

ASIA'S ENVIRONMENT, 1900–2000

By Conrad Totman

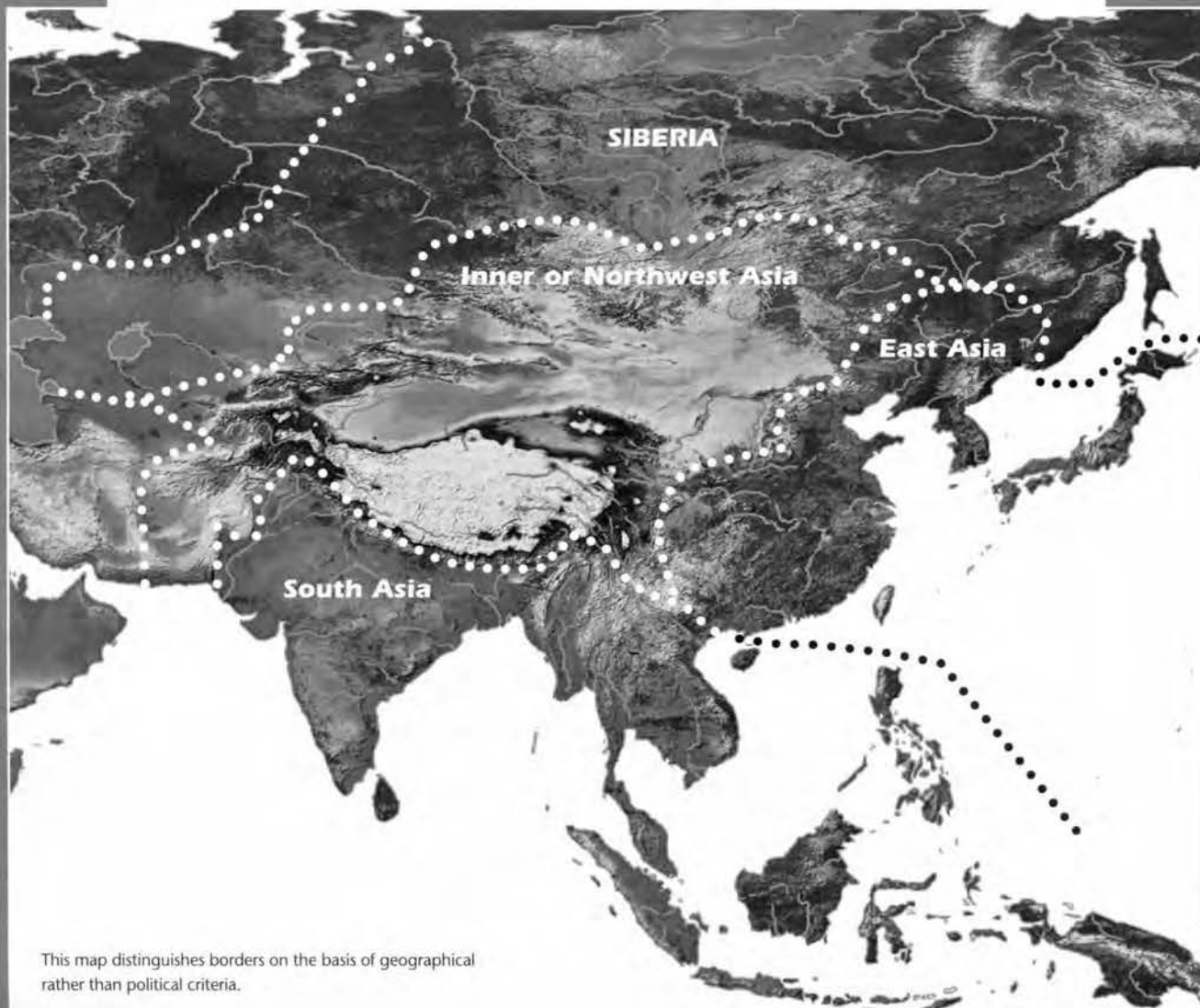
What does the above title mean? Anything? Despite its admirable conciseness, it is in fact laced with semantic problems. Perhaps if we rephrase it, “On Thinking About Asia’s Environment, 1900–2000,” we’d give ourselves occasion to explore those problems briefly. And if we do so, we may find a silk purse lurking in this sow’s ear of a title.

