

‘I have been very fortunate...’.
Brief report on the BSHS Oral History Project:
‘The history of science in Britain, 1945–65’

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The Oral History Project of the British Society for the History of Science (BSHS) ended on 10 July 1998, after almost nine months’ duration. Twenty-nine interviews are now available on fifty-eight tapes and in transcript – not all, but nearly all of them on open access for scholars. With this oral history project, the BSHS commemorates its fiftieth anniversary. In particular it pays tribute to the field in the decades 1945–65, during which the historical, philosophical and sociological study of science and technology expanded in an unprecedented way, not least of all in higher education. Who were the individuals involved in this expansion, what factors contributed to its coming about, what purposes did the subject serve, what changes did it undergo, what audiences and functions had the BSHS, how was the process of expansion situated within the larger cultural and political context of the time and did it reflect that context? The project sought to explore these and similar questions.

The project’s purpose was to gather material which would otherwise go unrecorded, and thus to create an archival resource for future research, consisting of the interviews (on tape and in transcript), returned questionnaires and any material (biographical or other) received in the course of this project.¹ The intended status of the interviews as source material (not as publications) determined their format from the outset and automatically settled a number of issues: since the idea was to safeguard the collective memory of the group of people who witnessed or actively contributed to the making of the field, the actors’ own categories had priority. Accordingly, while there exists a list of questions and themes to be explored during the meetings, themes which were established by discussion

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¹ The Oral History Project and all appended material have been deposited in the BSHS Archive in the Science Museum Library, London (advance notice of two or three days is recommended). Since access to some of the material is restricted, those wishing to use the archive should first consult Jon Topham, or any subsequent BSHS Archive officer. Permission must be sought from the Society to copy or publish material from the collection. If the copyright for the material in question is not with the Society, the permission of the interviewee must be sought.

with the BSHS Oral History Project steering committee, my role largely consisted in prompting those interviewed, rather than getting through a routine set of questions. Further, since access to the recorded material formed a top priority, it was always a primary goal to secure the copyright for the recordings for the BSHS. Those interviewed retained control over what material entered the archive from the first contact right up to the point of deposition,² and the content of the recorded interviews is thus largely governed by what those interviewed consented to. At request, specified passages have been removed from the transcripts and put on restricted access,³ and in one case we returned the recordings. The intended function of the oral history archive as a resource, however, also put a limit on interviewees' control over the material: while additions in the form of either footnotes or appendices have been incorporated, transcripts have not been revised. They retain a somewhat 'raw' quality (the spoken word in transcript reads nothing like an ordinary text!) but they are a reasonably accurate record of what went on at the time the recordings were made.

There were obvious restrictions on the sample. In order to be able to relate first-hand experience from the decades prior to 1965, every 'tapee'⁴ had to be born prior to 1940. Several people who would have been able to contribute a great deal to this oral history project have unfortunately passed away. A number of others now live abroad and were not visiting the UK while the project was running. Many have lost contact with the field and I was unable to track them down in time. To some extent, therefore, the sample was self-selecting and soon consisted chiefly of those who 'made' or 'carried' the subject through some crucial decades. Of these, some declined to be interviewed for reasons personal, philosophical or other. Thirty, however, participated in the enterprise to the very end, and my thanks hence extend from the youngest (Niall Martin, b. 1939) to the oldest (Margaret Rowbottom, b. 1908) and to all those in between (in alphabetical order): David Allen, Asa Briggs, Bill Brock, Angus Buchanan, Maurice Crosland, Alistair Duncan, David Edge, Kathleen Farrar, Robert Fox, Frank Greenaway, Rupert Hall and Marie Boas Hall, Mary Hesse, Michael Hoskin, Alex Keller, David Knight, Stephen Mason, Jack Meadows, Jack Morrell, Arnold Pacey, Piyo Rattansi, Jerry Ravetz, Martin Rudwick, Colin Russell, Stephen Toulmin, Gerard L'Estrange Turner, Charles Webster and Bob Young. As the project went on, the list of potential interviewees increased, regrettably beyond what was manageable, and so there are a number of people missing whom I would very much have wanted to include, such as June Goodfield, Lt. Cdr. Waters, David Bryden, Richard Hills, Ted Caldin, Nancy Underwood and more.

For the report that follows, I have used material from the interviews themselves and from the set of questionnaires that formed part of this project. For the concluding section I have also drawn on my own research into the genesis of history and philosophy of science in Britain and its cultural and political context.⁵ One of the things missing from the report

2 Note that those who have not signed a copyright form still retain complete control of access.

3 This means that the tapes in question are off-limits until the date stipulated by the narrator on the copyright release form.

4 The coinage is Jack Morrell's.

5 See also A.-K. Mayer, 'Moralizing science: the uses of science's past in national education in the 1920s', *BJHS* (1997), 30, 51–70.

below, however, is a detailed assessment of how the ‘tapes’ and their peers contributed to the field. While I have not attempted here an assessment of the historiographical developments in the period in question, or of the everyday life of a historian or philosopher of science at the time, the recordings can undoubtedly be used to develop a better understanding of what counted as the content of the subject and what counted as proper research questions (in other words, of what was taught, and what was written).

