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## Book Review

### Is Fallibilism Mistaken?

Menachem Fisch, *Creatively Undecided: Toward a History and Philosophy of Scientific Agency*. Chicago and London: University of Chicago Press, 2017. 304 pp. ISBN: 978022651451 – \$ 37,50

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The history of science according to Menachem Fisch goes as follows: Scientists work both within Frameworks that are constitutive of the Normative Standards for the Frameworks, and also with Critical Rationalism where those Frameworks are revised through criticism. This creates a dilemma: since rational criticism depends on Frameworks, rational criticism is inherently limited. Hence, there will always be uncriticised areas. However, science as a fully rational endeavour cannot function without Frameworks. How then can Frameworks be fully rationally criticised and changed when rationally required? Solution (according to Fisch): the rational change of Frameworks and their normative standards of rationality occurs through a psychological process of seeking out new Frameworks and modifying one's belief-systems by use of rational criticism from alternative Frameworks or belief-systems; by creating new hybrid Frameworks partially composed of the old Framework, and an alternative Framework – done for the *reason* of getting the best of both “worlds” (Frameworks as constitutive of normative systems) and ridding both “worlds” (or Normative systems) of their worst components.

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#### Background:

### Exposing Fisch's Tacit Interpretative Schema for Science

This history of science according to Fisch is itself a hybrid of Fisch's old Framework, Karl Popper's *critical rationalism* philosophy, and the new Frameworks not only of Kuhn's paradigm-shift of scientific revolutions, but also of contemporary followers of Wittgenstein's *forms of life* formula; contemporary neo-Kantians; and various sociologists of Science in the inter-disciplinary approaches to Science lately known under the umbrella term of *Science Studies*. All these Frameworks for the story of science are weak in explaining how the transition from the old Framework to a new Framework in science can be rational. At the best, there is a very thin theory of rational transition such as the later Kuhn's instrumentalist rationality using Poincaré's conventionalist-aesthetic of simplicity or Michael Friedman's neo-

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Kantian/neo-Idealist coherentism-completeness and consistency.

Unfortunately, according to Fisch, Popper's neat story that Frameworks are a myth, and science is in a continual revolution through criticism is blind to normative change. *Contra* Popper, the normative element of science is itself subject to change, and is itself constituted by the metaphysical elements of science, also known as Frameworks.

Fisch develops a three stage approach to getting across his history of science. In the first stage, Fisch explains how he came himself to wander in the intellectual desert of freeing himself from the blinder of Popper's universal rationalism – his own intellectual crisis with his Popperian belief-system, a type of phenomenology of personal Framework implosion or a form of creative self-destruction. In the second stage, Fisch searches the literature and hits upon the concept of *Trading Zone* (born in the mind of Peter Galison) – where scientists, technologists, engineers – all from different disciplines and outlooks – get together, hash out and exchange ideas, and techniques (also similar in concept to Andrew Pickering's *melange*). This wandering ultimately leads Fisch to develop a new hybrid philosophy. Fisch uses the concept of *Trading Zone* to explain rational belief-system change or Framework change. Fisch's own hybrid philosophy is a philosophy for advocating hybrid philosophies that involve creative-destruction: destroy the worst ideas from alternative frameworks, and synthesize the new framework through combining the best ideas from alternative Frameworks while in the *Trading Zone* of exploring or rationally criticizing alternative Frameworks, especially and including self-criticizing one's own old Framework. In Fisch's case, he argues for “destroying” Popper's worst idea that frameworks are myths, and Kuhn's worst idea of a-rational paradigm-shift; and Fisch argues for transforming Popper's idea of critical rationality and Kuhn's idea of paradigm (-shift) by integrating those ideas into the newly created Fischian Framework of Framework change through rational criticism of alternative Frameworks. The third stage has Fisch testing his New Historiographical Framework for science against how the Framework for meta-mathematics or Formalist Mathematics developed in nineteenth century England (in the Analytical Society).

Fisch's first stage very deeply and adequately outlines the *problem-situation* (whoops, this is a Popperian term) for the book. Fisch does this by way of a phenomenology of his own intellectual crisis, and how he came to swap out his own intellectual tools for new intellectual tools – or better and more accurately put: how Fisch came to forge new intellectual tools out of the material of current but inadequate tools in widespread use among historians and philosophers of science. I want to step back from Fisch's own account, though I will return to it, and set the stage for Fisch's book using a different and alien perspective and set of tools; a bricolage (or less technically put, mishmash) of tool sets. (My approach may sound strange but it actually is in accordance with and exemplifies Fisch's own thesis that hybrid approaches arise from rational considerations and result in rational Framework-transitions.

