The challenge from sociology, feminism, and science studies

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Robert K Merton (1910-2003)

The Sociology of Science (1973)

Mertonian Norms of science ('cudos'):

1. communalism: common ownership of scientific ideas and results
2. universalism: personal attributes and social background irrelevant to value of person's ideas
3. disinterestedness: scientists act for the greater benefit of the scientific enterprise, not for their personal gain
4. organized skepticism: challenge and test ideas instead of taking them on trust or authority

Reward system in science

- basic currency for scientific reward is recognition
- evidence for this is found in fervor with which priority disputes are fought

⇒ basic community standard operating

- collateral damage: deviant behaviour (fraud, plagiarism, libel, slander)

The Matthew effect in science

"For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath." (Jesus's parable of the talents according to Matthew XXV:29, KJV).

- ambition and risk-taking will be rewarded, failure to do so will be punished
- Merton: eminent scientists often get more credit than lesser known scientists (whether they co-author a paper, or simultaneously discover something)
- prizes almost always go to senior scientist involved, although work may be done by graduate student
- example: isolation of antibiotic streptomycin (remedy against tuberculosis) by Albert Schatz in 1943, and the attribution of all credit (incl Nobel Prize 1952) to his advisor Selman Waksman

Merton Thesis: explaining the Scientific Revolution

- Max Weber: link between Protestant ethic and capitalist economy
- Merton Thesis: link between rise of Protestant pietism in England and Germany and early experimental science
  1. changes in the nature of science are due to an accumulation of observations and better experimental technique
  2. English Puritanism and German Pietism as causally significant in the development of the scientific revolution of the 17th and 18th centuries
- Objections:
  1. insufficient consideration of mathematics and mechanical philosophy in Scientific Revolution
  2. What counts as right type of Protestantism? Why are there important Catholic scientists in Scientific Revolution such as Copernicus, Galileo, Huygens?
- Thesis suggests why England (and Germany) was driving motor of Scientific Revolution

Strong program in sociology of scientific knowledge

- before: description of social structure of science as whole
- strong program: explain particular scientific belief in sociological terms

⇒ sociology has ambition to replace philosophy of science

- Symmetry Principle: all forms of beliefs and behaviour must be given the same kind of explanations
- all communities (not just scientific ones) have socially established local norms for regulating beliefs

⇒ we shouldn't give the Real World a special role in explanation of scientific beliefs that we wouldn't also give to explanation of any other forms of beliefs that pass their local community norms

- but: if you really think that the belief that arsenic is toxic merely passes a local community norm but has no objective meaning, then you shouldn't mind taking a mouthful...

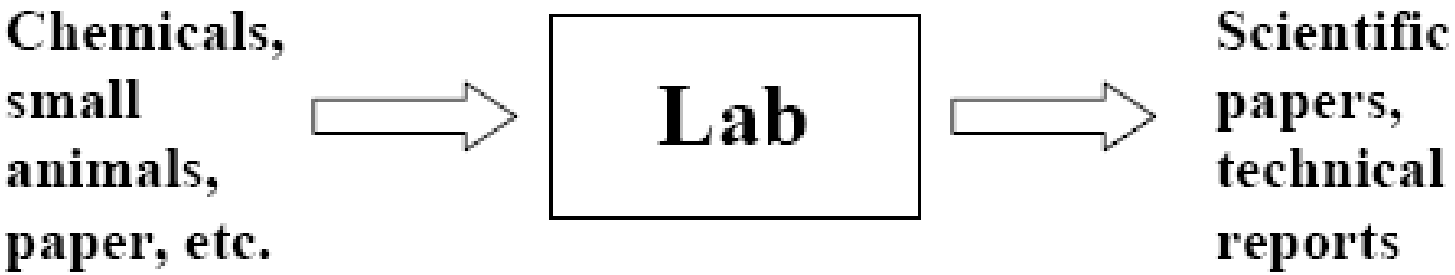
Shapin and Schaffer: *Leviathan and the Air Pump* (1985)

- in C17, Robert Boyle proposed new way of bringing experience to bear on theoretical investigation
- argued for distinction between public investigation of experimental 'matters of fact' from all other kinds of beliefs
- reconstructed questions about vacuum to bring them into contact with his experiments
- S&S argue that Boyle's treatment of terms like 'vacuum' established new 'language game', i.e. pattern of linguistic habits that contribute to a 'form of life'

