

THATCHER, SCIENTIST

by

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This paper has two halves. First, I piece together what we know about Margaret Thatcher's training and employment as a scientist. She took science subjects at school; she studied chemistry at Oxford, arriving during World War II and coming under the influence (and comment) of two excellent women scientists, Janet Vaughan and Dorothy Hodgkin. She did a fourth-year dissertation on X-ray crystallography of gramicidin just after the war. She then gathered four years' experience as a working industrial chemist, at British Xylonite Plastics and at Lyons. Second, my argument is that, having lived the life of a working research scientist, she had a quite different view of science from that of any other minister responsible for science. This is crucial in understanding her reaction to the proposals—associated with the Rothschild reforms of the early 1970s—to reinterpret aspects of science policy in market terms. Although she was strongly pressured by bodies such as the Royal Society to reaffirm the established place of science as a different kind of entity—one, at least at core, that was unsuitable to marketization—Thatcher took a different line.

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Did it matter that Margaret Thatcher, three times British prime minister, staunch opponent of socialism, fervid proponent of markets rather than governments as the agents of choice and change, had trained and worked as a research scientist? In the immense literature on Thatcher and Thatcherism, no author emphasizes, or even discusses in any depth, the connection between Thatcher, scientist, and Thatcher, politician.¹ This paper reviews the evidence for a connection, and offers an interpretation of an important episode in the formation of British science policy, that, I argue, has broad repercussions for how historians might revise the understandings of a shift in twentieth-century political and economic history. In particular, I propose an event that, among others, provided an early concrete moment when Margaret Thatcher demonstrably chose to adopt a market-based solution running strongly against official advice and precedent. An early commentary on Thatcherism remarked that the 'great mystery' was 'how and when the transformation [of Thatcher into a Thatcherite] took place'.² Commentators since then have substantially explained the transformation by appealing to the extraordinary and sudden salience of neo-liberal

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economic ideas in the context of the political upheavals of the early 1970s.³ Yet sociology of knowledge, and sociology of scientific knowledge in particular, has shown that ideas rarely, if ever, have such agency alone.⁴ This paper suggests an alternative model, in which concrete policy choices raise the questions that are only subsequently, and secondarily, abstracted and ratified in economic argument.

The paper proceeds in two distinct halves. First, I set out what we know about Thatcher's scientific training and employment in science-based industries. Second, I focus on a critical decision taken on UK science policy in 1971, when Thatcher was Secretary of State for Education, and therefore the minister holding the science brief. The decision was made against the background of both long-running rumbling concerns about agricultural research as well as a more specific, sharp intervention from Lord Rothschild, director of the Centre Policy Review Staff. I do not examine, here, science under Thatcher's premiership.

Biographers of Margaret Thatcher sing in unison on the topic of Thatcher, scientist: while she studied chemistry for four years at Oxford University, completing a research dissertation under an exceptionally gifted scientist, followed by three years of research in innovative industrial laboratories, the chemistry always came a distant second to her political ambition. The years spent over the laboratory desk are hastily sketched, even in the longest, multi-volume biographies, in the biographers' hurry to reach the 'real' politics. There are two dissonant voices in this choir. One, curiously enough, is Thatcher herself. I discuss passages of her autobiography below. The other is the political journalist Hugo Young, whose biography, *One of us* (1989), in a genre where balance and scholarly virtue are often hard to find, has won praise from historians.⁵ 'The chemistry was important', he argues; Young draws on the judgement of Dorothy Hodgkin, Thatcher's Oxford tutor, to suggest two ways in which a training in science shaped Thatcher the politician:

What, according to the Nobel Laureate, does the study of chemistry do to a person's mind? 'I think it should interest you in the problems of finding out as much as you can about the way we work, the way matter is put together. And it should give you an interest in using the results.'

This blueprint for the practical mind, a marriage between speculative and empirical habits, is one which as a politician Mrs. Thatcher consistently made much of. She retained a genuine interest in science, which Dorothy Hodgkin concedes. It equipped her, says the professor, to take serious decisions on scientific matters and 'to see what scientists are doing'. In the politician, her lack of any outstanding scientific talent was less significant than her rare capacity to understand the scientific mind at all.⁶

While I am agnostic over whether training in chemistry did indeed give students a peculiarly 'practical mind', I do find Hodgkin's second insight highly suggestive. By living the mundane, material, practical life of the working researcher, Thatcher's view of science was as an insider, who knew, as ethnographers of the laboratory have confirmed, that nothing extraordinary was going on.⁷ I will argue that it did indeed matter that Thatcher had known at first hand what it was 'to see what scientists are doing'.

THE EDUCATION OF MISS MARGARET ROBERTS

Above the motto 'cherish freedom', the coat of arms of Margaret Thatcher shows two supporting figures. On the left is an admiral of the fleet, representing the Falklands War,

which had transformed an unprecedentedly unpopular prime minister into a globally recognized figure. On the right is Isaac Newton. The natural philosopher represents the influence of her birthplace, the town of Grantham, near Newton's family home at Woolsthorpe, rather more than his presence records the influence of science. Margaret Roberts was born in Grantham in 1925, the second daughter in a strict Methodist household in which her father was the dominant figure. Later, at university, she would irritate her fellow students with constant talk about 'Daddy', a shopkeeper and town mayor; later still, she would not mention her mother at all in her *Who's Who* entry.

Margaret attended the local grammar school, Kesteven and Grantham Girls' School. In her sixth form she elected to narrow her studies to chemistry, biology and mathematics. Her biographers record that she chose chemistry because it 'suited her practical bent of mind' and had 'good employment prospects', but mostly because she was 'inspired by the excellent teaching of the chemistry mistress at Kesteven, Miss Kay'.⁸ The importance of mentors for women choosing science as a career is well documented for this period.⁹ Margaret Roberts applied to Oxford to read chemistry. Her earliest biographer, the *Daily Mail* journalist Russell Lewis, suggests that because 'there were few women's colleges and therefore fewer places... she seems to have decided rather coolly and calculatingly that for a girl Chemistry was the best examination bet.'¹⁰ Later biographers have repeated this charge.¹¹ Lewis speculates, too, with no evidence, that there 'was also the attraction of invading and succeeding in what was considered a man's domain.'¹²

She arrived at Somerville College, Oxford, in autumn 1943.¹³ Chemistry was Oxford's largest undergraduate school (although numbers dipped, as they did for all subjects, during the war), and indeed it was the largest of these in the country. She would have seen excellent facilities (such as the new physical chemistry laboratory opened in 1941), probably heard talk of the penicillin work of Florey and Chain, and certainly seen wartime air raid shelters and fire patrols.¹⁴ Interpretations of Thatcher's work at Oxford have been decisively shaped by assessments put on the public record by two senior women scientists at Somerville. Dame Janet Vaughan, the haematologist, radiologist and principal of the college, damns with faint praise: 'She was a perfectly adequate chemist. I mean nobody thought anything of her. She was a perfectly good second-class chemist, a beta chemist.'¹⁵ Vaughan knew very well that her young charge was highly active in the Oxford University Conservative Association, and stood out in contrast to the progressive left collegial style that Vaughan epitomized and encouraged.¹⁶ Margaret Roberts sat examinations at the end of the third year, but, as was traditional in Oxford, she did not find out the results until after the completion of a fourth-year dissertation. By then she was increasingly being supervised by Dorothy Hodgkin. The X-ray crystallographer was in the midst of career-defining work on the structure of penicillin when Margaret read essays to Hodgkin at the latter's home.¹⁷ 'I came to rate her as good', Hodgkin recalled; 'One could always rely on her producing a sensible, well-read essay.'¹⁸