Looking at the history and philosophy of science we can see two approaches: one I will call *detached*, and the other *attached*. To repeat: this is my terminology and not Fisch's, but a terminology and point of view that I think will help illuminate both the problem-situation that Fisch confronts and the novelty of his own solution to that problem-situation. The approaches are independent and can cut across the various schools, whether inductivist, neo-positivist, Wittgensteinian, Popperian, Polanyian, and so forth. The *detached* approach treats their theories and the theories of others as instruments, tools, techniques or heuristics that one uses according to the task at hand, and uses in a detached manner as fungible. For instance, one loses a hammer, and then goes to the hardware store and acquires an identical one, though without any nicks due to long usage, or sees a newer and better model, and purchases that one instead.

The *attached* approach treats theories as belief-systems composed of beliefs of relative importance depending on the place of specific beliefs relative to the identity of the system as a whole. The beliefs that are part of the core of the identity of the belief-system of the **individual** person, of the individual's psychology, as a whole become *axiomatic*. One

might say that the unity of physics, as in Einstein's failed but persistent attempt until the end to develop a unified field theory for physics, became axiomatic for Einstein's belief-system. In this approach, the emphasis is on the psychology of the individuals in a social group who share a belief-system. Changes in the core beliefs change the **identity** of the individual, the social group, and the belief-system.

The *detached* and the *attached* approaches are extremes of the spectrum concerning the issue of how to treat one's intellectual situation. Does one treat one's intellectual situation as a grab-bag of tools for solving puzzles? Or, does one treat one's intellectual situation as composed of beliefs that are formative of one's self, of one's personal identity, where challenges to one's beliefs are not merely intellectual puzzles, but are challenges to one's identity or with how one identifies one's self as a unique individual though part of a social group with similar identities? In terms of philosophers, does one identify oneself with a Hilary Putnam who was constantly changing views before others could finish publishing their critiques; or, with a Karl Popper who seemed to be elaborating, exemplifying, and extending the views he held from his early days on the fringe of the Vienna Circle?

How does Menachem Fisch's book fit into this context? Where does Fisch enter this stage with two conflicting scenarios? Does Fisch's argument in this book advocate for a Putnam-type who actually adopts Popper's theory of rationality where views need to be carefully and thoroughly scrutinized through rational criticism, and then exchanged for new views that better meet the test of rational criticism and the logic of the problem-situation? Or, does Fisch's argument advocate for a Popper-type or Einstein-type in practice, who holds onto views and tirelessly criticizes the opposing views, but not their own views, which they defend as if their views were a Masada/Fort Alamo?

The first way above (the Putnam-type in practice) sees the *detached* approach – the bricolage or mishmash approach – as positive for intellectual growth. The second way above (the Popper or Einstein-type in practice) sees the *attached* approach, as required for the authentic and integral intellectual who holds fast to unpopular and critical views against intellectual fashions. Do Fisch's theory and argument emphasize the *detached* or the *attached* approach for science? Does Fisch see scientists using a mishmash of theories, heuristic techniques, and technologies – as *detached* from the intellectual and technological tools as instruments for scientific discovery, explanation, and prediction? Or, does Fisch see scientists developing or contributing to belief-systems that the scientist attempts to promulgate among the community of scientists as adequate for discovery, explanation and prediction – as *attached* or integral to the identity of the scientist and scientific community.

The background problem or logic of the situation for the historiography and philosophy of science that I am exploring is not the customary issues of instrumentalism and conventionalism on one side, *versus* realism on the other side; nor is it one of social constructionism on one side *versus* realism and representationalism on the other side; nor, is it one of the personal and subjective on one side *versus* the impersonal and objective on the other side. Rather, the logic of the situation confronted by Fisch for his own historiography and philosophy of science cuts across and through the above issues and rather focuses on what I have been calling the *attitude* of scientists (and all intellectuals in general): the *attitude of detachment versus attachment* to the products of their intellectual work. Fisch, I propose, in this book, hovers between the two attitudes. According to Fisch's argument in this book, scientists are critical and as such require a *detached* attitude towards their intellectual productions; however, scientists are also *attached* to their intellectual productions as integral to their self-identity, and hence suspend criticism for commitment. Fisch's own approach to the historiography and philosophy of science is *binocular* – seeing the world of science through both poles of the detached-attached spectrum; or *bi-cognitive* – interpreting the world of science with the two dimensions of detached/attached axes for Fisch's intellectual coordinate system for the intellectual biographies of scientists in their specific scientific communities.

