondence and drafts.

SECTION F

PUBLICATIONS

F.1-F.112

F.1-F.46 OWN AND COLLABORATIVE PUBLICATIONS
In chronological order

F.47-F.108 EDITORIAL AND ADVISORY
In alphabetical order

F.109-F.111 ADDENDUM

F.112 LIST OF PHILLIPS'S PUBLICATIONS

The material at F.1-F.46 and F.109-F.111, related to Phillips's own publications, may include drafts, correspondence with colleagues, editors and referees, requests for reprints or permission to quote. It is presented in chronological order of date of publication; correspondence may antedate this by a year or more, and continue for many years later. It is far from adequately covering Phillips's activities as a research scientist; he was usually a reluctant writer, rarely kept documentation after publication, and during his early career at Ottawa and the Royal Institution did not enjoy secretarial backup. His major papers on lysozyme in *Nature* 1965 (F.7) and *Scientific American* 1966 (F.10-F.12) are, however, well documented, particularly the latter which was remarkable in several ways: it presented a major research advance in a non-specialist publication and it was illustrated by hand-drawn diagrams specially commissioned from the artist Irving Geis, giving rise to copyright difficulties in later years. See the note on F.10-F.12. The recurring problem of presenting three-dimensional results on a printed page is frequently addressed in correspondence with colleagues and editors during the 1960s and 1970s and was usually 'solved' at that time by expedients such as red-green diagrams and filter spectacles for the reader.

Also of interest is the extensive material assembled by Phillips for his memoir of Sir Lawrence Bragg written for the Royal Society and published in 1979. This includes information and recollections covering many aspects of Bragg's career, sent by colleagues and not used in full in the final version. See the note on F.25-F.43. An account by Phillips of his work with Bragg at the Royal Institution and the early history of the move to Oxford is at F.44. See also P.28, P.29 for further personal and scientific recollections of Bragg by Phillips and others.

Publications

Phillips was in constant demand as editor, referee or consultant adviser both to established journals and to new publications in specialist fields, and to publishing houses old and new. Though unable to accept many requests to undertake such work, he was actively involved with learned journals in his own line of research. See note to F.47-F.108. The frequent occasions on which he declined similar invitations, some persistent, are partly seen in F.106, F.107.

Publications

OWN AND COLLABORATIVE PUBLICATIONS

- F.1 'The crystal and molecular structures of ephedrine hydrochloride', *Acta cryst.*, **7**, 1954.
- Referees' comments, the second (perhaps by A.J.C. Wilson) very laudatory; also a letter by A.J.C. Wilson referring to Phillips's appointment at the Royal Institution.
- F.2 'The crystallography of acridine Part II. The structure of acridine III', *Acta cryst.*, **9**, 1956.
- Correspondence with editor, referee's comments, corrections.
- F.3 'On the determination of crystal and counter settings for a single-crystal X-ray diffractometer' (with U.W. Arndt), *Acta cryst.*, **10**, 1957.
- Typescript of paper as submitted, correspondence about suitability for publication in *Acta cryst.* or in *J. Scientific Instruments*.
- F.4 'On the adoption of standard symbols for the settings of single-crystal diffractometers' (with U.W. Arndt), *Acta cryst.*, **11**, 1958.
- Typescript of paper as submitted, correspondence.
- F.5 'A wide sweep of human activity on display', *Financial Times*, May 1958.
- Correspondence and proof only.
- This is an article on the Brussels International Exhibition. The British contribution to the International Science Hall, referred to in the article, was organised at the Royal Institution under the direction of W.L. Bragg, Phillips himself playing a major part in the organisation. There is no other documentation for this episode in the collection other than scattered references in the correspondence of the period.

Publications

- F.6 'The crystallography of acridine Part III. The structure of acridine II' (with F.R. Ahmed and W.H. Barnes), *Acta cryst.*, 13, 1960.

This was a continuation of work begun in Ottawa; in his letter of 22 October 1959 Phillips explains 'for the moment I am so deeply involved in protein crystallography and diffractometer development that I have no time to think about it'.

Material includes correspondence, data, drafts and corrections exchanged with colleagues and collaborators 1955-60.

- F.7 'Structure of hen egg white lysozyme ... at 2Å resolution' (in collaboration), *Nature*, 206, 1965.