DEFINING “ASIA”

To begin with, “Asia,” as innumerable people have pointed out, is a term utterly lacking analytical utility. After all, does it identify any topographical, climatic, biotic, political, diplomatic, military, economic, social, ethnic, linguistic, genetic, demographic, medical, religious, or cultural entity?

As used here, Asia refers to the geographical region whose ethnopolitical parts are studied by (among others) members of the Association for Asian Studies (AAS). This “Asia” is itself only a portion of that segment of the Eurasian continental land mass known by cartographers as Asia (see Figure 1).¹ This latter encompasses “Russia-in-Asia” and the “Near East” as well as the “little Asia” of the AAS.²

For thinking about environmental matters in Asia thus demarcated, it may be most useful to think of the region in terms of three rather ill-delineated segments.³ There is “south Asia,” a largely tropical realm that extends from the Indus River watershed east-southeastward across the Indochina region to encompass the island reaches of Indonesia and the Philippines. There



This map distinguishes borders on the basis of geographical rather than political criteria.

is "east Asia," a moist, temperate region that extends from the Yunnan Plateau northeastward to Manchuria and Hokkaido. Then, to the north and west of those two segments is the third region, the extensively mountainous and mostly arid reaches of "inner" or "northwest" Asia, which extends to Russia-in-Asia and the Near East.

While "Asia" as a unit may have no analytical utility, this tripartite division offers some help because the three biomes thus identified are quite dissimilar to one another but do have a modest degree of internal climatic and biological coherence. And their twentieth-century experiences have, to a degree, reflected those qualities, as we note briefly below.

DEFINING "ENVIRONMENT"

The problem with the term "environment" is that it has diverse meanings. We use it all the time. "Because of differences in their childhood environments, Joannie ended up a scientist and Billie a bank robber." Even though Billie became rich and famous and Joannie spent her life in a lab, that's not what we mean here by "environment."

By environment we mean ecosystem. An ecosystem consists of the biosystem—the world of plants, animals (humans included), and other biota (living things) that occupy the region in question—and its enveloping context of climate, topography, geological processes, and nonliving materials, both organic and inorganic, such as air, water, coal, and mineral deposits. Even when we set aside these elements of enveloping context, how are we to think about those wonderfully complex and variegated assemblages of life forms that constitute the biosystem? There are two basic approaches to the task, denoted by two ponderous terms: synecological and autecological.

A synecological (syncretic or synthetic ecology) approach attempts to examine "the whole thing," to understand how the participants in a particular assemblage of living creatures interact with one another and their non-living context so as to sustain the assemblage as a whole. One might ask, for example, how does that little patch of wet, mountainous, tropical realm in that corner of the Philippines work? What is the interplay between those trees, vines, and other plants, those birds, insects, people, and other animals, those bacteria and fungi and so on? How do they all get along, surviving in disregard of one another or despite one another even as they depend on one another? And what happens when this or that part of the system gets disrupted, whether by wildfire, earthquake, land clearance, bacterial mutation, climate change, arrival of an "exotic" (a non-native creature), or whatever?

An autecological (autogenous or autonomic ecology) approach focuses on a particular species and tries to understand how it handles its multiple relationships with other biota and its non-living context, what impact it has on them, and vice versa. A study of teak trees, wolves, or the bird-flu virus—of how they function, fare, and affect matters—would be such a project.

The advantage of the autecological approach, when compared to the synecological, is that it is much more manageable and permits one to tell a much larger-scale and more linear story with a well-defined focus. (After all, it would take a long synecological article just to describe an hour at the bird feeder or a summer morning's activity in the rich biome that thrives under the little flowering cherry tree in my back yard.)