In the following for my interpretation of Fisch's book, I will use the metaphor of *bicognition* where one interprets intellectual life as having an intellectual coordinate system with two orthogonal axes, one axis is for representing the dimension of detachment in intellectual life; and the other axis is for representing the dimension of attachment in intellectual life. I don't see Fisch as the neo-Hegelian (see especially pp. 46, 101 and 129) that he sees himself who synthesizes two antithetical viewpoints into a new integral higher monocular viewpoint (where other antithetical viewpoints emerge to continue the dialectic until there is the ultimate absolutely monocular viewpoint). Rather, I see Fisch as a tacit pluralist who subliminally realizes that multi-dimensions are required for interpretation of intellectual life. In that respect, I am applying Fisch's own tacit framework as an intellectual coordinate system for interpreting his own intellectual life found in and between the words of this book.

I emphasize: I am not imposing my own interpretative scheme; rather, I am using the tacit interpretative scheme for interpreting Fisch's book that Fisch has subliminally developed in the very clearly articulated phenomenology of his own intellectual travel away from Karl Popper and towards his own Fischian philosophy, and as well as that Fisch has subliminally developed in his own novel interpretation of the nineteenth century short-lived but profoundly important Analytical Mathematics School in England (Cambridge University). This ends the *Background* section, and next, I will discuss Fisch's *Argument*, self-application of his argument (or *phenomenology*), and some novel but *unasked questions* raised by the book.

## **Argument: How Fisch Tells us How to Go Beyond the Popperian-Kuhnian Debate**

Self-understanding is retrospective. Retrospective sight is not equivalent to hindsight in the way that hindsight is used to wonder why we did not choose a better course of action that would have avoided errors that foresight misses. Retrospective sight is the only sight we have available to us when attempting to achieve self-understanding (not self-evaluation nor self-criticism). Using this principle, that retrospective sight is better for self-understanding, one could start reading Fisch's book with *Part Two: We Philosophers*, Chapter 2, "The Philosophical Framework" (pp.39ff.). It is this Philosophical Framework outlined in Chapter 2, that informs the structure and approach of the entire book, including, *Part One: I (Orientations)* where Fisch outlines how his disappointment with his early philosophical outlook. Karl Popper's later or Post-Kuhnian philosophy and historiography of science guided Fisch's early approach to his studies of (and books about) nineteenth century mathematics and philosophy, as well as his book about rabbinics. [The irony is that many philosophers who came upon Popper after Kuhn's *Structure of Scientific Revolutions* hit the scene in 1962, came upon a Popper who was doubly out of the mainstream – rejected by the disciples of the Vienna Circle for not stepping in line with the programme for a universal physicalist language for the sciences; and rejected by the new disciples of the young Kuhn for holding onto the positivist assumption that science was defined by its logic or methodology, rather than by its practice – sociology and psychology.]

The second chapter departs from Fisch's own early Popperian philosophy, in its outline of three "biases". The first, is *framework dependency* – the social aspect of science. The second bias is *rational self-criticism* – the individual agent or psychological aspect of science. The third bias, Fisch refers to as the "[...] 'Hegelian' bias or set of commitments that underlies this study." (p.46). The third bias is explained, according to Fisch in his third chapter, "The Problem for Science". Fisch develops his self-styled *Hegelian bias* through a very *Hegelian* dialectical criticism of various philosophers who grapple with the two horns of the dilemma created by the first two biases of framework dependency and the importance of relentless

Popperian all-consuming self-criticism. The first horn of the dilemma is that since frameworks constitute even the norms of criticism and self-criticism, those norms of criticism themselves can only be reinforced by self-criticism. The second horn of the dilemma is that the norms of self-criticism require self-criticism, and so cannot be held free of criticism without a loss of self-consistency, self-integrity, and self-identity or *agency* as a critical rationalist.

The solution to the horns of the dilemma arises through Fisch's critical reflections on those philosophers outside the Popper school of thought who recognize the importance of the two biases: the principle of framework dependency and the principle of critical rationalism (as self-criticism). Here is Fisch's solution very clearly and concisely articulated in the following:

When we are left to our own devices, the self-critical fault lines of the reflective self are beyond control and remain rigid and unchangeable from within. But trusted criticism can change them for us. When the rich intrapersonal dialogue of the self is set within the context of an equally rich interpersonal critical dialogue with others, effective transformative normative self-criticism becomes a real option. (p.97)

