Editors’ Introduction

In May 1988 a workshop held in Jerusalem celebrated fifty years of the publication of the Merton thesis. Neither a continuation of the criticisms of the sixties, nor a further development of classical Mertonian themes (Puritanism and science, technology and science), it was rather an occasion for examining what the Merton thesis tended to overshadow: the relation of Catholicism to science and its comparison with Mertonian and non-Mertonian claims about science in Protestant environment. The workshop gave birth to a volume on which Merton’s work had a formative impact from more than one point of view: as an example of intersecting orientations (theoretical-empirical, sociological-historical) in the “studies of science”; as the focus of a central historiographical debate on the relationship between modern science and a religious creed; and as a narrative of self-identity by one of the “founding fathers” of the field. The interrelations among these three facets compose a “Mertonian history of science” serving as a source of inspiration and point of departure for further questioning of its various elements and the unity they form.

Merton’s *Science, Technology and Society in Seventeenth-Century England* was seminal for the combination of sociological and historical approaches in cultural studies in general, and in “studies of science” in particular. As against the series of grand generalizations of universal history that saw the light in the twenties and thirties (Oswald Spengler’s *Untergang des Abendlandes*, 1923; Pitirim Sorokin’s *Social and Cultural Dynamics*, 1937; Arnold Toynbee’s *A Study of History*, three volumes published in 1934 and all six in 1939), Merton produced a full-fledged historical case study that lent scientific credibility to broad sociological generalizations. The appeal, for Merton, of cross-fertilization between the theoretical and the empirical, the sociological and the historical, later received a systematic formulation in the concept of “theories of the middle range.” “Middle range theory,” Merton wrote, “is principally used in sociology to guide empirical inquiry” (Merton 1957, 39). Merton’s dissertation, first published in *Osiris*, was a “theory of the middle range,” even though it has never been so labeled by Merton himself. By subjecting a peculiar marriage between idealistic-Weberian and materialistic-Marxian theoretical assumptions to empirical historical investigation, he exposed himself to philosophical, sociological, and historical criticisms of the type represented in this volume by the Merton-Sorokin correspondence as well as by Heilbronn’s and Harris’ papers. And it was the criticisms, no less than the Merton thesis itself, which demonstrated the fruitfulness of a sociological-historical orientation in the study of science.

For all the criticism that his approach to science has attracted, Merton has never considered the boundaries of science problematic. Summing up his responses to critics in the preface to the second edition of *Science, Technology and Society* (1970),
he emphasized the clear distinction between “society,” whose norms might favor, enhance, or reject the type of knowledge called “scientific,” and “science,” which for him was well defined within the boundaries of objective rationalism, empiricism, and the belief in an underlying material reality. Thus, perhaps ironically, the division between the “internal” cognitive aspects of science and the “external” – religious, political, economic – influences on it was rooted in the work of Merton himself, the pioneer of the sociology of science. Zuckerman’s reassessment in this volume of the meaning of the Merton thesis is a further testimony to Merton’s insistence upon the distinction between “internal” and “external” factors in the development of science. Merton’s definition of the boundaries of science also ignored the historiographical tradition in intellectual history which tended to stress science’s metaphysical dimensions at the expense of its rational-empirical aspects.

The division between “internalists” and “externalists” has split the community of scholars who work in the Mertonian tradition, or in reaction to it, into two camps: those who concentrate their efforts on looking wholly “within,” at cognitive structures and their development; and those who venture “without” to examine the social context of knowledge. Twenty years of debate between internalists and externalists have not proven very fruitful, however. The internalists remain entrenched in their belief in the special epistemological status of science, in their preference for a logical reconstruction of scientific thought which follows from the belief in its epistemological superiority, and in their consequent role as apologists for science. The externalists, on the other hand, concentrate mainly on the institutional aspects of science without asking about the effects of the institutional forms on its cognitive structures. In spite of their disagreements, the category of “science” and its boundaries remains unproblematic for most internalists as for many externalists, just as it was for Merton: all tend to agree on a tacit definition of the boundaries of science in terms of objective knowledge and to ignore the relevance of metaphysics to an understanding of the practice of science.