Phillips's manuscript draft, brief notes and correspondence with *Nature*. Includes carbon of letter to Editor by W.L. Bragg, 6 April 1965, on the importance of the paper:

Dr Phillips in the Davy Faraday Laboratory is sending you a paper on the structure of lysozyme.

This paper is quite an event. It follows the paper by Kendrew on myoglobin and that by Perutz on haemoglobin, which were first published in *Nature*. But while the structure of haemoglobin has never been analysed beyond 5-6Å resolution, and that of myoglobin is still rather uncertain in certain places, this new solution marks a new stage in the x-ray analysis of protein. The Fourier map is so clear that the positions of practically all the atoms are certain. It is a most interesting structure in itself, and also interesting because Phillips and his colleagues have found out where the inhibitors are attached to the enzyme.

It is a long paper for *Nature*, but in my opinion, in view of its importance, it is very desirable to publish the work in this rather full detail at this stage. The word has gone round that a third protein has been analysed and very great interest has already been taken in the results. I hope therefore that you can find a place in *Nature* for this paper.

Yours very sincerely,

Also included here are requests for reprints, permission to use material or figures in books or articles etc., various dates 1967-86.

- F.8 'Advances in protein crystallography', in *Advances in structure research by diffraction methods*, 2, 1966.

Contract, correspondence with publishers and colleagues 1962-66, corrected proof. Phillips submitted his article in May 1964 and there was considerable publication delay.

Publications

- F.9 Review of H.R. Wilson: *Diffraction of x-rays by proteins, nucleic acids and viruses*, in *Transactions of the Faraday Society*, September 1966.
- Correspondence and draft of review. Phillips wrote very few book reviews (see also F.13).
- F.10-F.12 'The three-dimensional structure of an enzyme molecule', *Scientific American*, 215, 1966.
- This is perhaps the single most influential of Phillips's publications. It diffused among a wide public information about the scientific techniques required for the lysozyme study, the problems of protein folding and interaction and the mechanisms of enzyme activity. The difficulty of illustrating the three-dimensional molecule was solved in this case by the talents of the artist I. Geis who spent a week in the Royal Institution studying and drawing direct from the model, and subsequently producing paintings for reproduction.
- The article, which appeared in November 1966, was immediately popular. W.H. Freeman (publishers for *Scientific American*) added it to their reprint series and republished it in collections in book form for many years. Phillips himself received many requests for reprints, or for permission to reproduce material; because the illustrations were based on original specially commissioned paintings, however, permission had to be sought from the publisher and was not normally granted. In addition to the requests at F.12, several correspondence files in Section P include some reference to the matter; see especially exchanges with I. Geis (P.85) and J. Glusker (P.86).
- F.10 Phillips's plan and typescript for article (originally under the title 'How Fleming's lysozyme works'), two proof drawings.
- F.11 Correspondence June 1965 - May 1967 with editors and publishers, and later information 1967-75 on reprint and collected publication. Includes invitation to write, arrangements for illustrations, copy of draft with comments by A.C.T. North, proof with corrections by Phillips.
- F.12 Requests to reproduce material or diagrams 1966-88.
- F.13 Review of G.V. Gurskaya: *The molecular structure of amino acids*, in *Quarterly Review of Biology*, 1968.
- Correspondence only.

Publications

- F.14 'X-ray studies of crystalline proteins', in *Progress in Physics and Molecular Biology*. 19, 1969 (with A.C.T. North).
- This was a review article originally commissioned for Volume 18 (1967) but was not finished in time.
- Correspondence 1966-69 with editors, colleagues and publisher (Pergamon Press), including invitation to write, ideas and permissions from colleagues, suggestions for later volumes in the series.
- F.15 'Vertebrate enzymes' (in collaboration), in *The Enzymes*, Vol.VII, 1972.
- The chapter was originally intended for Volume III, then deferred to Volume V (1970) and finally appeared in Volume VII (1972).
- Correspondence 1968-74 with editor, collaborators and publisher (Academic Press). The problem of colour printing for the stereo diagrams is also discussed.
- F.16, F.17 'Protein Structure' (with A.C.T. North). This was first published by OUP in 1973 as one of the Oxford Biology Readers series. From 1976 control of the series was passed to Carolina Biological Supply Company distributed in UK by Packard Publishing. The series editor was J.J. Head.
- The Reader, which had several reprints and revisions, was published with red-green stereo diagrams and viewing spectacles.
- F.16 Correspondence and papers 1970-74, with editor, collaborator and publisher, including negotiations, contract, draft text and comments, colour-printing for diagrams.
- F.17 Correspondence and papers 1976-89, on new revisions, editions, contracts.
- F.18-F.20 'Structure of chicken muscle triose phosphate isomerase determined crystallographically at 2.5Å resolution using amino acid sequence data' (in collaboration). *Nature*, 255, 1975.
- F.18 Phillips's heavily-revised manuscript and typescript drafts.