Early in World War II, chemists in the Soviet Union had identified antibiotic properties in the bacterially derived substance gramicidin S.¹⁹ Richard Synge brought crystalline gramicidin S from Leningrad to London for use in work that deployed his and Archer Martin's new technique of partition chromatography. From London some crystals were passed westward to Hodgkin in Oxford.²⁰ Hodgkin in turn passed them to a refugee German postgraduate, Gerhardt Schmidt, in her laboratory.²¹ Thatcher's fourth-year dissertation research was an investigation of the structure of gramicidin S, guided by Schmidt and Hodgkin.²²

All of her biographers agree that the future Mrs Thatcher devoted her free time to politics rather than science, and even regretted her choice of undergraduate study. One repeated anecdote has her walking with a friend at graduation in 1947 saying, ‘You know, I oughtn’t to have read chemistry. I should have read law. That’s what I need for politics. I shall have to go and read law now.’²³ Another repeatedly recalled incident, at an unspecified date, but presumably during her undergraduate years, was a conversation between the young scientist and Norman Winning, the Recorder, or municipal clerk, of her hometown, who had a Cambridge natural sciences degree. Winning advised her to continue with chemistry as a means to getting into law as a patent lawyer.²⁴ All these anecdotes serve to prepare the narrative for the next stage in Thatcher’s career, her training and employment as a lawyer in the later 1950s.

Nevertheless, Margaret Thatcher did *not* use chemistry as a stepping stone to patent law (she specialized, indeed, in tax law), nor did she immediately retrain. Instead, her next three years were spent as a full-time research chemist.²⁵ The Oxford University Appointments Committee, a clearing-house or agency for industrial firms to find Oxford graduates, set up a series of interviews for Margaret in 1947. She was interviewed by British Xylonite (BX) Plastics early in the year, and was offered a post. Thatcher comments in her autobiography:

Very few people greatly enjoy the early stages of a new job, and in this I was no exception. It had been understood when we originally discussed the position that it would involve my being in effect Personal Assistant to the Research and Development Director. I had been looking forward to this because I thought it would allow me to get to know more of how the company as a whole operated and also to use the talents I had, over and above my knowledge of chemistry. But on my arrival it was decided that there was not enough to do in that capacity and so I found myself donning my white coat again and immersing myself in the wonderful world of plastics.²⁶

BX had its roots in the beginnings of plastics industries in east London in the 1860s and 1870s.²⁷ As the company expanded its range of goods moulded from cellulose nitrate plastic sheet (‘British Xylonite’), it expanded east into the Essex countryside near Manningtree, building a new factory and even a company village. When Margaret Roberts, along with six other graduate scientists, joined the company in 1947 it was under a new wave of expansion, including a new Research and Development Section.²⁸ The details of her work at BX are unclear, beyond the ironic knowledge that she joined a union, the Association for Scientific Workers, and that her work had a focus on the development of methods of attaching polyvinyl chloride to metals.²⁹ Although there might have been no such thing as society, there was such a thing as glue.

In 1949 Margaret Roberts had her first big political break: she was adopted as a parliamentary candidate for the constituency of Dartford. Although only across the Thames estuary as the crow flies, the journey from Essex through central London and out along the Kentish coast was too far to make employment at BX compatible with political campaigning. She sought and found a second science job: as a food research chemist at the Cadby Hall, Hammersmith, London, headquarters of the cakes and teashop business J. Lyons & Co. Again the details of the research work are hard to confirm. Young describes it as ‘testing the quality of cake-fillings and ice-cream’.³⁰ Campbell adds ‘pie-fillings’.³¹ She certainly researched saponification, a chemical process named after, but not necessarily implying, soap making.³² Thatcher herself records that the work had ‘a



Figure 1. Margaret Thatcher as research scientist. A publicity photograph taken for the 1951 election campaign.

stronger theoretical side . . . which made it more satisfying than my position at BX had been', which suggests more than mere quality control.³³ An oft-told anecdote in British left circles associates Thatcher with the invention of soft ice cream, which added air, lowered quality and raised profits. Lyons certainly worked on this new product, but there is no firm evidence that Thatcher directly assisted in its invention.

General elections were held in the UK in 1950 and 1951. Margaret Roberts contested Dartford both times, cutting the Labour majority significantly in what was a safe Labour seat. By the end of 1951 she was married to Denis Thatcher, a manager of a paints business (the chemistry in this romance was literally, although only partly, chemistry³⁴). Photographs of her in a white coat were produced as part of the 1951 campaign, and they illustrate how her professional life as a working scientist was seen by her political agent as providing a positive image (see figure 1). Their existence means that Hugo Young's summary of the contribution of Thatcher's scientific employment to her political career must be slightly qualified:

These two jobs, lasting barely three years in all, constitute the totality of Margaret Thatcher's first-hand contact with the world of commerce and industry. . . . In any case, prime minister Thatcher never tried to make political capital out of these fugitive involvements. They were incidental to her political ambition and she has never pretended otherwise. They made her a living, while she devoted most of her psychic energy to the greater and more glamorous task.³⁵

Nevertheless, Young's main point is that these jobs were incidental; or, in other words, Thatcher the politician owed nothing to Thatcher, scientist. Other biographers agree.³⁶

In 1951, Thatcher resigned from Lyons, starting a family with Denis and revising for her bar examinations. In her own words she chose tax law rather than patent law because the 'opportunities [in the latter] were very limited'.³⁷ She served a series of six-month pupillages before gaining tenancy at 5 New Square in Lincoln's Inn.³⁸ She passed her final exams in December 1953, was called to the Bar, and joined chambers in January

1954.³⁹ In 1959 she won the seat of Finchley, in North London, and so joined Parliament as a Conservative MP. From 1961 to 1964, under Harold Macmillan and Sir Alec Douglas-Home, Thatcher served as a junior minister in the department of pensions. When the conservatives were ousted by Harold Wilson's Labour party in 1964, Margaret Thatcher had to spend six years out of government, in opposition.