Two more facts are worth mentioning in connection with the broad intellectual context of Merton’s own work and that of his critics: as Struik’s and Mendelsohn’s papers clearly show, the Mertonian program was congenial to those Marxist intellectuals who perceived Merton’s work as a correction to vulgar Marxism. To the anti-Marxist, on the other hand, Mertonian sociology of science was living proof that one could deal with such basic issues as science and society without being a Marxist. Both, however, subscribed to the same definition of the boundaries of science and ignored the whole tradition of the history of ideas, epitomized in the works of Burtt, Cassirer, Koyré, and others, where the main issue was science and metaphysics, or science and philosophy, rather than science and society. In a similar manner, the alternative tradition which tended to investigate science from the point of view of intellectual history tended to isolate itself from the sociology of knowledge and to treat the problem of science and society as nonexistent.

The systematic assumptions common to Merton, his followers, and his critics, who adopted a narrow definition of the boundaries of science, were not unrelated to the
thematic side of *Science, Technology and Society*. Although, as a Weberian, Merton naturally rejected the Whig interpretation of history, he nevertheless shared with positivistic histories of science the conviction that Catholicism, in contradistinction to Protestantism, was not conducive to science, perhaps even detrimental to it. True, the concept of “the war of science and religion” was discarded, but not the idea that modern science was a child of the opposition to authoritarian Catholicism. This conviction was in the background, and probably allowed overlooking the continuity between medieval philosophical traditions and modern science, the favorite theme of many continental intellectual historians. Thus, in spite of the criticism that it evoked, the thematic thread of Merton’s work was woven into the larger texture of the narrative of the Scientific Revolution, accepted by a major current among Anglo-American historians of science. Both Merton and his critics believed in the break between medieval modes of scholarly thought and scholarly organization, on the one side, and their modern counterparts, on the other. They regarded the seventeenth century as the crucial divide between a nonscientific and a scientific world. They also asserted a continuity between late seventeenth-century English science and our modern forms of it.

The links between the systematic and the thematic facets of Merton’s work in fact represent a much wider consensus than appears to be the case from the disagreement on specific theses. They constitute a nonphilosophical, practical view of science that fits in well with historical descriptions of late seventeenth-century English science. They anchor the privileged narrative of the origins of modern science in the English scene. No wonder that they also tend to tie up the identity of the “studies of science” – conceived as a newly founded field, fertilized on American soil – with the investigation of the origins of science in seventeenth-century England.

Merton himself has confirmed these connections in his “founding-father” narrative of 1977, *The Sociology of Science. An Episodic Memoir*. Here he betrayed his conviction that there had been no history of science before the crystallization of the discipline in America, under the leadership of George Sarton (Merton [1977], 1979 60–61). The maturation of the discipline, moreover, is here understood in terms of the fruitful collaboration with neighboring disciplines: the sociology of science, heavily wrapped in Marxian and Weberian influences on the one hand, and the philosophy of science of the Popperian and Kuhnian type on the other.

These Mertonian reflections embody, in a nutshell, the hidden assumptions of a certain discourse in the “studies of science,” common to Merton and his critics: Mertonian, Marxian and Weberian sociologists, Sartonian historians, Popperian and Kuhnian philosophers – all share a rather narrow definition of the boundaries of science, stressing its rational-empirical character; implicitly or explicitly they all share the belief in the Scientific Revolution as the privileged narrative of the origins of modern science; hence they tend to tie up this story with their professional self-identity.

At first glance it seems that Merton’s inspiration for this volume has been mainly thematic: six out of the ten papers deal exclusively with Catholic science, a topic that
Merton’s work almost ignored and which was a non-subject in the “studies of science” for many years after the publication of the Merton thesis. This thematic shift does not necessarily involve a rejection of the Mertonian “spirit,” namely, the belief that social norms mediate between science and society, and that they do not determine the nature of science but are essential for the process of selection that ensures its survival. Moreover, the thematic challenge to Merton has frequently been achieved by applying Mertonian methods such as quantification and comparison. Essentially, however, the thematic challenge to Merton’s work calls into question the hidden connection between an agreed definition of the boundaries of science, the larger narrative of the origins of modern science in late seventeenth-century England, and a certain narrative of self-identity of the profession, rooted in the investigation of the Scientific Revolution. Although this volume does not present any coherent alternative to the Mertonian union of the systematic, the thematic, and the reflective, its rationale is to call into question the naive acceptance of such a union as given.