One last observation: when going over the recordings, I was very much struck by the idiosyncratic integrity of these interviews, and while the data collected in this project suggest certain prosopographical generalizations, there is no escaping the particularity of the attitudes and careers of those interviewed. Any future use of the material should acknowledge and respect this integrity, bearing in mind that, as David Lowenthal reminds us, memories ‘are not ready-made reflections of the past, but eclectic, selective reconstructions based on subsequent actions and perceptions and on everchanging codes by which we delineate, symbolize, and classify the world around us’.⁶

DEGREES

What are the educational backgrounds of the thirty who went on record? With one exception,⁷ all of the above did at least their postgraduate work in the UK. Of the twenty-seven who took their first degree here, eight read chemistry, five physics, four history; seven of the remaining ten graduated in maths or a science or several sciences, three hold a first degree in anthropology or politics and economics. That is, in terms of the arts–science divide, twenty-one out of twenty-seven (over 75%) have a science background, and eight⁸ (just under a third) one in the arts or in the social sciences.⁹ Eight took their first degree in Cambridge, a further eight in London, six in Oxford, and the remaining five went to Nottingham, Birmingham, Edinburgh and Hull. That is, over half of them went to Oxbridge, and more than three-quarters of them graduated from the ‘golden triangle’.

Twenty-nine of the overall thirty went on to do further degrees. Over half took an extra B.A., B.Sc., M.Sc., M.A., and/or Diploma after their first degree, eleven of them in London, the rest in Leicester, Nottingham, Oxford, Radcliffe College and Rochester, NY. Of these further degrees, nine (over 40%) were in the history or philosophy of science, two each were in chemistry and physics, the rest in maths, medicine, general science, English, education and economics and social sciences.¹⁰ Further, twenty-one (over two-thirds) of the thirty took a Ph.D. or D.Phil. before they reached the age of 35,¹¹ nine of them in Cambridge, five in London, four in Oxford and one each in Nottingham, Cornell and

⁶ David Lowenthal, *The Past is a Foreign Country*, Cambridge, 1985, 210.

⁷ Marie Boas Hall took her first degree and her M.A. at Radcliffe College, Massachusetts, and her Ph.D. at Cornell.

⁸ Jack Morrell took a second degree in English Literature after his degree in chemistry. Alistair Duncan followed his Oxford Philosophy, Politics and Economics degree with a London External Degree in science.

⁹ Extended to the whole project, four-fifths have a background in science and a third in the arts. To reiterate this, some have one in both.

¹⁰ Margaret Rowbottom took an extra B.Sc. special in physics, as well as an M.Sc. (both in London).

¹¹ I am not counting here honorary D.Phil.s or doctorates awarded later in a person’s career.

Leicester. Of these degrees, ten were in the history of science, three in physics, two each in history and maths, and one each in chemistry, astronomy, palaeontology and philosophy. Thus over 40% of Ph.D.s were taken in Cambridge, over 60% in Oxbridge, and over 85% in the golden triangle, and almost half of them were in the history of science. Only one of the twenty-nine who took degrees in the UK obtained none of them from either Oxford, Cambridge or London; nineteen of the twenty-nine (two-thirds) have either a first degree or a postgraduate degree from Oxbridge; and eight of the twenty-nine took an M.Sc. and/or a Ph.D. at the Department for the History and Philosophy of Science at University College, London (UCL).

What is striking about these data? Almost all of those interviewed for this project have been educated in the South of England at some stage in their career. The overwhelming majority have a science background. A significant portion have been educated at Oxbridge. A third attended the part-time course at the History and Philosophy of Science department at UCL, the oldest department of its kind in the UK. Moreover, since the requirements for state scholarships or college grants for postgraduate studies were high indeed, and a substantial portion of those who went for such degrees did so on grant money, they must have done extremely well in their first degree (so much for the old wives' tale that historians of science recruit themselves from the ranks of failed scientists). Finally, the accumulation of degrees is itself striking. In short, those interviewed continued to acquire further formal qualifications, often in fields different from those they had initially chosen. Frequently they left behind occupations for which they were fully or more than fully qualified, and embarked on what at the time looked an exotic and potentially risky career path.

THE CENTRES

The participants in this project did not merely move between careers, they were also geographically rather mobile. While this makes it extremely difficult to represent graphically some of the information collected during this project, certain clusters clearly do emerge.¹² To begin with, there were institutions, such as the departments at UCL and Cambridge, which channelled their forces into setting up a degree structure (undergraduate and/or postgraduate) in the new subject.¹³

12 In the following text, I am not considering the Society for the History of Alchemy and Early Chemistry, which was founded as early as 1936. For a historical account, see W. A. Smeaton, 'The Society's first fifty years: Part I – Ambix; Part II – Members and meetings', in *Ambix* (1987), 34, 1–4, 57–61. Nor am I considering the formal connections that participants held with the British Society for the History of Science; for this, see J. Browne, 'Officers and council members of the BSHS, 1947–97', *BJHS* (1997), 30, 77–89.