Publications

- F.19 Correspondence with collaborators and colleagues, with comments on the draft paper.
- F.20 Editorial correspondence, revisions to accommodate referee's comment.

See also G.153 for a meeting in Cambridge 9 April 1975 when Phillips first announced the structure.
- F.21 'On the protein crystal chemistry of chloroplatinite ions: general principles and interactions with triose phosphate isomerase' (in collaboration). *J. mol. Biol.* **120**, 1978.

Corrected draft, brief correspondence.
- F.22 'Preliminary crystallographic data for β -lactamase I from *Bacillus cereus* 569' (in collaboration). *J. mol. Biol.*, **120**, 1978.

Drafts, brief correspondence.
- F.23 'Lysozyme', in *Encyclopaedia of Chemistry*, VII, Utet Sansoni Edizioni Scientifiche (USES), 1978.

Correspondence 1970-78, contract, drafts.
- F.24 'Dynamic information from protein crystallography: an analysis of temperature factors from refinement of the hen egg-white lysozyme structure' (in collaboration). *J. mol. Biol.*, **130**, 1979.

Correspondence with collaborators and with journal, referee's comments, revised paper.
- F.25-F.43 William Lawrence Bragg 1890-1971, *Biographical Memoirs of Fellows of the Royal Society*, **25**, 1979.

Bragg died in July 1971 and in October Phillips was invited by the Royal Society to prepare a Biographical Memoir. He made clear that he could not undertake to complete the task for the original deadline for publication in the 1972 volume; in the event, his memoir - a major account occupying 70 large-format printed pages - did not appear until 1979.

Publications

Many factors, in addition to the principal one of Phillips's multiple commitments, contributed to this considerable delay. There were practical difficulties in compiling a full accurate bibliography; several publications were out of print, many additions and corrections had to be made to the existing lists, and there was the further problem of dealing with Bragg's numerous contributions to radio and TV. These were omitted from the published memoir but there is a list included with other bibliographical notes and enquiries at F.31. Bragg's long career had included several sensitive episodes on both a personal and public level - among others, his relationship with his father W.H. Bragg, his early difficulties as professor at Manchester University and the stormy events at the Royal Institution preceding his appointment as Resident Professor in 1953 (Director 1965). There was need to deal with these, as well as all the other aspects of his career, in a way which would satisfy both accuracy and discretion and could be approved by colleagues and by the members of the Bragg family, some of whom were themselves actively involved in publication projects. There were also the many relatively routine enquiries to establish facts and dates of various events, some of which led to reminiscences and recollections not incorporated in the final version. In this respect the correspondence and comment folders at F.33-F.43 are of some interest.

Phillips's drafts and notes

- | | |
|------------|---|
| F.25 | First manuscript draft, n.d. |
| | |
| F.26, F.27 | Typescript drafts of 20 and 27 May 1979, with manuscript corrections in red ink (not identical), and some revisions based on comments received. |
| | |
| F.28 | Blue notebook of 'Bragg notes'. |
| | |
| F.29 | Red notebook of 'Bragg notes'. |
| | NB. A notebook at C.28 contains some additional notes and drafts on Bragg as well as scientific material. |
| | |
| F.30 | Miscellaneous bundles of notes, information and drafts. |
| | |
| F.31 | Correspondence and information from publishers, librarians, BBC on Bragg's publications. Includes list of radio and TV contributions. |

Publications

- F.32 Information and documentation on various periods of Bragg's career, assembled by Phillips. Some photocopied material, but also includes some original letters, and manuscripts of a speech (1967) and article (n.d.) by Bragg.

Correspondence and comments

- F.33 Correspondence with Royal Society 1971-79.
- F.34 Correspondence, information, comments from the Bragg family (few letters dated).
- F.35 Correspondence with H. Lipson, 1972, 1978-9, including draft accounts by Lipson of Bragg's period at Manchester and comments on parts of Phillips's drafts. Also includes comments and criticisms from W.H. Taylor.
- F.36 Correspondence and comments from colleagues on drafts or sections of memoir. In alphabetical order.
- F.37 Thanks for copies of completed memoir. In alphabetical order.