Where does one go to find "trusted criticism"? Moreover, who cares – how does one who has become transformed, or has changed their *normative framework*, get others in their intellectual community to adopt the new or modified normative framework? The discussion of those questions, about trust and care, is carried out in the fourth chapter, "Toward a Narratology of Scientific Framework Transitions" (p. 100 ff.) First: intellectual trust is gained when working with others – intellectually trading with others as in "[Peter] Galison's notion of a scientific trading zone proves extremely helpful in ways he himself failed to anticipate." (p.106) By engaging in mutual discussion with others from alternative normative frameworks or even alternative disciplines, and with the development of intermediary modes of communication, one is exposed to different ways of thinking as well as exposed to criticisms from trustful "strangers". Second: one who has come up with novel changes in their normative framework, and is well placed in their intellectual community, is able to jar others into reconsidering their old normative framework and adopting the new normative framework of their exemplary colleague. (See p. 126.)

What has Fisch so far accomplished in his argument for resolving the dilemma of joining the principle of *framework dependence* (at least for normative standards regarding scientific rationality) and the principle of *critical rationalism* (where all criticism including self-criticism, self-applies)? Fisch's own self-interpretation of his resolution as quasi-Hegelian as a synthesis of two dialectically opposed elements, I think is misleading. Rather, I think Fisch has created a two-dimensional axis system for historically and philosophically interpreting scientific revolutions, as follows. One axis is for the sociological issue of framework application and transition. The other axis is for the psychological issues of doubt, commitment, ambivalence due to applying the external criticism of trusted criticism to one's own framework. These coordinate, orthogonal, axes provide a reference frame for describing the *logic of the situation* for science during a period of revolution or transition. The *logic of the situation* involves exemplary scientists who develop a modified version of the old framework; unsettle their colleagues to the degree that their colleagues recognize the value of the modified and improved framework for their own research; and so, launch a scientific revolution or at least a transition in scientific thinking and practice. How, then, does Fisch's argument with its bi-cognitive approach of two coordinate orthogonal axes – one for the social dimension of frameworks, and one for the psychological dimension of belief-system questioning and transformation – apply to Fisch's own development (*phenomenology*) of this new framework for the historiography and philosophy of science?

## Phenomenology: How Fisch Uses A Self-Critical Autobiography for Illustrating his New Framework

A quasi-Freudian approach where Popper is the father and Fisch is the son with a Freudian Oedipus-complex where the son in intellectual reality metaphorically kills the father, is whether true or false, beside the point. It would be especially irrelevant for a Popper who saw psychoanalysis as a pseudo-science. Popper also was unhappy with Freud's disciple, Adler and Adlerian individual psychology, where the younger sibling with an inferiority complex rivals the elder siblings (other philosophical metaphorical children of Popper) through becoming an intellectual revolutionary. Both types of failed attempts in psychology (at least in terms of meeting the standards of Popper's theory of science) are neither here nor their in application to the phenomenology of Fisch's self-described journey away from Popper's and Popperian historiography and philosophy of science, as detailed in the first chapter (which is also the first part) of the book. How Fisch sees his development is indeed philosophically speaking generic Popper of the critical and problem-solving approach to intellectual history. Fisch realized that his attempts at applying Popper *simpliciter* to the history of nineteenth century mathematics failed. Rather, than conjectures and refutations with respect to an unsolved problem, what seemed to be was something very different: stubbornness in rejecting a deeply problematic framework with doubts arising, and then an attempt to form a hybrid framework that resolved the criticism and doubts.

This situation covers several problematic issues: first, there are frameworks, rather than isolated conjectures; and what is subject to criticism are not so much the conjectures or isolated theories, but the general over-arching frameworks. In Fisch's early studies of nineteenth century mathematics in England, (Cambridge University) -- in particular, George Peacock, John Herschel, William Whewell, and William Rowan Hamilton -- he was disappointed to find that Karl Popper's model (with a dash of Robin George Collingwood) missed the mark. In Fisch's current vocabulary as developed in the second part of the book (that I discussed above), here is how Fisch explains his disappointment:

Indeed, the Popperian-Collingwoodian vocabulary to which I was committed failed to do justice to these works [of Peacock, Hamilton, Hershel, and Whewell -- and later discussed in the third part of the book, Charles Babbage, and Augustus De Morgan]. Rational agents, it implied, were expected to face up to the problems they encountered, to boldly address and solve them. An inability to fully relinquish past commitments in favour of less problematic options, it firmly implied, is a form of weakness, a lapse of rationality. The ideal coupling of keen and impartial refutation with bold and creative conjecture leaves no room and has little patience for the apparent dithering these works displayed. (p.15)