The disadvantage of this approach is that it fundamentally distorts by making a particular entity the central player in biological process, the subject of a subject/object relationship or the "we" in a "we/they" relationship, so to say. It is an approach that seems to impute a unique ecological importance to its subject, thereby reducing other creatures to mere parts of the context. In consequence, that approach cannot reveal the full complexity of biological interactions, the intricate patterns of mutual disregard, interdependence, and contestation that exist among the members of every biome.

This fundamental shortcoming of the autecological approach notwithstanding, it seems to be the predominant form of ecological commentary, at least among non-biologists. And by far the most common autecological studies are those that center on humans, *Homo sapiens*. Indeed, almost everything we read that purports to be "environmental history" is in fact focused on *Homo sapiens* and its relationship to some facet of the ecosystem.

Certainly the advantages of the autecological approach as a vehicle for story-telling make it attractive to historians.⁴ But surely this narrow focus on humans is more basically a reflection of our "speciesist" parochialism and our overwhelming commitment to

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self-interest, usually short-sighted self-interest. And it does help perpetuate the mischievous image of humans as creatures who stand outside of, but interact with “them,”—the plants, animals, and so forth that we call the biosystem. Insofar as it does that, this focus obscures the fact that we are merely players in that biosystem and in the broader ecosystem, basically no different from other biota. Like them, we are capable of flourishing only insofar as the system as a whole flourishes.⁵

Still and all, there is legitimate reason to focus on *Homo sapiens* when examining environmental matters because at present we are the species having the greatest impact on the Asian (and global) ecosystem. Chimpanzees with their tools, for example, can really mess up a termite nest; a growing hemlock stand can ruin the livelihood of a lady-slipper community; a properly equipped virus can decimate a species, whether oak, finch, or human. However, such impacts tend to be local, transient, or of narrow biotic scope, whereas the devastating impact of industrial society is ravaging both terrestrial and marine biomes everywhere.

So if we wish to think about what has been happening to the Asian ecosystem in recent times, it makes sense to start by looking at what the humans have been doing. That, of course, has been true for centuries, but it has become especially true in recent decades, let us say from about 1850 onward, but mainly from about 1950 onward. Which brings us to the curious time segment, 1900–2000.

DEFINING “1900–2000”

The problem with the time period “1900–2000” is that it lacks any unifying distinctiveness apart from the arbitrary digits “19.” Moreover, it is bounded by dates that demarcate nothing of note (remember what a bust Y2K was?). If, however, one uses it loosely to denote “recent time” or “recent decades,” then it can be useful because of the way human activity affects an ecosystem, how that impact changes as society changes, and how these truisms apply to Asia.

Basically, we humans function as foragers, as agriculturalists, or as participants in industrial society.⁶ Forager society is sustained by the naturally recurring yield of the ambient biosystem. Agricultural society is sustained primarily by diverse forms of collaboration with “domesticated” plants and animals. Industrial society is sustained by the manipulation and exploitation of both the living biosystem and past generations of life (fossil fuel), wherever they can be found.

The key variables that determine the character and extent of a human population’s impact on the ecosystem are population density, level of material demand-per-capita, and the type and scale of technology employed to satisfy that demand. The particulars of social organization and values seem to count for little, except as they influence the expression of those key variables.

Forager society consisted of small, scattered populations living at subsistence levels. Their technology was so modest as to prevent them from having more than a local and transient impact on the ambient biosystem.

Agricultural society consisted of much larger and more densely settled populations that included ruling elites of considerable wealth. The gadgetry and knowhow of the producer populace enabled it to effect major and permanent (in terms of human timescales) transformations in biomes. Farmers converted vast reaches of woodland to pasture and arable land, denuded many other areas, and sharply altered the composition and density of biotic communities in the areas they touched. Once the landscapes were altered, however, the modified biomes usually stabilized, with the remaining groups of biota, humans included, working out new, generally sustainable systems of communal interaction and survival.

