

The Three Merton Theses

VIDAR ENEBAKK University of Oslo, Norway

ABSTRACT In this article I examine the historical background to Merton's formulation of the scientific ethos, especially in relation to his dissertation, published in 1938 as *Science, Technology and Society in Seventeenth-Century England*. Here Merton outlined the so-called 'Merton thesis', and I emphasize how both the content and the context of the monograph is related to his formulation of an 'ethos of science' – introduced for the first time in 1938 in 'Science and the Social Order'. Three different readings can, however, highlight different aspects of Merton's monograph, thus the article attempts to enrich the understanding both of the ethos of science and of Merton as a politically engaged social scientist by discussing 'The Three Merton Theses'.

KEYWORDS Hessen, history of science, Merton, science, social responsibility of science, technology and society, visible college, Werskey

The Merton Thesis

The main topic of *Science, Technology and Society in Seventeenth-Century England* (Merton, 1938a) was the emergence of the Royal Society in London, while the so-called 'Merton thesis' concerns the relationship between science and religion. Contrary to the assumed opposition, Merton argued for an intrinsic compatibility between the ethos of science and the ethos of Puritanism. According to Merton, the spread of Puritan values encouraged the growth of modern science in 17th-century England – a thesis similar to Weber's in *The Protestant Ethic and the Spirit of Capitalism* (1958 [1904–5]) regarding the religious context of the rise of modern capitalism.

Having analysed a total of 6034 scientific biographies in the *Dictionary of National Biography*, Merton identified a remarkable shift in 'foci of interest' among the intellectual elite in the mid-17th century towards acknowledging science as a

noble pursuit. The initial statistical analysis contained in the first three chapters of Merton's monograph indicates that the social esteem of science was being elevated during this period. Only later, at the end of the sixth chapter, does Merton put forward the 'crucial experiment' – the experimental test of his thesis regarding Puritanism and the rise of science. A review of the initial members of the Royal Society in 1663 indicated that a majority of the scientists (42 out of 68, or 62 per cent) were Puritans. When correlated with the small proportion of Puritans within the general population, this over-representation was even more remarkable (Merton, 1938a: 473; for references to the 1970 edition, subtract 359 pages).

Still, it is not obvious what the Merton thesis really involves. What is Merton actually trying to explain? How is he really explaining it? In his article 'Misunderstanding the Merton Thesis', Gary Abraham (1983) provides some important clarifications as to the what?-question, regarding Merton's use of the concepts 'religion' and 'science'. Both concepts, he argues, are to be regarded as institutional. This, in turn, requires a clear understanding of the process of institutionalization.

In the mid-17th century, religion was a dominant cultural value legitimizing various social institutions such as the king, the church and the universities. Hence Merton was not primarily concerned with Puritanism in any formal sense, or with articulated doctrines or specific sects or groups. Rather, he referred to a 'Puritan ethos' that motivated Puritans towards the pursuit of science. With their 'intramundane interest' in reshaping this world through social welfare, education and industry, these Puritans cherished cultural values such as empiricism, realism, utility and anti-traditionalism. Hence, the values of Puritanism and the values of science were congenial. Science was being embraced as the 'handmaid of socio-economic utility'. Puritanism is therefore not to be understood as a motivation or a cause for the pursuit of science. No-one is ever cited in the monograph as defining Puritanism as a motive in this sense. Rather, religion was used to justify and legitimize science, Merton explains: '... religion sanctioned science and raised the social estimation of those who pursued scientific investigation' (1938a: 431). Such arguments, according to Abraham, 'acted on the popular religious mind as motives for accepting those who did science' (1983: 372). In this sense the Puritanism of Francis Bacon was used to raise the acknowledgement and acceptance of science within the broader culture.

With regard to science, the focus is not so much on the scientific activity itself, but rather on how science became institutionalized towards the mid-17th century. Merton, we might say, was interested in the rise of interest in science. The focus is not primarily on the formal funding of the Royal Society, but rather on the process by which science became fashionable and highly approved within the broader culture. Science became acknowledged and institutionalized as a social value in itself, no longer in need of further justification: 'Institutionalized values are conceived as self evident and require no vindication' (Merton, 1938a: 442). Through journals, academies, societies and patronage, science was gradually being assimilated and absorbed into the religious culture.

Now, how did Merton explain this correlation of science and Puritanism? This is the main question discussed by Steven Shapin in his article 'Understanding the Merton Thesis', published in 1988, where he tries to identify the explanatory framework developed in Merton's monograph. According to Shapin, the explanatory model must be understood in relation to Vilfredo Pareto and his concept of 'motivating sentiments'. These sentiments are underlying motivating structures influencing both articulation and action: 'Sentiments, therefore, are the theoretically posited mental entities that make Merton's system go, that lie behind the expression of religious values and exert force upon social action' (Shapin, 1988: 598). The explanatory role of the Puritan ethos is thus not embedded in articulated doctrines or in formal institutions, but is rather a social-structural patterning entity. Further, these sentiments should not be understood as stable causal entities, but ones that may be affected by both words and deeds: 'We are to understand that the causal item that motivates social action is also an effect of that action' (Shapin, 1988: 601).

Further, Shapin argues, Merton's model did not imply a mono-causal kind of social reductionism, explaining the rise of science by reference to Puritanism, but rather modes of interaction and 'mutual dependence' between the ethos of Puritanism and the ethos of science. According to Shapin, Puritanism was not the only, and not necessarily the strongest, factor accounting for the emergence of science. Likewise, the rise of science within Catholic environments did not imply a refutation of Merton's thesis.

