Robert Merton's Sociology of Science: Baconianism, Puritanism, Science

1. Introduction: Meet Robert King Merton—inventor of sociology of science

Merton first addressed the internalist/externalist problem in 1938 in his influential Harvard dissertation on "Science, Technology and Society in Seventeenth Century England". His views were later refined in new and revised case studies boasting greater theoretical articulation. His focus on science as a social institution defined the study of scientific communities and institutions as an externalist undertaking: firstly, because he eschewed all concern with the technical contents of science; secondly, because he attempted to discern the social norms which supposedly are functional to healthy science. Merton's historical treatment of the rise of modern science in seventeenth century England became an exemplary externalist project, in which he sought to identify the larger social conditions, particularly the prominence of Puritanism and the Puritan 'ethos', which in turn carried and fostered the values necessary for modern science. As for the 'inside' of science, Merton defined a cognitive realm defined in positivist terms by the existence of a universal scientific method, arising from a balanced amalgam of the "technical norms" of "rationalism" and "empiricism". Hence his approach depended upon the expected sort of social/cognitive boundary marking.

However, as Shapin has shown, Merton's significance extends much further than forging a new style of externalism. On a deeper level Merton was defining the traffic that could pass over the cognitive/social barrier, for he was willing to admit both internal and external factors played a role in the history of science. He even went so far as to accommodate, or finesse, the Marxist challenge by devoting half of his dissertation to the issue of technological and economic stimuli to scientific achievement in seventeenth century England.

An externalist explanation, but not Marxist; a sociological explanation using socially distributed factors—attitudes, values, norms.

Link between Protestantism and Growth of Science; data England in 17th century; Germany in 19th century.

Took up idea of Max Weber that religious systems reinforce certain social and intellectual sentiments which condition and channel social behaviour. The other side of the idea that economic need and social standing channel and condition ideology. Weber applied this to Protestantism and Capitalism; Merton to Protestantism and Science.

2. The Theoretical background: American Functionalist Sociology

For Merton (and Talcot Parsons and their followers) society is a network of institutions, social institutions (means large networks of structures, not local or one off organisations). Science, Economy, Medicine and Health, Military, Police, various Professions, Education. Institutions are defined by functions in respect of larger social system. A balance and health model➔social problems and their solutions; lacks a sense of history and historical process, let alone built in dilemmas, tensions or contradictions.

Social problems and their solutions

Any institution is functionally defined by norms—socialised into actors. That allow the institution to run, to fulfil its functions in the society.

We do functional analysis of societies and social institutions making them up—treat social values as given, determinants of behaviour of actors, playing roles in the institutions.

Norms—internalised into consciousness and behaviour and self-image of actor—you are internally driven to adhere to them; various sanctions can exist for breaking them—marginalisation; lack of recognition, advancement, etc.

> Socialisation and normalisation

So, here in the case of science we need norms that allow sciences to be produced, that facilitate and protect its essential nature.

3. 'Science' as a Parsonian 'Social Institution'

Favourable social environment will encourage successful institutionalisation of Science

The later depends on widespread acceptance of certain values and norms.

These values and norms were favoured by Protestantism: They are

6 Norms of science: 4 Social Norms and 2 Technical Norms (=scientific method)

[1] Communism: knowledge open, public

[2]Universalism: everyone can join; all can contribute

> Four social norms known as CUDOS

[3] Disinterestedness: not pursued for personal gain; detachment; objectivity

[4] Organised scepticism: critical, conditional scepticism

[5] empiricism + [6] rationalism [critical sceptical] = scientific method

Now, Protestantism carries, reinforces, favours these values and norms and it is in such societies that individuals can turn them to science and build special institutional frameworks for science that crystallise; institutionalise these norms as the norms of science.

4. Merton's Historical Thesis

Protestant Ethos➜norms/sentiments➜action *[or just actors's rationalisations of what he is doing, read as evidence of existence of ethos?]*

Protestant Ethos not = doctrinal propositions but atmosphere of sentiments and maxims (common sense in this sub-culture or institution) inherent in the religion, its practice, social interactions and organisation. Ideals or maxims for behaviour induced by the Religious sentiments—regardless of what the formal ethics or theology might say.

Argument: Analysis of social ethos of Protestantism   Match up with values and aims which (according to Merton) are necessary to Science.

So, the Protestant is marked by desire to be moral and active in his worldly calling (no need to be a priest or monk). Anxiety over Predestination/ election and emphasis on lay calling => ascetic activity in the world.

