

## Book Reviews

**Carl Mitcham (ed.):**

**Encyclopedia of Science, Technology, and Ethics.**

**MacmillanReference, USA, 2005, 4 vol. 2. 378 pages.**

The general introduction to the *Encyclopedia of Science, Technology, and Ethics (ESTE)* provides an overview of the global context surrounding the encyclopedia: our world is increasingly a world of science and technology, but the future of that world will depend on our views of the nature of the good life, our decisions about the use of knowledge, the implications of science and technology for ethics and politics, and the implications of ethics and politics for science and technology. These issues go well beyond the areas of risk assessment and risk management that are currently attended to within science and technology; they are qualitative and philosophical problems that require sustained discussion, not only among scientists, engineers, and policymakers, but also social scientists, philosophers, historians, and the general public.

There is an abundant amount of research on specific issues or case studies within science, technology and ethics. However, in a culture that maintains distinct boundaries around areas of expertise, very little synoptic discussion or integration of these matters exists. *ESTE* addresses this deficiency by providing, as Editor-in-Chief Carl Mitcham notes in his introduction, “a snapshot of emerging bodies of work in the co-construction

of an ethical, scientific, and technological world” (xiii).

*ESTE* is indeed a unique offering. Besides coverage in specialized volumes, such as the *Encyclopedia of Bioethics* (Garrard Post, 2003), there is inadequate discussion of ethics issues in most available science and technology reference literature. For example, of the 7,100 articles in the twenty-volume *McGraw-Hill Encyclopedia of Science and Technology* (1997), which is described in its preface as “[bringing] together the most current and the finest thinking on every major aspect of scientific and technical research” (Parker, 1997: ix), there is no entry for ethics, not even in the encyclopedia’s 170,000-entry analytical index. Alternatively, one might think that a discussion of ethics is better suited for the field of the philosophy of science, but it does not receive an entry in the *Dictionary of Concepts in the Philosophy of Science* (Durbin, 1988). In the more recent *Science, Technology, and Society: An Encyclopedia* (Restivo, 2005), reviewed in the current issue of *Science Studies*, there is in fact an entry for “medical values and ethics,” as well as two articles on professional responsibility, but here again one finds no sustained discussion of ethical theory or normative issues in science and technology.

One of the goals of the *Encyclopedia of Science, Technology and Ethics* is to break down disciplinary barriers within the fields of science, technology and ethics, thus promoting reflection on the relationships between these realms. This is admittedly difficult to accomplish within the strictures of an encyclopedia, arranged alphabetically by topic, with little opportunity for contextual synthesis. Several features of *ESTE*, including the topical outline, the general introduction, eight introductory essays, a wide range of topics and perspectives, and generous cross-referencing throughout, are offered as means to alleviate these problems. However, there remains a degree of tension between two of the contrary goals of knowledge organization: analysis and integration.

A further limitation of the encyclopedia is due to the rapid pace of change in science and technology: developments in these fields are invariably accompanied by new ethical dilemmas. Its offerings are not conclusive, but *ESTE* does succeed in providing a snapshot of contemporary issues, historical cases and figures, and general concepts.

Containing nearly 700 signed articles by 473 scholars representing a diversity of nationalities, the four-volume encyclopedia is organized around the categories of topical overviews; concepts, case studies, issues, and persons; sciences, technologies, institutions, and agencies; and philosophical, religious, and related perspectives. This taxonomy is provided in the front matter of the first volume as an aid to locating related entries, a gesture which acknowledges the problematic nature of the encyclopedic framework by contextualizing discrete topics.

*ESTE's* articles vary in length from 250

to 5,000 words. They address contemporary issues including terrorism, democracy, the concept of the just war, alternative energy, science policy and economics. They span an impressive historical and philosophical distance, considering international perspectives, historical contexts, and a variety of religious, political and cultural perspectives. Although the coverage of the topics is extensive some seemingly central entries are excluded altogether. For instance, there is no entry on physics or biology. As Mitcham explains, these are not included as discrete topics because they are dealt with at length in other entries such as "Bioethics" and "Nuclear Ethics." However, that editorial decision highlights the difficulty with undertaking such a project: in a reference work that is not meant to be comprehensive, knowledge must be parsed in a somewhat arbitrary fashion. Another problematic feature is the polemic tone of a few of the entries. The editor chose to include provocative arguments in some instances (the articles on Chernobyl and the Three Gorges Dam, for example), instead of insisting on purely informational content. These instances depart from the usually impartial tone of the encyclopedia, but the method is perhaps more honest, as it captures the controversial nature of some of the encyclopedia's more tendentious topics.