Finally, and now with reference to the explanandum, Shapin argues that Merton's social-structural model did not imply that scientific knowledge was being ascribed to social factors: 'Neither in his 1938 text nor in subsequent writings was Merton ever concerned to adduce social factors to explain the form and content of scientific knowledge or scientific method' (Shapin, 1988: 594). Later, when Shapin, Barnes and Bloor contributed the sociology of scientific knowledge (SSK) usually associated with the Edinburgh School, the extension of sociological analysis to the realm of knowledge was the central question in their critique of the Mertonian sociology of science. According to Shapin, 'Merton's early work is the first site in which the internal and external were systematically invoked' (1992: 337). This might, in fact, be described as a fourth thesis put forward in *Science, Technology and Society in Seventeenth-Century England*.

To the extent that Merton formulated any single question for his inquiry in his 1938 monograph, it is introduced at the beginning of Chapter 4, before he outlines the Puritan ethos: 'What were the consequences for the new science of the powerful motivations which derived from Puritanism?' (Merton, 1938a: 415). The thesis itself is usually inferred from the conclusion of Chapter 6: 'Puritanism, and ascetic Protestantism generally, emerges as an emotionally consistent system of beliefs, sentiments and action which played no small part in arousing a sustained interest in science' (Merton, 1938a: 495). And the final and careful conclusion of the monograph sums it up: 'On the basis of the foregoing study, it may not be too much to conclude that the cultural soil of seventeenth century England

was peculiarly fertile for the growth and spread of science' (Merton, 1938a: 597). Hence, the explanatory framework was not reductionist or externalist, but rather portrayed an interaction between the Puritan ethos and the ethos of science.

The Ethos of Science

Yet there was no explicit reference to 'ethos of science' or 'scientific ethos' in Merton's 1938 monograph. Rather, he spoke of 'the Puritan ethos' accompanied by 'the same values in science'. The concept was nevertheless introduced in the same year by another publication on 'Science and the Social Order' (Merton, 1938b). Here the context was the rise of Nazism and how recent changes in the social order and institutional structure in Germany could curtail and possibly prevent the pursuit of science. Just as the 'cultural soil of seventeenth-century England was peculiarly fertile for the growth and spread of science', the opposite was the case in Nazi Germany in the mid-1930s. Departing from an observation made by Max Weber – that 'the belief in the value of scientific truth is not derived from nature but is a product of definite cultures' – Merton went on to emphasize that the 'persistent development of science occurs only in societies of a certain order, subject to a particular complex or tacit presuppositions and institutional constraints'. This social code, or set of sentiments, was further described as 'the institutionalized norms of science' – or simply as 'the ethos of science'. According to Merton '... the ethos refers to an emotionally toned complex of rules, prescriptions, mores, beliefs, values and presuppositions which are held to be binding upon the scientist.' These rules of the game were further defined and characterized by five terms: impersonality, intellectual honesty, integrity, disinterestedness and organized scepticism (Merton, 1938b: 326–7) – what we might call the IIDOS, as distinct from Merton's 1942 formulation of the CUDOS (acronym for the norms Communism, Universalism, Disinterestedness and Organized Scepticism).

Although Merton explicitly referred to Weber in 1938 in his formulation of the ethos, Weber's influence on the thesis published the same year is less straightforward. Even though Talcott Parsons, one of his teachers at Harvard, in 1930 had translated *The Protestant Ethic and the Spirit of Capitalism* (1958), it seems misguided to consider Weber as the inspiration for the thesis on the happy marriage between Protestantism and science. 'Rather, it happened in quite another way', Merton informs us in his preface to the 1970 edition of *Science, Technology and Society in Seventeenth-Century England*:

In the course of reading the letters, diaries, memoirs and papers of seventeenth-century men of science, the author slowly noted the frequent religious commitments of scientists in this time, and even more, what seemed to be their Puritan orientation. Only then ... was he belatedly put in mind of that intellectual tradition, established by Max Weber, Troeltsch,

Tawney and others, which centered on the interaction between the Protestant ethic and the emergence of modern capitalism.

(Merton, 1970: xvii)

Only later, when consulting Weber's work to see whether he might have said anything about science, did Merton (re)discover that Weber had in fact made extensive remarks about science and technology: 'Once identified, Weber's recommendation became mandate' (Merton, 1970: xvii).

Where, then, did Merton find the inspiration to look for a sociological connection between the members of the Royal Society and their Puritan orientation? Is it so obvious that the initial idea came from sociology as such or from sociological literature?

The greater part of *Science, Technology and Society in Seventeenth-Century England* was originally submitted as Merton's doctoral dissertation at Harvard University in December 1935 (Cohen, 1990: 21–8). Having spent the previous two years in the Widener Library at Harvard, under the supervision of George Sarton, Merton was actually trained in the history of science before he eventually became the founding father for the sociology of science. When Sarton invited him to join the editorial board of *Isis* in 1938, there was no 'Sociology of Science' in any institutionalized sense, hence the new department entrusted to Merton was entitled 'Social Aspects of Science' (Sarton, 1938: 103). And only after having submitted his thesis, was Merton advised by Sarton to consult the German tradition of Wissenssoziologie, which resulted in his article 'The Sociology of Knowledge' (Merton, 1937, 1977: 64) – thus ruling out this literature as a source of inspiration for his 1935 thesis. Rather, two historical studies of scientific societies seem to be of great importance.

