

interconnections among developments in science, policy, and the popular imagination which Spencer Weart attained in *Nuclear Fear*, the brilliant 1988 study of nuclear physics, is not approached. There are sticky fundamental issues about changing relations — both actual and perceived — between basic and applied science over the period and across fields, which are glossed over notwithstanding their obvious relevance. The linkage of biotechnological projects with the changing disciplinary landscape of the life sciences is not well developed: for instance, MIT's midcentury champion of a new discipline of 'biophysics', Francis Schmitt, is dismissed casually as a biologist with conservative 'ideas of his own' that sabotaged the MIT administration's ambitions to build up biological engineering. In fact Schmitt was in many ways a follower of bioengineering avatar Loeb, and the issue at MIT was over academic low culture (sewage engineering, food canning) versus high culture (electrophysiology, molecular self-assembly) interpretations of the biotechnology enterprise. Most historians will find treatment of the topics they know best to be scanty and simplistic, I suspect, but again, this seems inevitable in a work of such broad scope and small size.

It is certainly appropriate that an accomplished historian of chemistry should write about the history of biotechnology, and the way Bud weaves his technical understanding of industrial chemistry into the story is very impressive and enlightening. However, the story would probably look different if told from a standpoint in the history of life sciences. Bud might not so quickly adopt the idiosyncratic view — though one not unique to Bud — that 'biology' (as opposed to botany, zoology, physiology, etc.) makes its first appearance as a discipline around 1900, however well this may fit his restricted focus on the names of academic departments and journals. Recognising biology as a confederation of related disciplines with a continuously evolving collective identity from the end of the 18th century, as the more traditional view has it, would allow a better representation of how various offers of technological benefit made by different disciplines and subdisciplines at different moments in the later 19th and earlier 20th centuries played a role in border struggles over turf and status. That is, biotechnology was not a product or promised product of one single discipline of biology, but of the nascent *disciplines* of general physiology, microbiology, plant physiology, genetics, and medical biomechanics, among others. The growth of genetics in the interwar period, with its stabilisation in institutions, was attended by glowing promises of eugenic and agricultural payoffs, especially in America. The variously successful efforts of microbiologists in several European nations to found an autonomous academic discipline in the same period, and to break away from a medical service role, were often predicated on promises of improved

industrial fermentation. Bud touches on these promises and products, but not as much on their causes within the originating disciplines which motivated development of what we now consider elements of biotechnology.

Biotechnology and its cognates — bioengineering, *biotechnik*, and so on — have always been a motley category, like biology itself. Even today in what we class as biotechnology, though there is a predominance of the products of molecular genetics, there are also contributions of other disciplines, such as prosthetic limbs for amputees and soil nematodes that control crop pests. The way Bud describes it one would think there is today one unitary enterprise called 'biotechnology', and that the enterprise has a long history. This is probably not Bud's intention, but a byproduct of his story's compression. Biotechnology is more a question of long histories of scientific and practical disciplines, together with recent reification as a single investment and policy category. All this is not to detract from Bud's work, but only to suggest that much more remains to be done on the large and important topic of the history of biotechnology. *The Uses of Life* will constitute an essential starting point for studies on this topic for many years to come.

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Cruel Carnal Reason

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Kenneth Craven, *Jonathan Swift and the Millenium of Madness: The Information Age in Swift's A Tale of a Tub*.
Leiden: E.J. Brill, 1992. Pp. xiv + 238. US\$68.57 HB.

In an exciting, idiosyncratic book, Kenneth Craven rejuvenates Swift's 1704 satire *A Tale of a Tub*, a skewed and vibrant verbal assault on early modern political theory, ethics, and philosophy of psychology. Swift would not, on Craven's reading, be surprised to find that his wayward, twisting, twisted work seems rather dank to modern readers ignorant of the victims of its savagery. Swift had already mocked the future interpreters who would skim and scan proliferating information systems for clues he had secreted: but Craven is comfortably self-conscious about the paradoxes

of elucidating with scholarly passion a compressed mockery of scholarship. He succeeds at least in reclaiming Swift from 18th century literary history for 17th century intellectual history.

