Humans as Cancer

by A. Kent MacDougall

A cancerous tumor continues to grow even as its expropriation of nutrients and disruption of vital functions cause its host to waste away. Similarly, human societies undermine their own long-term viability by depleting and fouling the environment. With civilization as with cancer, initial success begets self-defeating excess.

When a spot on a person's skin changes color, becomes tough or rough and elevated or ulcerated, bleeds, scales, scabs over and fails to heal, it's time to consult a doctor. For these are early signs of skin cancer.

As seen by astronauts and photographed from space by satellites, millions of man-made patterns on the land surface of Earth resemble nothing so much as the skin conditions of cancer patients. The transformation of the natural contours of the land into the geometric patterns of farm fields, the straightening of meandering rivers into canal-like channels, and the logging of forests into checkerboard clearcuts all have their counterparts in the loss of normal skin markings in cancer victims. Green forests logged into brown scrub and overgrazed grasslands bleached into white wasteland are among the changes in Earth's color. Highways, streets, parking lots and other paved surfaces have toughened Earth's surface, while cities have roughened it. Slag heaps and garbage dumps can be compared to raised skin lesions. Open-pit mines, quarries and bomb craters, including the 30 million left by US forces in Indo-China, resemble skin ulcerations. Saline seeps in inappropriately irrigated farm fields look like scaly, festering sores. Signs of bleeding include the discharge of human sewage, factory effluents and acid mine drainage into adjacent waterways, and the erosion of topsoil from deforested hillsides to turn rivers, lakes and coastal waters yellow, brown and red. The red ring around much of Madagascar that is visible from space strikes some observers as a symptom that the island is bleeding to death.

If skin cancer were all that ailed Earth, the planet's eventual recovery would be less in doubt. For with the exception of malignant melanoma, skin cancer is usually curable. But the parallels between the way cancer progresses in the human body and humans' progressively malignant impact on Earth are more than skin-deep. Consider:

Cancer cells proliferate rapidly and uncontrollably in the body; humans continue to proliferate rapidly and uncontrollably in the world. Crowded cancer cells harden into tumors; humans crowd into cities. Cancer cells infiltrate and destroy adjacent normal tissues; urban sprawl devours open land. Malignant tumors shed cells that migrate to distant parts of the body and set up secondary tumors; humans have colonized just about every habitable part of the globe. Cancer cells lose their natural appearance and distinctive functions; humans homogenize diverse natural ecosystems into artificial monocultures. Malignant tumors excrete enzymes and other chemicals that adversely affect remote parts of the body; humans' motor vehicles, power plants, factories and farms emit toxins that pollute environments far from the point of origin.

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It's easy to dismiss the link between cancer the disease in humans and humans as a disease on the planet as both preposterous and repulsive—or as a mere metaphor rather than the unifying hypothesis its leading proponent claims for it. Only a handful of limited-circulation periodicals, including this one (see Forencich 1992/93), have granted the concept a respectful hearing.

Accepting the humans-as-cancer concept comes easier if one also accepts the Gaia hypothesis that the planet functions as a single living organism. To be sure, the Earth is mostly inanimate. Its rocky, watery surface supports only a relatively thin layer of plants, animals and other living organisms. But so, too, is a mature tree mostly dead wood and bark, with only its thin cambium layer and its leaves, flowers and seeds actually alive. Yet the tree is a living organism. Earth behaves like a living organism to the extent that the chemical composition of its rocky crust, oceans and atmosphere has both supported and been influenced by the biological processes of living organisms over several billion years. These self-sustaining, self-regulating processes have kept the Earth's surface temperature, its concentrations of salt in the oceans and oxygen in the atmosphere, and other conditions favorable for life.

James Lovelock, who propounded the Gaia hypothesis in 1979, initially rejected humans' cancer-like impacts as a corollary, declaring flatly: "People are not in any way like a tumor" (Lovelock 1988, p. 177). But before long he modified this view, observing: "Humans on the Earth behave in some ways like a pathogenic micro-organism, or like the cells of a tumor or neoplasm" (Lovelock 1991, p. 153).

