

Catherine Wilson, *The Invisible World: Early Modern Philosophy and the Invention of the Microscope*. Princeton: Princeton University Press, 1995, 288 pp.

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“The present book,” acknowledges Wilson in her *Preface*, “owes its origins to a study of the preface to Robert Hooke’s *Micrographia* undertaken in a seminar on reappraisals of the scientific revolution under the direction of Robert S. Westman.” It is in that very preface that Hooke proclaims: “*my ambition is, that I may serve to the great Philosophers of this Age, as the makers and grinders of my Glasses did to me*” (*Micrographia*, Preface; pp. xii-xiii), and it seems that for Wilson, the reappraisal of paragraphs like this have served to erode Westman’s conception of the scientific revolution as a “*long-term event—some one hundred fifty years in the making*” (Westman, in Lindberg and Westman’s *Reappraisals of the Scientific Revolution*. Cambridge: Cambridge University Press, 1990, p. 170). From Wilson’s perspective, this time frame does not appear as an ‘event’ at all.

Albeit, or perhaps because, Wilson’s accounts are so careful and specific, *The Invisible World*’s lessons are as general as one may find—they pertain, as she unabashedly declares, to the very “ontology” of the historiography of science (p. 8). Distinguishing itself from the other, seemingly similar studies published lately, Wilson’s book transcends the question of early microscopy to become a critique of historiographic categories, and the category of ‘event’, in its application to those “one hundred fifty years,” is its first victim. Wilson does not offer any explicit ontological argument, but her “selection of events and moments” radically undermines the unified conception implied by this category. This is partly due to its very nature as a selection, but more importantly, because it exposes the alleged ‘event’ rather as a series of loosely related processes, technological developments and neglects, institutional expansions and decays, oscillations between optimism and scepticism, openness and closure, co-operation and competition.

It is not surprising that the common places through which we narrate the scientific revolution should be magnified into critical reflection by the microscope and its story. On the one hand, this story exhibits most of the essential characteristics of the various narratives and sub-plots into which we pack this formative period. It has in its centre the development of a new technology, with its accompanying practices and the obvious opportunities for glory (within the scientific circles) and fortune (outside them). Like its elder brother, the telescope, the microscope fits perfectly into our view of that period as one of increasing interest in careful experimental

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procedures, aided by perception-enhancing devices, and its early applications are entitled to our endearing treatment as a young and fresh version of our own science; “proto-science,” is the term Wilson prefers.

On the other hand, the tale of the microscope stubbornly refuses to properly fit the mould when it comes to some other important features. The quick channelling of microscopic investigation towards questions of life and death, regeneration and disease, and, as Wilson compellingly shows, images of matter and its elementary structure, supplied its early practitioners with metaphysically-loaded terminology, making their texts a strange detour in the great march towards positive science. Moreover, fitting microscopy into that progress story requires an explanation for the curious loss of interest in it just when the new science started to come of age, a mystery which none of the new studies has succeeded in solving.

It is in the treatment of these difficulties that *The Invisible World* proves most valuable. It does not solve them, but in the course of communicating a series of telling stories about the production of microscopes, their observational and theoretical uses and the philosophical reactions to the hopes and frustrations those generated, it does expose many of the unquestioned assumptions that make these historical happenings into explanation-demanding phenomena.

Summarising the various intellectual ramifications of its early use, Wilson suggests that

the microscope put into question that type of explanation that required appeal to formal and final causes, especially the replicative causation in which an idea or a formal immaterial agent produces a copy of itself. (p. 254)

Her book, one may add, should have the same effect on historical explanations. It reminds us, once and again, that our epistemological ideology had no causal efficacy on our ancestors, and therefore should not feature in our accounts of their choices. This piece of historiographic know-how, elementary in any other branch of the trade, does not seem self-evident when it comes to the history of science, perhaps because

it is easy to imagine philosophical rationalism, manifested in methodologies employing new and stringent canons of evidence, driving out irrationalism, as though the *Geist* of history were at work. (p. 43)

Wilson, on the other hand, demonstrates that “the standard story ... puts the cart before the horses.” For example,

There is reason to doubt that ... simplicity, economy, universality, and so forth ... that figured so prominently in the rhetoric of the moderns, actually explain the success of the corpuscularian philosophy in winning general acceptance.

Despite the tendency to present a seventeenth-century Democritean revival in these terms, there was no sudden upset of the old ontology of substances, manifest and occult qualities, virtues, and forces, and its replacement with an incommensurable one. (p. 40)

Looking at the rise and relative fall of the microscope in the seventeenth century from that perspective, the assimilation of magic and mechanism in the texts of, e.g., Harvey or Hooke, not to mention van Helmont, Kircher and Digby (cf. pp. 146-8, 198-200) does not seem any more a strange aberration, but a reasonable use of available intellectual, as well as technological, resources by scholars immersed in the problems of *their* times, rather than aspiring to satisfy *our* criteria.