Information requested and supplied

This covers all aspects and periods of Bragg's career. In alphabetical order of individual or institution.

- F.38 A-C
- F.39 D-F
- F.40 L-P

Publications

- | | |
|------|--|
| F.41 | R-T |
| F.42 | W |
| F.43 | Miscellaneous, and no reply. |
| F.44 | <p>'Dorothy Hodgkin and molecular biophysics in Oxford: a fragment of personal history', in <i>Structural studies on molecules of biological interest</i>, OUP 1981.</p> <p>The volume was prepared to commemorate Dorothy Hodgkin's official retirement in 1977. The editors were G.G. Dodson, J.P. Glusker and D. Sayre. Phillips gave his official recommendation of the publication to OUP (10 April 1978).</p> <p>Correspondence 1978-80 with editors, colleagues and publishers, list of contributors, drafts of contributions by Phillips and others.</p> |
| F.45 | <p>'Protein Engineering', University of Wales <i>Science and Technology Review</i>, 1, 1987.</p> <p>Correspondence 1986-87, draft of article.</p> |
| F.46 | <p>'William Lawrence Bragg' <i>DNB</i> 1970-79, 1987.</p> <p>Correspondence 1983-85, draft of article, comments.</p> |

EDITORIAL AND ADVISORY

The material, in alphabetical order, consists of correspondence and papers exchanged with editors, authors and publishing houses. Some are relatively brief in date and scope, others cover a long period and may concern matters of publishing policy as well as advice on books or papers submitted for publication. Specialist journals with which Phillips had a long connection as contributor, editor or consultant include *Acta cryst.*, *Biochemistry*, *EMBO Journal*, *J. mol. Biol.* Publishing houses with which he was similarly involved on a long-term basis include IRL Press, Medical & Technical Publishing Co., OUP.

Publications

- F.47 Academic Press 1964-86
- Invitations to write books or articles, comments and advice on projects.
- F.48 *Accounts of Chemical Research* 1970-72, 1984, 1989
- Phillips promised an article in 1970 but was unable to complete it.
- F.49, F.50 *Acta Crystallographica* 1957-87
- Extensive correspondence on papers submitted for publication and referred to Phillips, requests to review, advice on new publications. Includes a little correspondence with colleagues.
- F.49 1957-69
- F.50 1970-87
- F.51 Addison-Wesley Publishing Company 1982
- Proposed *Biophysical Techniques* series.
- F.52 Adenine Press 1985
- Comments on new journal.
- F.53 *Archives of Biochemistry and Biophysics* 1972-73
- Comments on papers submitted.
- F.54, F.55 *Biochemistry* 1969-90
- Phillips regularly refereed papers for the journal (ed. H. Neurath) and in 1983 joined the Editorial Advisory Board (with effect from January 1984), participating in policy decisions as well as continuing to advise in the field of x-ray crystallography.

Publications

- F.54 1969-70, 1976-82.
- F.55 1983-90. Includes papers and minutes of meetings of Editorial Advisory Board, comments on papers, report by 'Task Force' set up to monitor *Biochemistry*, discussion of problem of deposition of x-ray data and other affairs of the journal.
- F.56 *Biochimica et Biophysica Acta* 1967, 1970-71, 1975

Comments on papers submitted.
- F.57 *Biochimie* 1974

Comments on paper submitted.
- F.58 Blackwells Scientific Publications 1969-76

Advice on books and authors.

Requests for Phillips to write textbooks.
- F.59 British Association *Link-up* 1984-86

This was a journal started by the British Association as 'part of the initiative to bridge the gap between science, in the widest definition of that term, and industry'. It was launched in the House of Lords on 21 March 1984 and Phillips was invited to join the Editorial Advisory Board on 10 April by the Chairman (F.C. Dainton).

The journal, published four times a year from September 1984, was distributed free to a relatively narrow circulation list and lost money for the publishers Home & Law (Scientific Publications) Limited. Ownership of the company was transferred to Mark Allen Publishing Ltd in June 1986; his plans to expand the frequency of publication, introduce a subscription fee and other editorial decisions led to representations from the existing staff and administrators of *Link-up* and to emergency meetings of the editorial board on 2 and 29 July 1986. Legal action was necessary to terminate the agreement between the BA and the publisher, the matter being settled out of court in December 1986.

