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# Ecological Theory and International Relations

DENNIS PIRAGES\*

## INTRODUCTION

David Fidler's article raises a number of important questions existing at the nexus of international relations theory, globalization, and emerging and resurgent infectious diseases.<sup>1</sup> I would like to explore more deeply some of these ideas in the context of international relations theory. Most traditional theoretical approaches to international relations fail to acknowledge even the most basic ecological factors in explaining interstate behavior and the emergence of global issues. In this article, I suggest an ecological approach to international relations, capable of increasing understanding of the causes and consequences of globalization, that provides an efficient and useful alternative to realism, liberalism, and critical international relations theory—the three commonly accepted theoretical frameworks mentioned by Fidler.

An ecological approach to explaining the evolution of the international system and the emergence of global issues begins with the observation that *Homo sapiens* is but one species among millions sharing the global ecosystem. Human beings live in basic units called populations. The thousands of individual populations that once roamed the Earth's surface are now being consolidated into a global system increasingly composed of semisovereign states. Just as human interactions with nature directly determined the early successes and failures of human populations, ecological factors continue to shape human societies, human conflicts, the international distribution of power, and the nature of emerging global issues. Even though *Homo sapiens* has developed impressive technologies to deal with some of the limits imposed by nature, the contemporary world, beset by an AIDS epidemic and many other emerging and resurgent infectious diseases, is still being very much impacted by human interactions with nature.

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1. David P. Fidler, *The Globalization of Public Health: Emerging Infectious Diseases and International Relations*, 5 *IND. J. GLOBAL LEGAL STUD.* 11 (1997).

## I. TRADITIONAL PERSPECTIVES

To avoid being overly harsh on an adolescent international relations discipline, suffice it to say that the three so-called "contending schools" of international relations thought—the realist, liberal, and radical—have dubious credentials as scientific theories, wield little predictive power, and now offer little policy guidance in dealing with the issues of twenty-first-century globalism. In a rapidly changing world experiencing what has been described as an acceleration of history,<sup>2</sup> these traditional perspectives offer little help in anticipating and dealing with the numerous issues that now confront the inhabitants of an emerging global village. The traditional theoretical approaches to international relations, centered on men and their motives, are increasingly obsolete in the face of the relentless ecological and technological changes that are transforming the state system into a global one.<sup>3</sup>

Realist perspectives, based on "billiard ball" models of state behavior, may well explain nineteenth-century patterns of sovereign behavior, but do little to increase understanding of the nuances of contemporary political relations among complex, semisovereign societies. State borders are now much more porous because of the multiple external pressures of globalization and internal pressures from more educated and ethnically diverse electorates. Such pressures increasingly constrain the options of sovereigns. While possibly useful in explaining the machinations of nineteenth-century European autocrats or the behavior patterns of contemporary despots in less industrialized countries, the realist perspective, stressing the unitary nature of the state and a perpetual quest for power, is of little use in predicting and explaining changes in the contemporary world.

Many of the recent major shifts in international relations, ranging from the transitions to democracy and the downsizing of armed forces in the former Soviet Union, to the surrender of significant national sovereignty by the countries composing the European Union, can only be described as anomalies when analyzed within the confines of a realist paradigm.

The Enlightenment and the economic abundance growing out of the Industrial Revolution shaped liberalism, the next tradition. With its emphasis

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2. See generally GERALD PIEL, *THE ACCELERATION OF HISTORY* (1972).

3. There is an extensive literature debating the merits of the three perspectives. A most useful recent summary is *CONTROVERSIES IN INTERNATIONAL RELATIONS THEORY: REALISM AND THE NEOLIBERAL CHALLENGE* (Charles W. Kegley, Jr., ed., 1995).

on individual rights and cooperation through international regimes and markets to promote the good life for the individual worldwide, liberalism is more a set of prescriptions for managing a world of individual liberty and community prosperity than a theory that can explain global changes.

Liberalism's vision is that of a more educated, permissive, and forgiving world without ecological limits. Rights are stressed at the expense of responsibilities and the guiding role of the state is minimized. Liberalism offers an interesting description and somewhat utopian commentary on possibilities for a more cooperative world and helps to explain the willingness of some leaders to form alliances for economic and ecological progress. However, it is not particularly useful in building relevant theory or offering policy guidance for dealing with the mounting biological and ecological challenges to the existing global order.

