“The Invisibility of Revolutions” & “Exemplars, Incommensurability, and Revolutions,” Kuhn

HPS 2103, Spring 2022

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**The Invisibility of Revolutions**

Three authoritative sources systematically render revolutions invisible by recording the stable outcome of revolutions that are the bases of the prevailing normal science:

1. Scientific textbooks
2. Popular Science
3. Philosophy of Science

Particularly guilty are textbooks, which are rewritten post-revolution and studied by new science students.

* Refer to selective and distorted history which portrays past scientists as working on the problems of the current paradigm, lending to the view that they contributed to the current paradigm.
* Historical fact is depreciated; scientists “fortunately […] forget or revise” their heroes’ works (139). “Forgetting” is an unavoidable and apparently useful aspect of working within a paradigm. “A science that hesitates to forget its founders is lost” (Whitehead, as quoted by Kuhn, 138).

The result of disguising the existence of revolutions is that science looks linear and cumulative.

Textbooks present theories as fitting the “piecemeal-discovered facts” (141). But the so-called “facts” are paradigm dependent. “[Theories] emerge together with the facts they fit” (Ibid.).



**The Resolution of Revolutions**

Paradigm-testing in crisis science does not proceed by verification or falsification of theories. Because we are concerned with how well theories fit the facts, we can ask which of the competing theories fits them better (147). Here enters the problem of incommensurability.

* Disagree about problems that a candidate must solve.
* The new paradigm borrows elements of the old, but use them in different ways, leading to misunderstanding.
* “The proponents of competing paradigms practice their trades in different worlds” (150).

**Exemplars, Incommensurability, and Revolutions**

Theory choice is not a matter settled by logical or mathematical proof, but by reasons that function as values. This is due to incommensurability, here described as:

* Different scientific communities share terminology that attaches to nature differently, leading to only partial communication.
* Normal science depends on primitive groupings of similarity sets based on exemplars, and redistribution of these sets leads to communication breakdown.
* No neutral language is available for adjudication.

Once scientific communities recognize each other as different language communities, scientists can act as translators (by identifying the disparate then the shared terms/locutions; i.e., stop doing science?).

“Each will have learned to translate the other’s theory and its consequences into his own language and simultaneously to describe in his language the world to which that theory applies. This is what the historian of science regularly does (or should) when dealing with out-of-date scientific theories” (202). Is this a good methodology for historians of science?



Translation is a means for persuasion and conversion.

*Persuasion* “to convince [someone] that one’s own view is superior and ought to supplant his own” (203); work of persuaded scientists is parasitic on those who are converted.

*Conversion* internalized, native; one is “thinking and working in” the language and is “at home in the world [the view] helps to shape” (204); gestalt switch (all at once).

**(Returning to Resolution of Revolutions)**

Effective means for persuasion:

* New paradigm solves problems that led the old paradigm to crisis.
* New paradigm allows for predictions that were unsuspected under the old paradigm.
* Aesthetics—the new paradigm is more simple, more neat, more suitable.
* Faith.

Arguments are couched in terms of problem-solving ability but are really about future promise.

Decisive arguments are given post-revolution in textbooks.

**Revolutions and Relativism**

That scientific communities are likened to language-culture communities suggests that both groups may be right, bringing charges of relativism. But Kuhn believes in scientific progress.

* Scientific progress is improvement in puzzle-discovering and puzzle-solving ability, not approximations to truth in terms of ontology.
* Dominant criterion for theory comparison is the ability to set up and solve puzzles.

Kuhn makes a number of seemingly empirical claims throughout these selections.



* We should be able to look through textbooks pre- and post-revolution to determine that they truly render revolutions invisible.
* “Considering any two such theories [related by descent], chosen from points not too near their origin, it should be easy to design a list of criteria that would enable an uncommitted observer to distinguish the earlier from the more recent theory” ( 205f). This is followed by examples of such distinguishing criteria.
* “Translation may, in addition, provide points of entry for the neural reprogramming that, however inscrutable at this time, must underlie conversion” (204).

It would be interesting to see if these claims have found support.

**Discussion Questions**

1. “…at times of theory-choice […], the demonstrated ability to set up and to solve puzzles presented by nature is, in case of value conflict, the dominant criterion for most members of a scientific group” (205). Given that the incommensurability thesis extends to problems and problem-solutions, should we understand this as a non-decisive and possibly mistaken criterion that scientists use? Moreover, how can we make sense of this in light of what Kuhn says about paradigm debates: “the issue is which paradigm should in the future guide research on problems many of which neither competitor can yet claim to resolve completely” (157)?
2. Scientific communities have incommensurable viewpoints—they perceive experimental or observational situations differently (200)—but use many of the same terms, implying that these terms attach to nature differently. What are the limits of seeing situations differently that makes this a problem unique to science but not a problem *within* any scientific community?
3. Persuasion “comes particularly easily to [people] just entering the profession, for they have not yet acquired the special vocabularies and commitments of either group” (203). How are we to think of this given what was said about textbooks and the invisibility of revolutions? Wouldn’t their textbooks be in one of these vocabularies? But do persuaded scientists have a paradigm?