Material includes correspondence and papers, editorial board meetings, publishing programme, suggestions for articles and authors, comments on journal.

F.60	<i>British Medical Bulletin</i> 1976
	Advice on topics.
F.61	Cambridge University Press 1973, 1979, 1982
	Advice on proposed publications.
F.62	<i>Catalysis Letters</i> 1987-90
	This was a new rapid communication journal. Phillips accepted an invitation from J.M. Thomas, one of the editors-in-chief, to serve on the editorial board. He resigned in April 1990.
	Brief correspondence and information.
F.63	Chapman & Hall Ltd. 1977, 1988-89
	Advice on proposed publications.
F.64	<i>Comprehensive Biochemistry</i> 1983-84
	Advice on authors and topics.
F.65	<i>Computer Physics Communications</i> 1981
	Advice on specialist editors.
F.66	CRC Press 1970, 1973-78, 1984, 1990 (A division of the Chemical Rubber Company)
	Invitations to write or edit volumes (declined), advice on material for <i>Handbook of Biochemistry and Molecular Biology</i> (ed. G.D. Fasman) for which Phillips served on Advisory Board, comment on papers submitted for publication.

Publications

- F.67 *Current Opinion in Structural Biology* 1989-90
- Invitation (accepted) to join Editorial Board of this new bi-monthly review journal.
- F.68 The *Daily Telegraph* Young Science Writer Awards 1988-93
- Invitations to act as one of the judges, information, arrangements, Phillips's assessments, correspondence arising.
- F.69 Elsevier/Associated Scientific Publishers (ASP) 1975-76, 1981
- Mainly correspondence, proposals and comments on monographs for *Frontiers of Biology* series; Phillips served on the Advisory Board. The company decided to discontinue the series in June 1976. Also included are invitations (declined) to write.
- F.70 *EMBO Journal* 1982-86, 1991
- Published monthly for the European Molecular Biology Organization by IRL Press.
- Recommendations of papers submitted to the Journal by Phillips (not all dated), correspondence 1991 on deposition of crystallographic data.
- F.71 *FEBS Letters* 1968, 1979-80
- Comments on papers submitted.
- F.72 IRL Press (Information Retrieval Limited) 1984-88
- Information Retrieval Limited was founded as an Abstracts publishing business in 1965 in UK and sold to an American scientific publisher in 1981, but the primary journal publishing activity remained in UK, based from 1982 in Eynsham, Oxford. (See obituary notice of founder A.G. Woolcott, 15 September 1986). IRL published a large number of journals (including *EMBO Journal* and *Protein Engineering*, qqv), books, software and conference proceedings; it was taken over by OUP in August 1988.
- Phillips was invited to join the Advisory Panel in June 1984, and the Editorial Board of *Protein Engineering* in March 1986. He resigned from pressure of other commitments in May 1988.

Publications

Material includes correspondence, notices, information and minutes of meetings and discussions (including US panel meeting), advice and comments, publication plans and progress, conducted mainly with E.M. Coast (Editorial Director) but also with colleagues.

F.73 Institute of Physics 1975, 1977, 1979

Correspondence etc. on various publications of the Institute: invitation (declined) to join editorial Board for *Physics in Medicine & Biology* 1975; comments on review article for *Reports on Progress in Physics* 1977; comments on article for *physics today* 1979.

F.74 *Interdisciplinary Science Reviews (ISR)* 1975-92

The enterprise was set up in 1975, to begin publication from 1976. The Editor was A.R. Michaelis with a Consultant (P.J. Farago) and an international editorial board on which Phillips served from its inception.

The journal's original publishers Heydon & Son were taken over from May 1982 by Wiley & Sons who ceased publication of ISR at the end of 1983. It was then transferred to J.W. Arrowsmith of Bristol, who in turn ceased publication in February 1990 and put the journal up for auction. It was subsequently published by the Institute of Metals.

Material includes arrangements for editorial meetings and dinners, comments on proposed articles, general correspondence on the progress and fortunes of the journal, with editors and colleagues.

F.75 *JANIS (Journalists' Auxiliary Information Service)* 1973

F.76 *Journal of the American Chemical Society* 1973

F.77 *Journal of Applied Crystallography* 1977

F.78 *Journal of Cell Science* 1972-76

Phillips served on the editorial board 1972-75 and refereed papers.