First, Merton was greatly indebted to Martha Ornstein's book *The Rôle of Scientific Societies in the Seventeenth Century* – submitted as her doctoral dissertation at Columbia in 1913 (supported by Veblen and Robertson). Her institutional approach had revealed the twofold function of these new societies, both in scientific investigation and in propaganda, and she emphasized the 'organized support which science needed in order to penetrate into the thought and lives of people' (Ornstein, 1975 [1928]: 261). Francis Bacon was among the central figures in her book, and his outline for 'Solomon's House' in New Atlantis – understood as a blueprint for the Royal Society – was included as an appendix. In his monograph Merton described Ornstein's book as an 'exemplary study' (Merton, 1938a: 413). And when Ornstein and Merton were reviewed together in the *American Sociological Review*, Marjorie Nicolson described Ornstein as 'a pioneer in an important chapter in intellectual history', stating further that 'Mr. Merton's conclusions in regard to the relation between Puritanism and the scientific spirit, while opposed to many of the older generalizations, are entirely in line with the conclusions drawn during the last few years by literary historians' (Nicolson, 1938: 884).

Another obvious source of inspiration is Richard Foster Jones, Professor of English Literature at Stanford. His book *Ancients and Moderns* was published in 1936, and as the subtitle makes clear, it is not so much concerned with the famous 'Battle of the Books' in the late 17th century as with the broader cultural background. The origin of the humanistic dispute, according to Jones, was the previous conflict between ancients and moderns within natural philosophy (later outlined in Merton's *On the Shoulders of Giants*, 1993 [1965]). Studying the influence of Bacon, Jones came to realize the importance of Puritanism in the rise of modern science:

The materialism, utilitarianism, democracy, social-mindedness, humanitarianism, and anti-authoritarianism, explicit or implicit in his writings, developed rapidly in the congenial atmosphere of Puritanism. Perceiving the practical worth of the experimental philosophy, the reforming Puritans seized upon it with eagerness, and made it the companion of their fanatical religion. At first sight this appears as an odd couple, indeed, but upon closer scrutiny the strangeness disappears.

(Jones, 1961 [1936]: 269)

Merton wrote a review of *Ancients and Moderns* for *Isis* (Merton, 1936), but both Cohen and Merton himself have toned down the importance of Jones for the formulation of the Merton thesis by arguing that the book was not published until after Merton had submitted his thesis at Harvard. A close reading of the monograph nevertheless reveals that Merton had in fact read and drawn heavily on three earlier articles by Jones published in 1930, 1931 and 1932, respectively. Jones is also the main source for the important passages where the so-called 'Merton thesis' is introduced. Thus the Merton thesis on Protestantism and science might not be so much of an 'independent' and 'simultaneous' discovery as both Cohen and Merton seem to imply. Also, it may well originate from the humanities and the history of science rather than from Max Weber.

The Other Merton Thesis

In his 'Preface: 1970' to the new edition of *Science, Technology and Society in Seventeenth-Century England*, Merton comments on and clarifies many important aspects related to the reception and discussion of the monograph since its publication in 1938. A most remarkable observation was the fact that the second half of the monograph had been completely overlooked.

These responses seldom attend to the total structure of the inquiry. I should estimate that some nine of every ten discussions of the book . . . have centered on just one part of it, the one dealing with the interrelations between Puritanism and the institutionalization of science.

(Merton, 1970: xi)

After the three initial and statistical chapters and the following three on the Puritan ethos, the monograph also contained four more chapters on economic and military influences. 'And yet', Merton points out, 'the trio of chapters has received all manner of attention in scholarly print while the quartet of chapters has received remarkably little.' Furthermore he is clear with regard to his own preferences and sympathies: 'I find myself more partial to the section dealing with economic and military influences on the spectrum of scientific work, and for a variety of reasons' (Merton, 1970: xi–xii).

Merton reviewed a huge amount of biographical information on scientists of the 17th century. One conclusion derived from this material was a remarkable shift in 'foci of interest' among the intellectual elite towards science. But Merton also analysed about two thousand articles that appeared between 1665 and 1702 in *Philosophical Transactions* – the official publication of the Royal Society. This material added two more levels to his analysis of changes in 'foci of interest': regarding specific sciences and regarding specific problems within these specific sciences. In the monograph, these other dimensions were mapped out at the beginning of Chapter 7: 'Which forces guided the interests of scientists and inventors into particular channels? Was the choice of problems a wholly personal concern, completely unrelated to the socio-cultural background? Or was this selection significantly limited and guided by social forces?' (Merton, 1938a: 496). This sociological observation is later described by Harriet Zuckerman as 'the problem of problem choice', in her article 'The Other Merton Thesis' (1989).

According to Zuckerman, Merton's monograph has been massively misunderstood by taking into account only the first trio of chapters, thus separating them from the analysis in the following quartet: 'The theoretical underpinnings of the neglected chapters – let alone of the entire monograph – have not, to my knowledge, been examined in their own right' (Zuckerman, 1989: 242). The analysis in the first part was somewhat idealistic, related to a concept of 'culture', while the rest was more materialistic, relating science to 'society'. The analysis in Merton's monograph combined the two interconnected but often opposite theoretical ideas:

... it holds that society *and* culture or social structure, on the one hand, *and* social values and norms, on the other, help account for the institutionalization of scientific activity in seventeenth-century England and for the particular direction it took.

(Zuckerman, 1989: 240, emphasis in original)

Society *and* culture, Zuckerman argues, contributed to the institutionalization of science and the direction it took, neither one exclusively. This is also emphasized by Merton in his new preface: 'It rejects, in other words, the mock choice between a vulgar Marxism and an equally vulgar purism' (Merton, 1970: xiii). Rather he framed it as a reciprocal interaction between science, culture and society.