Others have stated the connection more strongly. "If you picture Earth and its inhabitants as a single self-sustaining organism, along the lines of the popular Gaia concept, then we humans might ourselves be seen as pathogenic," Jerold M. Lowenstein, professor of medicine at the University of California, San Francisco, has written. "We are infecting the planet, growing recklessly as cancer cells do, destroying Gaia's other specialized cells (that is, extinguishing other species), and poisoning our air supply....From a Gaian perspective... the main disease to be eliminated is us" (Lowenstein 1992).

Dr. Lowenstein isn't the first physician to examine the planet as a patient and find it afflicted with humanoid cancer. Alan Gregg pioneered the diagnosis. As a long-time official of the Rockefeller Foundation, responsible for recommending financial grants to improve public health and medical education, Dr. Gregg traveled widely in the years following World War II and observed the worldwide population boom. By 1954 he had seen enough. In a brief paper delivered at a symposium and subsequently published in *Science*, Gregg (1955) compared the world to a living organism and the explosion in human numbers to a proliferation of cancer cells. He sketched other parallels between cancer in humans and humans' cancer-like impact on the world. And he expressed hope—unrealized to this day—that "this somewhat bizarre comment on the population problem may point to a new concept of human self-restraint."

It has fallen to a physician who is also an epidemiologist to flesh out and fill in Gregg's sketchily drawn analysis. Warren M. Hern wrote his Ph.D. dissertation on how the intrusion of Western civilization has increased birth rates among Peruvian Amazon Indians. He does his bit to keep the US birth rate down by operating an abortion clinic in Boulder, Colorado. Hern (1990) published a major article that laid out in detail, and buttressed with anthropological, ecological and historical evidence, the ways in which the human species constitutes a "malignant eco-tumor." He proposed renaming us *Homo ecophagus* (for "the man who devours the ecosystem"). Illustrations accompanying the article included aerial photographs of US cities juxtaposed with look-alike photos of brain and lung tumors.

Dr. Hern has delivered papers on the hypothesis at symposia organized by the Population Association of America, the American Association for the Advancement of Science, and the American Public Health Association. Two papers have subsequently been published (Hern 1993a, 1993b). But in general the scientific community doesn't take his hypothesis seriously, preferring to see it as a mere metaphor or analogy. Indeed, it has evoked hostility in some quarters. When Hern presented the hypothesis at the International Conference on Population and Development in Cairo in 1994, listeners reacted angrily, with one threatening, "Are you ready to die?" A Denver radio talk show host called Dr. Hern an "ecoquack" and a "fellow-in-good-standing of the Sky-Is-Falling School."

illustrations by Sarah Lauterbach

Such disparagement can be seen as yet another parallel between cancer the scourge in humans and humans as a carcinogenic scourge on the world. For just as Warren Hern encounters indifference, denial and downright hostility to his views, until recently American doctors routinely kept their cancer patients in the dark about the nature of their illness. The aim was to spare patients the shock, fear, anger and depression that the bad news commonly evokes. Families were reluctant to admit that a relative had died of cancer, and newspaper obituaries referred euphemistically to the cause of a death from cancer as "a long illness." In Japan, cancer remains a taboo topic. Public opinion polls indicate that people would rather not know if they have cancer and doctors would rather not tell them. When Emperor Hirohito was dying of cancer of the duodenum, his doctors lied, telling both him and the public that he had "chronic pancreatitis" (Sanger 1989).

In the United States, even some environmentally enlightened analysts remain in denial when it comes to the humans-as-a-planetary-cancer hypothesis. Christopher D. Stone, a law professor at the University of Southern California and son of the late leftist journalist I. F. Stone, authored an influential essay on environmental law, *Should Trees Have Standing? Toward Legal Rights for Natural Objects.* But in his latest book Stone (1993, p. 4) casts doubt on the proposition that "the earth has cancer, and the cancer is man." "The interdependency of the earth's parts does not amount to the interdependency of organs within a true organism," he notes. "The earth as a whole, including its life web, is not as fragile...the Gaian relationships are not so finely, so precariously, tuned."