MARKETS AND SCIENCE

In the twentieth century, most science, including most UK science, was done in firms that were responding to market forces. (Margaret Thatcher, an industrial food chemist, is a more 'typical' twentieth-century scientific figure than Albert Einstein.) So the reforms proposed in 1971 by Victor, Lord Rothschild, which called for market forces—government patrons as 'customers', research communities as 'contractors'—to shape government-funded science policy, were in one sense a matter of mere emphasis. Outside, industrial science—most science—would continue as before. Likewise, an inner pocket of science, variously conceived as 'basic', 'pure', 'academic', 'curiosity-driven', or just very cheap, was not called upon to justify its continuation through an appeal to a market. (Note that this is certainly not saying that such research was not shaped by contextual forces, including market ones. Indeed, the category of 'basic research' was mobilized by Vannevar Bush in *Science: the endless frontier* (1945), at the culmination of mid-century militarization of science. By 1959 the case for state funding of basic research was being vigorously promoted by sometime RAND Corporation consultant Richard Nelson.⁴⁰ Indeed, Mirowski and Sent describe the category of basic research as a Cold War artefact.⁴¹) In this sense, the Rothschild reforms were an argument about where the boundary between research governed primarily by market forces and research governed primarily by wise expert guidance should lie. Nevertheless, it was precisely because this boundary was a fault line between the two regimes that it generated such seismic controversy.

Both sides could view the controversy as a slippery slope. Opponents of Rothschild could see the argument as the first step towards a more general marketization of science policy. Likewise, proponents of the reforms might agree. In fact a more satisfying account of the controversy acknowledges that actors' positions and arguments changed as the controversy developed. In this process, arguments that were first seen to have a merely local or specific purchase were recognized as having broader significance. I will suggest that intervention of Thatcher, minuted by some of the subtlest professional documenters of their time, can be interpreted thus. Before we get there, however, we need a grasp of the Rothschild controversy.

When the conservatives returned to power in 1970, the new prime minister, Edward Heath, appointed Margaret Thatcher his Secretary of State for Education and Science. He also sought a 'quiet revolution' in the structure of government: the formation of large rationally ordered departments, new vigorous institutions of policy analysis, and, third, a 'central capability unit' that took a long-term view.⁴² Historian Peter Hennessy summarizes the rationale for this 'Think Tank':

Heath had been irritated by Whitehall's tendency to produce conflicting data which blurred the process of decision-making as ministers haggled over facts and their interpretation. This most rational prime minister wanted the Think Tank to produce a common data base before Cabinet or Cabinet Committee met to find a solution.⁴³

The label ‘Think Tank’ originated in the press, but it is apt: the Central Policy Review Staff (CPRS), to give it its full title, would stand to the UK government as RAND, in its early days, stood to the United States Air Force, as the preferred source of expert scrutiny and source of innovative policy ideas.⁴⁴ The CPRS was not a vendor in a free marketplace of ideas, because it did not compete with similar bodies. In this sense, Heath’s restructuring of government was no ‘revolution’ but a culmination of the trend towards *dirigiste* big government, informed by efficiently channelled rational expertise, and adapted for British Cabinet government.

The CPRS was designed to do a blend of ‘quick-dash productions’, keeping its staff involved with the issues of the day, as well as ‘long-term policy reviews’, or ‘routine punctuated by orgies’ as one wag put it; other summaries of the CPRS include: to ‘sabotage the over-smooth running of the machinery of government’, to ‘attempt a synoptic view of politics... Try to devise a more rational system of decision-making between competing programmes’, and, in a humorous nod to its Cold War forebears, ‘think the unthinkable, but always wear a dark suit when presenting the results.’⁴⁵ It was staffed by a mixture of Whitehall insiders and outsiders, and was led by Lord Rothschild.

The name of Victor, third Baron Rothschild, had been suggested by the Cabinet Secretary, Burke Trend, ‘who had long been worried about ministers’ abilities to take complicated decisions on science policy.’⁴⁶ Rothschild’s inheritance had included scientific pursuits as well as independent wealth. His uncle, Walter, second Lord Rothschild, had built up the immense collection of bird skins at Tring; Victor’s father, Charles Rothschild, had combined minding the bank with natural history; and Victor’s sister, Miriam, enjoyed a long career as an entomologist and field parasitologist.⁴⁷ Victor Rothschild, however, rejected the field for the laboratory. His gametological studies began at Trinity College, Cambridge. A 1935 dissertation on the biophysics of frog sperm and eggs won him a fellowship to King’s College, although he felt himself ‘lucky’ to be awarded it.⁴⁸ (An insecurity over whether his achievements reflected talent or wealth surfaced more than once in his working life.⁴⁹) In 1937, he gave away Tring, bird skins and all, to the Natural History Museum, London.

During World War II, Rothschild put the delicate skills developed in the dissection of frogs’ eggs to good use, leading a small anti-sabotage unit of the Security Service (unit BI(c) of MI5) that intercepted and dismantled bombs hidden in shipping cargo.⁵⁰ In the July 1945 general election, Clement Attlee’s Labour party was swept to power, ousting Churchill, and promising the building of a New Jerusalem in the form of the full-scale welfare state. Four months later, Rothschild joined the victorious party. Labour peers were few and far between, and Lord Rothschild was soon appointed to official tasks. In particular, from 1948 to 1958 he served as chair of the Agricultural Research Council (ARC).

In 1959 Rothschild joined the petroleum giant Shell, becoming director of Shell’s UK research programmes from 1960, and research director of the Royal Dutch-Shell Group of companies from 1965. Surprisingly, this commercial experience was not directly relevant to his appointment as leader of the CPRS. An intense job search took place in the autumn of 1970, as Heath’s new administration sought to set up the institutions key to changing the British political landscape. The think tank must be, wrote one insider, ‘the highest political priority of this Parliament... [in order] to see that by 1974 there has been a major change in the whole spectrum of Government activities.’⁵¹ This insider listed seven characteristics that any leader of the think tank must have, none of which were experience of the private sector, and suggested the candidates Charles L. Schultze (former director of the Bureau of the Budget, then at the Brookings Institution) and Thomas O. Paine, the NASA

administrator and a former director of General Electric's TEMPO think tank at Santa Barbara.⁵² The short list included Claud Richard Ross, a professor of economics and Vice Chancellor of the University of East Anglia; Ralph Turvey, joint deputy chairman of the National Board for Prices and Incomes; Robert Braithwaite Marshall, a senior civil servant at the Ministry of Power; Hugh Ford, a mechanical engineer at Imperial College; Christopher McMahon, a high-flier at the Bank of England; and Ian Fraser, a journalist, banker and businessman. This was a list that did not draw, apart from Fraser, from the best of private business. Lord Jellicoe, the minister overseeing the civil service, blackballed several names: Marshall was 'a little on the old side', Ford lacked 'experience', Fraser was 'a little over-ambitious and perhaps over-abrasive', and the 'days of real usefulness' of an alternative, the chief government scientist Solly Zuckerman, 'an old and valued friend', were 'numbered'.⁵³ McMahon and Ross, the first and second choices, respectively, said no.⁵⁴ Only then did Rothschild's name circulate, and within days he had said yes.⁵⁵

Rothschild's formally started work on 1 February 1971. The proposed research had ten items, from the very general ('definition of major Government objectives') to the specific ('Concorde').⁵⁶ Item seven read:

What are the objectives of Government Research and Development? What resources should be devoted to achieving each objective? How should these resources be divided intramurally and extramurally? Is the present system, including the Research Councils, the best one for achieving the Government's R&D objectives; and, if not, what improvements, could be made?