The inclusion of eight introductory essays at the beginning of the first volume is a particular strength of the encyclopedia. In general, these essays provide thoughtful and oftentimes provocative approaches to synthesizing issues that are covered in a more topical manner in the main portion of the encyclopedia.

*ESTE* provides bibliographies (many annotated), at the end of each article. The Appendices include an annotated general bibliography and an annotated list of internet resources on science, technology and ethics; a glossary of terms; a chronology of events related to the field; and a set of ethics codes from around the world.

*ESTE* will be accessible to scholars, industry professionals or educated readers with an interest in these topics, but it is most useful as a synthetic overview of current issues and a starting-place for further research. Indeed, it was recently included on the 2006 New York Public Library "Best of Reference" list. *ESTE* is a pioneer in the field of Science, Technology and Ethics. It will most certainly prove to be a valuable resource for scientists, engineers, scholars and all those concerned with how to live well within a technological society.

**Sal Restivo (ed.):**

**Science, Technology, and Society: An Encyclopedia.**

**Oxford University Press: New York, 2005. xxiv + 701 pages.**

This one-volume encyclopedia (which is not yet available in any digital format) includes 133 signed articles by 131 authors from around the world. Articles range in length from roughly 1000 to 6000 words, arranged alphabetically, each with an annotated bibliography. The main body of articles is preceded by a four-part introduction that includes separately authored sections on ST&S (the abbreviation utilized in the encyclo-

**References**

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1988 Dictionary of Concepts in the Philosophy of Science. New York: Greenwood Press.
- Garrard Post, S. (ed.)  
2003 Encyclopedia of Bioethics 3<sup>rd</sup> ed. New York: Macmillan.
- Parker, S. (ed.)  
1997 McGraw-Hill Encyclopedia of Science and Technology 8<sup>th</sup> ed. New York: McGraw-Hill.
- Restivo, S. (ed.)  
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pedia itself) in general and then on each of three overarching themes: science and society, technology and society, and medicine and society. Back matter includes a topical outline, list of contributors, and index. The editor-in-chief, Sal Restivo, is a well-known sociologist of science who has been assisted by a three person editorial board, a five person advisory board, and seven editorial consultants representing an internationally

diverse array of ST&S fields, departments and universities.

The *ST&S Encyclopedia* readily invites comparison with the *Handbook of Science and Technology Studies* (1995), to which Restivo contributed. But as Restivo writes in the first paragraph of his general introduction, the present “volume is focused on Science, Technology, and Society, not on Science and Technology Studies. The distinction is meant to convey to potential readers and contributors that the book is not focused on bringing a high level of order and articulation to theory, method and research in S&TS; rather, it is designed to illustrate the mutual shaping of science, technology and society” (ix). He then goes on to note that although the original organization called for articles covering two broad categories, “Science and Society” and “Technology and Society,” editorial discussions led to the addition of “Medicine and Society” to reflect the increasing body of ST&S research dealing with such issues.

The remainder of Restivo’s six-page general introduction provides a deft historical overview of the development of the ST&S field and its tensions. Indeed, for anyone new to the field this introduction is an encyclopedia strong point. It constitutes a quick tutorial on oppositions between those natural scientists who think they already know best what they are doing, and thereby dismiss the value of the social studies of science, versus those social scientists who wish to promote and pursue such studies. It further offers a good brief outline of different approaches to science studies, from the science and society movement during the early part of the 20th century to social constructivism, the science wars,

and continuing tensions within the ST&S community during the latter part of the century.

In response to the scientists versus social scientists debate, Restivo argues that the social study of science and technology grows out of a legitimate intellectual curiosity that can actually help nonscientists appreciate the “intrinsic value” of science and technology. ST&S studies can further assist scientists in viewing their work from new perspectives, while bringing non-scientists into discussions about the meaning of scientific and technological progress. Internal and external approaches complement each other.

With regard to continuing differences of approach among ST&S scholars, Restivo references the tension between “low church” activists and “high church” scholars. But for Restivo, each has its strengths and weaknesses, and he presents the encyclopedia as a contribution to a more synthetic “broad church” that would include both. On all counts Restivo seeks to integrate knowledge and approaches for a common good.

Following Restivo’s first-part general overview, a second-part to the introduction by Thomas Gieryn addresses the “Science and Society” theme. Gieryn’s shorter, two-page introduction argues the co-construction of science and society. “The interchanges between science and society are so thick and deep that finding a line to separate one from the other may be impossible.” (xvi) Scientific knowledge overlaps and competes with religious, political and common sense forms of knowledge. Additionally, on the one hand, science enters society via technologies that transform the human condition, as in medicine, as

well as to inform and justify political decisions. On the other hand, society both funds and regulates science.