⇒ Boyle and friends engage in the manufacture of facts, i.e. ideas are made rather than found

- "It is ourselves and not reality that is responsible for what we know." (p. 344)

Latour and Woolgar: *Laboratory Life* (1979)



- objects of scientific study are constructed within lab and thus cannot be attributed with an independent existence
- scientific activity as system of beliefs, oral traditions and local practices, i.e. not as procedure, method, or principles but as a culture
- actor-network theory: agency of nonhuman actors but of material-semiotic networks, i.e. relations between material objects and concepts
- both S&S and Latour close to social constructivism

Feminism and science: main idea

Thesis (Feminism on science)

Science is part of the structure that perpetuates inequalities between man and woman. This has political as well as epistemic consequences.

Remedies:

- inclusion of more women in science, affirmative action
- encouragement of female 'voice' in science
- dethrone science from its preeminent position in Western culture

Political v. epistemic implications

Note: political demands arising in feminism such as affirmative action, equal opportunities etc have per se no implication for philosophy of science or epistemology

Feminist *philosophical* ideas about science:

(i) feminist analysis of history of ideas/science

(ii) feminist analysis of specific scientific disciplines (mostly social and biomedical science)

(iii) feminist epistemology: rationality/knowledge from feminist point of view

Genevieve Lloyd: *The Man of Reason* (1984)

Thesis (Lloyd)

Early ideas about reason and knowledge were greatly affected by views about relation bw genders.

- maleness: reasonableness, rationality
- femaleness: intuition, empathy, emotion, but also irrationality
- Francis Bacon: real knowledge manifested in control of nature ("Knowledge is power")

⇒ knower (man) v. nature (woman)

- Question: phil consequences for contemporary science?
- Evelyn Fox Keller: real effects for women now entering science
- but: political rather than epistemological effects

Case study: Primatology

Thesis

There are cases in which science benefits from inclusion of women in field.

- Observation in study of social behaviour in nonhuman primates: coincidence between significant influx of female scientists into primatology with emergence of more sophisticated picture of sexual behaviour of female primates

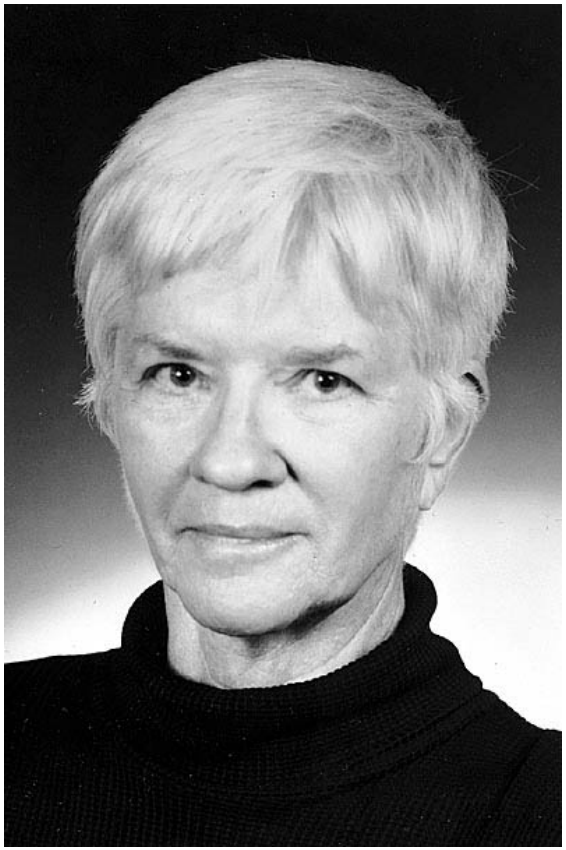
$\Rightarrow$ often interpreted as causal relationship

Kathleen Okruhlik

Kathleen Okruhlik, "Gender and the biological sciences," *Biology and Society*, Suppl. vol. 20 (1994): 21-42

1. Non-cognitive factors influence the generation of theories.
2. Theory choice in science, even if perfectly rational and uncontaminated by non-cognitive factors, is irreducibly comparative, i.e. only operative among extant rival theories.
3. The number of actually available contenders in each choice is finite. [Okruhlik: two]
4. By (2) and (3), theory choice only identifies the theory which is epistemically superior over a finite number of extant rivals.
5. By (1) and (4), nothing in the appraisal machinery will completely 'purify' the victorious theory from non-cognitive elements.
6. In particular, if all of the contenders for a particular choice, or set of choices, suffer from an androcentric bias, then the content of science as a whole suffers from an androcentric bias even if the mechanisms of theory choice are fully rational.