Using Mertonian methods (Heilbron, Harris) and some Mertonian assumptions (Harris) to focus on the Catholic context of science has yielded one certain result and many questions. The result concerns the legitimation of a series of isolated projects as a research program with wide implications for the traditional narrative of the Scientific Revolution. The papers by Harris and Heilbron offer persuasive evidence for the impressive quantity and substantial support for science in Catholic institutional frameworks such as the Jesuit order and the courts of Catholic princes. Harris indicates at least one normative system within the Catholic world which, he insists, carried an “ideology” conducive to science. Ashworth further illuminates how the cultural environment of the Jesuits encouraged interest in natural phenomena. In addition, Feldhay and Heyd show that a certain type of Jesuit science attempted to construct its self-identity around its own image of the founder of the “scientific method,” namely, Galileo Galilei.

Although Catholic science may have been legitimated as an object of research, the character of that science is far from being established. Wallace shows that at least until the generation of Clavius (first part of the seventeenth century), science could be legitimated in a Jesuit environment only if it could provide causal explanations on the model of Aristotle’s Posterior Analytics. Feldhay and Heyd attempt a characterization of late seventeenth-century Jesuit astronomy versus Calvinistic natural philosophy in terms of an interpretation of natural signs versus insistence on mechanistic causal explanations. This opposition is supported by Mali’s typology of Catholic and Protestant science as “a science of tradition” versus “a science against tradition.” All these characterizations or typologies are obviously non-exhaustive.

The preliminary picture that emerges from a limited number of case studies indicates the existence of different scientific styles that flourished simultaneously in different social and institutional environments within the Catholic world. The difficulty in defining the boundaries of science in the seventeenth century is implied by two papers that otherwise differ in style, method, and focus. Heilbron, in his
suggestion of “an ecumenical Merton thesis,” categorizes as “scientific activities” every kind of observation of nature or collection of data about nature, including rare curiosities like a unicorn’s horn. People who “perforated Italian Churches” to discover fundamental quantities of positional astronomy are obviously included by Heilbron among the actors in the drama of science, whether they held to a heliostatic or geostatic view of the cosmos. From a completely different perspective, Hatfield calls into question the boundaries of science by showing that Descartes’ metaphysics, developed in the interest of his physics, is essential for understanding Cartesian science.

The blurring of the boundaries of science during the Scientific Revolution and the need for intersecting orientations that straddle philosophy and history as well as sociology and history are by no means unique to a program legitimating Catholic varieties of science as an object of study. They were implied long since in various historiographical traditions that examined the “metaphysical foundations of modern science” (Burtt, Koyré) or occult mentality and its relation to modern science (Yates and her followers). Nevertheless, the thematic shift from science in an English Protestant environment to science in a Catholic environment does raise again the question of such boundaries and may entail a different position on the problem of science in context.

True, this passage from the thematic to the systematic is not always inevitable. Wallace and Harris, exemplifying the internalist and externalist position respectively, do not seem to challenge the boundaries of science accepted by Merton. For both, science is separated from the rest of culture by the “edge of objectivity”; Wallace believes in the convergence of Science and Truth, while Harris works with the practical definition of science as a combination of rationalism and empiricism. Feldhay and Heyd, Heilbron, and Mali attempt to bridge the gap between internalist and externalist perspectives. Feldhay and Heyd suggest analytical categories that apply both to science and to institutional reality, without reducing them to each other. Mali’s suggestion that Catholic and Protestant science be considered in terms of “tradition” is another example of an analytical category that transcends the boundaries between science and society at large. In both papers science and society are described in terms of the dynamics that continually reshape the boundaries between them. Neither is defined a priori, nor are they ever posited in a relation of explanans and explanandum.

The legitimation of a research program that treats science in a Catholic environment as part of the story of the Scientific Revolution does more than simply entail a change in the traditional narrative of the emergence of modern science. It contributes no less to a modification of the accepted story of the origins of the history of science as an academic discipline. In this volume, the thematic shift to the Catholic environment in the study of the origins of modern science is not divorced from reflections on the origins of the discipline in Catholic cultural policy at the beginning of the twentieth century. Motzkin’s paper reminds us of the alternative tradition in the history of science, originating in the Catholic countries at the turn of the century,
which implies a different narrative of the origins of modern science. According to this tradition, science was born in the metaphysical and epistemological discoveries of the Middle Ages, and the identity of the history of science is related to the exposure of their scientific meaning by Catholic scientists and philosophers such as Pierre Duhem.

Upon the fiftieth anniversary of the Merton thesis, renewed attention to the theme of Catholicism and science seems opportune. Such a thematic shift may stir up further reflection on the links between the discipline’s favored thematic focus on English science, the perception of the boundaries of science within the confines of the rationalistic-empirical tradition, and the narrative of self-identity of the profession, closely related to the ability to tell a story about the Scientific Revolution.

References


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