Between Merton's remarks in 'Preface: 1970' and the revival of the other Merton thesis by Zuckerman in 1989, the social historian of science Steven Shapin stands out as one of the vital contributors to this line of inquiry (Enebak, 2005: Ch. 5). Just as Merton had studied the Royal Society of London in his thesis of 1935, the topic of Shapin's thesis in 1971, in the history and sociology of science at University of Pennsylvania, was the Royal Society of Edinburgh (Shapin, 1971). Among his first publications we find the article 'The Audience for Science in Eighteenth-Century Edinburgh' (Shapin, 1974) – later described, by himself, as 'one of the very few historical attempts to apply and develop Merton's approach to "foci of interest" constructively' (Shapin, 1988: 604 n. 4). And in 1981 Shapin wrote an important contribution on Merton for the *Dictionary of the History of Science*, outlining the existence of two Merton theses in the monograph. According to I.B. Cohen, 'This is the only work in which it is said that there are "two aspects of the Merton thesis"' (1990: 107). Also Zuckerman shares this evaluation of Shapin's contributions: 'Shapin (1981, 1988) is one of the few to take up the social structural aspects of Merton's analysis of the legitimation of science as a social activity' (Zuckerman, 1989: 241 n. 5).

'Perhaps it is now time to make the Merton monograph whole,' Harriet Zuckerman concludes (1989: 262) – extending the analysis from the so-called 'Merton thesis' to the other Merton thesis: from the first trio of chapters to the following quartet; from the idealistic account to the more materialist approach; and finally, from changes in 'foci of interest' towards science to changes among and within different sciences.

The Third Merton Thesis

Contrary to the conventional discussion, Everett Mendelsohn claims that Merton actually articulated three hypotheses in his publications of the mid-1930s. The third thesis, however, has been systematically excluded and forgotten in the reception and reprinting of Merton's earliest works – much like the second. Mendelsohn's main move is to read the 1938 monograph together with the 1938 formulation of the ethos of science. Highlighting the contemporary relevance and the political context of both publications, the third Merton thesis reflects an additional critical element in the early writings of Merton: while the monograph was concerned with science in history and the later institutionalized sociology of science was concerned with social structures within the scientific community, the third Merton thesis focuses directly on the role of science in society (Mendelsohn, 1989).

The third thesis points to the critical role of a democratic social order for the support of science, and Mendelsohn's point of departure is Merton's 1938 article 'Science and the Social Order' (1938b), where the ethos of science is formulated as a liberal ideal in opposition to the development in Nazi Germany (and only later to Stalin and the Soviet Union). As Hollinger had argued earlier, Merton's defence of

science overlapped with that of a group of radical British scientists led by J.D. Bernal, Joseph Needham, Hyman Levy, J.B.S. Haldane and Lancelot Hogben – described by Gary Werskey as ‘the Visible College’ (Werskey, 1978; see also Hollinger, 1983: 6). Yet Mendelsohn shows in great detail how Merton’s defence of science, in line with these British radicals, is also a critique of science as being frustrated by Western capitalism. He goes even further by showing how Merton’s concern with the economic and military aspects of science in his monograph is also, to a large extent, indebted to these British radicals. Thus, to make the monograph whole, in accordance with Mendelsohn, would also have to involve this third and more critical aspect, which highlights the contemporary relevance and political context within which the historical study was written: ‘Merton identifies his third thesis as “the principal assumption underlying the entire book”’ (Mendelsohn, 1989: 280).

Nevertheless, still according to Mendelsohn, both Merton and the sociology of science were dramatically transformed during and after World War II – from studying science in society to the study of the social organization within science. Merton’s article on the ethos of science was decontextualized and removed from its historical setting, Mendelsohn concludes:

The social roots of Merton’s sociology of science are now to be found only in the older texts themselves. The times have changed; Merton the social scientist changed; and the new discipline, the sociology of science, has developed imperatives of its own.

(1989: 287)

In the rest of this article I would like to continue this line of argument by focusing closer on these earliest writings of Merton and his relationship with the group of British scientists and socialists described by Gary Werskey as ‘the Visible College’.

Merton and ‘the Visible College’

According to Peter Kuznick in *Beyond the Laboratory* (1987), which discusses scientists as political activists in 1930s America, these British radicals were introduced to the US in late 1934 and early 1935 through articles by Julian Huxley and J.D. Bernal in *Harper’s Magazine*. Still, he claims, ‘little evidence exists that British scientific radicalism influenced American thinking prior to late 1936’ (Kuznick, 1987: 68).

In this context it is interesting to note Merton’s early review (1935a) of Julian Huxley’s *Scientific Research and Social Needs* (1934). The book consists of twelve discussions between Julian Huxley and Hyman Levy on the relationship between science and society. Werskey has described it as Huxley’s ‘pilgrim’s process’, and the older Levy as his guide through the world of science and research (Werskey, 1978: 243–4). Following an initial discussion, Huxley departs on his ‘tour of British science’ visiting various research laboratories to find out what they

actually do. And his findings are rather surprising: half of the activity is directed towards industry, a quarter is military research, while only the remaining quarter is research or science for the people. 'It does look as if money consciously or unconsciously guides the course of science,' (cited in Huxley, 1934: 279) Levy states rhetorically, and a somewhat disillusioned Huxley can only agree:

The chief moral of this book, it seems to me, is that science is not the disembodied sort of activity that some people would make out, engaged in the abstract task of pursuing universal truth, but a social function intimately linked up with human history and human destiny. And the sooner scientists as a body realize this and organize their activities on that basis, the better both for science and society.

