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Layered history: Styles of reasoning as stratified conditions of possibility

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ABSTRACT

This paper depicts Ian Hacking's 'styles of reasoning' as conditions of possibility. After distinguishing between possibilities and causes, it articulates the implicit stratigraphical metaphor used to describe the relationship between different conditions of possibility, with 'lower' layers being necessary for 'higher' ones. It notes the use of this stratigraphical metaphor in the work of multiple scholars in history and in science studies. The paper suggests three ways in which this model can be useful: clarifying the definition and use of 'context' in history of science; redefining counterfactuals as 'possible historical worlds'; and thinking up new forms of 'big picture' histories of science.

Epigraph. "For my part, I enormously enjoy a free space of possibilities, but we can nominalize these issues, by regimenting our talk, and speaking only of which sentences, at a time and place, are deemed to have truth values." (Hacking, 2000, S68).

1. Introduction

This paper depicts Ian Hacking's styles of reasoning not as causes of new kinds of science, but as conditions that make possible new kinds of science. Such a distinction leaves room for agency. The paper then emphasizes a recurring stratigraphical image in Hacking's work: that conditions of possibility are arranged in layers, with lower conditions being necessary for the existence of higher conditions. Other scholars are shown to implicitly use this metaphor of strata. The image of 'layered history' is then used to clarify several issues for historians of science, such as a more precise definition of 'context' and the future shape of 'big picture' histories of science.

Because it is so extensively dealt with both in this issue and elsewhere, particularly by Martin Kusch (2010), this paper will not discuss Ian Hacking's use of Alastair Crombie's six categories, or Crombie's work for that matter. Nor will it talk about questions of relativism, anarcho-rationalism, self-vindication and truth. And this paper will pass over the tendency of many scholars to transform 'styles of reasoning' into 'styles of thinking' despite Hacking's insistence that hand-work is just as important as head-work (Hacking, 1992a, pp. 180–181).

Rather, this paper will focus on a theme running through Hacking's work in general: the importance of *possibility*. It then depicts styles of reasoning as *conditions of possibility*—circumstances that are necessary for other phenomena to occur. The relationship might be expressed temporally: first there appeared a style of reasoning, then there came things made possible by that style. Thus the probabilistic style emerged around 1650, and in so doing made possible new concepts such as populations, new techniques such as representative sampling, and new authorities such as statistically-informed civil servants. (Hacking, 1990, p. 6).

Yet while the probabilistic style appeared first, followed by new concepts, techniques and authorities, one cannot say that the probabilistic style *caused* such changes. A condition of possibility is only a prerequisite. Hence the probabilistic style was necessary but not sufficient for the emergence of national statistical agencies or the use of randomization in experiments.

This point can also be formulated negatively. If a style of reasoning that is necessary for a certain science disappears, then the science it makes possible can no longer exist. That is, the science can no longer produce 'positive' knowledge: statements that are true

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or false. Hacking's case of Paracelsian iatrochemistry's rationale for why mercury cures syphilis is one example of a science disappearing in this way—a point discussed in more detail in section four.

Certain sciences are made possible by a style of reasoning. But in turn, styles of reasoning are themselves made possible by other conditions. Such conditions of possibility might be a contingent historical event, an institution, or economic circumstances—they may be physical, intellectual, or cultural. For instance Hacking notes Steven Shapin's point that "what made the new laboratory science possible was the custom of trust among the gentry who formed the Royal Society." (Hacking, 2009, p. 44). In this particular case, the custom of mutual trust made possible the laboratory style of reasoning, which in turn made possible specific forms of experimental science.

Hacking, as well as other scholars, depicts these myriad relationships of possibility, necessity, and dependence by using the metaphor of layers. Multiple conditions of possibility form *strata*. How high a particular condition of possibility sits as a layer indicates how much it requires other condition-layers for its very existence: 'higher' strata are made possible by 'lower' ones. This can again be expressed negatively: remove the lower level conditions of possibility, and the upper level conditions that depend on them must also disappear.

Layered history may cause philosophical concerns. An obvious one is that this model seems deterministic. Wasn't Marx's now-discredited historical materialism a form of layered history? Didn't it ignore agency and contingency by depicting economic forces of production as the 'base' for political and intellectual 'superstructures' such as ideologies, theories, or political relations—the lower ones thereby causing the upper ones (Rigby, 1998, p. 180)? Another concern might be with the model's reductionism. Didn't the failure of the specific case of historical determinism show how layered history in general relies on the exploded positivist belief that all knowledge can be reduced to science? Isn't this a stance which is misguided at best, dangerous at worst, and occasionally quite funny (Fodor, 1998)?