And, in Protestantism:

[1] God is transcendent, which conduces to seeing his will in Nature: hence *empiricism* and *organised scepticism*

Closely related to:

[2] Book of Nature/Book of Bible: induces and depends upon *organised scepticism*; *empiricism* vs authority; *critical rationalism*

In sum, both [1] and [2] ➔ Rational calculation of means and empirical orientation. versus recourse to magic or intervention of clergy.

[3] Value of worldly vocation: induces *communism*, *disinterestedness*, *universalism*, *utility*. All of which conduces toward Activity for the glorification of God

Finally in regard to Protestant concern with Utility, this conduces with and *impartiality/objectivity*) [Sentiment and charity are vanity if done as good works for reward as in Catholicism, but good done for other as for glory of god are OK.]

Merton: In Protestantism natural philosophers find these traits; often conceive of natural philosophy as a legitimate calling, entailing 1,2,3 above. Most of English 'scientists' are Protestants, same with his 19th century German data.

Dr J: None of this is surprising—it is the parallelism of English Protestantism and Baconianism at various points along the mid century political-religious spectrum. [Merton left out Millenarianism, radical natural philosophies and radical Puritan views].


5 What kind of historiography is this and what are implications for historical work

Merton's aim can be taken to have been the production of a version of externalism acceptable to both externalists and internalists on social theoretical and historical grounds.

His focus on the social institution of science defined the study of scientific communities and institutions as an externalist undertaking, firstly, because he eschews all concern with the cognitive contents of science; secondly, because he attempts to discern the social norms and values which supposedly are functional to healthy science; and thirdly, because he seeks to define the larger social conditions, for example the prominence of Puritanism and the Puritan 'ethos' in seventeenth century England, which in turn fostered those values and made them available for institutionalisation.

As for the 'inside' of science, Merton gave us a cognitive realm defined in Positivist terms by method, arising from a balanced amalgam of the "technical norms" of 'rationality' and 'empiricism'. Give that over to the intellectual historians of method and philosophers of science.

In this way the internalist/externalist game could continue with conflict mediated by attention to that middle realm of institutions, communities, groups and their social norms, just inside of which Merton placed the social/cognitive boundary.
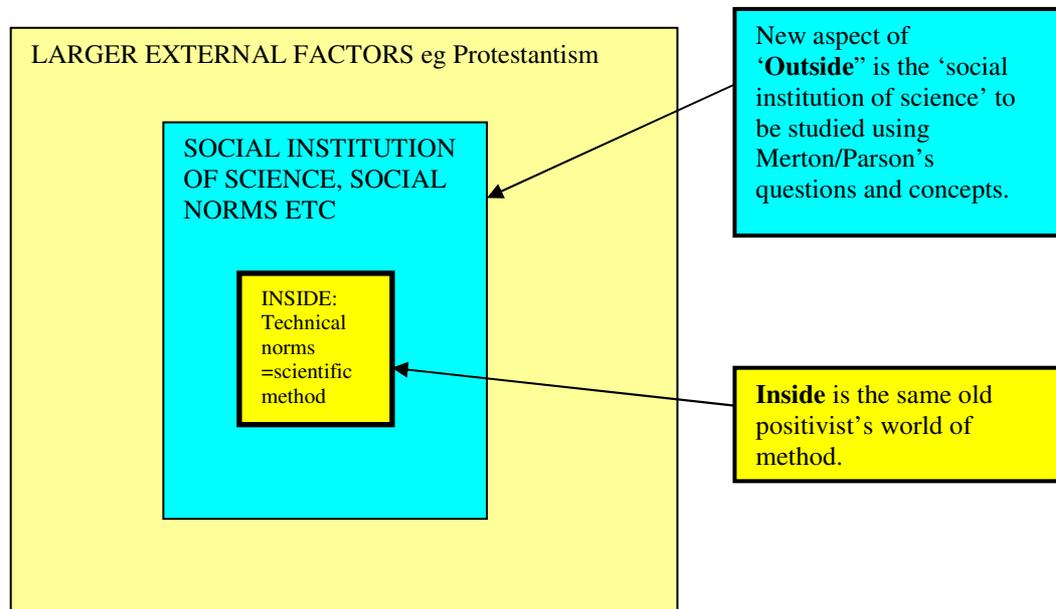
6. Critique of Merton's Sociological Model of Science in General

A naïve view of science as equal to internal method (empiricism + rationalism) plus appropriate social norms built into the institutions and social system.