(Huxley, 1934: 279)

I would suggest that both Huxley and Levy were important for Merton's understanding of 'foci of interest' in scientific research. In Merton's 1935 review Levy is credited for this approach or perspective: 'It is Mr. Levy who suggests the query: which forces direct scientific attention to certain fields of investigation?' (Merton, 1935a: 188). And in his monograph, completed at about the same time in December 1935, the same reference to Huxley and Levy occurs at the beginning of Chapter 7, where Merton first addresses the issue of economic factors in scientific development: 'Was the choice of problems a wholly personal concern, completely unrelated to the socio-cultural background? Or was this selection significantly limited and guided by social forces?' (Merton, 1938a: 496 n. 1).

As Mendelsohn points out, Merton's 1938 monograph is 'filled with references to many of the key figures in the British movement – P.M.S. Blackett, Julian Huxley, L. Hogben, J.D. Bernal, Hyman Levy, and others' (Mendelsohn, 1989: 273). This is also the case in his 1938 formulation of the ethos of science in 'Science and the Social Order', with its references to the British debate on both 'the frustration of science' and the 'social responsibility of scientists' (Merton, 1938b: 331). Notice also that Merton's paper was originally presented in 1937 at a conference at the American Association for the Advancement of Science (AAAS) – the 'Triple A-S' being the US twin of the British Association for the Advancement of Science (BAAS). During the mid-1930s the BAAS had been radicalized, and the Blackpool meeting in 1936 was especially important in launching the discussion on 'the social relations of science' and 'the frustration of science' – even in the US: 'The September 1936 Blackpool meeting represented a significant turning point in both the British and the American Movements' (Kuznick, 1987: 69). Merton explicitly refers to this BAAS meeting and especially the contributions by Hogben, Huxley and Haldane, contrasting them with the American debate: 'These attempts for concerted action by English scientists contrast sharply with the apathy of scientists in this country towards these questions' (Merton, 1938b: 331 n. 25). The AAAS meeting in December

1937 resulted in the establishing of a new committee on ‘Science and Society’ – inspired partly by the British radicals at the Blackpool meeting.

Another interesting connection is the Columbia sociologist Bernard J. Stern and the journal *Science and Society*. Stern figures frequently in footnotes in Merton’s early articles, especially in relation to the concept of ‘resistance to innovation’. His analysis of the medical profession was informed by the debate on ‘the frustration of science’. In 1936 Stern established the Marxist journal *Science and Society* (together with Dirk Struik) to promote the British debate: Hogben, Haldane, Levy and Needham all contributed to the first volume, and Hogben, Levy and Needham all numbered among its seven original foreign editors (Struik, 1989; Werskey, 1978: 174). Further, Stern was among the few to emphasize the connection between science and the economy in his review of Merton’s monograph (Mendelsohn, 1989: 276–7). Another was Joseph Needham, reviewing Merton in Stern’s journal *Science and Society*: ‘Since capitalism, therefore, went hand-in-hand with Puritanism on the one side and with science on the other, we should expect to find a correlation between the scientists and the Puritans’ (Needham, 1938: 568). This is also the journal where Merton would publish his article ‘Science and the Economy of Seventeenth-Century England’ (1939a).

Even after World War II Merton’s relationship with members of the Visible College continued. When UNESCO was formally established in 1946, Julian Huxley was appointed its first General Secretary, while Joseph Needham was put in charge of the Science Division. In the related ‘Commission on the History of the Social Relations of Science’, under the aegis of the newly established International Union for the History of Science (IAHS), British radicals such as Crowther, Farrington and Lilley were joined by both Robert K. Merton and Bernard J. Stern from the US (Lilley, 1948). As for Bernal, Merton only met him face-to-face once, in Chile in 1962. Still, when Merton received the Bernal Award twenty years later, he would still describe himself as ‘one of Bernal’s many students-at-a-distance’ (Merton, 1982: 23–4). It is worth recalling that Merton later would describe the younger Merton of the 1930s as ‘a dedicated socialist’ (Merton, 1996: 349).

Following Mendelsohn, I would therefore argue for the relevance of ‘the third Merton thesis’ and of Merton’s relationship with ‘the Visible College’. In Merton’s early and formative years these British radicals were among the giants alongside whom he placed himself. This perspective also provides important information with regard to Merton’s formulation of the ethos of science, especially the norm of communism. In *The Social Function of Science* Bernal made the following connection between science and communism:

In its endeavour, science is communism. In science men have learned consciously to subordinate themselves to a common purpose without losing the individuality of their achievements. Each one knows that his work

depends on that of his predecessors and colleagues, and that it can only reach its fruition through the work of his successors.

(1939: 415)

Merton wrote a favourable review of Bernal's book (Merton, 1941), and one year later his famous article on the ethos of science was published, where he included both communism and universalism as central features of the CUDOS (Mendelsohn, 1989: 285; Merton, 1942). In his 1942 article Merton combines the OTSOG aphorism of Bernard of Chartres with the communism of Bernal:

Newton's remark – 'If I have seen farther it is by standing on the shoulders of giants' – expresses at once a sense of indebtedness to the common heritage and recognition of the essentially cooperative and cumulative quality of scientific achievement. The humility of scientific genius is not simply culturally appropriate but results from the realization that scientific advance involves the collaboration of past and present generations.