Sandra Harding (*1935), UCLA



- *The Science Question in Feminism* (1986)
- *Whose Science? Whose Knowledge?: Thinking from Women's Lives* (1991)
- contributions to standpoint theory
- notorious for quote that "Isaac Newton's Principia Mathematica is a 'rape manual' because 'science is a male rape of female nature' " (*Science Question*, 264)
- influential categorization of feminist epistemology

Feminist epistemology

Characterization (Feminist epistemology)

Use feminist theory as basis for criticizing how science handles evidence and evaluates theories.

1. Feminist empiricism: espouses value-neutrality of science, androcentric bias sign of 'bad' science
   - but if non-cognitive factors cannot be eliminated, then value-neutrality not convincing

2. Standpoint epistemology: stresses role of ‘situatedness’ of epistemic agent; oppressed or marginalized standpoints are epistemically superior in their ability to criticize basics
   - inspiration from Hegel, Marxism
   - What contextual beliefs might women have that gives them principled epistemic superiority?
   - there’s no unified standpoint shared by all women
3. Feminist postmodernism: embraces full-blown relativism and epistemological anarchism; idea of ‘true’ neutral description of world is harmful illusion

   $\Rightarrow$ impossible to criticize science for androcentric bias on relativist basis since it eschews all normative judgments

Science studies and Science Wars

- science studies: history, sociology, philosophy, cultural anthropology, classics, economics, communication, semiotic theory, feminist theory, cultural studies, etc
- variegated community, multifaceted discipline
- notorious (and virulent?) strand: postmodernism, anti-representationalist view of language
- scientists irritated by how science was presented in wider public

⇒ 'Science Wars': advocates of traditional education worried that transmission of treasures of Western civilization was being undermined by radical leftist faculty members mostly in the humanities

- backlash: Sokal hoax challenging the intellectual standards in science studies and literary theory

Sokal hoax

Thesis (Sokal)

It is sufficient to use appropriate jargon and propagate the right political agenda to get published in some postmodern journals, regardless of whether any intellectual standards are met.

- used jargon to discuss progressive political implications of quantum gravity: “Transgressing the boundaries: toward a transformative hermeneutics of quantum gravity”
- published in 1996 in journal *Social Text*
- let’s look at the section entitled “Hermeneutics of classical general relativity”...

"General relativity can arguably be read as corroborating the Nietzschean deconstruction of causality... although some relativists find this interpretation problematic. In quantum mechanics, by contrast, this phenomenon is rather firmly established... [Citing Derrida:] 'The Einsteinian constant is not a constant, is not a center. It is the very concept of variability – it is, finally, the concept of the game. In other words, it is not the concept of something – of a center starting from which an observer could master the field – but the very concept of the game...' [Footnote: Right-wing critics Gross and Levitt (1994, 79) have ridiculed this statement, willfully misinterpreting it as an assertion about special relativity, in which the Einsteinian constant c (the speed of light in vacuum) is of course constant. No reader conversant with modern physics – except an ideologically biased one – could fail to understand Derrida's unequivocal reference to general relativity.]... the π of Euclid and the G of Newton, formerly thought to be constant and universal, are now perceived in their ineluctable historicity; and the putative observer becomes fatally de-centered, disconnected from any epistemic link to a space-time point that can no longer be defined by geometry alone..."

Sokal's motivation

"But why did I do it? I confess that I'm an unabashed Old Leftist who never quite understood how deconstruction was supposed to help the working class. And I'm a stodgy old scientist who believes, naively, that there exists an external world, that there exist objective truths about that world, and that my job is to discover some of them." ("Transgressing the Boundaries: An Afterword" (1996))