This item won the specific praise of Burke Trend, who sent a minute to the prime minister saying that 'R&D represents an area of enquiry which is very badly in need of co-ordination', and although the chief scientific officer (in other words, Zuckerman) might 'regard this as his preserve . . . there is to my mind no doubt that a review, conducted by the CPRS in the context of their broader concern with the disposition of our national resources as a whole, would represent the right course to take.'⁵⁷ 'It may', Trend concluded significantly, 'encounter resistance from the Secretary of State for Education and Science'—the minister holding the science brief: Margaret Thatcher.

There is one final piece of the puzzle that we need before continuing. To understand Thatcher's role in the move towards greater marketization of science, as well as the relevance of Rothschild's background and think tank to this shift, we need a sense of how the UK research council system operated in general, and the peculiar position of the ARC in particular. The system dated from around the time of World War I, as an institutional innovation that resolved some of the tensions arising as science sought an increased flow of state patronage. In its ideal form, approached by the Medical Research Council and—to a much smaller extent—parts of the Department for Scientific and Industrial Research, research councils were supposedly autonomous: the guidance of science policy was to be kept separate from the politicians responsible for the administration of, say, health or industrial matters.⁵⁸ The ARC, however, was set up later (1931) and had only limited autonomy; its recommendations to the Ministry of Agriculture, Fisheries and Food (MAFF), for example, were merely advisory.⁵⁹ Furthermore, the policies of the agricultural department, for much of the twentieth century, strongly reflected the interests of wealthy farmers and growing agri-business. The outcome can be labelled 'landed science': a research programme that felt the tug of its patrons' concerns.

In the summer of 1970, the Minister of Agriculture was complaining that there was a 'real problem about marrying together the pure research' performed by the ARC with the 'applied

research' that was done on the ministry's experimental farms.⁶⁰ The minister, although 'not personally seeking to empire build', wanted the 'ARC under the Ministry of Agriculture'. Soon, sides were taken. Not only the agriculture department but even the chief scientific adviser to the government and the chair of the Medical Research Council supported putting the ARC under MAFF's control.⁶¹ Opposing them, the Royal Society insisted on no change without 'consultation with the scientific profession'—that is to say, no change without Royal Society approval. Thatcher, in late December 1970, relayed the Royal Society's view to the prime minister.⁶² At this stage, then, Thatcher was comfortable merely acting as established science's representative. She trod the departmental line: the 'Secretary of State for Education and Science and her officials... believe that responsibility for research councils should continue [as before] as part of "Science"', a view shared, thought Heath's adviser, 'by the great majority of scientists'.⁶³

By early 1971, this almost trivial instance of normal politics—an everyday Whitehall tug-of-war over turf—was developing into something much more troublesome. 'This minor irritant has been hanging around for a long time and creating increasing uncertainty', wrote Robert Armstrong to the prime minister, and a 'decision to leave the ARC as it is would be widely welcomed in itself as well as for removing the uncertainty'.⁶⁴ It was in this specific context that government research, a 'minor irritant', was placed as item seven in the think tank's programme of research. But Rothschild had been charged with thinking the unthinkable. The report on Concorde had bluntly said, for example, that it should never have been built. Now, on science, Rothschild offered a radical solution to remove the 'minor irritant'. In a memorandum entitled 'How to ensure that 80% of the Agricultural Research Council's programme is "user-orientated" without putting it under MAFF', Rothschild spelled out that even research council science should be seen in terms of market forces and terminology: 'It does not seem to be clearly understood that... the labs and their research administrators... are contractors doing a job for a user who says what he wants done and how much he is prepared to pay for it'.⁶⁵ This was precisely the market language and argument that the famous Rothschild Report, published later in November 1971, argued should frame all government applied science.⁶⁶

Nevertheless, there was an argument to be won. The decisive meeting took place on 20 April 1971. In that month the first drafts of the Rothschild report were being circulated. Trend labelled it 'rather revolutionary' (which is usually, but not in this case, Whitehall mandarin parlance for 'wrong'). Rothschild, in his cover note to the prime minister, wrote, tellingly, that he would 'prefer to describe it as a business approach to a business matter'.⁶⁷ It was expected to be 'emasculated' as it encountered Whitehall special interests. Edward Heath rubbed his hands at the thought: 'Excellent', he wrote by hand on the report, 'I'd like to hear what it does to them.' The Royal Society, watching the developments closely and, fearing the ramifications for the relative autonomy of other research councils (and ultimately, perhaps, the Royal Society itself), protested. Alan Hodgkin, President of the Royal Society, wrote directly to Heath pleading, again, for the kind of 'consultation' that established science had received in the past.⁶⁸ The Secretary of State for Education and Science was expected to represent, as she had done before, this position. With her strong support, Armstrong's wish for an end to uncertainty and no change in the position of the ARC would be granted, and Rothschild's radical reform would fall at the first ditch. The ARC was the case that would determine the general argument.

Gathered at 10 Downing Street on 20 April to discuss the future of the ARC, along with the prime minister, were Lord Rothschild, two senior civil servants (Sir William Armstrong, the head of the home civil service, and Robert Armstrong, Heath's Principal Private

Secretary), and Margaret Thatcher.⁶⁹ The new chief scientific adviser was not invited.⁷⁰ Thatcher began by channelling the pure voice of established science:

a decision on the future of the ARC was urgently needed. . . . Her Council on Scientific Policy had expressed concern on this matter, and she had undertaken to report to them before any decision was implemented. The subject had recently flared up again, because the [Council on Scientific Policy] and the Royal Society had represented that the Research Council system had been thoroughly reviewed by the Trend Committee in 1963, in the course of which the Royal Society had been consulted. The outcome . . . had enjoyed [the] general agreement of the scientific world, and it was felt that the system was now working better than it had ever worked before.⁷¹

In other words, at this stage of the meeting, Thatcher held strongly to the line that no major change was necessary.⁷² As a compromise she conceded that there was ‘some straight development work’ funded by the ARC that could be ‘hived off’. Nevertheless, her ‘main concern was to ensure that no change was made against the wishes of the scientists without having been consulted.’ Now it was the turn of the prime minister to ventriloquize. Heath spoke, subtly shifting Rothschild’s words: ‘in relation to the Research Councils Departments were consumers, and their main business as consumers was to define their requirements . . . and commission the appropriate work.’ Rothschild now stepped in, taking the cue to talk of ‘consumers’ as a proxy for his more forthright ‘customers’: 90% of research council research should be contracted applied research.⁷³

Presumably there followed vigorous argument over basic principles. Robert Armstrong, the expert minuter of the meeting, recorded in an artfully abbreviated summary that ‘In discussion it was recognized that this would be fundamentally different from the present system.’ We do not know how long this argument lasted. However, the next line in the minute indicates a momentous shift in Thatcher’s position, recorded in typically restrained Whitehall style:

The Secretary of State said that she did not object to a fundamental change, so long as its implications were worked out and appreciated before decisions were taken. The logical conclusion appeared to be that the Agricultural Research Council, the Medical Research Council and the Natural Environment Research Council would become organizations primarily dealing with applied research [and therefore research shaped decisively by customer–contractor market language]. . . . It was suggested that for tactical reasons it might be better to stop short of the logical conclusion, and there would be no objection to doing so, so long as the primary objective was achieved.⁷⁴

There are two broad ways of interpreting the note for the record. Either Thatcher, a relatively junior minister, had been called before her prime minister and senior civil servants and advisers, and had been told to change her mind. Or, rejecting this rather passive scenario, she herself had made the creative jump to market language. Either way, Thatcher had changed her mind.⁷⁵ She now embraced the relevance of the market in shaping key areas of government science, and had already moved into ‘tactical’ considerations of how to sell the conclusion. The lady had turned. She had recognized a ‘primary objective’.

