

Gross and Levitt are tilting at windmills. (The ten-page index is useful with names, but much less so with themes.) The authors are biologist and mathematician respectively, also competently read in the history and philosophy of science. Though the book is not light reading, it is very well written; nowhere could I detect that it is a joint work rather than that of a single mind. There are many fine turns of phrase, as absurdities and perversities of the "academic left" are described in a tone of disciplined outrage: disciplined because the authors distinguish scrupulously between thoughtful analysts and mad-cap activists, between warranted concern and dogmatic fanaticism. Thus Peter Singer is recognized as the originator of moral argumentation for the rights of animals but not held responsible for the verbal and physical terrorists who claim to be acting in the cause of animal rights (197). Be Gross and Levitt largely right or largely wrong in their analysis, their book ought to be read by everyone interested in knowing what academic society is saying these days. If the authors' apprehension is only partly warranted, that is ample enough cause for concern.

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Perilous Knowledge: The Human Genome Project and Its Implications by Tom Wilkie. London and Boston: Faber and Faber, 1993. 195 pp. \$22.95.

Science progresses along multiple and intertwining paths, most of interest only to the strollers themselves, but occasionally an event crystallizes the attention of a larger population. Inevitably this focusing on one milestone overlooks the other byways, creating the impression that a control point has been identified, a crossroads where future directions will be determined with lasting implications. The Human Genome Project is just such a landmark. It has captured the public imagination as some great [ogre-or-savior] that will mark the [destruction-or-salvation] of the human condition—all may choose their preferred word in the bracketed pairs. The project is also viewed as a concerted, centralized, directed enterprise, often likened to the Apollo Program, as is the case at the start of *Perilous Knowledge*, written by a physicist-turned-journalist.

Unfortunately, the large-scale projects in physics or space exploration do not provide the right models. The Human Genome Project has given a focus to work that was in progress already and the ultimate sequencing is still awaiting

suitable methodologies in terms of cost and reliability. Moreover the strategies are constantly shifting, as emphasized by the controversy surrounding the initiative by Craig Venter (described on p. 93 in passing—he is not mentioned by name) that permits skimming the cream (the genes) off the project with a system of tags. The importance of the rest of the genome may prove to have been underestimated. It is therefore unfortunate to find the statement that everything will be sequenced "including the vast volumes of nonsense" (p. 71), although nuances to this attitude are presented later (p. 89).

While Wilkie tends to over-dramatize the subject, this may be the price to pay for the journalistic treatment that renders the book very readable, as is to be expected from a professional writer, with touches of local color, e. g. "Nancy Wexler works from a small office . . . located at the unfashionable end of Manhattan." Professional scientists may not find this style appealing. Nevertheless, the author has produced a valuable primer on many of the technical underpinnings of the field.

The dramatic features need appropriate characters and James Watson fills the role. However, the discussion of his resignation as director of the program mentions "internal politics," but sidesteps the triggering issue related to the nature of his personal investments in biotechnology companies. The issue of ownership of the sequences themselves is at least touched upon briefly.

Ultimately, interest in the genome relates mainly to concerns about genetic diseases. The sickle-cell-anemia story is well described, but lessons learned from genetic testing for this and other hereditary diseases turn on the slightly sensational side (testing of the fetus always carries the risk of casting doubts on the paternity of the alleged father) without doing full justice to the successes—thalassemia has been virtually eliminated in Sardinia by prenatal diagnosis and therapeutic abortions. However, the time is approaching when considerations of gene therapy will dominate the debate, but this subject is only briefly visited by Wilkie and not in an up-to-date manner. Other aspects addressed include the problems of late-onset diseases and the engaging topics of selecting for geniuses or making shortness a disease to be cured.

The final chapter on Moral Consequences touches the usual points (including the wise words of G. E. Moore), but cannot escape the reductionist view that exaggerates the importance of the Genome Project. As we learn to live with the idea, it becomes less frightening and we realize that much of the data will be mundane. One of the yeast chromosomes was recently sequenced, producing mainly a litany of unidentified genes. When the human genome is finally sequenced, the difficult period of interpreting the results will begin. Thus sequencing the genome is neither an end in itself nor the automatic guarantee of scientific breakthroughs. Other challenging (and potentially more contentious) frontiers are still before us, particularly in the realm of neurobiology. The brain has far more neurons than the genome has bases and compared to the uncertain genetic manipulations of the future, the consequences of mental manipulations, by drugs, already confront us.

In summary, this book provides a useful basic introduction to genome sequencing, although in the context of a fairly stereotyped reading of the history of the subject. The book includes an index, but mainly proper names: when trying to find a reference to the chimpanzee genome that I wanted to reread, the closest I could come was "Churchill, Winston." Another major shortcoming, perhaps in keeping with the journalistic treatment of the subject, is that the book contains no references whatsoever to published books or journal articles.

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The Body, Self-Cultivation, and Ki-Energy by Yasuo Yuasa (translated by Shigenori Nagatomo & Monte S. Hull). Albany (NY): SUNY Press, 1993. 224 pp. \$44.50 (c), \$14.95 (p).

The twentieth century is approaching its end. As we leave it behind, carrying with us remnants of ancient practices and aspirations of advanced techniques, this question arises: will we broaden our outlook to include new sciences, or will we cling to safeguards of the recent past? Yasuo deals with this question and others by comparing the beliefs of the Eastern world (Buddhism, Daoism, ki-energy, self-cultivation) with those of the Western world (philosophy, medical science, psychology, parapsychology). Yasuo brings to light uncommon facts concerning Eastern culture that slant him towards preferring that civilization and its methods. His purpose is not one of conversion, however, but to find a "happy medium" between the contrasting cultures for the benefit of life in general.

It may be beneficial for the reader to have some knowledge of Eastern religions and practices, but such knowledge is not crucial to understanding and enjoying this book. Yasuo's style glides easily and coherently from one thought to the next, taking careful precaution to inform the reader of the detailed content. This work can be an inspiration owing as much to Yasuo's writing technique as to his subject matter.

As noted, Yasuo's bias clearly lies with Eastern culture. Within that, the mind-body relationship involves ki-energy, a type of power or energy relating the physical body to the unconscious; and self-cultivation, a form of training for the body and the mind in order to ameliorate one's personality. This view underlies the use of meditation methods for medicinal purposes. Yasuo shares the Eastern belief that the mind and the body must be viewed as a whole in