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eds. N. Patrick Peritore and Ana Karina Galve-Peritore. *Biotechnology in Latin America: Politics, Impacts and Risks.* Wilmington, D.E.: Scholarly Resources, 1995. xxiv + 229 pp.

N. Patrick Peritore, Ana Karina Galve-Peritore. *Biotechnology in Latin America: Politics, Impacts, and Risks (Latin American Silhouettes).* Wilmington, Del.: SR Books, 1995. $65.00 (cloth), ISBN 978-0-8420-2556-0; $17.95 (paper), ISBN 978-0-8420-2557-7.

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In a search for a place in an increasingly post-industrial global economy, many nations have turned towards biotechnology as a means of long economic growth and a source of national wealth. To that end, N. Patrick Peritore and Ana Karina Galve-Peritore have edited a series of essays that examine both the risks and rewards of biotechnological development in Latin America.

In a regional survey, the editors seek to examine both the risks and rewards of using biotechnology as a major part of Latin American economies. For the purposes of this book, biotechnology can be seen as the use of the biological sciences, such as genetics and biochemistry to manipulate viral and genetic material to create a marketable product for the world economy. Such examples would be disease resistance, high yield crops, alternate ("natural") pesticides and improved pharmaceutical compounds. While such scientific research holds to promise to solve many of the worlds problems, such as epidemic and mass hunger, such research is not without risk. Tampering with the genetic code can led to unforeseen consequences, such as the creation of supercrops that may lead to the unintended introduction of aggressive crops that crowd out and kill indigenous flora.

The collection consists of nine essays that examine both the risk and promise of biotechnology. Given the fairly technical nature of this work, the editors have gone to great lengths to provide detailed information in the form of a glossary and an listing of abbreviations and acronyms. The glossary is especially useful, covering ten pages and giving concise and clear definitions of some of the more complex terms involved in biotechnology. The book also contains short abstracts about each contributor, giving their areas of expertise and recent research. In addition, there is an extensive bibliography of articles, papers, and books related to this field.

The first essay, "Biotechnology: Political economy and Environmental Impacts", is by one of the editors, N. Patrick Peritore. In this essay Peritore gives an overview of biotechnology and implications. Specifically, Peritore looks at three elements; the strategic elements driving the political economy, the double standards of genetic property rights and environmental risks of biotechnology.

One of the elements that Peritore points out is the involvement of multinational countries as they try to dominate this newly emerging industry. It is though control of this industry, through such mechanisms as the development of gene banking, where genetic material of plant life is stored. While the industrialized nations contain 4.3 percent of the genetic base for plant life, they control access to the genetic samples they have collected. Money for research, trained scientist and favorable property laws all give industrialized nations a headstart. Peritore contends that multinationals will use this information and expertise to control and dominate lesser developed countries.

The second essay, "Third World Biotechnology, Latin American Development, and the Foreign Debt Problem", by Dr. Daniel J. Goldstein, M.D.. Goldstein examines the differences between biotechnology in the Third World and the First World. For the first world, biotechnology is big business, when the end result of research is to produce a product that will bring profit to the company. Goldstein uses the example of the American company Genetech, which produces a compound called PTA that treats coronary thrombosis and costs $22,000,000 a kilogram (p. 38). For Third World countries, biotechnology is seen as a means of dealing with malnutrition, parasitic disease and crop output. Goldstein criticizes this ap-

proach, stating that "science and technology per se have never solved social and political problems" (p. 37).

Goldstein resolves to use the "debt problem" as a means of expanding biotechnology in Latin America. He suggests the conversion of outstanding debt in to equity arrangements that would serve to provide First World investment in Third World biotechnology programs. Goldstein claims the increased competition of Latin American biotechnology countries would be off set by the strategic stability that a more prosperous Latin America would present the First World. In addition, the great prosperity would lead to more trade and spending on the part of these revitalized Third World nations. Although a novel approach, it seems unlikely that this method would find much currency in the board rooms of Wall St. banking houses.

The third essay, "Plant Intellectual Property Rights: the Rise of Nature as a Commodity", by Jose de Souza Silva, examines the idea of plants as a commodity. The general theme of this essay is that there is an unequal division of both unique plant species and the ability of a nation to exploit them in terms of biotechnology. He explains that the plants of the Third World, which form an intellectual property right, will flow to the First World for use and economic exploitation, while the Third World will gain little benefit. This loss of benefit is not only economic (although a key concern) but also biological. First World countries, will little to tie them to the tropical regions, will take what they need as a commodity, and will gradually damage the biodiversity of region, leaving it as little more than a weaken biosphere, unable to forestall the advance of weeds and pests.