(Merton, 1942: 123)

It is therefore no surprise that both Bernard Stern and J.D. Bernal figure in the footnotes exactly where Merton introduced the norm of communism.

What about Boris Hessen?

The formative event for Werskey's 'Visible College' was a conference on the history of science and technology held in London in 1931: 'In that respect we are in the unusual position of knowing precisely when and where their political vision dramatically improved. It was at the Science Museum, South Kensington, on Saturday morning, 4 July 1931' (Werskey, 1978: 138). During a special session Boris Hessen presented his paper on 'The Social Roots of Newton's *Principia*', and, along with the rest of the contributions from the Russian delegation, it was published almost immediately as *Science at the Cross Roads* (Bukharin et al., 1971 [1931]). This introduction to Marxist perspectives is usually considered to be a landmark in the so-called 'externalist history of science' (Olwell, 1996; Thackray, 1970). Further, Christopher Chilvers has recently emphasized that the Marxist contributions were related not only to the social aspects *in* the history of science, but equally to the social aspects *of* the history of science and therefore the social and political responsibility of historians of science (Chilvers, 2006). This, I would claim, is important also for understanding Merton as a politically engaged social scientist in the 1930s.

It has already been argued by Shapin that 'Merton made liberal use of Hessen's empirical findings in his 1938 text while distancing his own enterprise from Hessen's materialist perspective' (1988: 594). Also Zuckerman emphasizes these differences and how 'Merton unambiguously rejected what he considered

“vulgar materialism” . . . especially Hessen’s “economistic” efforts’ (1989: 261 n. 39). In accordance with Mendelsohn and ‘the third Merton thesis’, I would challenge this interpretation and show to what extent Merton actually was influenced by Hessen’s work.

Among Merton’s first publications, and the first to deal with the history of science, Merton drew upon Hessen’s analysis of science and military technique. Hessen had shown how ‘the foci of scientific interest are determined by social forces as well as by the immanent logic of science’ (Merton, 1935b: 542). Also, in the final part of his 1938 monograph Merton makes it clear that ‘the following discussion is heavily indebted to Hessen’ (1938a: 544 n. 10). Although Merton is careful in formulating his own theoretical position, there is no evidence in the monograph that he actually criticized Hessen’s analysis: he mentions ‘certain differences of interpretation’ and describes his ‘provocative essay’, which nevertheless, ‘if carefully checked, provides a very useful basis’ (Merton, 1938a: 565 n. 8, 501–2 n. 24) – it is more of an extension and modification than a critique or refutation. There are differences, but also huge overlaps, both empirical and theoretical.

The *locus classicus* in this debate is nevertheless the critique put forward by George N. Clark in *Science and Social Welfare in the Age of Newton* – a direct attack on what Clark regarded as Hessen’s social reductionism (Clark, 1937). In the addendum to his 1938 monograph Merton explicitly embraces Clark’s critique of social reductionism. Later, in his review of Clark’s book, Merton concludes that he ‘provides a supplement and a corrective to such economistic discussions as those of Professor HESSEN’ (Merton, 1939b: 120). Meanwhile, in his article ‘Science and the Economy of Seventeenth-Century England’ (published in *Science and Society*, 1939a) Merton confirms his support for Clark’s argument against socio-economic reductionism.

Merton points out, however, that Clark’s critique was not valid as a critique of Boris Hessen: Merton began this 1939 article by discussing first ‘the confusion which derives from loose conceptualization concerning the relation between the motivation and the structural determinants of scientific behaviour’ (Merton, 1939a: 3). But, crucially, this is a critique of Clark, not of Hessen. Second, Merton also criticized a ‘vulgar Marxist’ conception of social reductionism, but the point, however, was to free Hessen from such accusations as put forward by Clark:

Within this context, Clark’s criticism of Hessen narrows down to a repudiation of the thesis that economic factors are alone determinant of the development of science. In company with Hessen I hasten to assent to this undisturbing renunciation. The primitive thesis of exclusively economic determination is no more intrinsic to Hessen’s analysis, as he himself indicates . . . than to the work of Marx and Engels.

(Merton, 1939a: 6)

In this respect, and contrary to conventional wisdom, Merton actually defended Hessen, Marx and Engels against the accusations made by Clark.

The Social Roots of Merton's Ethos of Science

It is remarkable how the professionalization of the sociology of science after World War II coincided with a forgetting of Merton's earlier writings in the history of science, as summarized, for instance, by Joseph Ben-David: 'The institutional approach is best suited to the treatment of comparative historical material, but the way sociology developed in the 1950s provided no incentive for the acquisition of historical knowledge' (Ben-David, 1978: 199). Although the sociology of science flourished during the 1960s, Cole and Zuckerman have pointed out that 'the active interest taken in [Merton's] later papers does not appear to have triggered renewed interest in his earlier ones' (Cole and Zuckerman, 1975: 156). Obviously this has to do with general mechanisms related to professionalization through differentiation, as Merton explained: '... the empirically oriented sociology of science involved a *de facto* (rather than a doctrinal) differentiation and separation from the philosophy and history of science' (Merton, 1977: 68). In this article I have attempted to enrich the understanding of Merton's formulation of the ethos of science in 1938 by relating it to his historical thesis developed in *Science, Technology and Society in Seventeenth-Century England* published that same year.

