BOOK REVIEWS

China at the Limits

China's Environmental Crisis. An Inquiry into the Limits of National Development. VACLAV SMIL. Sharpe, Armonk, NY, 1993. xx, 257 pp., illus. $42.50; paper, $16.95. An East Gate Book.

In 1984, University of Manitoba geographer Vaclav Smil published *The Bad Earth*, calling the world's attention to serious environmental problems in China. Many Western scholars of China at the time thought that Smil was overstating his case, but few of these observers had given the subject the kind of focused attention Smil had. Over the past decade, as travel to China became more routine for foreigners and as concern for environmental protection became part of international culture, interest in China's environment has deepened. Awareness of the severity of China's environmental problems has become more widespread, and Smil has been vindicated for issuing his warning call.

The China of 1993 is, in many ways, vastly different from the China Smil assessed in *The Bad Earth*. Reforms of the economy have taken deep root, growth in average gross national product since reforms began has been high and promises to remain so, wealth and living standards have risen dramatically in some (not all) parts of the country, China's intercourse with the rest of the world has become more complex, and the Tiananmen incident attenuated the hopes of some for political liberalization. China's economy is now recognized as the second or third largest in the world, and China is being pointed to as the world's next economic superpower. Its environmental quandary has become more severe, however, and it is to it that Smil's new work, *China's Environmental Crisis*, is directed. Anyone interested in China, in U.S.-China relations, and in international environmental issues will want to examine what Smil has to say.

Smil's concern is not in the first instance with the dreadful problems of air and water pollution that afflict China's urban and rural landscapes. He is concerned rather with the continuing availability of the "ecosystems goods and services" necessary to keep the society going.

> The environmental foundations of China's national existence are alarmingly weak and they continue to deteriorate at high rates. This state of affairs, worrisome in itself, must give rise to even greater concerns when one considers the enormous resource needs implied in the country's continuing high absolute population growth and in its ambitious plans for economic modernization [p. 66].

Smil (rightly, to this reviewer's way of thinking) wants to bring to our attention the fact that China's environmental problems *are* different—that in few other places on the planet have the pressures of human activities stressed natural ecosystems to the extent seen in China.

> China's environmental predicament is made much more acute by a restrictive synergy of natural endowment and human action. Intensifying economic production depletes natural resources whose per capita availability would be quite limited even should the country have a stationary population. Progressing ecosystem degradation affects natural services whose provision, owing both to the country's climatic and geomorphic peculiarities and to its long history of deforestation and intensive farming, would be recurrently impaired even without further onslaughts. Resulting realities are stunning in their magnitudes, effects, and potential implications [p. 190].

Smil would, I believe, not fail to recognize the severity of misery-inducing environmental conditions in other countries. What sets China apart for him is the implausibility of technological and institutional remediations. Though technological innovations, new policy directions, and altered incentive structures are important for dealing with China's environmental dilemmas, the positive effects of such interventions would occur only at the margins.

Smil's points of departure, not surprisingly, are population size and population growth, subjects he treats crisply and competently. Though prepared to be agnostic with regard to the grand debates between Western demographic catastrophists and cornucopians about the prospects of large populations in other settings, Smil believes that in China any benefit associated with population expansion is illusory in light of the numbers. Growth predictions warrant our careful attention: 125 million people (roughly the current population of Japan) will be added to the Chinese population during the 1990s. By 2025, there is a good chance that another 200 million (more than Indonesia's 1990 population; more than the combined populations of the Philippines, Thailand, and Vietnam) will be added (pp. 34–35).

The "China at the limits" argument begins to unfold as the magnitude of the population is seen against the availability of water and land resources, against China's economic growth trajectory and modernization aspirations, and against the food and energy requirements these will entail. Analysis of the interactions among these factors requires an ability to locate, assess, and assimilate many diverse data. Smil is unrelenting in his quest to establish an empirical basis for his judgments. Specialists in any one sector of his analysis (forests, water, land use, industrial performance, or others) might cavil with some of the details of his treatment, but few can match him in providing an account of the interactive effects of trends in all relevant sectors.

Smil is at his best in documenting the degradation and loss of usable land, in discussing China's movement away from sustainable agriculture, and, especially, in his analysis of energy. Of interest with regard to the last of these is his argument that there is much less room for righting China's energy supply-demand relationship through conservation than is commonly thought. The well-known case regarding China's unavoidable heavy reliance on coal is again highlighted, but Smil adds new flourishes by linking the coal story systemically with water and land-use problems. His treatment of China's role as a global CO_2 source is both measured and somber.

For Smil, further ecological degradation over the course of the next few decades is inescapable. What may be controllable is the pace of degradation. Smil ends his study with some reflections on how that pace might be altered, but it is with reference to such choices that most readers will be calling for more. It is a credit to Smil's work that one leaves it with a new sense of a broader *problematique*.