The fourth essay begins a series of three that look at biotechnology on a country by country basis. "Mexican Biotechnology Policy and Decision Makers' Attitudes towards Technology Policy" by N. Patrick and Ana Karina Galve-Peritore. For a two year period between 1989-1991, they conducted 66 interviews with the top policy makers with regard to biotechnology. Using a research modeling technique known as "Q-Method attitude-modeling protocol", they took the top forty most important people and used their responses to gauge how they would deal with biotechnology in the Mexican economy. Their conclusions, in part, where that while Mexico has the means to carry out some biotechnological research (based mainly at the university level), and there is a recognition on the part of officials for the importance of biotechnology in the Mexican economy, little is being done to promote biotechnology. In essence, write the authors, Mexico is doing little more than to hand over its genetic plant stock as raw material, and purchasing back, at great cost, the finished biotechnological product. the irony is that Mexico had both the means and the genetic product to produce such items itself.

Cuba is the subject of Julie M. Feinsilver's "Cuban Biotechnology: the Strategic Success and Commercial Limits of a First World Approach to Development". I found this article to be one of the most interesting, since Cuba is an example of a Latin American nation that has pushed ahead in its development of biotechnological products, despite the great economic hardships facing Cuba. In spite of the fiscal quandary facing Cuba, Castro has deemed that biotechnology, along with food production and tourism as key areas for investment and government attention. The key to Feinsilver's article is that Cuba has made great advances in biotechnology, especially in the area of vaccines that sell quite well in Latin America. If Cuba was able to sell in the United States (with the lifting of US embargo on Cuba) as it does it Latin America, the biotechnology sector could bring billions of desperately needed foreign capital to Havana.

Essay six examines the last area study, that of Colombia. Gustavo Hernandez-Boada examines "Colombia and the Challenge of Biotechnology". Hernandez-Boada states that the "future of biotechnology lies in agriculture and foodstuffs" (Peritore p. 129) and examine the impact of biotechnology. How Colombia can benefit from its geographical advantages. According to Hernandez- Boada, Colombia's portion of the Amazon river basin contains 10% of all the worlds biodiversity. The author gives the astonishing statistic that there "are more plant species in one hectare of Amazon jungle than in the entire European continent" (p. 133). The problem for Colombia is to develop and foster a biotechnology industry in order to benefit from the commercial opportunities available.

The seventh essay is "Recombinant Growth Hormone: a Challenge for Latin America" by Ramon Aboytes-Torres. This issue of the recombinant growth hormone, which is also known as the bovine-growth hormone, is one that is not new. The hormone, which is used to increase milk and meat production in the United States, has been controversial. Aboytes-Torres examines the shortcomings of using such hormones. Specifically, Aboytes-Torres notes the short comings in the ability of the government to understand and properly use these growth hormones. In addition, the long term effects of the use of such biologically modifying biotechnical products.

Essay eight, "Manipulation of Gametes and Embryos in Animal Biotechnology's Impact on Livestock Produc-

tion in Latin America", by Jose Juan Hernandez-Ledezma and Valantine Solyman-Golpashini, looks at the practical application of biotechnology to the rasing of livestock. The authors examine the use of reproductive technologies in the United States. These technologies are explained in great detail, and their benefits are examined. After looking at these reproductive methods, Hernandez-Ledezma and Solyman-Golpashini come to the conclusion that these approaches will not be useful for Latin America. The reason for this is the high cost of these technologies and the belief that other, less expensive, approaches would be more appropriate for Latin America.

The last essay, "National, Regional and International regimes and the Regulation of Biotechnology", is again by N. Patrick Peritore. In this essay, he ties together themes raised by the other contributors. Peritore states that the "world's environment is in such a poor state that we have a rapidly shrinking set of parameters in which to maneuver" (p. 198). Peritore feels that the current approach of neo-liberal regulations has failed, and that a new, international approach to create a workable treaty system to control biotechnology. Peritore looks to the regulations that brought about the Law of the Sea, to control international sea jurisdiction.

Overall, I found this book to be quite useful in gaining an understanding of the role and importance of biotechnology. The issues raised within this book apply not only to Latin America, but to the world at large. It is a credit to the authors and the editors that they were able to take a highly technical issue and make it accessible to a social science audience. This book would be quite suitable for a graduate-level seminar dealing with Latin America.

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