13 For the history of the UCL department, see W. A. Smeaton, 'History of science at University College, London, 1919–1947', *BJHS* (1997), 30, 25–46; W. J. M. S. Sherratt, 'History of Science in Education: an investigation into the role and use of historical ideas and material in education with particular reference to science education in the English secondary school since the 19th century', Ph.D. thesis, University of Leicester, 1980. See also Mayer, op. cit. (5). For developments at Cambridge see G. Buchdahl, 'Twenty-five years of History and Philosophy of Science at Cambridge', *Cambridge Review*, December 1989, 167–71; A. R. Hall, 'Beginnings in Cambridge', *Isis* (1984), 25, 25–8, and 'On Whiggism', *History of Science* (1983), 21, 45–58; Mary Hesse, 'History and Philosophy of Science in the early Natural Sciences Tripos', *Cambridge Review*, 24 November 1962, 140–5. See also Scott Mandelbrote, 'Interview with A. Rupert Hall', *Metascience* (1994), 3, 64–84.

The names associated with these sites are (*italics indicate interviewees*) as follows. For UCL: Herbert Dingle,¹⁴ Douglas McKie,¹⁵ Alistair Crombie, *Mary Hesse*, John Wilkie, Niels Heathcote,¹⁶ Angus Armitage,¹⁷ Bill Smeaton, R. Bradshaw,¹⁸ Larry Laudan,¹⁹ Paul Feyerabend, Nicholas Maxwell, *Piyo Rattansi*, and others.²⁰ In the late 1960s, the department at UCL joined forces with members of other London institutions (such as the London School of Economics, Imperial College, Chelsea College and the Warburg Institute) to set up the ‘Intercollegiate Course in the History of Science, Medicine and Technology, and the Philosophy of Science’. In 1968–9, lecturers in this course included such notables as Karl Popper, Imre Lakatos, A. I. Sabra, Elie Zahar, Moshe Machover and many others.²¹ At Cambridge, the list of those associated with the nascent programme initially included Joseph Needham, Herbert Butterfield, Michael Postan, Charles Earle Raven, Hugh Hamshaw Thomas, Sam Lilley, Jean Lindsay, Basil Willey and Richard Braithwaite, while in the 1950s and 1960s the field increasingly belonged to *A. R. Hall*, N. R. Hanson, Gerd Buchdahl, *Mary Hesse*, *Michael Hoskin*, *Bob Young*, *Piyo Rattansi*, *Martin Rudwick* and so on. Rattansi’s name crops up again here due to his role in the intellectual history seminar at King’s College, Cambridge, which he organized with Young in 1968/9, and whose regulars and guests included Quentin Skinner, John Dunn, a very young Roy Porter, *Charles Webster*, Martin Rudwick, Joseph Needham, Ernst Gombrich, Frances Yates, D. P. Walker and many more.

Among the centres where history and philosophy of science (HPS) was on the lecture list, but where less emphasis was placed on building up a degree specifically in HPS, were Oxford,²² Leeds, Leicester and Manchester. Oxford names include those associated more with curatorial work in the museum – F. Sherwood Taylor,²³ Kurt Josten, Francis Maddison, *Gerard Turner* – and lecturers and researchers who tended to be associated

14 W. A. Smeaton, ‘Herbert Dingle’, *BJHS* (1979), 12, 242–3. While he held the Chair in Philosophy of Science, Dingle continued to engage in scientific debates. See, for example, Hasok Chang, ‘A misunderstood rebellion: the twin-paradox and Herbert Dingle’s vision of science’, *Studies in the History and Philosophy of Science* (1994), 24, 741–90; Ian McCausland, *The Dingle Affair: an Unresolved Scientific Controversy*, Toronto, 1977.

15 W. A. Smeaton, ‘Douglas McKie’, *Annals of Science* (1968), 24, 1–5.

16 W. A. Smeaton, ‘Niels de V. Heathcote’, *BJHS* (1987), 20, 350–1.

17 W. A. Smeaton, ‘Angus Armitage’, *BJHS* (1978), 11, 99–100.

18 From 1960 (possibly earlier) until 1965, R. Bradshaw gave guest-lectures on the history of geology at UCL, while being employed in the Department of Geology at the University of Bristol.

19 For Laudan’s views on the UCL department in the 1960s, see L. Laudan, ‘Thoughts on HPS: 20 years later’, *Studies in the History and Philosophy of Science* (1989), 20, 9–13, 9.

20 Of the previous generation at UCL, Charles Singer and Abraham Wolf still put in an occasional appearance but were not involved in teaching any more. Of course Singer was one of the key figures in the foundation of the BSHS (1947). See G. Cantor, ‘Charles Singer and the early years of the BSHS’, *BJHS* (1997), 30, 5–23. Note also that at Imperial College, Gerald Whitrow was working on the philosophy of time. In 1963 he was joined by the Halls, and Norman Smith started teaching there in 1970.

21 This information is from uncatalogued manuscripts at the Department of Science and Technology Studies, UCL.

22 From the early 1950s, Oxford offered a diploma which included a history of scientific instruments option and also philosophy of science (chiefly for students of philosophy). At some stage in the 1950s, historical topics were allowed for research theses (fourth year) of the honours degree in chemistry. From 1965 there was a special subject in the Modern History Faculty, ‘The Scientific Movement of the Seventeenth Century’.