Many of the issues suggested by Gieryn's introduction are explored in greater detail in contributions to the main body of the book. Good examples are "Culture and Science" by Sandra Harding and "Education and Science" by Linda Muzzin. Harding, in just under 2000 words, reviews the manifold ways that cultures can serve as "toolboxes" of knowledge production. Muzzin, in 4000 words, analyzes social debates about the role of science in public education.

The third part to the introduction is a three-page essay on "Technology and Society" by Steve Woolgar. It addresses the second major category of articles in a quite different way than Gieryn. Woolgar, considering technology in relation to technocracy, science, and a spectrum of definitions for "technology" itself, argues the absence of any simple technology/society or technology/science divide. At the same time, on the basis of his conceptual and socio-historical analysis, Woolgar highlights the problems of "applying metaphors about technology to ostensibly nontechnical phenomena" such as schools and clinics (xx). Surprisingly, Woolgar fails to mention more common problematic issues of technology, such as those associated with risks and unintended consequences.

A number of encyclopedia contributions nevertheless take up such problems. For example, Piet Strydom's entry on "Risk" provides a 900 word social history of the concept. But the encyclopedia might have benefited as well from a companion article on "Unintended Consequences." Indeed, in regard to such topics as "Agriculture and Technology"

and "Bioengineering and Computers" the issue of unintended consequences might also deserve more explicit attention.

The final part of the introduction is on "Medicine and Society" by Alondra Nelson. Nelson's four-page essay provides a historical overview of the development of medical theory (e.g., germ theory), changing roles for physicians, the invention of vaccines, and the antibiotic revolution, closing with a projection of challenges for medicine in the 21st century. Appropriately, Nelson notes how "longer life spans made possible by the many successes of modern medicine have produced unexpected consequences in the form of chronic and degenerative conditions such as a cancer, heart disease, and Alzheimer's disease." (xxiv)

The medicine and society theme is developed further in the main body of the encyclopedia by Joan Leach's complementary 5500 word overview article on "Perspectives on Medicine and Society." It is additionally explored in a spectrum of articles, such as those on "Pain and Culture" by Jennifer Croissant and "Pharmaceutical Anthropology" by Lise Bouchard. Crossant's 5500 word article narrates how pain is experienced differently in different cultures; Bouchard's 1000 word article notes how medicines are used differently in different socio-cultural contexts.

In conclusion, Restivo's *Science, Technology, and Society: An Encyclopedia* is a strong collection of socio-historical concept analyses, case studies, and critical literature reviews developed in an interdisciplinary manner and with an impressive global inclusion. As such it will serve not only as a good introduction to the field for new ST&S students, but as a

more general resource guide for advanced students and scholars. Its effort to bridge ST&S low church activism and high church scholarship by means of a mix of articles that is intentionally lacking any strong aspirations for theoretical unity is also to be commended.

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**Bruno Latour:**  
**Reassembling the Social: An Introduction to Actor-Network-Theory.**  
**Clarendon Lectures in Management Studies. Oxford: Oxford University**  
**Press, 2005. 301 pages.**

Any seriously-argued book that contends that scholars world-wide are in pursuit of another equivalent of the “ether” must be given at least minimal consideration. Recognizing one’s own resistance to the idea can be an indicator of just how daunting a task the author has taken on. If indeed there is any credibility in the notion that our energies are being diverted by assumptions of ethereal proportions, then the persistence needed to transform them may not necessarily be pleasant. Depending on one’s own stake in doing research, the experience might be liberating, even illuminating, or the destruction of what has been so painstakingly created during a lifetime. The passion expended by Bruno Latour in arguing for just such a realization entails that the claim cannot be ignored. His book is an important work,

not just for science studies, but for social science in general.

Merely the title, *Reassembling the Social: An Introduction to Actor-Network-Theory*, as good titles do, speaks for several dimensions of the work. The main title strengthens the impression that its author’s intention is to deliver a tour-de-force in navigating the social sciences (“back,” as Latour would say) onto a more appropriate course. The tone of the sub-title also signals that a certain amount of tongue-in-cheek is never too far off. After all, those who have been interested in Actor-Network Theory (ANT) during its some twenty years or more of circulation will be piqued by the idea of an introduction at this stage of things, especially when considering that there is also a substantial body of opinion that already holds that ANT has been

proclaimed dead and buried for some time now. Relevant lines of thought from most of Latour's books are synthesized and, where necessary, reformulated in the text, so that they can play their part in his overarching arguments. The insistence that ANT is more of a method than a theory contributes to the book's sense of being a hands-on manual, which in turn is reinforced by its organization. Part One, for instance, is entitled "How to deploy controversies about the social world"; Part Two has an equally instructional title, "How to render associations traceable again." In case there was any doubt, its first chapter's title is, "Introduction: How to Resume the Task of Tracing Associations."

