BOOK REVIEWS

Embattled Values

Science and Anti-Science. GERALD HOLTON. Harvard University Press, Cambridge, MA, 1993. xii, 203 pp., illus. $24.95 or £19.95.

Gerald Holton is a zealous champion not only of science but of a particular notion of its cultural significance within the drama of modern history. Like many avatars of the Enlightenment and of 19th- and early–20th-century "progressive" thought, he believes science to be a powerful agent of human liberation and well-being. *Science and Anti-Science* is the most recent of a three-decade string of books, articles, and lectures through which he has sustained his reputation as a resolute defender of this venerable rationalist faith against a variety of skeptics and scoffers.

This collection of reworkings of previously published essays advances Holton's project by two means. One is an affectionately detailed, almost antiquarian account of the activities of selected great scientists and philosophers. The second is a sketch of the intellectual history of modern times as a struggle between the Enlightenment and its irrationalist enemies. In both modes, Holton picks up where he left off in *The Advancement of Science, and Its Burdens* (1986), a collection of papers featuring his performance as Jefferson Lecturer.

The central paper in the first mode is an account of the influence of Ernst Mach on a succession of "positivist" thinkers, especially in the United States. The actors in Holton's narrative are the leaders of the Vienna Circle and those American philosophers and scientists who took up its vision of a "unified science" that could serve as the foundation for an entire way of life. Holton traces both the personal connections and the philosophical affinities of Otto Neurath, Percy Bridgman, Charles Morris, Philipp Frank, W. V. O. Quine, and the other principals of his story. He quotes extensively from statements these men made about each other and about Mach.

The epistemic universalism espoused by Holton's cast of characters is now widely condemned as a "totalizing" project fated to confine, if not to destroy, the diversity of potentially valuable approaches to knowledge. Hence it is surprising that Holton displays so little critical distance toward their ideas. Scattered in his footnotes are references to Peter Galison, Robert Proctor, and other historians who, while far from contemptuous of logical positivism, have recognized it as a particular construction of reason rather than taken it as reason's natural embodiment. But Holton betrays scant sensitivity to the historicity of the idea of reason. He concludes this study by declaring "correct" the claim about the historical significance of logical positivism offered in the bland apologia with which the positivists signed off their own encyclopedia: "they have paved the way for a new and fruitful manner of philosophizing."

The conceptual limits of Holton's engagement with the positivist tradition are remedied, to some extent, in his exercises in the second mode, the defense of "scientific" values within the openly contentious *Kulturkampfen* of modern times. In these essays, Holton is no longer a respectful chronicler of reason's exemplars but an embattled controversialist acutely aware that his values are now on the defensive in many quarters.

Holton's polemic against science's detractors takes its most pointed form as a warning. Within "the anti-science phenomenon" of our own time represented by such apparently benign presences as Václav Havel and Kurt Vonnegut there slumbers a "Beast." This irrationalist monster, if awakened, could reenact the horrors of Nazism and of the Inquisition. Holton seems to see himself in a debate with the Grand Inquisitor of Dostoevsky's *The Brothers Karamazov*, whose celebration of "miracle, mystery, and authority" he quotes. A large part of Holton's mission in *Science and Anti-Science* is to persuade his too-complacent contemporaries that the old enemies of the Enlightenment are far from vanquished. Rather, they are formidably latent among astrologers, New Age healers, and creationists. That the United States for eight years had a president from Hollywood who professed support for these pernicious cultural tendencies is, for Holton, an emblem for the seriousness of the problem.

Holton seems much more comfortable debating a familiar foe like the Grand Inquisitor than engaging those thinkers of our own time who doubt the continued adequacy of the classical Enlightenment construction of the relation of reason to freedom and human well-being. For example, he invokes Michel Foucault only for having coined the useful phrase "rhetorical space" and says nothing about François Lyotard or Richard Rorty. Although he mentions along the way the names of Bruno Latour, Sandra Harding, and several other contemporary theorists of science whose ideas might challenge his traditional categories, the thrust of his argument is always to diminish the novelty and particularity of today's intellectuals in order to group them as either proponents or opponents of a science-centered "Modern World Picture" defined in terms that might well have been appreciated by Condorcet, Mill, and the young Bertrand Russell. There is merit to Holton's implicit insistence that these old fellows got more things right than today's literati readily grant, but he does not engage contemporary thought about science and culture with the care required to indicate why anyone with humane instincts and a modicum of good sense would think differently from himself.