23 ‘Frank Sherwood Taylor’, obituary, *Ambix* (1956), 5, 57–8. See also A. V. Simcock, ‘Alchemy and the world of science: an intellectual biography of Frank Sherwood Taylor’, *Ambix* (1987), 34, 121–39.

with the modern history faculty – Alistair Crombie, Christopher Hill, and *Charles Webster*,²⁴ or, indeed, with philosophy (such as *Stephen Toulmin* and, later, Rom Harré).²⁵ *Stephen Mason*, however, who taught at Oxford between 1947 and 1953, held the title of Demonstrator as a history of science lecturer.

There was also a large cluster up North, counting Leeds (plus Bradford), Leicester and Manchester. In January 1954, the Northern Group (or Northern Section) of the BSHS had its inaugural meeting in Manchester (thereafter alternating between Leeds and Manchester), and many of those attending the subsequent meetings were *in situ* before then.²⁶ In 1950s Leeds, there were Ted Caldin, Peter Alexander, *Mary Hesse*,²⁷ *Asa Briggs*, *Stephen Toulmin* and *Jerry Ravetz*, and while the first five soon moved South, Ravetz in the 1960s was joined at Leeds by *Piyo Rattansi*, Donald Cardwell,²⁸ Ted McGuire, *Maurice Crosland*, Charles Schmitt and *Charles Webster*, with Arnold Thackray among the students.²⁹ These latter names are associated with what is sometimes referred to as the ‘Leeds school’ and with its research seminar, ‘Topics in the history of scientific thought’, which met from 1963 onwards and soon attracted those living nearby – Bradford’s *Jack Morrell*,³⁰ *Robert Fox*,³¹ and *Arnold Pacey* and Cardwell from Manchester (where he had since transferred).³²

Manchester in the 1950s counted a respectable number of philosophers and scientists with an interest in the history and philosophy of science: there were the Farrars (*Kathleen* and *Wilfred*), Michael Polanyi, Leon Rosenfeld, Dorothy Emmett, Wolf Mays, with *Kathleen Farrar* keeping the minute-book of their meetings in the early 1950s.³³ In the 1960s the Farrars (who represented the historical wing) were complemented by *Arnold Pacey*,³⁴ Cardwell and Richard Hills³⁵ at UMIST, all three of whom were making a living in history of technology. Lastly, at Leicester in the late 1950s, there were *Michael Hoskin* (about to go to Cambridge), Rom Harré (about to go to Oxford) and *Bill Brock* (then a postgraduate student), soon to be joined by Ted McGuire (before he went to Leeds), *Alex*

24 For an account of the interactions between the museums and the nascent departments, see J. A. Bennett, ‘Museums and the establishment of the history of science at Oxford and Cambridge’, *BJHS* (1997), 30, 29–46. See also A. Crombie, ‘Beginnings at Oxford’, *Isis* (1984), 25, 22–5.

25 Amongst their postgraduate students were Robert Fox, David Knight and J. D. North.

26 Leon Rosenfeld (the physicist) delivered the inaugural address. *Nature* reported on it on 20 February (*Nature* (1954), 173, 341–2). The first ordinary meeting was held in March 1954 at Leeds, with Peter Alexander in the chair and Mary Hesse speaking on ‘Action at a Distance’. See *Bulletin of the BSHS*, (1947), 1, 248, 254–5.

27 Mary Hesse lectured in mathematics, but she was in close contact with the Manchester academics with philosophical interests.

28 See D. Cardwell, ‘The academic study of the history of technology’, *History of Science* (1968), 7, 112–24. Also J. V. Pickstone, obituary of Donald Cardwell, *BJHS* (forthcoming).

29 Early in the 1960s, Arnold Thackray (then a science teacher) started as a research student at Leeds and subsequently transferred to Cambridge, where he did a Ph.D. with Mary Hesse.

30 See J. B. Morrell, *Science, Culture and Politics in Britain, 1750–1870*, Aldershot, 1997, pp. vii–ix.

31 Nominally, Fox was doing his Ph.D. at Oxford with A. C. Crombie, but actually he did his research in Leeds, under the tuition of Jerry Ravetz.

32 The ‘Topics’ seminar was for final year Leeds undergraduates but it was actually run as a research seminar.

33 According to Donald Cardwell, this minute-book is still kept at the department at UMIST, but my enquiries there have yielded nothing so far.

34 Arnold Pacey was initially employed as a lecturer in physics.

35 Richard Hill, by all accounts, single-handedly built up the Manchester museum.

Keller and *Jack Meadows*, and *Alistair Duncan* down the road at Loughborough. Many of those listed attended the Northern Seminar, which from 1967 met four times a year, twice at Manchester and twice at Leeds. Initially run by *Webster* and *Pacey*, it catered for people principally in Leeds and Manchester (and subsequently also Lancaster), plus ‘strays’ such as *Jack Morrell*, *Alex Keller*, *Bill Brock*, *Jack Meadows*, *Robert Fox*, *Maurice Henry*, and so on.