The environmental impact of industrial society has been immeasurably greater. And its full effects are yet to be seen. The root factor that has enabled humans to industrialize and that underlies the transformative power of industrial society has been the availability of fossil fuel. This vast reservoir of coal, oil, and gas has permitted an immense expansion in the size and flexibility of humanity’s usable energy supply and in the variety and malleability of its material goods. Those changes, in turn, have made possible radical physical and, subsequently, chemical manipulation of the ecosystem.

That manipulation has allowed stunning increases in human population numbers and in average per-capita levels of consumption.⁷ And this process of extremely rapid and

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Elevated highway through Guangzhou, China.
Photo courtesy of Imaginechina.
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ill-managed population growth and enrichment has fostered urban sprawl, environmental pollution and despoilment, bio-habitat loss, species endangerment, global decline in both terrestrial and marine biodiversity, depletion of both organic and inorganic natural resources, and consequent intensification of disputes (both intra-*sapiens* and inter-species) over the use of air, water, land, biota, and subsurface materials.

None of which is news. And anyway, what does all this have to do with Asia's environment during "recent decades," i.e., circa 1900–2000? Well, quite a bit.

Roughly speaking, that was the century during which industrialization and its impacts gradually spread across Asia. There, as in the whole world, of course, some areas have become more elaborately industrialized than others. None of the three regions of Asia has remained untouched, and none is fully industrial (whatever that condition may entail). But in all three the basic trajectory of change and its effects is clear enough.

In Asia, as everywhere, industrialization first had an environmental impact when industrialized outsiders arrived in pursuit of their enterprises.⁸ We students of Asia commonly refer to those enterprises as trade and empire and see initial environmental impacts in such matters as Indian trees for the British navy, Japanese coal for American steamships, Indochinese rubber for whomever. Then, as local peoples (elites initially, others later) discovered the apparent (i.e., immediate) benefits of industrialization, the dynamic of change became indigenized and the magnitude of its impact swelled.

By the year 1900, for example, the effects of Japan's nascent industrialization were rippling outward from the Tokyo elite, starting to alter the lives of common people throughout the realm and giving rise to heightened problems of soil erosion and flooding and Japan's first major incident of industrial pollution. By 2000 the environmental impact of industrialization was being felt nearly everywhere in Asia, manifesting itself in the several ways cited above. This trend has continued down to the present and likely will persist for a few more decades.

AND THE SILK PURSE?

In Asia as we have defined it, then, the twentieth century witnessed a widespread and accelerating human impact on the environment because of the spread of industrialization. As noted above, however, not all areas of Asia have been affected equally.

Primarily because of the biogeographical differences among Asia's three major segments, industrialization has affected them at different rates and in different ways. As suggested by the example of Japan, it first had a substantial impact on east Asia, then south Asia, and finally northwest Asia.

To elaborate the point, because the temperate realm of east Asia offered the early industrial societies of western Europe fewer desired goods than did south Asia—which furnished timber, spices, other tropical forest products, and diverse subsurface materials—it was subjected to less complete control and exploitation. In consequence, the indigenous elites of east Asia had a freer hand in pursuing their own industrial development.⁹ Then, as that process advanced, they looked elsewhere for the natural resources that industrialism required. Especially from about 1960 onward, to cite a notable example, they found in the tropical forests of south Asia immense volumes of wood for industrial uses. Together with buyers from other industrial societies, they collaborated with local elites to extract the wood, in the process facilitating the destruction of forest biomes and helping to wreak havoc across the region.

Meanwhile, the arid reaches of northwest Asia offered even less of value to industrial societies, either those within or beyond Asia. In consequence, socioeconomic change has proceeded more slowly there, and inroads on the ecosystem have been slower to develop than in either east or south Asia. By 2000, however, that region, too, was becoming entangled in industrialization, and the ramifications thereof were gradually becoming more visible.