The most basic of these criteria, indeed our main instrument of interpretation of texts, is that of order and consistency:

Both positivists, who argue that science became science when it set philosophy aside, and intellectualists, who believe that philosophical reconceptions were essential to its development, agree on a certain doubtful assumption: that truth may emerge out of error but cannot emerge out of confusion. (p. 12)

Yet Wilson shows time and again that contradictory conceptions can happily survive shoulder-by-shoulder. For example, a particularly important intellectual achievement of the seventeenth century was the realisation that “Plague ... was not a missive from God ... but the effect of normal operation of subvisible agents,” an achievement tightly related to the advent of microscopy, which allowed the subtle distinction that the plague’s “cause was not occult in the profound sense, but only contingently invisible to the unaided eye” (pp. 142-3). Still, the attention to “standing Pools ... the Wombs of vaults ... Muckhills, Graves and Tombs” (p. 144) did not interrupt conceiving the plague as “the anger of a most righteous God,” as this array of causes, together with the recitation of forwarding signs and omens and the “marks” or “tokens” of plague that appear on its victims, constituted, rather than an explanation of plague, what might be called a semiology of plague, set in a semantic field of wrath, darkness and poison. (p. 145)

Moreover, even within the writing of a single, careful thinker one should expect opportunistic use of available theoretical and rhetorical means rather than coherence. Forcing it on the writings of Bacon, Boyle or even Locke, we lose sight of the actual assets they were aiming at. Discussing the delicate issue of microscopy and theories of generation, where all modern notions of relations between speculation and observation keep being challenged, Wilson notes, as yet another example, that

Though [Harvey and Descartes] appealed to their readers—Descartes by subtle indirection—to imitate them, they made no attempt to divest themselves of

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their personal authority or to disperse this authority in a community of eyewitnesses (p. 108)

and that

Malpighi sometimes preferred to make a direct seed-fetus comparison, bypassing the egg. “The seed is the fetus, in other words a true plant, with its parts . . . completely fashioned.” ... *But nothing depended on such identifications.* The plant seed, he says elsewhere, “is an ovum which contains a fetus made up of its more important parts and which can be kept fertile even for years, until its parts are caused to unfold by the swelling of fluid entering it from the outside.” (pp. 123-4, italics mine)

The most conspicuous way in which Wilson subverts the myth of order and consistency is her refusal to force her various stories, sketches, protocols of meditations and debates into a coherent narrative. Yet, although she has never promised to do so, Wilson leaves her readers (at least this one) a little disappointed at not being offered an alternative “ontology” (or epistemology). Shunning coherence and progress, Wilson stresses the need to “see how, in terms of the choices actually available, certain modes of practice and language came to achieve authority over others” (p. 43), but does not explicate how this should be carried out.

Let us return, as a last example, to one of Wilson’s most intriguing claims, namely, that

the corpuscularian philosophy established itself in the first half of the 1600s as the product of a progressive refinement of the Renaissance notion of “subtlety,” and a materialization of hidden resident spirits. (p. 40)

This insight may, among other things, provide a clue to how it came about that “the microscope ... had a role to play” (ibid.) in non-biological investigations into the structure of matter, such as Hooke’s. Subsequently, it might even shed some light on that mysterious disappointment felt by the microscope’s early practitioners and aficionados. But avoiding the naïve assumption of “rationalism ... driving out irrationalism,” how should one understand this “progressive refinement”?

We could perhaps look back at Wilson’s starting point—that preface by Hooke—for a beginning of an answer. It may be Hooke’s notion of himself as a worker, an artisan, a *producer* of knowledge in the most literal sense, that would finally reveal how it was that

as technically limited and as amateur-infested as early microscopy was, and as sceptically as its promise was sometimes viewed, the knowledge it produced was nevertheless real. (p. 254)

Indeed, to write “the knowledge ... *produced*” and actually mean it, Wilson would

need to account for “*the great Philosophers*” using the same categories she uses for “*the makers and grinders of ... Glasses*” (see quote from Hooke above). This is, no doubt, a matter of new “ontology” for the historiography of science. But by showing how microscopy severed “the paradigm of clear, distinct, immediate perception,” arising from “our familiar commerce with the visual world” (p. 256), Wilson has already pointed at what is to be changed. This ontological turn is, to quote her again, what we should “have learned from studying the relation between ... George Berkeley’s theories of vision and [his] metaphysics, from comparing Gottfried Wilhelm Leibniz’s concern with the conservation of forces with his theory of monads” (p. 10). Taking seriously Berkeley’s tie of seeing with doing, as well as Leibniz’s insistence that representation and causation should be handled in the same terminology, we may have learned not only that “philosophers work [has] both a conceptual and experimental dimension” (p. 10), but that these dimensions are much less distinct than we are accustomed to think.

This, I would like to suggest, is *The Invisible World*’s most important lesson. Wilson definitely provides a fine example of approaching the production of knowledge “in terms of the choices actually available,” but until we learn to account for microscope-observations and microscope-discussions, just like microscopes themselves, as artefacts, products of human craft, wholly contingent upon the “modes of practice and language,” we will continue, in the history of microscopy (or of any other science or philosophy), just as in microscopy itself, to

encounter the paradox formulated by Mersenne, by Locke, by Fontenelle, and by Hume: We see only surfaces, whatever we see is the effect of hidden machinery; therefore whatever we see is scenery and not truth, and as an illusionistic object, it can play no causal role. (p. 255)