CAREERS

A few names have not come up in connection with the above institutions, and some seem out of place. There are simple reasons for this. To begin with, the above list of institutions is of course incomplete.³⁶ Also, while certain names and places are very obviously linked with the field, others played a part in its history but were less visibly associated with it. Of the many whose names came up during conversations in this project, some were clearly credited with an impact on the nascent field even if they did not actually produce any history of science (or technology); others produced but had little affiliation with institutions in the field, and some have simply been forgotten.³⁷ Moreover, in the period we are looking at, there is no single dominant career pattern leading to the condition ‘professional historian of science’.³⁸

At the time, the standards and institutional anchorage of the enterprise were still at an experimental stage. The field was undergoing the kinds of processes at the end of which the ‘professional’ and the ‘amateur’ stand separated by an asymmetry of authority. Indicative of the pre- or semi-professional character of the field at the time are a number of features: only some of those interviewed in this project were able to make a living in the field as soon as they were ready to do so. None of them have a first degree in anything like science studies, and many do not even have a postgraduate degree in anything like science studies. Indeed, some began to teach in the subject when they had little to recommend them for the task beyond a decent track record in another branch of learning, and an earnest amateur interest in the field itself.

Access to what became the field of history and philosophy of science was a lonely business. With exceedingly few exceptions, those interviewed were self-taught in the craft. They took their original inspiration from objects – textual and material – preserved in libraries, museums or private collections, or from objects about to be or recently left behind by progressing scientific, industrial or military practices, that is, from objects on the way to either decay or recognition within a heritage culture. Often, when asked ‘who did

36 Obvious omissions are, for example, Edinburgh (where Eric Forbes taught, well before the Science Studies Unit appeared on the scene), Aberdeen (where D. P. Wightman taught from 1951) and of course the Science Museum in South Kensington. On the latter, see Xerxes Mazda, ‘The Changing Role of History in the Policy and Collections of the Science Museum, 1857–1973,’ M.Sc. dissertation, London Centre for the History of Science, Medicine and Technology, Imperial College, 1996. On Wightman, see W. A. Smeaton, ‘William Persehouse Delisle Wightman: 4 June 1899–15 January 1983’, *BJHS* (1984), 17, 214–16.

37 Asa Briggs’s book on the power of steam, for example, has been little noticed by people in the field. Briggs, *The Power of Steam: an Illustrated History of the World’s Steam Age*, London, 1982.

38 For similar problems raised by retrospection in the case of eminent quantum physicists interviewed by professional historians of physics for the Archive of the History of Quantum Mechanics, see Thomas Kuhn’s reflections in his ‘Revisiting Planck’, *Historical Studies in the Physical Sciences* (1984), 14, 231–52.

you initially learn from?', the answer consisted in a book title, such as Lovejoy's *Great Chain of Being* (1936), Collingwood's *Idea of Nature* (1945), Burt's *Metaphysical Foundations of Modern Physical Science* (1925), Dampier-Whetham's *History of Science* (1929) and so on. If that generation had teachers, they tended not to meet them in the flesh. Later on, they learned from one another – hence the importance of the 'Topics' seminar, the Northern Seminar, the King's Intellectual History Seminar, and, unexpectedly, the importance of external examining, which helped establish and maintain numerous contacts in the field. Also, of course, the BSHS itself operated as a convenor, providing both a focus for those interested but not actually engaged in research, and a platform to present and exchange ideas for those more involved. This function was of eminent importance considering that each of those interviewed was strictly speaking a member of a professional group that as such did not exist.

As indicated above, most of those interviewed tried out several branches of enquiry, or even several careers, before (and in some cases after) discovering the domain of history (or philosophy) of science. David Allen practised in a number of respectable professions (not least of all as an administrator with the SSRC) whilst in private pursuing a keen interest in natural history. By the time his *The Naturalist in Britain* brought him to the attention of the community this project focuses on,³⁹ he had long entered the network of British naturalists, a network incidentally which in the past had had close links to history of science.⁴⁰ Asa Briggs sponsored a history of science option when Professor of Modern History at Leeds (1955–61); he then left for the new University of Sussex, where among others he encouraged the setting up of the Science Policy Research Unit (SPRU)⁴¹ to which Roy McLeod was attached. He also attended Alistair Crombie's conference on 'Scientific Change' held in 1961, participating in the session on the future of the history of science as an academic discipline.⁴² After a Ph.D. in physics, David Edge spent seven years producing science talks for the BBC, before he was called to Edinburgh to found the Science Studies Unit (1966).⁴³ Angus Buchanan worked for a number of years for the Royal Foundation of St Katharine, Stepney, a Church of England foundation specializing in social work and adult education, before he joined the Bristol College of Science and Technology. Frank Greenaway, Margaret Rowbottom and Gerard Turner pursued careers in the museum world, respectively in the Science Museum, London, the Wellcome History of Medicine

39 However, it should be noted that a number of people in the field knew David Allen's earlier work some time before this book came out in 1976.

40 Hugh Hamshaw Thomas and Charles Raven, for example, were keen naturalists, and both of them were powerful members of the Cambridge History of Science Lectures Committee in the 1940s and 1950s.

41 SPRU was run by Christopher Freeman.

42 The International Conference on Scientific Change took place in Oxford from 9 to 15 July 1961 and was attended both by scientists and by historians and philosophers of science. It is notable chiefly for two events. First, it is considered the first public occasion at which Thomas Kuhn presented the ideas he was about to publish in *The Structure of Scientific Revolutions*, Chicago, 1962. Second, by asserting that to include social factors in the history of science was 'un peu Marxiste', Alexandre Koyré condemned the social historiography of science. The conference proceedings were published as A. C. Crombie (ed.), *Scientific Change: Historical Studies in the Intellectual, Social and Technical Conditions for Scientific Discovery and Technical Invention, from Antiquity to the Present*, London, 1963. For Briggs's contribution see 765–9.