Additionally, one might consider a counter-argument, grounded in a more interpretative stance in sociology: the supposed social norms of science are not the determinants of thought and puppet like actors. Rather, actors have at their disposal a range of norms and counter-norms (and modulations thereof), which they attempt to apply as categories and definitions of their own and others' actions, according to their perceived interests in the outcome of localised and contingent courses of activity in the making and un-making of knowledge claims.

One set of norms, culled from the traditional congratulatory rhetoric of the public face of Science, can explain neither the detailed and fluid negotiating stratagems of the actors, nor the direction and form of their achievements, the construction of for-the-time-being taken for granted knowledge claims.

Moreover, norms can be looked at historically, just because they are actors' resources, rather than sociological or metaphysical determinants of action. Mertonian norms such as "rationalism" or "organised scepticism" are not essences grasped by good scientists; they are evolving, reinterpretable, variously deployable social categories used as tools and weapons in the struggle to dominate situations and establish knowledge claims. For example, in our period it is good, *rational* to link natural philosophy to religion, later in the 20th century it became good, *rational* to isolate from religion; distinterestedness?, well what about the recent rise of demand, and justification, of relevance and immediate commercial utility of scientific work— does that not change 'the relevant norm'..

To speak with Merton of the social norms of science (and of their social historical

Interpretative sociology says norms and counter norms are part of a common tool kit of resources used by actors in the culture or institution to formulate day to day rhetoric and more formal legitimations concerning their actions, etc.

causes or promoters) is to chase conceptual essences into a sink of mythologised history. Scientists are not scientists because they adhere to Mertonian norms; rather, scientists are people who, through their training, traditions of discourse and institutions, have a certain history of deploying, re-interpreting and attempting to enforce versions of the norms in their discourse and in their accounts of behaviour. The social historical issue is to study these processes in relation to the history of the construction/alteration of knowledge claims in the same communities, the latter studied in a post-Kuhnian way.

7.Critique of Merton's Historical Claims

1.   He says he wants to explain increased recruitment to 'Science' But is this a motive or a rationalisation. Men of learning did not necessarily need Puritanism to support natural philosophy. Merton forgets the European learned traditions in the universities, and in humanism, and their 'ethics'. Moreover, maybe issue is choice of a new natural philosophy; if numbers do not change much, maybe large ideological change will not explain it

2.   Last point is related to a larger one—are these correlations enough to explain shift to mechanical philosophy. No the causes are static; they do not grasp the dynamic of unfolding Baconian/mechanistic current in the English context. Merton's story is consistent with that history but too broad really to explain any concrete part of it. For example, did Boyle become a mechanist in the mid later 1650s because he was a Puritan? Yes, in a general sense, but earlier he was an alchemical Helmontian; and that also accorded with the more radical Puritanism dominant at that stage in the period of the English Civil War and reign of Cromwell—we actually want to know why and when he shifted.

3.   Ok, it is so general, ahistorical, but also Merton is describing traits common to all Protestants. It doesn't select for Puritans, and it's hard enough to decide what one is.