REVERSING THE TREND

There is no doubt that the parties to the Downing Street meeting felt that a fundamental change in policy had been decided. The meeting had ended on a conspiratorial note.

Heath ruled that the Rothschild study of the structure and organization of the research councils would continue its work, but no public announcement would be made; ‘In the meantime, the Secretary of State should temporize when she gave evidence. . . . There was no objection to its being known that the Government had put an inquiry in hand, but the direction which the inquiry was taking should for the time being remain confidential.’⁷⁶

When eventually published, in a complex process that made the Rothschild Report an annex to a green paper that held opposing views, Rothschild’s views met a chorus of criticism.⁷⁷ ‘My report evoked squeals of anger, Gadarene-like in their intensity, from the scientific establishment’, recalled Rothschild in a lecture, adding that 121 scientists and doctors had signed letters of protest to *The Times*.⁷⁸ The impact of the report was complex, but the report did indeed trigger a messy process of reform of government-funded science in which customer–contractor relationships figured strongly. In her memoirs, Margaret Thatcher would insist, rather implausibly, that protection of pure science was her main concern.⁷⁹ Although her 1972 anniversary speech at the Royal Society contained some mollifying pieties about the continuing place for ‘fundamental research’,⁸⁰ other documents from the time show that any concern for pure science was secondary to acceptance of the Rothschild principles.⁸¹ ‘The adoption of these principles,’ Rothschild had written,

which are used in industry here and in America, will almost certainly result in economies in R&D expenditure, though this is by no means the only reason for the system, which should be applied whether the Department is concerned with tanks, coronaries, vegetables, standards, statutory responsibilities, fish or aircraft.⁸²

Furthermore, once departments were buying research services from an internal market, it was a natural extension to ask for those internal suppliers to compete against external suppliers under the model of market testing. In the British context, the Rothschild report made a significant contribution towards a market turn in the sciences, directly in the case of the UK.

However, arguably this was not the most important turn to emerge from this episode, which instead lies in its significance as a crossroads in global paths towards the marketization of state functions, and therefore, ultimately if indirectly, for science in an international context. Historians of Thatcherism agree that Margaret Thatcher did not embrace a radical political agenda until the early 1970s. For example, in her 1968 lecture to the Conservative Political Centre, assessed by Young as her ‘first comprehensive attempt at an articulate political philosophy’, she spoke against ‘excessive government, but in terms that were inoffensive to the views of Heath and the leadership’.⁸³ Only when the Heath administration was utterly shaken by a series of provoked and contingent events—a miners’ strike that raised the question ‘Who rules the country?’, the oil crisis, government interventions to save failing industries, and defeat in the general election of October 1974—did a context arise in which politicians of the right rethought their political philosophies. In particular, as Young emphasizes, Thatcher in Heath’s government was not the ‘frustrated monetarist’ of mythology but a substantial public spender, in an administration that shared a political and economic world view. ‘Two conclusions already seem inescapable’, writes Young:

One is that if the body of liberal economic ideas later known as Thatcherism already existed in the Conservative Party from 1965 onwards, it was a puny growth. It had no roots and carried only the feeblest conviction

It follows from this, secondly, that the images of betrayal in which these years have so often been portrayed are mostly convenient fantasy. By his shifts and turns Heath betrayed

nothing—because there was no significant body of opinion in the party that wanted him to do anything else . . .⁸⁴

The change came from a tight coterie around Margaret Thatcher and Keith Joseph, who had had a ‘road to Damascus’ experience in April 1974 and began attacking Heath and calling for severe cuts in government spending, published as *Reversing the trend* in 1975. ‘It is safe to say’, writes Young, ‘that Sir Keith spoke for her, at a time when she herself said little.’ Thatcher challenged Edward Heath for leadership of the Conservative Party in February 1975, and won. Her radical right policies were well developed by the time that she became prime minister in 1979.

But when did Thatcher start believing in Thatcherism? If by Thatcherism we mean economic liberalism, then biographers such as Young trace a flow of ideas that had its recent source in Hayek’s *Road to Serfdom*, that continued as a trickle in the small Institute for Economic Affairs in the 1950s, and London School of Economics economist Alan Walters and Alfred Sherman’s Centre for Policy Studies (CPS) in the 1960s, and that became significant on the main political stage only in 1974, with the conversions of Keith Joseph and Thatcher.⁸⁵ However, the problem with accounting for neoliberalism as a triumph of ideas is that very few economists accepted them. Even when Thatcher, as prime minister, introduced the monetarist budget of 1981, the bulk of academic economists (numbering 364) signed a letter advising against it. As Prasad writes, ‘the ideas of supply-side economics never convinced more than a handful of people in the 1970s and early 1980s . . . the real question is why this small number of people acquired such disproportionate power.’⁸⁶ However, if we add to this picture the real choices made in policy settings by politicians, then the 1971 reversal of science policy stands out as a concrete and early moment when Thatcher chose the market as an alternative to established models of resource allocation. I suggest that we look to this and other concrete decision-making moments: we might find a train of episodes within which Thatcher became a Thatcherite. Furthermore, science had a peculiarly significant strategic position for Thatcher, for two reasons. First, science represented the best of the public economy, and the research councils (at least the science and medical variants, not the environmental and certainly not the Social Science Research Council), alongside grammar schools and Oxbridge, as places where the public economy worked. Her esteem for elite scientists, recorded in her memoirs, seems genuine and unforced. Thatcher enjoyed repeating an anecdote about a great scientist and a great politician: ‘When Gladstone met Michael Faraday, he asked him whether his work on electricity would be of any use. “Yes, sir”, remarked Faraday with prescience. “One day you will tax it.”’⁸⁷

She viewed science as a source of wealth, and therefore as a justified expenditure from the public purse. Yet this elevation made science even more of a test case for her developing views on economic liberalism. If markets could work for science policy, they could work anywhere.

The second effect worked in the opposite direction. Margaret Thatcher had lived the life of the working research scientist, as a final-year chemistry student in Dorothy Hodgkin’s X-ray crystallography laboratory, as an investigator of glues for BX and as a food chemist for Lyons & Co. Perhaps the most important effect of this experience was a negative one: it was precisely because Thatcher knew what scientific research was like that made her impervious to claims that science was a special case, with special features and incapable of being understood by outsiders, and therefore that science policy should be left in the

hands of scientists. Such a strategy of persuasion and protection might have considerable purchase on a science minister with no direct experience of the working life of a scientist, but not Thatcher. The Royal Society's insistence on consultation as part of the Rothschild process came from more than a professional association's belief that it represented its members. The right to consultation, it was felt, was justified in the same way that the autonomy of research councils over political direction was justified, because the success of science depended on its independence and separation. Thatcher, who lived both worlds, saw no separation, in principle and in practice.