43 See D. Edge, 'Reinventing the wheel', in *Handbook of Science and Technology Studies* (ed. S. Jasanoff), Thousand Oaks, CA and London, 1995, 3–23.

Museum, London and the Old Ashmolean, Oxford.⁴⁴ Bob Young went to Cambridge to work with Oliver Zangwill in the department of psychology, wrote a history of ideas about the brain, set up the intellectual powerhouse at King's, ran the Cambridge Wellcome Unit for the History of Medicine, but eventually tired of a lifestyle purely academic.⁴⁵ Stephen Mason left the field in 1953 to return to a career in chemistry, but he continued his interest in the history of science, while Colin Russell practised and taught chemistry for two decades before he went to set up the history of science programme at the Open University. Arnold Pacey contemplated leaving his career in physics for one in architecture and town-planning, but eventually found himself practising the history of technology. Greenaway, Rowbottom, Morrell, Crosland, Fox and Webster spent a spell (or more) as schoolteachers. This shows how many different paths intersected in the domain of the study of science.

THE FUNCTION OF THE SUBJECT

Of those whose career pattern we perhaps associate closest with the 'profession' – those employed by a university for the purpose of teaching and/or research in the field – only a few were at this stage located in anything like a department for the history of science or history and philosophy of science or suchlike. Most were (and some still are) attached to the faculties of philosophy, history, physics, social science and so on. Not only does this heterogeneity of institutional affiliation point to the multiplicity of interpretations of how to go about the study of science, it also reflects the expectations the outside world had of it. These manifested themselves not least of all in the expansion which the field underwent in the 1950s and 1960s – the era when Wightman at Aberdeen (1951), Hanson at Cambridge (1952), Crombie at Oxford (1953), Hoskin at Leicester (1957), Ravetz at Leeds (1957), Duncan at Loughborough (1958), Buchanan at Bristol (1960), Hesse at Cambridge (1960), Cardwell at Leeds (1961), Brock at Leicester (1962),⁴⁶ Cardwell at Manchester (1963), McGuire at Leeds (1963), the Halls at Imperial College (1963), Young at Cambridge (1964), Knight at Durham (1964), Morrell at Bradford (1964), Pacey at Manchester (1964), Webster at Leeds (1965), Meadows at Leicester (1965), Rudwick at Cambridge (1967) and so on all got appointed to what were essentially new positions.

One type of appointment is particularly indicative of the more fundamental processes that underlie this trend of expansion in what could broadly be called science studies. Not all of the above appointments in institutions of higher education were university appointments.⁴⁷ A number of Colleges of Advanced Technology (CATs) were set up

44 For the interactions between museums and departments, see Bennett op. cit. (24) and Robert Bud, 'History of science and the Science Museum', *BJHS* (1997), 30, 47–50. See also Mazda, op. cit. (36).

45 At the time, the Cambridge Wellcome Unit was essentially a one-man show. Note, however, that Young's influence was substantial: Karl Figlio, Ludmilla Jordanova, Roger Cooter, John Brooke, Maureen McNeil, Roger Smith, Peter Bowler, John Forrester, Edward Yoxen and many more studied with him. See also J. V. Pickstone, 'On the development and present state of history of medicine in Britain', paper for the Conference of the Spanish Society for the History of Medicine, Granada, 25–26 April 1997 (forthcoming *Dynamis*, 1999).

46 Brock was already there as a student (1959) and as a tutorial assistant (1960).

47 As Harold Silver reminds us, until the Robbins Report (1963), 'higher education' meant only the universities, though the phrase was not commonly used. H. Silver, *A Higher Education. The Council for National Academic Awards and British Higher Education 1964–1989*, London, 1990, 7.

following the White Paper on technical education (1956), which argued for a broader, ‘liberal’ approach to technical courses. The CATs designated in its wake were assessed by the National Council for Technical Awards (NCTA, founded in 1955), which stipulated that a tenth of teaching time be devoted to non-specialist subjects – such as English, history and sociology, and eventually also history and philosophy of science, history of technology, industrial archaeology and so on. The NCTA stipulation accounts not only for Buchanan’s post at the Bristol College of Science and Technology, but also for Morrell’s at Bradford and Duncan’s at Loughborough. All three institutions were CATs, and all three of the jobs were installed with one express purpose: as one of Morrell’s colleagues put it, to ‘put a daub of culture, literary culture, on the cheeks of the plumbers’.