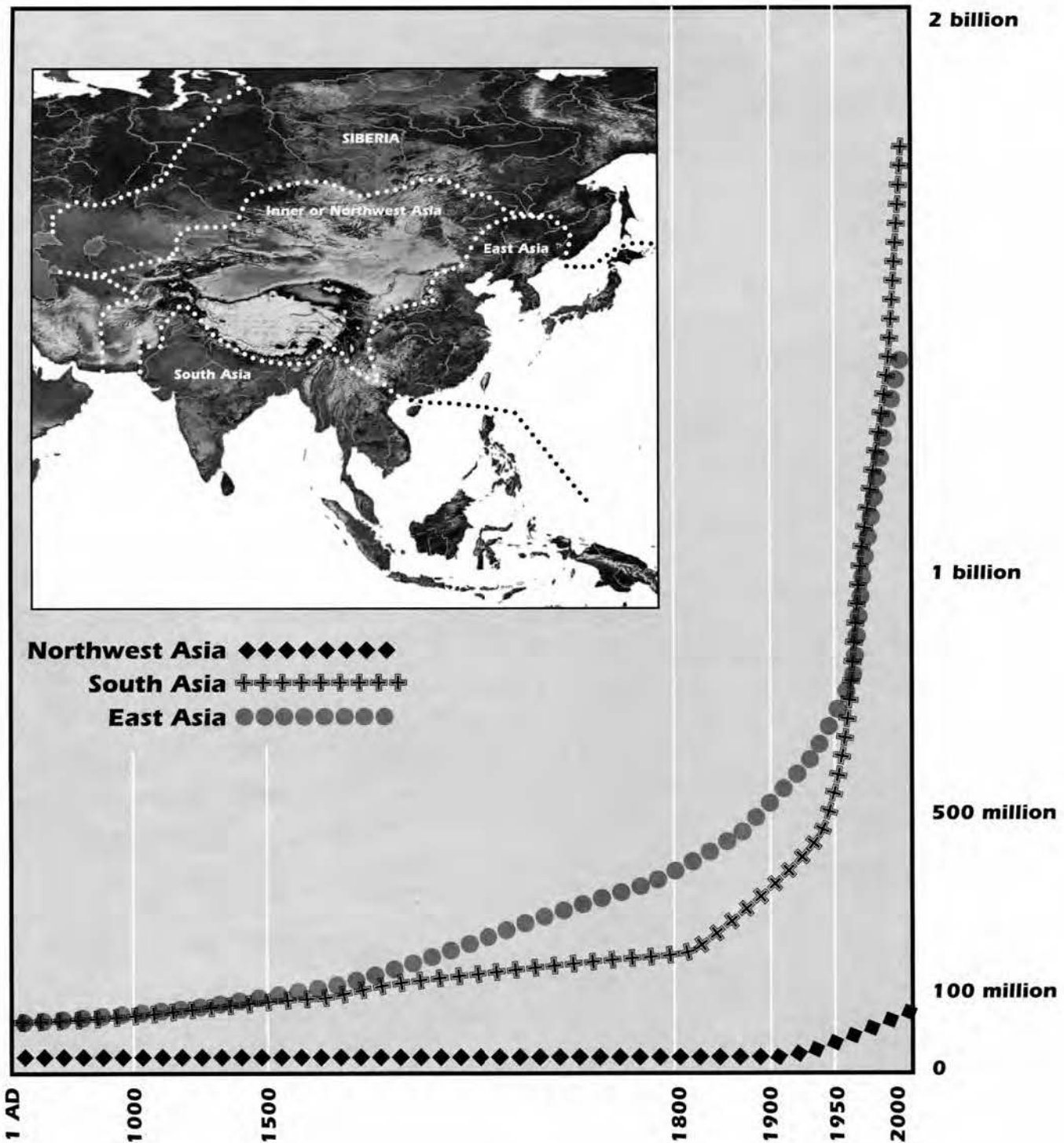
These regional differences between east, south, and northwest Asia are reflected in their rates of fossil fuel consumption. As of 1850, Asians consumed almost no fossil fuels (coal, oil, natural gas); today they consume about three billion metric tons of coal or equivalent oil and gas every year. And the rate of consumption continues to accelerate. When fossil fuel consumption at the end of the twentieth century is examined, east Asia is clearly the largest consumer of fossil fuel both in absolute and per capita terms, followed by south and northwest Asia (see the chart on page 17).