Such concerns about determinism and reductionism arise because the relationship between different layers often goes unarticulated. One can allay these worries by claiming that a lower layer does not *cause* a higher one, but instead *makes it possible*. Work in philosophy of biology, on levels of organization, suggests better ways to think about possibility in layered history. On reductionism, John Dupré says that while it has led to countless important insights about the structure of objects, reductionism works less well at predicting their behaviour: this is because the constituent elements of a higher level structure do not *cause* it to behave in a certain way. On materialism and physicalism, Dupré notes that while four players are necessary for a game of bridge to occur, this doesn't mean that the game is nothing but those four players; their mere presence does not *cause* the bridge game to occur (1993, pp. 87–94). Nor are lower layers necessarily physical or material: the trust making possible the laboratory style is a custom, a cultural trait. Further distinctions between possibility and cause appear in section three.

At the end of section four and throughout section five, this paper argues that other scholars in addition to Hacking use a model of layered conditions of possibility. One is Michel Foucault, whose archaeological work inspired Hacking, and whose *episteme* is similar to a style of reasoning; Martin Kusch's diagram of Foucauldian strata is shown below. Another stratigraphical scholar is the *Annales* historian Fernand Braudel, whose history also included the *courte* and *moyenne durée*, despite being overshadowed by the *longue*. In science studies, the *questions* of Nicholas Jardine, the *central metaphor* of Peter Galison, and the *ways of knowing* of John Pickstone can all be seen as stratified conditions of possibility.

Section six argues that stratified conditions of possibility can be used to clarify three issues in the history of science. First, this model helps us better articulate the meaning of *context*: it is a condition that makes possible the emergence of scientific knowledge, or whatever phenomenon interests the historian. Second, this model helps advance the use of counterfactuals, which this paper suggests should be renamed *possible historical worlds*: in addition to merely seeing history diachronically, as a 'tape' to be rewound and played back again, one can also see history synchronically, looking at the underlying conditions that made a particular event possible, and speculating on degrees of necessity, contingency and impossibility had those depth conditions been different. Finally, layered history can redefine *big picture* histories of science: not as grand linear narratives, but as multi-levelled accounts of the conditions that made different kinds of science possible. Such histories have already been written by Geoffrey Lloyd and Nathan Sivin (2002), and by James McClellan III and Harold Dorn (2006) —meaning these four scholars can also be added to the roster of those using stratified conditions of possibility in their work.

2. Hacking's possibility-talk

Hacking frequently couches his investigations in possibility-talk: for instance the *Taming of Chance* seeks to "grasp the conditions that made possible our present organization of concepts" about physical indeterminism and statistical information (Hacking, 1990, pp. 5,6). One crude way to assess Hacking's possibility-talk is to head to Google Books and tally the frequency of the word 'possible', 'possibility', and 'possibilities' in his books, comparing them with the frequency of the appearance of the word 'cause', 'causes', 'causation', and 'causality.' Apart from *The Taming of Chance* and *Rewriting the Soul* (1995), 'possibility' and its variants appears more often than 'cause' and its variants. For example, the score is 45 to 35 in Hacking's introductory philosophy of science text *Representing and Intervening* (1983). The difference is far greater in other books: in the *Emergence of Probability* (1975) the count is 107 to 43, while in his *Logic of Statistical Inference* (1965), the word 'possibility' and its variants appears 132 times while 'cause' and its variants appears but twice.[1]

Possibility-talk takes various forms in Hacking's works. Sometimes it's extremely precise: his paper simply entitled "Possibility" (1967) uses modal logic to distinguish between several kinds of possibility. Sometimes his possibility-talk takes the form of general statements of curiosity about it, as shown by the epigraph which began this paper. A specific case of possibility-talk is to be found in 1982's "Making up people", which studies how an individual's possible actions and identities are shaped by words (names, to be precise). What does it mean "…to say that possible ways to be a person can from time to time come into being or disappear?" "Making up people" thus considers the relationship between "gradations of possibility" and language: words as much as power configure possibilities. Just as God Himself couldn't make a five-sided square, He couldn't also make George Washington a 'pervert' because the conception and name did not yet exist (Hacking, 1982b, p. 107).

Hacking also uses possibility-talk to reinterpret several famous projects in history and philosophy of science. Thus he describes Ludwik Fleck as trying to figure out what it was possible to think, and how a particular *denkstil* made certain concepts possible, or

[1] For all except *The Logic of Statistical Inference* the index and references were not counted.