While somewhat unfortunate, the image does convey a reality. The notion that the history of science was to provide a bridge between the arts and the sciences already lay behind the foundation of the HPS department at UCL at the end of World War I, the efforts of which were, however, chiefly directed at science teachers and thus at secondary education.⁴⁸ Decades later, the bridge-rhetoric of the 1950s still hid a fundamental asymmetry: rather than bringing science and technology to the young sprigs of liberal-humanistic culture, the history of science and technology chiefly ‘humanized’ scientists and technicians. It was very much in the faculties of the latter that the clientele of the rising enterprise lay. The topography of the expansion of science studies bears this out: the field did better at Cambridge, a science stronghold, than at Oxford; and while it undeniably expanded at Oxbridge, the bulk of new jobs happened to be located in the provinces, at technical colleges and institutes, redbrick universities and other locations with commercial and industrial traditions. This comes as no great surprise considering the overall expansion, after World War II, of higher education precisely on the technical side and in the provinces. That the only department for the study of science which suffered cutbacks in this period was at UCL,⁴⁹ and that the London figures were increased by two new appointments to Imperial College – a college for science and technology – fits what seems to be a general pattern.

Among those who participated in this project, then, the three at CATs were not alone in teaching their art to students of science or engineering. At Leicester, Leeds, Manchester, Edinburgh, Durham, Cambridge, London, Aberdeen and Oxford science and technology students overall provided the bulk of the audience. True, a number of individuals who taught in faculties of classics, history, philosophy, English and so on declared an interest, and indeed some of them had ambitious plans for the field.⁵⁰ Still, in the universities it was largely on the goodwill and ambitions of faculties of science and engineering that the

⁴⁸ See Mayer, *op. cit.* (5).

⁴⁹ From the early 1960s onwards, the department at UCL was under threat of being eroded. In the worst-case scenario, all of its five posts were to be scrapped, and the department ultimately survived in a much reduced form after a protracted struggle involving even the media. This report, however, seems not the right occasion to discuss this case *in extenso*.

⁵⁰ In an interview on 27 February 1998, Asa Briggs maintained that at Sussex they were ‘thinking very much in terms of building up institutes which were problem-orientated, and not discipline-orientated’. This was also what he suggested in the discussion on the future of the history of science at the 1961 Oxford conference (see note 42).

enterprise depended.⁵¹ One of the ideas behind their support was the ideal of a broad, non-utilitarian education, as embodied in the idea of university education as such. That this faith in the values of liberal humanism was made explicit at this point in time is no accident, for the time frame of our project here coincides with the period of the most intense and sustained attempt, in twentieth-century Britain to that date, to reconsider the nature and purpose of the universities.⁵² The educational requirements of the welfare state (some would say the requirements of the warfare state and industry),⁵³ and specifically the Percy Report on Higher Technological Education (1945) and the Barlow Report on Scientific Manpower (1946), were generating extensive discussion about the impact of science and technology on the values enshrined in traditional concepts of university education.⁵⁴

To uphold the virtues of preserving and expanding knowledge, it was felt that excessive specialism and/or utilitarianism had to be balanced by adding cultural units to the curriculum. However inconvenient this appeared from the standpoint of efficiency, room had to be made for what was termed ‘intellectual adventure’. While perhaps not universally shared, the notion existed that a less completely specialized scientist was a better scientist, and in some form or other Joseph Needham’s warning of 1925,⁵⁵ namely that overspecialization was counterproductive to the progress of discovery, furnished an argument for at least a margin of curricular flexibility. This could mean classes in poetry or art appreciation but it could also mean courses on the history of science and on scientific method to supplement the teaching of science. And while it is true that such courses were set up in the general belief that science as a human achievement deserved formal recognition, in the extreme the hope was also that an extra injection of history and

51 In contrast to the US, it seems, British historians were (with very few exceptions) not that interested in science. See Arnold Thackray, ‘The pre-history of an academic discipline: the study of the history of science in the United States, 1891–1941’, *Minerva* (1980), 18, 448–73, 469ff; Nathan Reingold, ‘History of science today. 1. Uniformity as hidden diversity: history of science in the United States, 1920–40’, *BJHS* (1986), 19, 243–62, 261f.

52 Silver, *op. cit.* (47), 8. Note that such sites as the journal *Universities Quarterly* and BBC Radio’s Third Programme were founded in 1946. It is arguable that the Third Programme was intended as a key instrument in the dissemination of the same enduring values the university was taken to embody. See, for example, Asa Briggs, *The BBC. The First Fifty Years*. Oxford, 1985, 250; also Kate Whitehead, *The Third Programme. A Literary History*, Oxford, 1989, esp. Chapter 3 ‘The Audience’, 45–64. Also, as H. A. Halsey reminds us, in the 1950s *Encounter* carried a series of articles on intellectuals, and Edward Shils began to edit *Minerva* in 1962. H. A. Halsey, *Decline of Donnish Dominion. The British Academic Professions in the Twentieth Century*, Oxford, 1992.

53 David Edgerton has argued for some time that the post-war expansion of British universities reflects more than anything Britain’s identity as a military nation. D. Edgerton, ‘British scientific intellectuals and the relations of science, technology and war’, in *National Military Establishments and the Advancement of Science and Technology: Studies in Twentieth-Century History* (ed. P. Forman and J. M. Sanchez-Ron), Dordrecht, 1995, 1–35; ‘Science in the United Kingdom: a study in the nationalization of science’, in *Science in the Twentieth Century* (ed. J. Krige and D. Pestre), Amsterdam, 1997. See also Edgerton’s *Science, Technology, and the British Industrial “Decline”, 1870–1970: the Myth of the Technically Determined British Decline*, Cambridge, 1996; and *England and the Aeroplane: an Essay on a Militant and Technological Nation*, Basingstoke, 1991.