Crowds on Nanjing Road, Shanghai.
Photo courtesy of Imaginechina.
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Asian Population Growth



NOTES

1. The graph of Asian population is based on figures found in Colin McEvedy and Richard Jones, *Atlas of World Population History* (NYC: Penquin Books, 1978). Their numbers for 2000 are projections. However, the most recent figures by the United Nations in its *2001 Demographic Yearbook* (NY: 2003), 93–94, seem to confirm their general accuracy. The accompanying map distinguishes borders on the basis of geographical rather than political criteria.
2. As with all population statistics, these must be treated with utmost caution. Even the best present-day censuses are inaccurate; nearly all the numbers on which this graph is based are “guesstimates” based on bits of information, logic, best guesses, and techniques of demographic modeling.
3. Demographic fluctuations between the indicated years are omitted.

Levels of Fossil Fuel Consumption in Asia*

(Selected Regions, 2000)

The basic trends of these decades—unprecedented human population growth, rising average levels of consumption, escalating fossil fuel consumption, and the various expressions of environmental deterioration that result—will likely continue for a few more decades. But, at some point, probably within the lifetime of today's 30-somethings and younger, one of two things will happen.

Of the two, the more likely development, I suspect, is that the recent and stunning expansion in the role of *Homo sapiens* will stumble to a halt, as such a process always does when a species overwhelms its niche and consumes/destroys its material foundation. Then a radical retrenchment will commence, in Asia as elsewhere. But precisely when this will become evident and precisely how it will unfold no one can foretell. Indeed, the retrenchment may already have commenced, although the relevant evidence—current global patterns of famine, disease, migration, and intra-*sapiens* conflict—is still too murky to persuade this old historian one way or the other.

The other alternative is that *Homo sapiens* will effect another transformation in its *modus operandi*. In this scenario, the species will transcend its fossil-fuel-based industrial