Publications

F.79-F.81 *Journal of Molecular Biology* 1962-83

Phillips refereed papers for the journal from 1962. He was invited to join the editorial board in December 1965, his appointment being renewed in September 1968, December 1971 and August 1975. He resigned as editor with effect from December 1976 on his appointment as Biological Secretary of the Royal Society, but continued to referee papers submitted to him for comment.

Correspondence, exchanged principally with the Editor-in-Chief (J.C. Kendrew) but also with colleagues and the publisher (Academic Press), includes policy and procedures, publication delays, membership of the editorial board, comments on papers.

A notebook of Phillips's expenses for *J. mol. Biol.* is at B.48.

F.79 1962-73.

F.80 Research and publications on triclinic lysozyme submitted to *J. mol. Biol.*, 1971, 1974-75.

F.81 1974-83.

F.82 *Journal of Theoretical Biology* 1972-77

Phillips refereed papers for the journal from 1972. He was invited to join the advisory board in May 1975 and resigned in May 1976 on his appointment as Biological Secretary of the Royal Society. His successor on the advisory board was K. Dalziel who had often supplied comments on papers.

Correspondence principally with the editors, L. Wolpert and J.F. Danielli.

F.83 McGraw-Hill Book Company 1962-76

Correspondence etc. on proposed book 'X-ray diffraction of crystals of macromolecules', to be written by Phillips and D.W. Green. The contract was signed in May 1963 but after various delays the agreement was cancelled in 1976.

Publications

F.84-F.87

Medical and Technical Publishing Co. Ltd. (MTP) 1970-80

The company published biennial International Reviews of various scientific disciplines. Apart from a little correspondence about an article by Phillips and collaborators for the chemistry series (F.84), the bulk of the material here relates to the period from 1971 when he and H.L. Kornberg accepted an invitation to act as consultant editors for the 12-volume biochemistry series of the International Review. They were to be responsible for determining the overall scope and pattern of the series, and to approach editors for each constituent volume.

F.84

Correspondence 1970-71 on a chapter on protein crystallography for International Review of Chemistry (contributed by L.N. Johnson and T.L. Blundell).

F.85

May 1971 - December 1975

Correspondence principally with co-editor and publishers, contracts, plans for the biochemistry series, recruitment of editors and correspondence arising, draft proposals for each volume of series, housestyle and presentation.

F.86

February 1975 - March 1979

Correspondence on 'Series II' of International Review of Biochemistry. Similar material to F.85, but including changes of editorship and publisher.

F.87

July-November 1979

Correspondence with University Park Press on plans and changes for continuing series, including Memorandum of Agreement signed 14 March 1980.

F.88-F.92A

National Academy of Sciences (USA) 1967, 1976, 1986-90

Correspondence etc. on papers submitted by Phillips for publication in the Academy's Proceedings, on his own behalf, or (especially after his election as Corresponding Member in 1986) on behalf of colleagues. Includes referees' reports and comments, and a little authorial and editorial correspondence.

Publications

F.88

1967, 1976, 1986

Papers by or refereed by Phillips, for publication in PNAS.

F.89-F.92A

1986-92

Papers by colleagues submitted to Phillips for publication in PNAS, with comments, revisions and correspondence arising. 5 folders.

F.93

Nature 1966-77, 1983, 1986

Correspondence and comments on papers submitted by Phillips for publication or sent to him to referee; also requests for Phillips to write reviews or articles for the journal, and a little material on journal policy.

F.94

nature america 1982-84

Correspondence, invitation to join Advisory Board, on proposed Encyclopedia of the Life Sciences. Includes correspondence on similar project with Cambridge University Press.

F.95-F.97

Oxford University Press (OUP) 1967-92

Officials of the Press consulted Phillips regularly throughout his period in Oxford for advice on proposed monographs, series or journals for possible publication, as well as pressing him to write for them himself, or to allow them to publish lectures or papers delivered elsewhere, notably the Royal Institution Christmas Lectures of 1980-81. Of these initiatives, the most successful was *Protein Structure* by Phillips and A.C.T. North published in the Oxford Biology Readers series (F.16, F.17). The most ambitious project, however, was the 'Protein Atlas', first mooted in 1968 by Phillips and F.M. Richards who subsequently became joint overall editors. The 'Atlas' envisaged a compendium on the structures of globular proteins, to be published in several volumes each under individual expert authorship. Two volumes only were published, under the series title 'Atlas of Molecular Structures in Biology'; these were *Ribonuclease - S* by F.M. Richards and H.W. Wyckoff (1973) and *Haemoglobin and Myoglobin* by M.F. Perutz and G. Fermi (1981). Phillips was to have contributed the volume on *Lysozyme* but this was never completed. Phillips's manuscript note on the original file cover reads "A largely abortive project with FMR - because of my procrastination". The project was finally wound up in 1992.