The political decontextualization of Merton's earliest work is even more remarkable. Here, the streamlining of the sociology of science during the Cold War must be taken into account, as Bernard Barber has recently argued: 'As a field, the sociology of science was directly founded on the back of the scientific growth curve after the second world war – more precisely, as part of the "Sputnik effect"' (2000: 63). The most obvious example here is Barber's own early introduction to *Science and the Social Order* (1952): Merton's monograph is reduced here to the first Merton thesis on Puritanism and science, while the initial inspiration from both Hessen and the Visible College is re-described and rejected as Marxism and economic determinism:

The burden of the Marxist view on these matters is that science is a wholly dependent part of society, molded fundamentally by the economic factor; and that therefore there is no reciprocal influence between science and the other components of society.

(Barber, 1952: 30)

Further, the ethos of science is suddenly a characteristic of liberal democracy (US, UK) opposing totalitarian states (Nazi Germany and the Soviet Union), thereby concealing the parallel critique of Western capitalism, while the norm of 'communism' is translated into 'communality'. 'That change in terminology', Merton pointed out in his final autobiographical reflections, 'was proposed by Bernard Barber in the 1950s during the Joseph McCarthy period of political witch-hunting' (Merton, 2004: 295 n. 115). As a consequence, the focus within the sociology of science was redirected from science in society towards what Mendelsohn describes as 'the

more discipline-oriented sociological study of aspects of the institution of science and the behaviour of scientists' (1989: 286).

Again Barber symbolizes this turn from a historically oriented and politically concerned approach towards micro-sociological laboratory studies. In his famous paper on 'The Case of the Floppy-Eared Rabbits', published in 1958, the analysis is reduced to the following question: 'Should you boil or freeze, filter or centrifuge? These are the kind of crossroads you come to all the time' (Barber and Fox, 1958: 136). We have sure come a long way since 1931 and *Science at the Cross Roads*.

By tracing the many links between the early works of Merton and the British scientists and socialists described by Gary Werskey in *The Visible College* (1978), I would emphasize the continued relevance of these perspectives, and at the same time argue for a broader understanding of the young Merton as a politically engaged scholar related to what Everett Mendelsohn has outlined as 'the third Merton thesis'.

Acknowledgements

Ragnvald Kalleberg and Christopher Chilvers have commented on an earlier version of this paper, while Ursula Phillips has given advice on style and grammar.

References

- Abraham, Gary A. (1983) 'Misunderstanding the Merton Thesis: A Boundary Dispute between History and Sociology', *Isis* 74: 368–87.
- Barber, Bernard (1952) *Science and the Social Order*. Glencoe, IL: Free Press.
- Barber, Bernard (2000) 'Some Patterns and Processes', pp. 63–74 in Ullica Segerstråle (ed.) *Beyond the Science Wars*. New York: State University of New York Press.
- Barber, Bernard and Renee C. Fox (1958) 'The Case of the Floppy-Eared Rabbits: An Instance of Serendipity Gained and Serendipity Lost', *The American Journal of Sociology* 64: 128–36.
- Ben-David, Joseph (1978) 'Emergence of National Traditions in the Sociology of Science', pp. 197–218 in Jerry Gaston (ed.) *Sociology of Science*. San Francisco: Jossey-Bass Publishers.
- Bernal, John Desmond (1939) *The Social Function of Science*. London: George Routledge & Sons.
- Bukharin, Nikolai et al. (1971) *Science at the Cross Roads: Papers Presented to the International Congress of the History of Science and Technology*. London: Frank Cass. (Orig. pub. 1931.)
- Chilvers, C.A.J. (2006) '[Postface] La signification historique de Boris Hessen', pp. 179–206 in Boris Hessen (ed.) *Les racines sociales et économiques de Principia de Newton*, trans. S. Guerout and C.A.J. Chilvers. Paris: Vuibert.
- Clark, George Norman (1937) *Science and Social Welfare in the Age of Newton*. Oxford: Clarendon Press.

- Cohen, I.B. (ed.) (1990) *Puritanism and the Rise of Modern Science: The Merton Thesis*. New Brunswick, NJ: Rutgers University Press.
- Cole, Jonathan R. and Harriet Zuckerman (1975) 'The Emergence of a Scientific Speciality', pp. 139–74 in Lewis A. Coser (ed.) *The Idea of Social Structure: Papers in Honour of Robert K. Merton*. New York: Harcourt Brace Jovanovich.
- Enebakk, Vidar (2005) *Mellom de to kulturer: Oppkomsten av vitenskapsstudier og etableringen av Edinburg-skolen 1966–76* [Between Two Cultures: The Development of Science Studies and the Emergence of the Edinburgh School 1966–76]. Dr.art. thesis, University of Oslo.
- Hollinger, David A. (1983) 'The Defense of Democracy and Robert K. Merton's Formulation of the Scientific Ethos', *Knowledge and Society: Studies in the Sociology of Culture Past and Present* 4: 1–15.
- Huxley, Julian (1934) *Scientific Research and Social Needs*. London: Watts & Co.
- Jones, Richard Foster (1961) *Ancients and Moderns: A Study of the Background of the Battle of the Books*. Gloucester: Peter Smith. (Orig. pub. 1936.)
- Kuznick, Peter J. (1987) *Beyond the Laboratory: Scientists as Political Activists in 1930s America*. Chicago: University of Chicago Press.
- Lilley, Samuel (1948) 'The Commission for the History of the Social Relations of Science', *Archives Internationales d'Histoire des Sciences* 2: 320–2.
- Mendelsohn, Everett (1989) 'Robert K. Merton: The Celebration and Defense of Science', *Science in Context* 3: 269–98.
- Merton, Robert K. (1935a) '[Review] *Science and Social Needs*', *Isis* 24: 188–9.
- Merton, Robert K. (1935b) 'Science and Military Technique', *Scientific Monthly* 41: 542–5.
- Merton, Robert K. (1936) '[Review] *Ancients and Moderns: A Study of the Background of the Battle of the Books*', *Isis* 26: 171–2.
- Merton, Robert K. (1937) 'The Sociology of Knowledge', *Isis* 27: 493–503.
- Merton, Robert K. (1938a) *Science, Technology and Society in Seventeenth-Century England*, *Osiris* 4: 360–632.
- Merton, Robert K. (1938b) 'Science and the Social Order', *Philosophy of Science* 5: 321–37.
- Merton, Robert K. (1939a) 'Science and the Economy of Seventeenth-Century England', *Science and Society* 3: 3–27.
- Merton, Robert K. (1939b) '[Review] *Science and Social Welfare in the Age of Newton*', *Isis* 29: 119–21.
- Merton, Robert K. (1941) '[Review] *The Social Function of Science*', *Isis* 46: 622–3.
- Merton, Robert K. (1942) 'A Note on Science and Democracy', *Journal of Legal and Political Sociology* 1: 115–26.
- Merton, Robert K. (1970) 'Preface: 1970', pp. vii–xxix in *Science, Technology and Society in Seventeenth-Century England*, 2nd edn. New York: Howard Fertig.