Holton's noble and persistent call for the defense of scientific culture is reminiscent of Herr Settembrini's voice, debating the irrationalist Herr Naphta in Thomas Mann's *The Magic Mountain*. But Mann created a fictional world in which Settembrini labored alone, and appeared to falter, whereas Holton inhabits a real one in which other voices, speaking in different idioms, lend credibility to the hope that the essential intellectual resources of the Enlightenment will not be lost in the postmodern era. Among these voices are Thomas Nagel, Ernest Gellner, Philip Kitcher, and, in at least a few of his many roles, Foucault. Shortly before his death, Foucault spoke antiphonally to Kant in "What Is Enlightenment," upholding the quest for knowledge and liberty in terms that even Holton, were he to become a bit less worried about a slippery slope toward the Beast, might find encouraging.

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Questions of Enslavement

Visions of Caliban. On Chimpanzees and People. DALE PETERSON and JANE GOODALL. Houghton Mifflin, Boston, MA, 1993. xii, 367 pp. + plates. $22.95.

The current debate over the rights (if any) of animals turns on issues raised by Aristotle, who argued that beasts and stupid people are natural slaves, subordinated by nature to their wise masters just as the body is subor-

dinated to the mind. Nobody accepts Aristotle's line on people these days, but most of us still follow his reasoning when it comes to beasts. The question at issue today is just how stupid a natural slave has to be before the Aristotelean arguments kick in. In this eloquent and disturbing book, the literary scholar Dale Peterson and the primatologist Jane Goodall argue that chimpanzees and other apes are too smart and too human to qualify as natural slaves and that we should stop treating them as such.

The book's governing metaphor is the figure of Caliban in Shakespeare's *Tempest*, who like the chimpanzee straddles the boundary between people and beasts. The authors begin their report on Caliban's present condition with an evocative description of the complex social lives and technical skills of chimpanzees in the wild. This idyllic prelude is followed by a grim account of the advancing destruction of chimpanzee habitat as the African forests recede and the animals, soils, and groundwater vanish with them. The book then descends into a 200-page simian Inferno, reporting and documenting cases and patterns of death, degradation, and misery visited upon chimpanzees that have fallen into human hands and been converted into butcher's meat, impossible pets, squalid nightclub performers, or cunning and dangerous lab animals interminably shut away behind bolted doors and "Biohazard" signs.

Goodall (whose prose in this book is distinguishable from Peterson's by its different typeface) holds out hope that chimpanzees can be protected, both as species and as individuals, by instituting new international laws, new chimpanzee sanctuaries, more effective and humane captive breeding programs, and aid programs that will promote "responsible development that will help the people of Africa escape the grip of poverty." More controversially, she urges an expanded Golden Rule on the scientific research community: whatever you would not do to a human being to gain knowledge, refrain likewise from doing to a chimpanzee.

Researchers who use apes in their work will undoubtedly reject this plea on the grounds that a chimpanzee's life is not worth as much as a human being's. Peterson and Goodall would probably agree. The same underlying belief, that the value of an animal's life depends in some sense on how humanlike it is, is implicit in Peterson's own suggestion (p. 244) that researchers should help preserve chimpanzees by using rhesus monkeys instead whenever they can. But this possible point of agreement does not take us very far toward solving the practical problem of weighing animal life against scientific knowledge in deciding when a piece of research is likely to be too trivial or fruitless to warrant the suffering and death of a chimpanzee, or a dozen macaques, or a thousand mice. Indignation is the mother of moral invention; and perhaps some reader of this book will be sufficiently outraged to ponder this question and come up with some useful answers. All scientists would do well to think about these issues—and to consider the possibility that there may just be something wrong somewhere with the whole theory and practice of natural slavery.