The last of these perspectives, alternatively called the Marxist, radical, or critical approach, offers useful insights into the nature of contemporary dominance and dependence relationships in the international system; but it also lacks any explanatory or predictive power in dealing with emerging global challenges. The focus on dependent development often confuses the effects of stratification visible in international economic development with the causes. Thus, while the distribution of power in the international system may create poverty pockets and uneven development, the changing origins of this unequal distribution are of much greater theoretical interest.

While it is useful to examine patterns of injustice and inequality in the new global village, identification of malevolent individuals, classes, or multinational corporations in the "core" countries as the causes of these problems obscures the technological factors that shape their development. These portraits of malevolent political and economic actors in industrial countries plotting the subordination of Third World masses cannot account for the extensive democratization and human rights movements that find their impetus in these same "core" countries.

## II. AN ECOLOGICAL APPROACH

The greatest challenges to human well-being in the next century are more likely to come directly from nature than from the malignant designs of malevolent dictators. Indeed, even the list of factors recently responsible for the premature loss of human life and potential indicates that this is already the case. While human casualties due to cross-border military incursions over the

last century have been considerable, they have easily been outpaced by deaths from infectious diseases. Even during the hostilities of World War I, for example, an influenza epidemic that originated in Kansas in 1918 and then spread around the world killed between twenty and thirty million people—many times the number of battlefield casualties.<sup>4</sup>

A predictive theory of international relations that can account for these biological threats to human security and deal with the causes and myriad human consequences of globalization, including emerging and resurgent infectious diseases, is best grounded in an ecological perspective. This approach stresses the evolutionary interactions among human populations, between them and the physical environment, and between them and pathogenic microorganisms.<sup>5</sup> *Homo sapiens*, like most other large species, lives in basic units called populations. For biologists, a population is a dynamic system of individuals potentially capable of interbreeding with each other.<sup>6</sup> Thus, the boundaries of many human populations theoretically could be located by measuring subtle genetic differences among peoples. Indeed, an approach similar to this has been successfully used in mapping early human migrations by comparing genetic similarities of presently geographically distant populations.<sup>7</sup>

It is obviously not an efficient use of time for international relations specialists to travel the world carrying genetic testing kits in an attempt to identify biological boundaries of human populations. Instead, human populations (ethnic groups) can be mapped fairly clearly by identifying “marked gaps” in communication that correspond to biological interbreeding and are related to the formation of group identity.<sup>8</sup> Use of a common language is a good surrogate measure for identifying many of the world's populations. Using the number of languages now estimated to be spoken worldwide yields between 3,000 and 5,000 identifiable human populations sharing common cultures.<sup>9</sup>

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4. See ALFRED CROSBY, *AMERICA'S FORGOTTEN PANDEMIC: THE INFLUENZA EPIDEMIC OF 1918* (1990).

5. Dennis Pirages, *Demographic Change and Ecological Security*, in 3 ENVTL. CHANGE AND SECURITY PROJECT REP. 38 (1997).

6. KENNETH E.F. WATT, *PRINCIPLES OF ENVIRONMENTAL SCIENCE* 1 (1973).

7. See LUIGI LUCA CAVALLI-SFORZA & FRANCESCO CAVALLI-SFORZA, *THE GREAT HUMAN DIASPORAS* (Sarah Thorne trans., 1995).

8. KARL W. DEUTSCH, *NATIONALISM AND SOCIAL COMMUNICATION* 98-100 (2d ed. 1966).

9. TED ROBERT GURR, *MINORITIES AT RISK* 5 (1993) (citing Bernard Nietschmann, *The Third World War*, 3 CULTURAL SURVIVAL Q. 1-16 (1987)).

During the Industrial Revolution, many of the thousands of isolated populations that once roamed the surface of the Earth have been eliminated, while others have been consolidated into the boundaries of larger states. Thus, some contemporary states are largely made up of one distinct population. Japan, for example, is a racially homogenous country and experiences almost no ethnic tension. But much more often, states such as Rwanda encompass two or more populations, and ethnic strife among populations can be frequent. It is also not uncommon for human populations to be spread across the borders of several states—for example the Kurds in the Middle East—and this can lead to forceful demands for ethnic reunification.