NOTES

- 1 Thatcher, of course, is by no means unique as a major political figure with substantial scientific or technical training. A list may be composed, including Angela Merkel (physicist), Hu Jintao (hydraulic engineer), Jimmy Carter (naval nuclear training) and Leonid Brezhnev (engineering) among world leaders, and Stafford Cripps (chemist) and Richard Beeching (physicist) in UK politics.
- 2 Hugo Young and Anne Sloman, *The Thatcher phenomenon* (British Broadcasting Corporation, London, 1986), p. 28. 'Thatcherism' I understand to be the promotion of economic liberalism combined with a strong, if restricted, state.
- 3 Dennis Kavanagh, *Thatcherism and British politics: the end of consensus?* (Clarendon, Oxford, 1987); Richard Cockett, *Thinking the unthinkable: think-tanks and the economic counter-revolution, 1931–1983* (HarperCollins, London, 1995).
- 4 This paper is a contribution to a growing literature that moves between the sociology of science and political science. The title is a nod to Mario Biagioli's *Galileo, courtier: the practice of science in the culture of absolutism* (University of Chicago Press, 1993), in which the protagonist moved from an academic–scientific identity (as a mathematician) to a philosopher–courtier. Thatcher also traces this movement from science to politics. Another parallel track is with Bruno Latour's *Pasteurization of France* (Harvard University Press, Cambridge, MA, 1988), but here the pasteurization argument runs backwards and in a different direction: not making a country like a laboratory, but making laboratories more like a market.
- 5 Hugo Young, *One of us: a biography of Margaret Thatcher* (Macmillan, London, 1989). A 'quite outstanding book, which brilliantly transcends the ephemerality of instant journalism, and will remain required reading for as long as Mrs Thatcher continues to fascinate contemporaries and intrigue posterity—which means for a very long time indeed', gushed David Cannadine, *History in our time* (Yale University Press, New Haven, 1998), p. 290.
- 6 Young, *op. cit.* (note 5), p. 16.
- 7 Bruno Latour and Steve Woolgar, *Laboratory life: the construction of scientific facts* (Princeton University Press, 1986).
- 8 For the first two reasons, see John Campbell, *Margaret Thatcher*, vol. 1 (*The grocer's daughter*) (Jonathan Cape, London, 2000), pp. 35–36; for the last reason, see Penny Junor, *Margaret Thatcher: wife, mother, politician* (Sidgwick & Jackson, London, 1983), p. 12. See also Young, *op. cit.* (note 5), p. 11.
- 9 One contemporary example among many was Rachel Carson; see Linda J. Lear's biography *Rachel Carson: witness for nature* (Henry Holt, New York, 1997). See also the overview provided in Sally Gregory Kohlstedt, 'Women in the history of science: an ambiguous place', *Osiris* (2) **10**, 39–58 (1995).
- 10 Russell Lewis, *Margaret Thatcher: a personal and political biography*, 1st edn (Routledge & Kegan Paul, London, 1975), p. 12.
- 11 See, for example, Kenneth Harris, *Thatcher* (Weidenfeld & Nicolson, London, 1988), p. 47.

- 12 Lewis, *op. cit.* (note 10), p. 12.
- 13 The Oxford science landscape on the eve of war is admirably set out in Jack Morrell, *Science at Oxford, 1914–1939: transforming an arts university* (Clarendon Press, Oxford, 1997).
- 14 John Roche, ‘The non-medical sciences, 1939–1970’, in *The history of the University of Oxford* (ed. Brian Harrison), vol. 8 (*The twentieth century*), pp. 251–289 (Clarendon, Oxford, 1994).
- 15 Quoted in Young, *op. cit.* (note 5), p. 16. Hugo Young and Anne Sloman, *The Thatcher phenomenon* (British Broadcasting Corporation, London, 1986), p. 17. Thatcher was indeed awarded a second-class degree, although she also won the Kirkaldy Prize for a third-year essay in the natural sciences. Junor, *op. cit.* (note 8), p. 22. Lord Annan, claiming to be puzzled by the ‘virulence’ of his fellow intellectuals’ loathing of Thatcher, summarized: ‘Harold Wilson was a man who respected complex ideas and intellectuals, but she had the mind of second-class graduate in chemistry incapable of making adjustments between economic and social goals.’ Noel Annan, *Our age: the generation that made post-war Britain* (Fontana, London, 1991), p. 590.
- 16 Her ‘distinguishing feature’, as President of the Oxford University Conservative Association, was ‘her energy and her belief in widening the party’s appeal at a time when some despaired of it’, and certainly not any early signs of Hayekian economic radicalism. Brian Harrison, ‘Politics’, in Harrison, *op. cit.* (note 14), pp. 377–412, at p. 393.
- 17 Junor, *op. cit.* (note 8), pp. 21–22.
- 18 Young, *op. cit.* (note 5), p. 16.
- 19 Y. M. Gall and M. B. Konashev, ‘The discovery of Gramicidin S: the intellectual transformation of G. F. Gause from biologist to researcher of antibiotics and on its meaning for the fate of Russian genetics’, *Hist. Phil. Life Sci.* **23**, 137–150 (2001).
- 20 Junor, *op. cit.* (note 8), p. 23. Hugh Gordon, ‘Richard Laurence Millington Synge’, *Biogr. Mem. Fell. R. Soc.* **42**, 454–479 (1996).
- 21 Brenda Maddox, *Maggie: the first lady* (Hodder & Stoughton, London, 2003), p. 41.
- 22 Georgina Ferry, *Dorothy Hodgkin: a life* (Granta Books, London, 1998), p. 241.
- 23 Lewis, *op. cit.* (note 10), p. 16. Junor, *op. cit.* (note 8), pp. 25–26.
- 24 Lewis, *op. cit.* (note 10), p. 13. Junor, *op. cit.* (note 8), p. 14. Harris, *op. cit.* (note 11), p. 47. Harris cites a newspaper interview with Margaret Thatcher, presumably the source for all later accounts, by Geoffrey Parkhouse, *Sunday Express*, 20 July 1975.
- 25 Although she may, at this stage, have been saving money to retrain.
- 26 Margaret Thatcher, *The path to power* (HarperCollins, London, 1995), p. 62. *The path to power* is the second volume of memoirs, after *The Downing Street years* (1993). It is fair to say that *Path* is a collaborative work between the ageing politician and a team of assistants.
- 27 Hackney Borough Archives; British Xylonite collection. Note: the patents held by BX were also exploited at American Zylonite, based at Zylonite, Adams, MA.
- 28 Margaret Roberts, Audrey Powell and Eileen Rutherford were the first three women to be employed by BX ‘in this capacity’, notes Junor, *op. cit.* (note 8), p. 29. The future Mrs Thatcher received £350 per annum, £50 less than the men. Campbell, *op. cit.* (note 8), p. 67.
- 29 Campbell, *op. cit.* (note 8), p. 67. Maddox, *op. cit.* (note 21), p. 43. Campbell records that she also attracted the eye of the son of the chairman: ‘he recalled Miss Roberts as not merely “the only good-looking woman in the research laboratory” but also an excellent chemist—“very go-ahead”. She always seemed to get her way, particularly in securing equipment and materials she needed to conduct her experiments.’
- 30 Young, *op. cit.* (note 5), p. 29.
- 31 Campbell, *op. cit.* (note 8), p. 74.
- 32 H. H. G. Jellinek and M. H. Roberts, ‘The saponification of α -monostearin in a monolayer’, *J. Sci. Fd Agric.* **31**, 391–394 (1951).
- 33 Thatcher, *The path to power*, *op. cit.* (note 26), p. 67.

