

Boyle: Between God and Science, Michael Hunter, Yale University Press, New Haven, 2009 (paperback 2010), 400 pp, ISBN 9780300123814, \$28.

As readers of this journal will know well, Robert Boyle has never been far from the center of studies of the scientific revolution in England. But in the past couple of decades there had been a remarkable amount of new information about him and his world brought to light, as well as great number of new interpretations of him and his work. Michael Hunter has been close to the heart of this revival of Boyle studies, since he has not only contributed to the interpretative literature but has been instrumental in editing and publishing some previously unknown works of Boyle, a new edition of all his works, an edition of his correspondence, and the catalogue and electronic edition of his papers (called the “work-diaries,” at www.livesandletters.ac.uk/wd/index.html). The achievements are enormous, and make it possible to reconstruct the way Boyle put together his written works in ways that would never before have been thought possible. In many of these endeavors Hunter has also had expert assistance from collaborators, many of whom have themselves also contributed substantially to the recent flow of books and articles. Clearly, no one knows the historical remains of Boyle and his associates, and the arguments about them, better than Hunter. His summary in a compact and readable biography is therefore most welcome. It will be undoubtedly remain the authoritative “Life and Works” of Boyle for the foreseeable future.

Hunter’s life of Boyle is structured according to the common biographical approach, from family history and birth, to productive years, death, and legacy. The chapters are not only chronological but thematic, since Hunter organizes each around a topic that he believes best characterizes Boyle’s doings and writings for each period of his life. A “Bibliographical Essay” arranged according to the themes of the chapters, and containing a good deal of guidance to secondary sources not mentioned in the notes, follows, as does a record of “Boyle’s Whereabouts, 1627-1691;” the index is substantial. While no single biography can do justice to all aspects of a life and works, the scrupulosity of Hunter’s record will provide an open and accurate guide for anyone looking for further illumination.

But the interest of the work goes beyond Hunter’s main agenda of giving an honest and careful accounting of a major figure. For it is Boyle’s own scrupulosity that organizes Hunter’s judgments about him. Whether Hunter was drawn to Boyle because he saw a kindred spirit in him, or whether the years of work on the Boyle

papers had their effect on Hunter, a deep sympathy between author and subject is evident. It is the adult Boyle’s pre-occupation with casuistry (the examination of conscience, on which Hunter has previously written authoritatively), which he places at the center of his assessment, with Boyle’s interest in experimentalism a kind of related careful and exacting examination of God’s creation—hence the title of the book. Hunter notes the young Boyle’s reports of his frequent moments when he allowed his self-described melancholic imagination free reign (which he called his “raving” and “roving wildness”), although Hunter wonders not whether he was a day-dreamer but “mildly autistic” (p 35). He also mentions Boyle’s enthusiasm for the new romantic literature coming from France, and later on the time spent with witty and fashionable men and women; he also remarks that it was Descartes’ *Passions of the Soul* (1649) that was the only work of the famous philosopher that he read more than once (p 106). Boyle’s refusal to marry is touched on gently, but whether this was due to the death of his mother when he was three years old or a domineering father, sexual dislikes, uncertainties, or modesty—as a boy, he was taken on a tour of the brothels of Florence but later said he had not indulged the flesh—a broken heart, deep affection for two of his sisters, a religious or philosophical commitment to celibacy, the lack of necessity of a younger brother to carry on the family, or the self-conscious preference for remaining free of entanglements, or all of the above, is left an open question. So, too, Boyle’s apparent deep interest in witchcraft and demonology, as well as in transmutational alchemy and other mystical attachments, and the various personal contacts he seems to have had with adepts, are also touched on. But since much of Boyle’s notes on such topics were destroyed by previous biographers as an embarrassment, Hunter has little evidence to work with. Parts of the life, and even perhaps of the work, therefore, remain shrouded in silence. Although Hunter says more than once that it is unfortunate that so little about these matters can be said, and that he is making his best effort to move beyond Boyle the experimental natural philosopher, he sticks closely to the evidence and refuses to speculate. Despite his best intentions, then, Hunter’s biography remains that of the Boyle known to the history of science. He does not give voice to the absences or attempt a reappraisal. Boyle’s relationships with his family and estates, colonial and proselytizing projects, and even laboratory assistants are carefully drawn, but never dominate the life of the mind engaged in exposing nature to view. Given the enormous amount of paperwork on that latter subject which remains, one

can well imagine that most of Boyle's energies must have been given to that pursuit. We hear distinct voices from the self-conscious remains of the Boyle archive, catching only distant echoes of a few others.