The same basic ecological principles that shape the behavior of other occupants of the global ecosystem govern populations of *Homo sapiens* wherever located. Among these principles is an imperative to be fruitful and multiply until resource limits are reached. Often, when needed resources cannot be obtained by growing populations, lateral pressure grows to obtain them from weaker neighbors.<sup>10</sup>

### III. AN EVOLUTIONARY PERSPECTIVE

Theories that attempt to explain how human beings, individually or collectively, behave in relation to nature or to other human beings can most usefully be anchored in the study of the evolution of the ecosystem-society interface.<sup>11</sup> Using human populations and their biological and ecological circumstances as a starting point, a theoretical framework can be developed that grounds international relations theory in ecological realities. This synthesis between ecology and international relations is useful in assessing both the consequences of globalization and the causes of emerging and resurging diseases.

Human populations have been and are continually evolving as they face the changing constraints provided by nature and neighboring populations. The continued ecological security of any human population depends upon maintaining an evolutionary equilibrium in four relationships: (1) between the size and demands of human populations and the sustaining physical environment; (2) between the size and growth patterns of neighboring human

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10. NAZLI CHOUCRI & ROBERT C. NORTH, *NATIONS IN CONFLICT* 16 (1975).

11. Dennis Pirages, *The Ecological Perspective and the Social Sciences*, 27 *INT'L STUD. Q.* 243, 244 (1983).

populations; (3) between the territorial demands of human populations and those of other large species; and (4) between human populations and various kinds of pathogenic microorganisms. It is the last of these relationships that is of greatest concern in the rest of this article.

Evolutionary processes produce and transmit information that is crucial to human survival. The human genome, shaped by millions of years of interaction with the physical environment, represents a storehouse of survival wisdom that is passed by natural selection from one generation to the next. While other species are also continually evolving, human beings have an edge over the competition. *Homo sapiens* learns from experience and can also pass knowledge from one generation to the next through oral and written communication. Thus, *Homo sapiens* adapts to the surrounding world in two ways: (1) through the harsh process of biological natural selection based on differential reproduction; and (2) from observing, learning, and passing on verbal and written information to succeeding generations. This latter process—sociocultural evolution—is embedded in the beliefs, norms, values, goals, and behavior patterns that provide the underpinnings of contemporary cultures.<sup>12</sup>

Throughout most of history, *Homo sapiens* lived in culturally diverse and relatively isolated hunting and gathering populations. These human populations coevolved with a host of local microorganisms in shared ecosystems. Since the Industrial Revolution, however, innovations in transportation and weaponry have been forging a world in which human populations have been brought into much closer contact. While the increased integration of these previously diverse populations has had a myriad of both positive and negative consequences for human beings, it has also upset delicate equilibriums between *Homo sapiens* and pathogenic microorganisms. Initial contact with microorganisms carried by people from distant parts of the world can expose naive populations to new pathogenic microorganisms to which they have developed little or no immunity.

Movement of pathogenic microorganisms among human populations through exploration, trade, and conquest has played a major role in shaping history. William McNeill refers to this kind of pathogen mixing as the confluence of disease pools.<sup>13</sup> Such mixing was a particularly important factor

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12. See WILLIAM H. DURHAM, *COEVOLUTION: GENES, CULTURE AND HUMAN DIVERSITY* (1991). See generally C.R. HALLPIKE, *THE PRINCIPLES OF SOCIAL EVOLUTION* (1986).

13. See WILLIAM H. MCNEILL, *PLAGUES AND PEOPLE* 77-147 (1976).

in nearly wiping out numerous indigenous populations during the age of imperialism when Europeans first made contact with these people. Europeans, bringing with them smallpox and numerous other diseases, easily conquered biologically naive New World populations almost without a shot being fired.<sup>14</sup>

Many other historical studies have stressed the impact of disease and related ecological factors on the course of international relations. Henry Hobhouse has documented the impact of disease and agricultural changes on the evolution of early European societies, politics, and economics.<sup>15</sup> Alfred Crosby has used the term ecological imperialism to describe the rapid spread of all kinds of European flora and fauna to the rest of the world on the heels of military conquest.<sup>16</sup> In summary, the study of the history of societal development and international relations from an eco-evolutionary point of view can yield rich insights into the sociopolitical consequences of human interactions with nature and pathogenic microorganisms. This theoretical viewpoint has much to offer when applied to the study of contemporary globalization.