- Merton, Robert K. (1977) 'The Sociology of Science: An Episodic Memoir', pp. 3–144 in Robert K. Merton and Jerry Gaston (eds) *The Sociology of Science in Europe*. Carbondale: Southern Illinois University Press.
- Merton, Robert K. (1982) 'Remarks on Acceptance of the John Desmond Bernal Award of the Society for Social Studies of Science October 1982', *Newsletter for the Society for Social Studies of Science* 7: 23–4.
- Merton, Robert K. (1993) *On the Shoulders of Giants: The Post-Italianate Edition*. Chicago: University of Chicago Press. (Orig. pub. 1965.)
- Merton, Robert K. (1996) 'A Life Full of Learning', pp. 339–59 in Piotr Sztompka (ed.) *R.K. Merton on Social Structure and Science*. Chicago: University of Chicago Press.
- Merton, Robert K. (2004) 'Afterword: Autobiographical Reflections on *The Travels and Adventures of Serendipity*', pp. 230–98 in Robert K. Merton and Elinor Barber, *The Travels and Adventures of Serendipity*. Princeton, NJ: Princeton University Press.
- Needham, Joseph (1938) '[Review] *Science, Technology, and Society in Seventeenth-Century England*', *Science and Society* 2: 566–71.
- Nicolson, Marjorie (1938) '[Review] *The Rôle of Scientific Societies in the Seventeenth Century, Science and Social Welfare in the Age of Newton; Science, Technology, and Society in Seventeenth-Century England*', *American Sociological Review* 3: 882–4.
- Olwell, Russell (1996) "'Condemned to Footnotes": Marxist Scholarship in the History of Science', *Science and Society* 60: 7–26.
- Ornstein, Martha (1975) *The Rôle of Scientific Societies in the Seventeenth Century*. New York: Arno Press. (Orig. pub. 1928.)
- Sarton, George (1938) 'Notes and Correspondences', *Isis* 29: 102–3.
- Shapin, Steven (1971) *The Royal Society of Edinburgh: A Study of the Social Context of Hanoverian Science*. Ph.D. dissertation, University of Pennsylvania.
- Shapin, Steven (1974) 'The Audience for Science in Eighteenth-Century Edinburgh', *History of Science* 12: 95–121.
- Shapin, Steven (1981) 'Merton Thesis', p. 262 in W.F. Bynum, E.J. Browne and Roy Porter (eds) *Dictionary of the History of Science*. London: Macmillan.
- Shapin, Steven (1988) 'Understanding the Merton Thesis', *Isis* 79: 594–605.
- Shapin, Steven (1992) 'Discipline and Bounding: The History and Sociology of Science as seen through the Externalism–Internalism Debate', *History of Science* 30: 333–69.
- Struik, Dirk (1989) 'Further Thoughts on Merton in Context', *Science in Context* 3: 227–38.
- Thackray, Arnold (1970) 'Science: Has Its Present Past a Future?', pp. 112–27 in Roger H. Stuewer (ed.) *Historical and Philosophical Perspectives of Science* (Minnesota Studies in the Philosophy of Science, Vol. 5). Minneapolis: University of Minnesota Press.

- Weber, Max (1958) *The Protestant Ethic and the Spirit of Capitalism*, trans. Talcott Parsons. New York: Scribner's. (Orig. pub. 1904–5.)
- Werskey, Gary (1978) *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s*. London: Allen Lane, Penguin Books Ltd.
- Zuckerman, Harriet (1989) 'The Other Merton Thesis', *Science in Context* 3: 239–67.
-

Vidar Enebakk is a Post-Doctoral Research Fellow in the Forum for University History at the University of Oslo, Norway, and currently a Visiting Scholar at the Department of History and Philosophy of Science at the University of Cambridge (2006–7). He wrote a Ph.D. in the Sociology of Scientific Knowledge on the emergence of the Edinburgh School, and his current research interests focus on the history of science studies since 1931, especially the UNESCO-related Commission for the History of the Social Relations of Science, 1947–53.

Address: Forum for Universitetshistorie, Boks 1108 Blindern, 0315 Oslo, Norway. [email: vidar.enebakk@iakh.uio.no]