

Experimenting with spirits: the creative and therapeutic role of experimentation on Francis Bacon's natural histories

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Francis Bacon's philosophy of experiment has been often subject to fierce debates, and sometimes thoroughly abused in the writings of historians of philosophy or historians and philosophers of science. Despite the obvious central role of experiment and experimentation in Bacon's writings, it is still not entirely clear how we would answer today to any of the following questions:

1. What is the relation between Bacon's speculative philosophy (i.e. cosmology and theory of matter) and his performed or imagined experiments?
2. What is the role of experimentation in general (in natural history or in natural philosophy)?
3. Why do natural philosophers have to do experiments at all?

Attempts have been made to read Bacon in a purely inductivist manner, as starting with observations and experiments, establishing some theory-free facts and constructing from them, through some sort of inductive reasoning, axioms and laws (Daston 1991, Park 1995). There were also attempts to read Bacon as a hypothetico deductivist: as starting with conjectures and theoretical statements and using experiments to test, confirm or reject theoretical statements (Urbach 1981). Yet other attempts tend to picture Bacon as a proto-Bayesian: as using experiments to amass evidence for a more probable conjecture and amend his theory accordingly (Manzo 2007). Last but not least, there are ways of reading Bacon in such a way that his natural and experimental history is no more than a feeble illustration of his metaphysical or cosmological theory of matter, or even a rhetorical device for enlisting actual or future help in realizing the societal and communitarian program of *Instauratio Magna* (Rees 2007).

In part, such divergent interpretations originate in the peculiar structure of Bacon's description of experimentation and experimental procedures – still the least investigated parts of his works.

For Francis Bacon, the proper objects of philosophy, the 'principles, fountains, causes and forms of motions, that is, the 'appetites' and 'passions' of every kind of matter' (OFB V 246) are to be investigated throughout a thoroughly regulated experimental procedure designed by the name *experientia literata*. In a characteristic metaphorical fashion, Bacon pictures his experimental methodology as a way of torturing nature or chaining the god Proteus and hence obliging the multi-faceted nature to change shape and reveal its secrets. In Bacon's speculative philosophy (Rees 1993, 2007) natural processes are the result of the active powers of the spirits enclosed in the tangible bodies. Spirits are "the most active of bodies" (SS I. 98) and it is from spirits "and their motions" that the majority of processes proceed. All properties of bodies ultimately arise from the 'appetites and desires' of pneumatic matter (OFB V 451-2). Experimenting with matter or chaining Proteus means, in fact, experimenting with spirits, reaching, through experiments, to the sources of motion and causation that lie at the origin of all physical phenomena.

How is this investigation possible?

For the mechanical philosopher, the bridge between the realm of the visible and the invisible world is to postulate a fundamental similarity between macroscopic/visible phenomena and what happens at the microscopic level. Collisions, for example, are relevant from the point of view of the experimenter

because of the postulate stating that in the visible and invisible world, particles or macroscopic bodies collide in the same way, like billiard balls, for example. Hence, it is relevant to study the macroscopic collisions and investigate the empirical laws governing this phenomenon. In Bacon's non-mechanical philosophy, however, no such postulate of similarity is at work. There is no reason to believe that the invisible spirits trapped in bodies act in any way similar with the macroscopic bodies we can see and experience. What is, then, the relevance of experimentation?

One important point worth noticing is, of course, Bacon's materialism. There is no ontological difference between spirits or pneumatics in general and tangible bodies. They are all material and, what is even more important, they can be transformed into one another. Such 'phase-transformations' are extremely important in Bacon's natural histories and a lot of experiments are constructed around them. Another important point is that spirits and matter are subject to the general conservation law stating that the total quantity of matter (tangible and pneumatic) in the universe is constant. All this, however, is not sufficient to bridge the gap between the observable and the unobservable, between the visible phenomena and the invisible actions of the spirits.

What is, then, the relevance of Baconian experimentation?

It is my suggestion in this paper to abandon the standard view that Baconian experiments function as evidence. Instead, by looking into the way experiments were put together, varied and exploited in Bacon's Latin natural histories, I will suggest alternative functions for experimentation in general, and a more sophisticated relation between theory and experiments.

In this paper I will investigate in depth a number of Baconian experiments with spirits taken respectively from *Historia densi et rari*, *Historia ventorum*, *Historia vitae et mortis* and *Sylva Sylvarum*. I will first show the way they were put together as applications of Bacon's own art of experientia literata, using instruments, instrumental set-ups and a complex methodology of experimentation. I will then emphasize their theoretical presuppositions and their connection with Bacon's matter theory. I will in the end attempt to explain three potential functions of experimentation that have received little attention so far. Firstly, I will show that experiments can serve as models for understanding more complex phenomena. Secondly, I will show in what way experiments can work as classificatory devices in Bacon's own cosmological scheme/matter theory. Thirdly, I will discuss the therapeutic role of experimentation, showing in what ways experiments, by providing 'ministrations' for the senses, memory and intellect, contribute to a more general program of 'medicining the mind'.