#### IV. TECHNOLOGY, GLOBALIZATION, AND ECOLOGICAL INSECURITY

The international system is presently being transformed into a global one, and it continues to be shaped by the same fundamental ecological forces that have always shaped human societies. While leaders of semisovereign states still attempt to maintain some degree of autonomy, emerging global issues raise challenges that require multilateral solutions. The ultimate impact of globalization on the quality of human life is not well understood. While economists and business leaders tout the virtues of an integrated world economy, others decry the negative ecological, social, and political consequences of globalization.<sup>17</sup> My suggestion is that we use an ecological perspective to identify aspects of these globalization processes that are increasing global ecological insecurity.

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14. *See id.* at 199-234.

15. *See generally* HENRY HOBHOUSE, *THE FORCES OF CHANGE: AN UNORTHODOX VIEW OF HISTORY* 9-93 (1989).

16. ALFRED W. CROSBY, *ECOLOGICAL IMPERIALISM: THE BIOLOGICAL EXPANSION OF EUROPE, 900-1900* (1986).

17. *See, e.g.*, *THE CASE AGAINST THE GLOBAL ECONOMY* (Jerry Mander et al. eds., 1996). *See also* WILLIAM GREIDER, *ONE WORLD, READY OR NOT: THE MANIC LOGIC OF GLOBAL CAPITALISM* (1997).

The same ecological dynamics that have always constrained human behavior continue to shape contemporary human populations. In today's global system, large numbers of rapidly growing human populations are living at the margin as they press against resource limitations. Ecological scarcity is reflected in various kinds of human conflict.<sup>18</sup> Infectious diseases, once declared conquered by a past U.S. Surgeon General, now constitute a global health crisis according to the World Health Organization.<sup>19</sup>

There are two faces to the technological revolution that created deep faith in the capabilities of medical science. The first one is responsible for the production of vaccines and antibiotics that have been successful in taming some infectious diseases. The other face of technology is the one responsible for innovations in transportation and telecommunications that are integrating existing human populations into a global village. Thus, while most human populations still retain their identities—Koreans still marry mostly Koreans and French marry mostly each other—the accelerating pace of human contact is creating a more homogenous global human gene pool and a confluence of various kinds of pathogenic microorganisms.

Among the myriad consequences of deeper interdependence are both an increased frequency of contact among neighbors in the global village and an acceleration of the speed with which diseases can now spread. Human immune systems have coevolved locally with a host of potentially deadly pathogenic microorganisms, and resulting immunities have played an important role in preserving human-microbe equilibriums. However, more frequent contact among populations increases the chances of exposure of naive immune systems to pathogens with which they have little experience.

The Institute of Medicine of the National Academy of Sciences has issued a report which concludes that "[t]here are at least four routes for the international transfer or acquisition of health risks: (1) the movement of people; (2) the international exchange of both legal and illegal potentially toxic products and contaminated foodstuffs; (3) the variance in environmental and occupational health and safety standards; and (4) the indiscriminate spread of medical technologies."<sup>20</sup>

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18. See Thomas F. Homer-Dixon, *On the Threshold: Environmental Changes as Causes of Acute Conflict*, INT'L SECURITY, Fall 1991, at 76. See also Thomas F. Homer-Dixon, *Environmental Scarcities and Violent Conflict: Evidence from Cases*, INT'L SECURITY, Summer 1994, at 5.

19. See David P. Fidler, *Return of the Fourth Horseman: Emerging Infectious Diseases and International Law*, 81 MINN. L. REV. 771, 773 (1997).

20. BOARD ON INTERNATIONAL HEALTH, INSTITUTE OF MEDICINE, AMERICA'S VITAL INTEREST IN

Innovations in transportation are the most obvious factor in accelerating the movement of people and thus increasing the scope and rapidity of human contacts. Only four decades ago transoceanic travel was relatively rare, and most voyages were made on slow moving steamships. Today, the increased use of rapid air transportation puts nearly all urbanized parts of the planet within one day's journey for a majority of the people in the world. The number of people traveling internationally by commercial airplane has jumped from only two million in 1950 to 280 million in 1990.<sup>21</sup> This figure is expected to reach 600 million by the year 2000.<sup>22</sup> This new mobility is also reflected in major increases in domestic air travel in the United States. In 1985, 382 million people took trips on scheduled airlines.<sup>23</sup> By 1994, this number had grown to 528 million.<sup>24</sup>

Large scale movements of people domestically and internationally place more human beings in contact with each other and accelerate the spread of communicable diseases. Thus, diseases with exotic names such as the Wuhan or Hong Kong flu may originate in Asia, but now move very rapidly worldwide, thereby cutting down the time available to prepare for them, which increases ecological insecurity.