Hunter's Boyle will therefore be open to further interpretation. For example, I think it would be possible to bring Boyle's medical interests closer to the center of the life. Hunter shows that Boyle's later personal account dated his early interest in natural philosophy to 1640, when he was in Geneva on his Grand Tour and read Seneca's *Natural Questions* (pp 49-50). But Hunter also shows that the work-diaries indicate that he started experimenting only in 1649, mentored by a number of medical practitioners who took an interest in chemistry. His last works were also devoted to medicine, and in between he learned anatomy and physiology by dissecting with William Petty in Dublin in 1653 or 1654, while (as Hunter shows clearly) his most famous early work, the *Usefulness of Experimental Naturall Philosophy* (1663) was organized according to the genre of medical textbooks known as the *Institutes*. During the 1660s and 1670s Boyle was often linked to the apothecaries and chemists who were fighting their public wars of

liberation against certain older traditions of medical physic, while in this period, too, the famous "English Hippocrates," Thomas Sydenham, associated his own work with Boyle's. But given Hunter's care to stick to the stated evidence of the Boyle papers rather than to pursue other hints, speculation about these and other associations which might illuminate some parts of Boyle's political and intellectual agenda is declined.

Hunter's Boyle therefore remains a rather aloof, exacting and industrious corpuscularian, the investigator of nature for its own sake, or rather for how it might support belief in the true God in the face of both doubt and sectarianism. One will find no Boyleian hidden agendas or conspiracy theories here, only an intelligent, earnest, open and non-doctrinaire member of the Anglo-Irish establishment. While it will not be the last interpretation of Boyle, then, Hunter's version of his Life and Works can be counted on for its full and scrupulous treatment of the evidence as we have it. Hunter's own integrity and discretion gives the work an enduring strength. Boyle himself would surely have been pleased with it.

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Atoms in Chemistry: From Dalton's Predecessors to Complex Atoms and Beyond. Carmen J. Giunta, Ed., ACS Symposium Series 1044, American Chemical Society, Washington, DC, 2010, vii + 116 pp, ISBN 978-0-8412-2557-2, \$150.

Anniversaries are difficult to pinpoint, since discovery and publication may be separated by several years, and the history of chemistry is rich in multiple discoveries. Who discovered the composition of water? Who discovered oxygen? These discoveries were contested originally, then by generations of chemists and historians. But there is no question that the chemical atomic theory, according to which each element was indecomposable, and characterized by atomic weight, was the invention or discovery of John Dalton, and made sense of his laws of multiple and definite proportions. There is more than one possible answer to the question of when he invented his atomic theory, but he first published his own detailed

statement of the atomic theory in 1808, and 2008 saw the ACS Symposium celebrating the bicentenary of that publication, followed in 2010 by the publication of this slender volume.

Carmen Giunta's introduction notes that unlike Dalton's atoms, today's chemical atoms are divisible; that atoms of the same element may exist as isotopes having different weights; that some elements are far from permanent, thanks to radioactive decay; but Dalton, were he alive today, could still take comfort from the fact that our atoms, like his, are discrete.

Scanning probe microscopy and manipulation enable us to "see" and to place individual atoms. This volume doesn't extend to nanotechnology, but it still covers a huge range. As William B. Jensen points out, atomism was seeping into chemical thought for almost two centuries before Dalton. One could argue for a longer pedigree, looking at medieval notions of least particles.