54 On the results of the post-war expansion in British higher education, especially following the Robbins Report (1963), see Halsey, *op. cit.* (52).

55 J. Needham, ‘Mechanistic biology and the religious consciousness’, in *Science, Religion and Reality* (ed. J. Needham), Cambridge, 1925, 219–57, 222.

philosophy of science might stimulate creative inferences and thus make possible a higher output of outstanding scientific work.⁵⁶

That a broader education would help make the scientist a ‘whole’ person and a better citizen was another train of thought behind generalism and one likely to gain votes for history and philosophy of science. This argument was already in some form involved in the foundation of the UCL department just after World War I, and was to come into its own a world war later – again in a context of debate over what kind of men and women the nation needed and what kind of education would produce them. This was the argument C. P. Snow was attacking in his Rede lecture of 1959. It was the argument behind the NCTA’s ruling that a tenth of the teaching time of a CATs degree had to be spent on liberal learning, and it was certainly an argument that commanded assent at Cambridge in the late 1940s and early 1950s, when those in charge of the History of Science Lectures Committee (Herbert Butterfield, Charles Raven, Hugh Hamshaw Thomas, Basil Willey, Richard Braithwaite and Jean Lindsay), and such individuals as T. R. Henn, an English Literature don at St Catherine’s College, joined forces with Cambridge scientists who felt that bridges should be built between the sciences and the arts: with the full approval of Sir Lawrence Bragg, Henn offered poetry classes for those who (in the words of C. S. Lewis) ‘need[ed] to be awakened from the slumbers of cold vulgarity’.⁵⁷ Herbert Butterfield deemed history of science lectures a necessity because scientists, even ‘the pioneers and creators in the world of science, [are] content with a routine kind of thinking, or with resort to a rough sort of common sense, when they turn aside for a moment to discuss problems ... which are essentially human ones’.⁵⁸ Braithwaite’s wife, the linguist Margaret Masterman, suggested that scientists would be unable to make any political, social and metaphysical judgements unless their intellectual development had previously been fostered and the relevant mental powers unleashed through philosophical training.⁵⁹ Not least of all there was a general fear that ‘by starving the sensibility of our pupils we only make them easier prey to the propagandist when he comes’. After all, the rise of totalitarianism was a recent experience and the Cold War an acute one.⁶⁰

Curiously enough, in their support for the study of science, those arguing that a humanization of the scientist was sorely needed found themselves united with their diametrical opposite, namely scientific and technological humanists like C. P. Snow and

⁵⁶ Kathleen Farrar surmised this, and her interpretation is supported both by the fact that the investigation of the intellectual, technical and social conditions favouring or discouraging original scientific discovery and technical invention was high on the contemporary research agenda, and also by the fact that a major international meeting to discuss the issue (i.e. the 1961 Oxford conference on ‘Scientific Change’) assembled specialists not only from history and philosophy, but also from ‘several different fields of *science*’. See M. Hoskin, ‘History of Science. International symposium at Oxford’, *Times Educational Supplement*, 7 July 1961, 19.

⁵⁷ T. R. Henn citing Lewis, in *The Apple and the Spectroscope, being lectures designed (in the main) for science students*, London, 1951. See also C. S. Lewis, *The Abolition of Man: or, Reflections on Education with Reference to the Teaching of English in the Upper Forms of Schools. Riddell Memorial Lecture 1943*, Oxford, 1943.

⁵⁸ Article intended as editorial for *Endeavour*, sent 13 October 1949. Butterfield Papers, Cambridge University Library, Manuscripts, Butt/290/1.

⁵⁹ M. Masterman, Memorandum of 10 July 1952, ‘The teaching in Cambridge of the philosophy of science’, Needham Papers, Cambridge University Library, Manuscripts, B 316.

⁶⁰ Henn, *op. cit.* (57).

Eric Ashby, who held that science or technology were in themselves great human achievements whose practice, narratives and method would teach its apprentices better morals and better judgement than any arts education could provide. Perhaps both sides agreed on one thing: what the future would look like very much depended on the work and the outlook of scientists and engineers. Mediation between liberal culture and the harsh realities of the post-war world, therefore, was not all a historian or philosopher of science was at times expected to provide. Some of their supporters hoped the history and philosophy of science (and the history of technology) would make an active contribution to the immense task of initiating all into the spirit of science, and of paving the way for a civilization ready to experience the scientific revolution (as Harold Wilson had intoned at Scarborough in 1963). By all accounts, however, the paths of public science and of science studies diverged more and more as the latter went through the classical stages of professionalization. While scientists moved further into the corridors of power and into the limelight, history and philosophy of science attached itself to academic codes and values, and opted largely for authority of the scholarly kind. Science studies has most certainly attained this, and the recordings made in this project reveal to a considerable extent how it has come about. They reveal also how proud – and in many cases how very grateful – those interviewed are to have been part of that enterprise during the crucial, early period of its professionalization. That there was no consensus, however, on whether professionalization was achieved at the right price, and on whether decisions taken in this process should perhaps now be reconsidered, was a striking, if perhaps not wholly unexpected, revelation.