By the standards of generic Popper, self-applied, it was time for Fisch to look elsewhere among trusted critics with alternative frameworks -- that is through hybridizing Popper with Fisch's own later developed approach to the historiography and philosophy of science. After retrospectively applying Fisch's solution to the dilemma of framework dependence conjoined with critical rationality to the problem Fisch faced when Fisch found that the works of the nineteenth century mathematicians and philosophers that he studied with Popperian philosophy, were a misfit with Popperian philosophy, Fisch looked prospectively towards those philosophers in various disciplines who took frameworks ultra-seriously though most either downplayed or ignored critical rationality. Fisch eloquently states his crisis of belief in Popperian philosophy:

[...] what initially broke the hold of Popper's philosophy on my thinking, in favor of a position closer to Kuhn's, was the realization that the early Victorian works I was studying focused almost exclusively on second-order, meta-scientific, and meta-mathematical questions that bore decisively on first-order research, but with regard to which, of themselves, Popperian fallibilism seemed quite irrelevant. (p. 27).

Fisch was enough of a Popperian fallibilist to recognize a failure in fallibilism, confront the problem, and search wherever Fisch could find it, for a resolution of his problem-situation.

On the sociological axis of Fisch's newfound framework, Fisch saw an objective problem-situation where Popperian fallibilism, faltered by its own standards. On the psychological axis of Fisch's newfound framework, Fisch, in his own words in the first chapter of the book that constitutes the first part of the book, "dithered" and "ambivilated" between the ideas of framework dependency and critical rationality. The psychological break, according to Fisch, with Fisch's commitment to Popperian fallibilism came when Fisch found a way through the impasse by seeing in his own situation that had internalized the criticisms of Kuhn and others against the idea that anomalies amount to refutations. Rather than minimize the criticisms of the theory of falsification of conjectures by way of refutation, Fisch transformed the criticisms into challenges for developing a new framework. The new framework recognizes, according to Fisch, that psychological self-criticism and doubt can be used to both look for alternatives and fuse alternatives with the old framework or way of doing things. Fisch's new framework is a fusion philosophy (my terminology, or "hybrid framework", Fisch's terminology) that recognizes that frameworks can become a fusion of alternative if not competing frameworks. Not quite "Hegelian", I think, in philosophy, but more multi-dimensional (or at least bi-dimensional and bi-cognitive) in philosophy. Alternative frameworks are held in balance or at least can be treated as coordinate axes for understanding intellectual developments, according to my interpretation of the tacit dimension of Fisch's book.

I leave the reader to explore the following question by reading the third part of Fisch's book: Does Fisch's bi-cognitive approach or fusion philosophy (in my terminology) of framework dependency and critical rationality, resolve the problems Fisch found when attempting to apply fallibilist philosophy to understanding Victorian (nineteenth century) mathematics and science? For the sake of argument, let us assume that Fisch's fusion philosophy works out. In that case, there are very important unasked questions to consider, which I will raise in the concluding section.

## Unasked Questions

The point that alternative frameworks can be fused (or "*sublated*" according to Hegelian terminology) or, at least, used as multi-dimensional axes for interpreting alternative intellectual outlooks, creates another paradox or question that needs asking but was not asked in this book.

Fusing alternative frameworks where frameworks are constitutive of at least norms presumes that frameworks are neither comprehensive nor complete. In other words, fusing alternative frameworks presumes that frameworks are porous. If so, is not the concept of *framework* misleading? Rather, could it be that people (as I have assumed in my background section) are required both psychologically and sociologically, to act stubbornly with regard to their belief-sets? If so, how stubborn can a person or community act, without becoming over rigid or frozen in their ways?

Furthermore, if we suppose the porosity of frameworks, then the question of how to escape, modify, criticise frameworks is an inadequate question – because frameworks as

porous have inbuilt exit doors, in their incompleteness and inconsistencies. Rather, a more powerful question would be, assuming the porosity of frameworks, when should a community of intellectuals treat their “identifying” theories (belief-sets) as mere conjectural intellectual tools open to replacement? That is, when do we decide to explore among alternative outlooks (metaphysical systems, if you will) or decide to hold firm and apply the monocular outlook? Is the road to truth paved with a pluralist approach or a monocular approach, or both?

If I have to ask one unasked question, it would be this question: Is ambivalence among alternative frameworks really due to the psycho-sociological state of thinkers during a time of intellectual and social transition? In other words, and this is a sharper form of the question, is ambivalence (*ambivilating*, in Fisch’s terminology) the psychological symptom of a person who is unwilling to live with open options, incompleteness, and incoherency – or simply put, a **plurality** – in an open universe where evolution is evolving?