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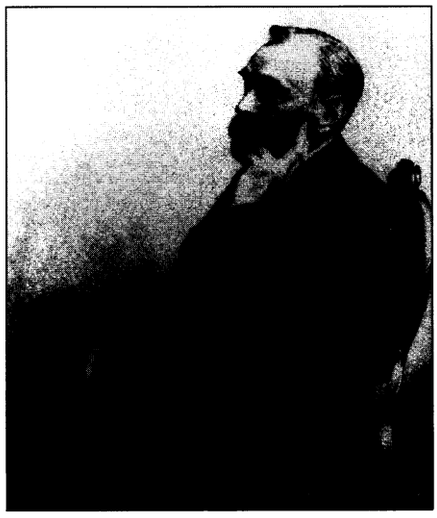
Chemical Entrepreneur

Alfred Nobel. A Biography. KENNE FANT. Arcade, New York, 1993. x, 342 pp. + plates. $24.95. Translated from the Swedish edition (Stockholm, 1991) by Marianne Ruuth.

Nitro compounds contain a grouping of atoms made up of two oxygens and one nitrogen. The credit for their commercial importance belongs not to the chemists who established their properties but to those who overcame the problems of practical application. This happened in the 1860s when nitro compounds became the basis of the new technologies of synthetic dyestuffs and explosives. The latter, in the form of the unstable liquid nitroglycerine, accelerated railroad construction, increased the output of mines and quarries, and gave a new and terrifying dimension to warfare. The harnessing of nitroglycerine as dynamite was the triumph of the Swedish inventor Alfred Nobel. By careful control of his patents, mainly through licensing arrangements with companies (later dominated by the Nobel Dynamite Trust Company and a second multinational corporation) that were set up to exploit his inventions, as well as through other industrial activities, Nobel left a fortune that serves to reward achievements in science, medicine, and literature and "the best work for the brotherhood of nations" (the Nobel Peace Prize).

Kenne Fant's reconstruction of Nobel's life is achieved mainly through the use of contemporary accounts, some by people whose contact with the inventor-industrialist was only fleeting, analysis of a manuscript of Nobel's play *Nemesis*, and correspondence with his mistress, Sofie Hess. The play and accounts of Nobel's early desire (quickly stifled by his father) to become a writer show him to be the perfect example of the frustrated and sensitive artist who achieves great success as an industrialist.



Alfred Nobel. [© The Nobel Foundation]

Nobel was born into poverty brought about by the bankruptcy of his father, a prolific inventor and innovative builder who suffered a series of financial disasters in Stockholm. Nobel Senior had more luck in St. Petersburg, where he manufactured munitions for the Russian army. In the meantime, Alfred received a grounding in chemistry, which was put to good use when the family returned to Stockholm, though not before a fatal explosion killed his brother and four other people. During 1865–66, Alfred overcame the problems of detonation and safe transportation of nitroglycerine with his dynamite. Its promotion was a matter of clever showmanship, especially demonstrations before military authorities and the media of Europe and North America. He was particularly concerned to use the publicity to show that a spate of fatal accidents associated with it had been caused by carelessness. Once the product was accepted Nobel turned to international partnership arrangements, sometimes with individuals that he should not have trusted in the first place.

Nobel's business links with his brothers eventually extended his interests to the oilfields of Baku. There were disagreements, moments of great personal difficulty with family members, and several financial calamities.

The correspondence with Sofie Hess, some of which is included in the volume, provides, more than anything else, a vivid impression of his hectic life, with continuous travel to and fro across Europe, experimentation and trials, negotiations with lawyers over patent litigation (especially for smokeless powder), and changes of direction in mid-course as a business matter or family tragedy interrupted his itinerary. The dark side of the relationship with Hess is exposed. It is apparent that Nobel kept her out of sight because (however