Material at F.95, F.96 comprises quite a full account of the project from its origin in 1968. It includes early proposals, funding and publishing ideas,

Publications

negotiations and correspondence with colleagues and especially with F.M. Richards, discussion of the stereo-diagram two-colour printing problem, and other matters relating to the published and projected volumes.

Reference should also be made to the correspondence for the relevant period with Richards at P.220-P.224.

F.95 Atlas project. Correspondence and papers 4 June 1968 - 23 December 1970.

Early proposals and outlines, negotiations with OUP, Richards's application for support from National Science Foundation, requests for support and information from colleagues, draft plan submitted for comment and criticism to members of the scientific community in USA, UK and Europe July-November 1970, and their replies, some with detailed suggestions October-December 1970.

F.96 Atlas project. Correspondence and papers 15 January 1971 - 1 October 1984, 1990-92. Continuing correspondence, consultations and negotiations with colleagues and publisher, invitations to authors, printing and publishing difficulties.

Phillips's letter of 2 April 1971 contains full information on proposed list of volumes and authors in series, format and paging, and also change of title from 'Atlas of Protein Structure' to 'Atlas for Molecular Biology'. Correspondence April-May 1975 deals with revised proposals and authors. Correspondence 1992 is on the discontinuation of the project.

F.97 Correspondence, information and comments June 1967 - December 1989 on various proposed books, series and journals, and on the general affairs of the Press.

F.98 Pergamon Press Ltd. 1975-79, 1987

Advice on proposed publications.

F.99 *Physiological Reviews* 1969-73

Mainly requests for an article from Phillips; also comments on a manuscript.

Publications

- F.100 Pitman Publishing 1975-76, 1984
- Correspondence on Pitman Advanced Publishing Programme, visits, requests (declined) to Phillips to join editorial boards.
- F.101 *Progress in Biophysics and Molecular Biology* 1971, 1976, 1977
- Comments on articles, suggestions for authors and editors.
- F.102 *Protein Engineering* 1985-87
- Phillips was on the editorial board of the journal (published by IRL Press q.v.) from its inception in December 1985. The Editors were G.A. Petsko and A.R. Rees.
- General correspondence with editors on journal, composition of editorial board.
- F.103 Science and Technology in Europe 1984-85, 1988
- Information on a proposed book of this title (General editor: Nigel Calder) and request to Phillips to act as 'prime consultant'. Also brief later correspondence on 'Foundation Scientific Europe'.
- F.104 *Scientific American* 1975-85
- Visits, advice on proposed publications.
- F.104A *South African Journal of Science* 1990
- Comments on article, brief correspondence.
- F.105 Wiley & Sons Ltd. 1969-70
- Various publication proposals.
- F.106 Requests to write books, articles, chapters, reviews, introductions and forewords, from publishers and colleagues, some renewed over a period of years. Declined or deferred. 1965-91.

Publications

F.107 Invitations to serve on editorial or advisory boards of journals. Declined. 1969-85.

F.108 Miscellaneous comments on papers and articles. 1965-79.

ADDENDUM

Material received too late for inclusion in the main sequence.

F.109 'α-Lactalbumin possesses a novel calcium binding loop.' Collaborative paper published in *Nature*, 324, 1986.

Draft, with a few corrections by Phillips, referee's report (by R.H. Kretsinger), minor correspondence.

F.110 'Crystallographic studies of the activity of β-lactamases from *B. cereus*.' Collaborative paper published with slight change of title in *Pure and appl. Chem.*, 59, 1987.

Phillips's manuscript draft.

F.111 'Crystals of HIV Reverse Transcriptase - preliminary X-ray crystallographic studies.' Collaborative paper.

Draft, brief correspondence.

LIST OF PUBLICATIONS

F.112 List compiled by Phillips. Received February 1994.