- 34 'His professional interest in paint and mine in plastics may seem an unromantic foundation for a
friendship, but it also enabled us right away to establish a joint interest in science'. Thatcher, *The*
path to power, *op. cit.* (note 26), p. 66.
- 35 Young, *op. cit.* (note 5), p. 32.
- 36 Lewis states that the Lyons job was taken just to be in commuting distance of Dartford. Lewis,
op. cit. (note 10), p. 18. So does Harris: Harris, *op. cit.* (note 11), p. 51. Junor writes of Lyons:
'This job, like her work at BX Plastics, represented no more than a means of earning money to
support her political aspirations.' Junor, *op. cit.* (note 8), p. 31.
- 37 Thatcher, *The path to power*, *op. cit.* (note 26), p. 83.
- 38 Campbell, *op. cit.* (note 8), p. 107.
- 39 John Campbell, *Margaret Thatcher: grocer's daughter to Iron Lady* (Vintage, London, 2009),
p. 26.
- 40 Richard R. Nelson, 'The simple economics of basic scientific research', *J. Polit. Econ.* **67**, 297–
306 (1959).
- 41 Philip Mirowski and Esther-Mirjam Sent (eds), *Science bought and sold: essays in the*
economics of science (University of Chicago Press, 2002), p. 22.
- 42 The vigour and emphasis on rationality of the early Heath administration match, at least, the
technocratic gloss of the Wilson years. For a variety of assessments of Heath's administration
see Stuart Ball and Anthony Seldon (eds), *The Heath Government, 1970–74: a reappraisal*
(Longman, London, 1996). A good, but in the context of this paper surprisingly irrelevant,
review of science and technology policy under Labour is David Edgerton, 'The "White Heat"
revisited: the British government and technology in the 1960s', *Twentieth Cent. Br. Hist.* **7**,
53–82 (1996).
- 43 Peter Hennessy, *Whitehall* (Secker & Warburg, London, 1989), pp. 220–222.
- 44 David Hounshell, 'The Cold War, Rand and the generation of knowledge, 1946–1962', *Hist.*
Stud. Phys. Biol. Sci. **27**, 237–267 (1997).
- 45 Hennessy, *op. cit.* (note 43), p. 226.
- 46 *Ibid.*, p. 223.
- 47 There is a marvellous anecdote testifying to Miriam Rothschild's dedication to her research in
Gerald W. Esch, *Parasites, people and places: essays in field parasitology* (Cambridge
University Press, 2004), p. 4.
- 48 Kenneth Rose, *Elusive Rothschild: the life of Victor, Third Baron* (Weidenfeld & Nicolson,
London, 2003), p. 41.
- 49 'Wealth sat uneasily on his conscience. He liked to present himself as a meritocrat whose record
of scientific research and public service owed little to his name, even less to his money. . . . He
was furiously resentful when a scientist at a research establishment introduced him to a party of
Japanese visitors with the flourish: "And here we have Lord Rothschild, one of the richest men in
the world." It was, he insisted, both inaccurate and vulgar.' Rose suggests that the meritocratic
norms of science were part of its attraction. 'Scientific research was for him an enclosed world in
which neither his name nor his money, wartime exploits nor government patronage, could pave
the way to the top.' Rose, *op. cit.* (note 48), pp. 143 and 124, respectively.
- 50 Rose, *op. cit.* (note 48), p. 67.
- 51 The National Archives, Records of the Prime Minister's Office (hereafter TNA PREM) 15/1406.
Mark Schreiber to Lord Privy Seal, 14 August 1970.
- 52 The seven characteristics were: (i) 'Intensely political in his motivation—that is to say
passionately keen that the new Government succeeds . . .', (ii) 'Able to think speculatively and
intuitively', (iii) 'Able to recognize when a piece of analysis . . . is complete and technically
good', (iv) 'Competent to decide which particular skills need to be applied for an
interdisciplinary approach to any issue', (v) 'Able to organize and enthuse staff', (vi) 'Able
to talk directly with Ministers and senior Departmental officers without being patronized,
feared, or distrusted', and (vii) ' . . . a committed Conservative'.

- 53 TNA PREM 15/1406. Jellicoe to Heath, 20 August 1970. Jellicoe to Heath, 2 September 1970.
- 54 Tessa Blackstone and William Plowden, *Inside the Think Tank: advising the Cabinet, 1971–1983* (William Heinemann, London, 1988), p. 26.
- 55 There is no discussion of Rothschild’s fitness in the expected file. The discussion from August to October 1970 does not mention Rothschild. The next documents announce Rothschild’s appointment on 29 October 1970. The file has been filleted.
- 56 TNA PREM 15/1406. Rothschild, ‘The work of the Central Policy Review Staff (CPRS)’, February 1971.
- 57 TNA PREM 15/1406. Trend to Heath, 2 March 1971.
- 58 Phillip Gummett, *Scientists in Whitehall* (Manchester University Press, 1980). Tom Jagtenburg, *Social construction of science: a comparative study of goal direction, research evaluation and legitimation* (D. Reidel, Dordrecht, 1983), p. 52. Tom Wilkie, *British science and politics since 1945* (Blackwell, Oxford, 1991), pp. 30–33. Herbert Gottweis, ‘Political economy of British biotechnology’, in *Private science: biotechnology and the rise of the molecular sciences* (ed. Arnold Thackray), pp. 105–130 (University of Pennsylvania Press, Philadelphia, PA, 1998), at p. 123.
- 59 Formally, the ARC was constituted as a Committee of the Privy Council for Agricultural Research. For UK agricultural research policy, see G. W. Cooke (ed.), *Agricultural research, 1931–1981: a history of the Agricultural Research Council and a review of developments in agricultural science during the fifty years* (Agricultural Research Council, London, 1981), and Colin Thirtle, Paolo Palladino and Jenifer Piesse, ‘On the organization of agricultural research in the United Kingdom, 1945–1994: a quantitative description and appraisal of recent reforms’, *Res. Pol.* **26**, 557–576 (1997).
- 60 TNA PREM 15/408. William Armstrong, ‘Note for the record’, 31 July 1970.
- 61 Hugh Percy, the 10th Duke of Northumberland, chairman of the Medical Research Council, ex-President of the Royal Agricultural Society of England, and successor to Rothschild as chair of the ARC (1958–68), favoured reorganization. So did Sir Basil Engholm, permanent secretary at MAFF, and Solly Zuckerman.
- 62 TNA PREM 15/408. ‘Extract from note of meeting between Prime Minister, Secretary of State for Social Services and Secretary of State for Education and Science’, 31 December 1970.
- 63 TNA PREM 15/408. Robert Armstrong to Heath, 5 March 1971.
- 64 Ibid.
- 65 TNA PREM 15/408. Rothschild, ‘How to ensure that 80% of the Agricultural Research Council’s programme is “user-orientated” without putting it under MAFF’, 10 March 1971.
- 66 *The organisation and management of government R&D* [Rothschild Report], published as an annex to the Cabinet Office green paper *A framework for government research and development* (HMSO, London, November 1971).
- 67 TNA PREM 15/408. Rothschild to Heath, 14 April 1971.
- 68 TNA PREM 15/408. Hodgkin to Heath, 1 April 1971.
- 69 For a sketch of the relationships between these figures see Lewis Baston and Anthony Seldon, ‘Number 10 under Edward Heath’, in Ball and Seldon, *op. cit.* (note 42), pp. 47–74.
- 70 The new chief scientific adviser, the metallurgist Alan Cottrell, who replaced Zuckerman, was not invited. However, Cottrell offered no resistance, at least if Rothschild’s report to Heath, that the CSA ‘agrees with the contents’ of an early version of the Rothschild report, was an accurate representation of his views. For other ways in which Cottrell was excluded from policy-making, see Blackstone and Plowden, *op. cit.* (note 54), p. 144.
- 71 TNA PREM 15/408. Armstrong, ‘Note for the record’, 21 April 1971.
- 72 She voiced support, at this stage, for the proposals of the report being written by Lord Dainton, which confirmed the *status quo*, and represented in formal terms the established science position.
- 73 Under this scheme, the Science Research Council and University Grants Committee would pick up responsibility for ‘fundamental research’, which would generally not be conducted in government establishments.