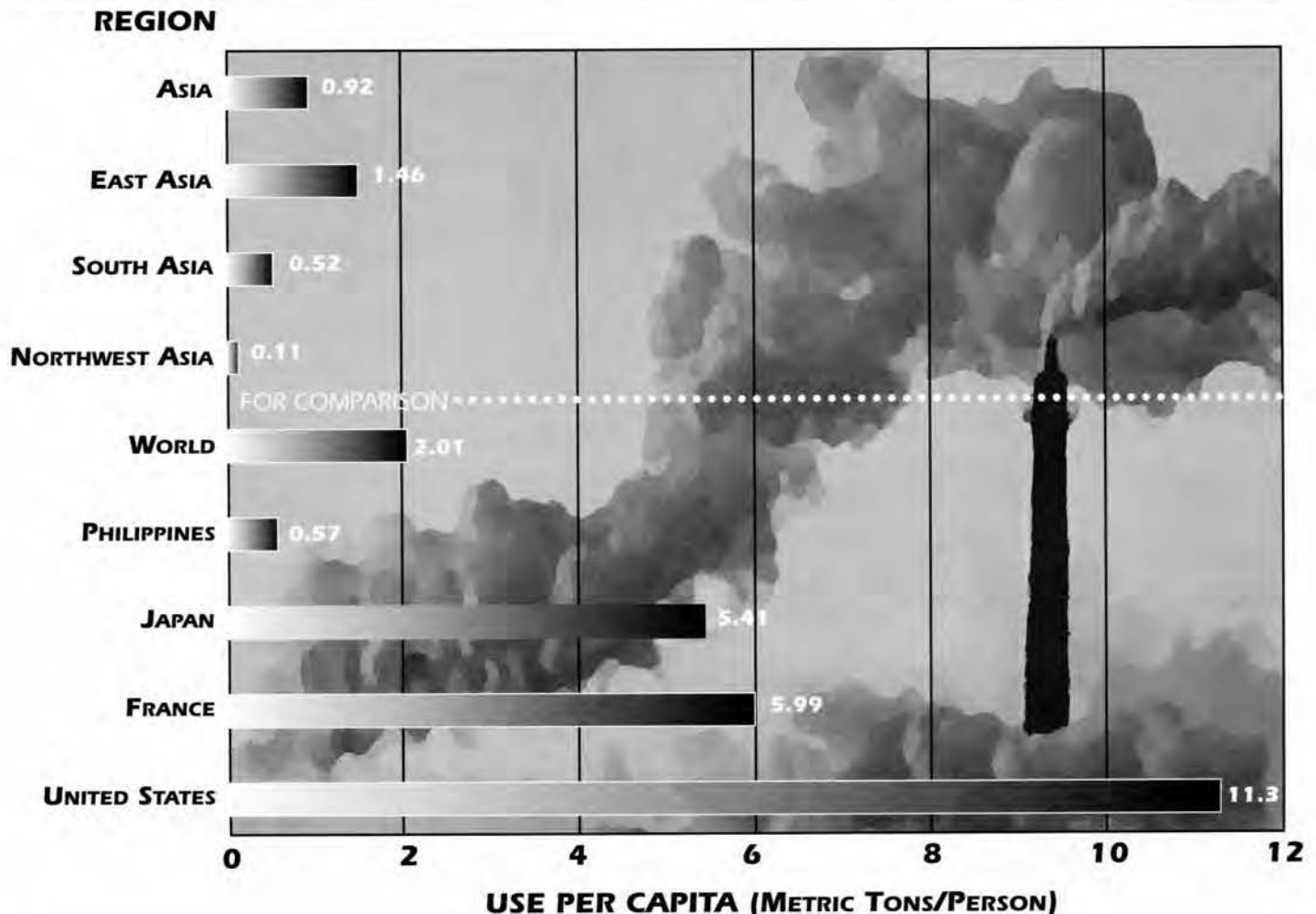
Area	Energy Use (1,000 Metric Tons)	Population (thousands)	Use per Capita (Tons/Person)
ASIA	2,914,741	3,160,000	0.92
East Asia	2,006,909	1,370,000	1.46
South Asia	902,853	1,745,000	0.52
Northwest Asia** (for comparison)	4,979	45,000	0.11
WORLD	12,229,372	6,071,000	2.01
Philippines	43,078	76,000	0.57
Japan	682,143	126,000	5.41
France	347,359	58,000	5.99
USA	3,174,983	281,000	11.30

* Asia here is as defined in this essay, not by the United Nations.

** United Nations figures are based on political units. These figures for northwest Asia include only Mongolia, Afghanistan, and Nepal. Chinese Turkestan and Tibet are included in the China figures. Had those two large regions been included in northwest Asia here, the "Use per Capita" figures for East Asia would be somewhat higher.

Sources: Energy figures come from United Nations, *2001 Energy Statistics Yearbook* (NY: 2004), 15–25. Population figures are rounded from those given in United Nations, *2001 Demographic Yearbook* (NY: 2003), 45, 58–62.

Fossil Fuel Consumption in Asia by Region (2000)



niche by devising a new niche, much as it did in the earlier changes from forager to agricultural and subsequently industrial societies.¹⁰

It is difficult, however, to envisage that new niche, given industrial society's pervasive dependence on fossil fuel. Quite apart from its role as the energy base of industrial life, this material provides myriad non-fuel products. These include the plastics we find everywhere, the tars that make our highways, roofing, and countless other structural materials, and the chemicals that underlie so much of the fertilizer, biocides, pharmaceuticals, clothing, and other goods essential to today's society.

All the living biota on the planet are not remotely capable of providing goods and energy in volumes and at rates sufficient to replace those currently provided by the uncountable generations of past life entombed in fossil fuels. In consequence, for example, despite the earnest rhetoric about "bio-fuels," "organic farming," "herbal remedies," "natural products," etc., attempts to replace fossil fuels with more complete reliance on current biomass output will not enable industrial society to maintain the current numbers and consumption levels of *Homo sapiens*. Rather, such attempts will simply accelerate the destruction of the global biosystem. So perhaps the only real question facing us in coming decades is how gracefully or barbarously *sapiens* will adapt to the shrunken niche that still exists in a deteriorated global biosystem and depleted ecosystem.