4.   Merton thinks he is explaining origin of modern science. He does not see it's mainly Baconian—mechanical natural philosophy he is explaining; not see growth of mathematical sciences and continental natural philosophy; or that Catholic Europe contributed as much or more to Sci Rev. So, again, a limited point, but a real one—in Protestant contexts look for possible causal link or post-facto link in that actors used Protestant rhetoric to explain and justify their actions and their institutions.
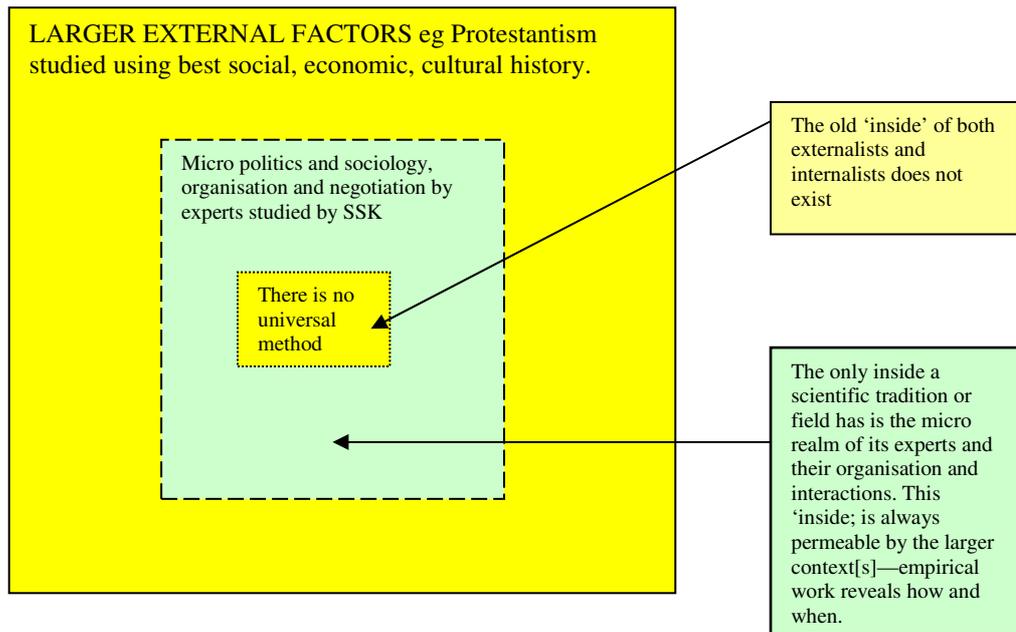
Where does the historical explanation of English 'science' lie? First, analyse Puritanism as a dynamic, changing ideology tied to its own social system within larger English society, from late 16th century onward. Trace its later conjunctions with Baconianism and other natural philosophical currents; note the course of ideological changes and conflicts; against wider social and political history—civil war; radicals' agitation; roles of royalists; social backgrounds and commitments of various sorts of Baconianisms.

Note here the difference between block, essentialist sociological explanation, and how historical explanation can use sociological categories, but must put them in dynamic motion.

8. Conclusion: Merton and modern post-Kuhnian 'Sociology of Scientific Knowledge [SSK]and good contextual history:

Internalist historians, as well as conventional philosophers of science were happy that Merton granted a pristine inside to science, defined by cognitive and technical norms favouring the development and use of the scientific method (for Merton a balanced amalgam of 'rationality' and 'empiricism'). Unfortunately, few internalist followers of Koyré and Kuhn noticed that the inside of Mertonian science is a Positivist heaven, based on the myth of a unique, efficacious, transferable scientific method, and hence bearing no relation whatsoever to the inner workings of a Koyréan or Kuhnian scientific tradition, characterised respectively by the all-defining presence of a 'metaphysics' or a sui generis 'paradigm'. That much should have been, but was not, obvious in the 1950s and 60s.

In the past three decades, however, further ironies have arisen, and they are obvious to many historians and sociologists of science. Increasing attention has been paid to the social and political processes going on within scientific communities, specialist groups, invisible colleges, laboratories and other institutions and research sites. It is precisely in this 'middle' region of social interactions -- beyond the mythical internal realm of method and below the gross macro-sociological realm of the older externalists -- precisely, that is, in the realm of Mertonian sociology, that one has begun to see knowledge claims manufactured, negotiated, deployed and reinterpreted variously as further resources, recycled and occasionally dismantled after attaining fact-like status, all through ongoing, small scale social interactions set in the grids of power and cognition characteristic of the field at that moment, and exercising feedback effects on the for-the-time-being nature of those grids.

LARGER EXTERNAL FACTORS eg Protestantism studied using best social, economic, cultural history.

Micro politics and sociology, organisation and negotiation by experts studied by SSK

There is no universal method

The old 'inside' of both externalists and internalists does not exist

The only inside a scientific tradition or field has is the micro realm of its experts and their organisation and interactions. This 'inside; is always permeable by the larger context[s]—empirical work reveals how and when.

The middle realm that Merton considered external turns out to be 'internal' in a way; indeed, it turns out to be the only 'inside' that science has, in the sense that it is the very site where the cognitive and the social merge in the manufacture of knowledge. And that in turn is why Mertonianism is a dead letter as a sociology of science; although some, even including Thomas S. Kuhn, apparently think that Merton turned the trick of mediating the internalist/externalist debate to a fruitful conclusion!

The fate of Mertonianism as a gambit in the internalist/externalist debate suggests that the challenge now is not to follow Merton's lead, nor to seek with Kuhn some accommodation of his internalism with Mertonian sociology. Rather, the issue is to develop the cognitive micro-sociology of scientific knowledge (the new 'inside') in ways adequate and useable for historians, and to articulate it to plausible accounts of larger contexts, defined by the methods of state of the art social history, rather than vulgar Marxism (the new 'outside').

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