Moving on, the appearance in the title and throughout the book of a second dash in the name Actor-Network-Theory is surprising. Ordinarily, this wouldn't warrant any attention, but since the very presence of a hyphen was noted by Latour, during his earlier<sup>1</sup> "re-call" of ANT, as one of the four main "problems" with its earlier one-hyphen incarnation as Actor-Network Theory (the other three were the words "Actor," "Network" and "Theory") we have become sensitized to the high significance of even the most trivial-seeming details. Here, Latour admits that he is reneging on his earlier recall of ANT; in this reincarnation the hyphen's presence strengthens the idea of an integrated package, of ANT-as-method. So it goes when one is crashing paradigms (that we are so invested in that we don't even see them, at first.)

The mention of a recall and the book's overall character as a primer is a reflection of the turbulent history of Actor-Network(-)Theory. As we read, we see

Latour continually looking over his shoulder, both in footnotes and in other asides, speculating about how his detractors will react, or apologizing for his difficulty in saying what he really means. With a distinctive degree of irritation at one point, he complains that those who have misunderstood continually insist on using "the Beta version," rather than "Version 6.5," which we consequently take the present one to be. Such tenacity, however, in a book that is so much about the subtleties of different words and how they are understood, only increases one's wondering about where the editors disappeared to at its publisher, Oxford University Press. While we are gratefully saved much trouble by its having been written in English (there is no mention of a translator), my strong contention is that Latour has been rendered a disservice by his publisher, in apparently not providing an appropriate editor to go over the text word-for-word with him. No matter how generously and patiently we try to follow him, our work is made much more uncertain when faced with passages such as the following:

The discovery – I see no reason to abstain from this rather grandiose word – that giving an explanation should not be confused with substituting a phenomenon for a social one has to be fully absorbed if we wish to continue our travels. [New para.] The difficulty lies with the word 'substitution'... (p. 102)

Do you feel tempted to go back and read that passage again? Which ideas of "the social" are implied by "a social one," when it is pointed out that the "difficulty lies with the word 'substitution'..."? What does it mean to be "substituting a phenomenon for a social one"? Those ques-

tions are indeed what much of the rest of the book revolves around, but by using similar language, which unfortunately reduces the convincingness of its arguments. This is all the more puzzling, even ironic, since the author holds that “good writing” must be one of the hallmarks of “good ANT.” Even the most well-meaning reader, however, will not want to be *repeatedly* giving the author the benefit of the doubt as to whether his recurring opacity is the result of either intentional ambiguity in argumentation, or of unedited language flaws.

The book’s identity as a manual co-exists with a number of theoretical arguments, of course, which unavoidably makes the issue of precision in writing especially acute. The author’s view of “how to do science” is motivated by theory, and doing science that way appears, in turn, to have resulted in more theoretical thinking. Because of space limitations here, only the most important argument can be briefly mentioned. It regards Latour’s view of the two main ways in which the term “social” is used today. One of the ways, which is acceptable to him, is as a descriptor that indicates things that have already been assembled, such as “social ties”; the other, unacceptable, way is to see the social as a sort of substance that already exists, like the earlier notion of the ether, and out of which assemblages arise, as if built of some pre-existing social stuff. His prime example is the notion of “society” itself. Paraphrased here as economically as possible, what we need to do once we have grasped that distinction is to perform a sociology that is “best defined as the discipline where participants explicitly engage in the reassembling of the collective” (p. 247). Most of the book ex-

plores the intricacies of working on that basis, with provocative arguments that should not leave any reader unmoved, one way or another.

By book’s end, however, I wanted to see references to works that completely live up to the author’s prescriptions, not just those mentioned along the way as fulfilling the partial criteria unveiled in the earlier chapters. Then it dawned that the book itself is Latour doing ANT, as we follow him through his complex associations, via his 360 footnotes, performing a kind of Auto-ANT. As such, the book resonates with humility, while remaining highly ambitious; it is an intellectual carnival and a mess of originality. The tension created by those extremes is almost irritatingly irresistible; it must be read.

## Notes

- 1 Latour, B. 1999 “On recalling ANT.” Pp. 15-25 in J. Law & J. Hassard (eds.) *Actor Network Theory and After*. Oxford: Blackwell.

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