There is first a set of questions about how China's domestic institutions will respond to intensifying ecological stress. Smil does call attention to the need for heightened awareness of environmental degradation by the government if a more effective environmental protection regime is to be established. The serious problems of fixing governmental responsibility at the local level and of seeing that progressive central government policy is implemented both nationally and locally are institutional issues that generally fall outside the scope of the analysis. But Smil's text does remind us, indirectly but powerfully, of the need for an institutional and cultural setting that would induce Chinese citizens, as individual environmental decision-makers, to become

Vignette: On Theory

Theories are ways of looking at things. A *theoros* in ancient Greece was "a spectator, an observer, one who travels to see men and things; an ambassador sent by the state to consult an oracle, or to observe the games." But that etymology makes it clear that theories cannot be just casual ways of looking: there is something ceremonial, almost official, about any view of the world which qualifies as a theory. Without pressing the point about oracles (or games) we can recognize in the present organization of science a reluctance to dignify with the title "theory" any mere working hypothesis. It was some such reluctance, perhaps, that led the founders of the Society for General Systems Theory to change its name, soon after its establishment, to the Society for General Systems Research. (This modesty did not last—the Society changed its name again, a few decades later, to the International Society for Systems Science.)

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Theories have often been compared to maps in which can be observed a similar selectivity. Railway maps, for example, show only railways, road maps only roads, relief maps only heights above sea level, etc. Each map is useful primarily for the specialized information it conveys. Each map contains also, it is true, hints about the country in question not directly related to its primary function. From curves in the track, and the positions of termini, bridges, and tunnels, it is possible to get a good deal of topographical information out of a railway map, although it is not the business of railways to describe the territory they traverse. They have, however, to conform to it more or less narrowly according to the available resources of civil engineering, and that necessity builds information about it into them. Similarly, airline maps give a good deal of information about population density, although here there is a danger that a refueling stop in the middle of an ocean may look like a large city.

—*Peter Caws*, in *Yorick's World: Science and the Knowing Subject* (University of California Press)

more ecologically responsible in their day-to-day lives.

A China that is neither a capitalist market economy nor a centrally planned socialist economy is one whose institutions generate very mixed messages with regard to the environment. The "get rich quick" mentality that currently characterizes much of the economy and the corrupt uses of political power for economic gain often encourage careless, exploitative behavior with regard to the environment. On the other hand, the reformist movement (however slow) toward prices that reflect scarcity values and the gradual emergence of new institutions providing a risk-management infrastructure for a capitalist society—such as insurance schemes and liability law—should, over time, encourage greater environmental responsibility.

A second set of questions concerns the international implications of the environmental quandary described by Smil. At various points in the study, Smil alludes to these—as in his discussion of the CO_2 problem and the possibility of ameliorating degradation through more efficient technologies from abroad (his discussion of irrigation technologies, for instance, is intriguing). Given the nature and extent of China's problems and the levels of support that could be expected from the international community, Smil is not sanguine that enhanced international cooperation will make a major difference in retarding degradation. This is clearly an area to be watched, however. The growing emphasis placed on the environment in China's relations with international organizations (especially the World Bank) and with foreign governments, the pressures placed on China by nongovernmental organizations, and the obligations China incurs by its participation in emerging international environmental regimes all ensure that China's domestic environmental technology and policy choices increasingly will be conditioned by international influences.

With the potential for creating serious international ecological problems, which may also become disruptive politically, China's environmental difficulties are inescapably matters of international concern. The maintenance of an ongoing constructive engagement with China on environmental matters thus looms as an important foreign policy challenge for the United States and for other Western countries. Though not addressed directly by Smil, questions of foreign policy and international environmental diplomacy are unavoidable in light of his account. For these reasons *China's Environmental Crisis* can be read as strengthening the case of those (many of whom may be uneasy with the narrow and increasingly unproductive terms of post-Tiananmen U.S. policy toward China) who would put environmental matters into a more central place in U.S. thinking about China.

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Symbioticists Rediscovered

Concepts of Symbiogenesis. A Historical and Critical Study of the Research of Russian Botanists. LIYA NIKOLAEVNA KHAKHINA. Lynn Margulis and Mark McMenamin, Eds. Yale University Press, New Haven, CT, 1993. xxxii, 177 pp., illus. $35 or £22.50. Bio-Origins Series. Translated from the Russian edition (Leningrad, 1979) by Stephanie Merkel and Robert Coalson.

This slender volume opens a long-closed window into a body of work largely unknown to the Western scientific public. The subject of the book is the work of Russian botanists pertaining to theories of symbiogenesis from the late 19th through the early 20th century. "Symbiogenesis" is the term devised by K. S. Merezhkovsky to describe the evolutionary origin of organisms through symbiosis. The book itself resembles a Russian doll: stories within stories are revealed as one reads from the foreword to the appendix, starting with the spy-novel–like episode in which the Russian version of the book came into Lynn Margulis's possession, slipped into her hand by an unknown woman in a crowd after a lecture in Moscow.

The book begins with a foreword by A. Vucinich pointing out the importance of lichens in tundra ecology and the profound influence of the study of lichen symbioses on Russian botany, followed by a lively preface by Margulis and M. McMenamin describing how the book came to be translated and published in the United States. Khakhina's book, edited to update terminology, follows. Originally published in 1979 in Russia, it consists of an introduction setting out the author's intent and approach and summarizing the develop-