The globalization of manufacturing and trade is also affecting the speed with which microbes and pests move and the territory over which they range. The World Bank estimates that total exports of goods and services grew from 2.6 trillion dollars in 1980 to 6.3 trillion dollars in 1994.<sup>25</sup> This increase in the large scale rapid movement of products and services has created a collection of global hitchhikers—viruses, bacteria, parasites, and insects—that often move with merchandise and flourish in their new environments. Thus, the Seoul virus (hemorrhagic fever) has apparently been transported from Korea to Baltimore, Maryland, by wharf rats hitchhiking on cargo ships.<sup>26</sup> Other larger migrant organisms are also transforming human environments.

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GLOBAL HEALTH 11 (1997).

21. LAURIE GARRET, *THE COMING PLAGUE: NEWLY EMERGING DISEASES IN A WORLD OUT OF BALANCE* 571 (1994).

22. *Id.*

23. See U.S. BUREAU OF THE CENSUS, *STATISTICAL ABSTRACT OF THE UNITED STATES*: 1996 645 (1996).

24. *See id.*

25. See THE WORLD BANK, *WORLD DEVELOPMENT REPORT 1996: FROM PLAN TO MARKET* 219 (1996).

26. Dennis Pirages, *Microsecurity: Disease Organisms and Human Well-Being*, WASH. Q., Autumn 1995, at 5.

Nomadic Zebra Mussels have arrived in the United States from Europe in the ballast water of cargo ships. These mussels are now flourishing in their new environment and doing hundreds of millions of dollars of damage to aquatic ecosystems.<sup>27</sup> Dozens of other migrants ranging from killer bees to superbugs have moved into new U.S. environments.<sup>28</sup>

The increasing scale of food production and distribution and the resulting associated disease risks are another aspect of globalization. The appearance of "Mad Cow" disease among British cattle herds has had a major impact on international trade in beef and on the British balance of payments.<sup>29</sup> In 1996, a serious bout of food poisoning in Japan sickened more than 10,000 people and killed several others.<sup>30</sup> In 1997, in the United States, imported berries from Central America were responsible for widespread intestinal disorders.<sup>31</sup>

Thus, the dark side of technology is the creation of the potential for large scale epidemics that may require additional technological innovations to solve. The more rapid movement of large numbers of people, whether by aircraft or subway, increases the speed with which diseases can move from one person to another. Population growth and movement into formerly pristine tropical rain forests continue to liberate microorganisms with which *Homo sapiens* has little experience. Urbanization and the development of megacities create potentially explosive situations for the spread of diseases. Even the increased use of antibiotics to fight disease threatens to create resistant bacterial strains.<sup>32</sup>

#### CONCLUSION

From an ecological perspective on international relations, interaction with microorganisms is simultaneously a causal factor in influencing state success and behavior, and a continuing policy concern of extreme importance. It is very unlikely that the deepening ecological interdependence associated with globalization can be reversed. Eventually, the number of distinct human

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27. See Leslie Roberts, *Zebra Mussel Invasion Threatens U.S. Waters*, SCIENCE, Sept. 21, 1990, at 1370.

28. See Elizabeth Culotta, *Biological Immigrants Under Fire*, SCIENCE, Dec. 6, 1991, at 1444.

29. James Harding, *UK Meat Agency Welcomes Easing of "Mad Cow" Rules*, FINANCIAL TIMES (London), July 6, 1995, at 37.

30. *Sakai Revises Toll of 0-157 Upward*, MAINCHI DAILY NEWS, Aug. 23, 1997, available in LEXIS, News Library, ARCNEWS File.

31. Jeff Gerth & Tim Weiner, *Tainted Imports—Imports Swamp U.S. Food-Safety Efforts*, N.Y. TIMES, Sep. 29, 1997, at A1.

32. Fidler, *supra* note 1, at 19.

populations will be substantially reduced in a kind of cultural and genetic simplification similar to that which has occurred among the world's food crops. This homogenization of the human race will be filled with biological and ecological perils associated with both assimilation and simplification. Thus, the international management of the epidemiological consequences of globalization must be one of the highest priorities for the emerging council of the global village.