Which brings us to our silk purse, such as it is. However the story of coming decades unfolds, a human-centered autecological approach to "The Asian Environment, 1900-2000"—or to portions thereof—can shed rich light on the dynamics of industrial society, its socioeconomic dimensions, and beyond that its effects on the Asian ecosystem as a whole. And when treated with insight and integrity, that examination of recent ecological ramifications can lay a firm foundation upon which future teachers and scholars may be able to explain what happened to Asia—and the world—during the twenty-first century. ■

NOTES

1. In this map Afghanistan and much of Pakistan are placed in northwest Asia; other maps commonly assign those areas to the Near East or south Asia.
2. "Russia-in-Asia" encompasses Siberia, the "Russian Turkestan" region east of the Caspian Sea, and the Caucasus Mountain region between the Black and Caspian seas. By "Near East," I mean Iran and westward to include the vicinity of Turkey and the Arabian Peninsula.
3. The three segments are "ill-defined" all along their boundaries. But most notably, much of Pakistan is here defined as part of northwest Asia, and Manchuria as part of east Asia. In population figures, Pakistan is treated as part of the "Indian Subcontinent" and both Manchuria and Inner Mongolia as parts of east Asia.
4. A recent example of this approach to global environmental change is Sing C. Chew, *World Ecological Degradation: Accumulation, Urbanization, and Deforestation 3000 B.C.—A.D. 2000* (Walnut Creek, CA: Alta Mira Press, 2001). Chew treats Asia along with other regions, and his lengthy bibliography will guide readers to many earlier works on diverse aspects of his story.
5. This is not to say that every type of creature is unextinguishable. Species (however defined) and varieties continually appear and disappear. As long as that process occurs at rates and in ways that do not substantially affect the larger patterns of biodiversity and biomass maintenance, it is not a problem. But when the process is radically accelerated and broadened and has a major cumulative impact on those larger patterns, as is occurring today with the rise and spread of industrial society, the consequences can prove catastrophic, and not just for "them."
6. In temporal terms, of course, the transitions from forager to agricultural to industrial society entail much overlap. Moreover, the three systems are partially cumulative. Agriculturalists forage in diverse ways. Industrial society utilizes high-tech agriculture as well as high-tech foraging (e.g., marine fisheries, old-growth logging).
7. One must say "average" because industrialization seems also to be creating unprecedented degrees of economic disparity within societies and among peoples. But that is an intra-*sapiens* problem, i.e., a social issue, not an environmental one.
8. I insert "as everywhere" because the ghosts of myriad English (French, German, etc.) villagers could attest to how outsiders from industrializing towns had, in the pursuit of their enterprises, turned the agricultural worlds of these villagers upside down.
9. Within the east Asian biome, needless to say, for a few decades prior to 1945, Japan's leaders attempted to play, vis-a-vis the Korea-China area, an "exploit and uplift" ("plunder and proselytize") role roughly akin to that played by Europeans (and their American outliers) in the south Asian biome a few decades earlier.
10. The term "post-industrial" as it is commonly used refers mostly to cultural commentary. It has nothing to do with this ecological issue of niche transformation. The virus that modifies its chemistry so that it can flourish in more varied host environments is experiencing niche transformation, as is the deer that learns to live among humans and utilize the bounty of their gardening.

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Mountain Vista in Yunnan near Tibet, known as "Shangri-la." Photo courtesy of Imaginechina.
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CONRAD TOTMAN is retired from a career teaching Japanese History at Northwestern and Yale Universities. Raised and educated in Massachusetts, he acquired his interest in Asia during military service in Korea and Japan. He has written extensively on Japan, mainly on aspects of political and environmental history. For details, see recent editions of *Who's Who in America*. Since his retirement he has been organizing, transcribing, and annotating diaries, letters, and other materials of Totman family history for deposit in archives at the University of Massachusetts, Amherst, and elsewhere.