- 74 Armstrong, *op. cit.* (note 71).
- 75 A word of warning is, however, relevant. Government memoranda are expertly crafted documents, written by skilled wordsmiths. A memorandum does not record the precise words used but is a senior civil servant's rendition, in concise terms acceptable to all parties to the meeting. What is and is not recorded, as well as how events are recorded, is the outcome of a particular writing context, in which all parties, including the discreet civil servant, have interests.
- 76 Armstrong, *op. cit.* (note 71).
- 77 Internal criticism and negotiation can be found in TNA Cabinet Papers (CAB) 168/226. The choreography of the publication can be traced in TNA CAB 168/227. The episode was reviewed in Roger Williams, 'Some political aspects of the Rothschild affair', *Sci. Stud.* **3**, 31–46 (1973).
- 78 Rothschild, 'Pure and applied research' (the Trueman Wood Lecture to the Royal Society of Arts, 8 December 1971), reprinted in Rothschild, *Meditations on a broomstick* (Collins, London, 1977), pp. 68–83.
- 79 'I arrived at the Department of Education with a strong personal interest in science, and the science responsibilities of the DES were mine alone. At that time a block sum was allocated on the advice of scientists between the five research councils. . . . But discussion of science policy was soon dominated by the Central Policy Review Staff (CPRS or "think tank") Report which formed the basis of the White Paper of July 1972, A Framework for Government Research and Development. Its central recommendation was that a proportion of this money should henceforth be allocated to the relevant Government department so that it could decide the projects to be financed by its own council—the so-called "customer-contractor" principle. Although I did not oppose the principle, I was worried that it would reduce the amount of money at the direct disposal of the research councils—unless there was an increase in the total science budget.
- 'All this may seem of limited importance. And indeed in terms of overall science policy it was. That was part of the problem. Arguments about the precise relations between departments and research councils were irrelevant to the wider and crucially important question of the Government's strategic role in scientific research. Ted's view was that pure research was not really work for Government-funded research and development, though he recognized that in any research establishment there was bound to be some proportion of pure or basic research. My view was precisely the opposite. It was only years later, when I was Prime Minister, that I was able to formulate my own answer to the problem, which was that Government should concentrate on funding basic science and leave its application and development to the private sector. But I already felt deeply uneasy about any policy that threatened to starve pure science of funds'. Thatcher, *The path to power, op. cit.* (note 26), pp. 174–175.
- 80 'Anniversary dinner 1972', *Notes Rec. R. Soc. Lond.* **28**, 1–9 (1973). 'Despite the claims of commissioned research, the needs of fundamental research must never be forgotten'. Even Rutherford, she said, had considered atomic energy 'moonshine'. 'We only know that unless we continue this kind of research and continue to put a great deal of money into it, we shall lack the capacity to make the maximum contribution in years to come to the future of this country and to other countries too.'
- 81 'I had a talk *a deux* with the Secretary of State for Education and Science. . . . She said that she herself was not inclined to dissent from the philosophy of the Rothschild Report although she felt that certain important proposals—for example the proposed percentage "split" between pure and applied research. . . .—were open to question.' TNA CAB 168/227. Jellicoe to William Armstrong, 7 October 1971.
- 82 TNA CAB 168/226. Rothschild, 'Framework for government R&D', 13 April 1971.
- 83 Young, *op. cit.* (note 5), pp. 63–64. Intriguingly, the example that Thatcher fixed upon as her core illustration of the excesses of government was the threat to personal privacy from the

computerization of bureaucratic records. The privacy issue rose very rapidly to prominence in the late 1960s, a phenomenon that still lacks adequate historical explanation. See Jon Agar, *The government machine* (MIT Press, Cambridge, MA, 2003), p. 361.

84 Young, *op. cit.* (note 5), pp. 79–80.

85 Richard Cockett, *Thinking the unthinkable: think-tanks and the economic counter-revolution, 1931–1983* (HarperCollins, London, 1995). Thatcher records that it was only ‘at the end of May 1974 that I first became directly involved with the CPS.’ She adds ‘The CPS was the least bureaucratic of institutions. . . . Alfred Sherman has caught the feel of it by saying it was an “animator, agent of change, and political enzyme”.’ Thatcher, *The path to power, op. cit.* (note 26), p. 252.

86 Monica Prasad, *The politics of free markets: the rise of neoliberal economic policies in Britain, France, Germany and the United States* (University of Chicago Press, 2006), p. 20. Prasad’s central, and counterintuitive, argument is that Britain and the USA embraced neoliberalism, in contrast with Germany and France, ‘not because the Left in each country [Germany and France] was weak, but because in the postwar period it had in some ways been so strong. American and British tax policies were more progressive, American and British industrial policy more adversarial to business, and the American and British welfare states more redistributive, and these structures . . . proved fragile.’ Thatcherism is therefore explained as catalysed by the ‘strength of labor’. Furthermore, the ideas alone had little power, and their uptake depended on state actors seeing advantages, especially electoral advantages, in their selective translation into practice. Prasad, *op. cit.*, pp. 3 and 102–103.

87 Thatcher, *The path to power, op. cit.* (note 26), p. 176. The anecdote is of dubious origin: there is no evidence for the conversation, and other versions on record have Faraday addressing other politicians. F. A. J. L. James, private communication.