The body of Craven's work is a series of eight studies of Swift's particular violent anatomies of mostly unnamed targets: those on the radical philosopher John Toland, the conservative Dublin Anglicans Narcissus Marsh and Peter Browne, Shaftesbury, literary and political followers of Milton and of Harrington, Swift's own employer William Temple, Paracelsian medicine, and Newtonian mechanics. These studies are framed by chapters on the grounding myth of Kronos-Saturn, the melancholy deity of time, balance, art and the humours. Craven sees this myth as Swift's alternative to the unpalatable 17th century choice between wishful Neoplatonism and fragmenting atomism. But little of a positive programme emerges from this reading other than a tendency towards authoritarian impositions of order to balance the internal chaos and fanaticism of the unaided individual. Craven's Swift is closer to Hobbes, in politics and psychology, than Swift himself could afford to admit.

Swift attends well, in his conservative way, to the microphysics of human nature, frustrated at the anti-naturalism of optimistic liberal moralists and revolutionaries. In relying on the powers of reason to alter things for the better, social reformers like Milton, Toland, and Shaftesbury forget the body and are then haunted by it. Psychology is libidinally driven; contemplation and the spirit must in time 'fall into matter', for reason is itself carnal, fanatical, seeking while overtly renouncing forbidden 'Mixture and Confusion of Sexes'. Denying the desire underneath utopian progressivism leads both to the deranged publication frenzies of modern mythologists (licensing of the press had lapsed in 1695), and to the cruelties enacted each time reason pretends to enter virtuously into 'the Depth of Things ... with Tools for cutting, and opening, and mangling, and piercing'. Swift is a spoiler of millenarian dreams, scorning the moderns' nostalgia for the womb-blisses of a Golden Age, pointing out the concealed violence of their rational dissections, reiterating that only bodies know.

I particularly enjoyed Craven's accounts of the affronted responses of Wotton, Clarke, and Shaftesbury to the still anonymous author of the *Tale*, about whom they could be sure of nothing save his depravity. They complain that, in refusing to acknowledge human dignity and 'the superiority and excellency of reason', the author, who does not even deserve to be argued with, has ridiculed what Samuel Clarke, one architect of the new Anglican-Newtonian order, called 'all virtue and government of a man's self' (pp.144-6). In response, Swift gleefully continued to trample over those valued virtues vaunted in Shaftesbury's aggrieved reactions to

the irregularity and obscenity of the *Tale*'s 'false wit' (pp.86-7, 99-103).

Craven rejects the judgements of historians of science that Swift had only a superficial knowledge of the sciences he attacks (pp.146-9); but insufficient detail is presented. Chapter Nine ('Newton: millennial mechanics'), for instance, contains nothing on mechanics and little on Newton. It is primarily a critique of contemporary writers like Margaret Jacob and Charles Webster for being duped into accepting myths of scientific progress and continuing the headlong modern attempt to enlist the discourses of hard science for reform of all human endeavour (pp.186-7). This is a naive reading of the work of Jacob and Webster; perhaps, like Swift, excessively concerned to situate himself in opposition to many strands of contemporary interdisciplinary scholarship. Craven occasionally loses the keen satiric tone which marks his historical analyses.

Craven is better on medicine and Swift's hostility, in the *Tale*'s Digression on Madness, towards proto-Jungian Paracelsian 'astral chemistry' and medical spiritualism. Swift relocates occult correspondences and astral pneuma to the alimentary canal. In a psychophysiological deconstruction of both mystical and political enthusiasm, he sees powerful digestive and sexual messages from the lower body placing 'the brain under chaotic siege' (p.166). New anatomy and medical mechanism reveal only guts and the inhumanity of experimenters flaying and mangling bodies in the name of science; only old saturnine melancholy is true to the 'erring, humorous self' (p.224). But, in reassessing Swift's science, we need more detail here on the kinds of humoral medicine being preferred to iatromechanism and iatrochemistry, and on exactly which strands of the old Saturn-melancholy patterns of thought Swift wished to retain. As it stands, Craven fails to back up his claim that Swift here reveals a 'sophisticated understanding of object relations' (p.159). More specific analysis of Swift's neurophilosophical reading and targets is required. The hypothesis of direct links between or common sources for psychological, digestive and libidinal energies, for example, was a commonplace in mechanistic Cartesian physiology; how ironically is Swift embracing it?

Each chapter raises such doubts and queries. Like the alienated satirist reclassifying the various modern madnesses in surprising ways, Craven draws unusual lines through other areas, including political psychology, publishing ethics, and religious toleration. He is good, too, on those intrusions of personal animus into Swift's satire which only biographical detail make clear. This playful, sad, humane book demands serious reading.

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