Even deep ecologists acknowledge that Earth is qualitatively different from a true organism, that its legitimate status as a superecosystem falls short of qualifying it as a superorganism. Frank Forencich, who argued in "Homo Carcinomicus: A Look at Planetary Oncology" (Forencich 1992/93) that "the parallels between neoplastic growth and human population are astonishing," concedes that even a nuclear winter wouldn't completely destroy the living biosphere, much less the inanimate lithosphere, hydrosphere and atmosphere. "We can't kill the host," he says. "Civilization will break up before the biosphere goes" (Forencich 1993).

Still another objection is that any generalization about cancer is suspect because cancer is not a single disease, but rather a group of more than 100 diseases that differ as to cause and characteristics. Some cancers—breast cancer, for instance—typically grow rapidly and spread aggressively. Others, such as cancers of the small intestine, usually grow slowly. Prostate cancer often grows so slowly that it causes no problem. "It's completely possible for an organism to have cancer cells for its entire lifetime and suffer no ill effects" (Garrett 1988, p. 43).

The lack of a perfect correspondence between cancer the disease in humans and humans' cancer-like effects on the Earth invalidates the humans-as-cancer concept for some observers. But Warren Hern insists humans-as-cancer is a hypothesis because it is subject to verification or refutation and because it is useful as a basis for further investigation. Frank Forencich, in contrast, is content to consider the concept a metaphor. "That humans are like cancer is indisputable," he says. "But humans are not cancer itself."

Whether as metaphor or hypothesis, the proposition that humans have been acting like malignant cancer cells deserves to be taken seriously. The proposition offers a unifying interpretation of such seemingly unconnected phenomena as the destruction of ecosystems, the decay of inner cities and the globalization of Western commodity culture. It provides a valuable macrocosmic perspective on human impacts, as well as a revealing historic perspective in tracing humans' carcinogenic propensities back to the earliest times.

The progenitors of modern humans exhibited one of cancer cells' most significant characteristics, loss of adhesion, one to two million years ago. Because cancer cells are attached more loosely to one another than normal cells are, they separate easily, move randomly and invade tissues beyond those from which they were derived. Our direct ancestors, *Homo erectus*, demonstrated this trait in migrating out of Africa. Living in small mobile groups, these foragers/scavengers/hunters spread across Asia and Europe. The next hominid species in the evolutionary line, *Homo sapiens*, extended the dispersal into previously uninhabitable northern forests and tundra. Their successors, anatomically modern *Homo sapiens sapiens,* have spread to every continent and major ice-free island. With the aid of clothing, shelter, technology and imported supplies, they now occupy forests, wetlands, deserts, tundra and other areas formerly considered too wet, too dry, too cold, or too remote for human habitation. Humans now occupy, or have altered and exploited, two-thirds to nine-tenths (estimates vary) of the planet's land surface. It seems only a matter of time before they take over all the remaining "empty" spaces.

Humans' ongoing expropriation of the planet has proceeded apace with the eruption of human

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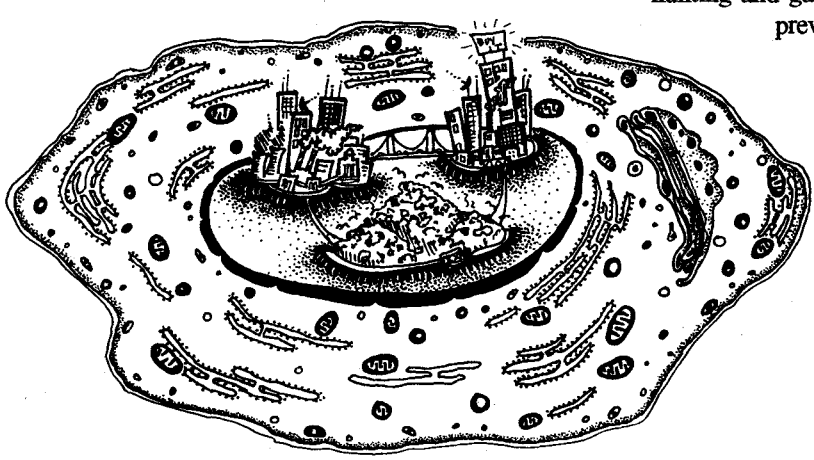
numbers; and the eruption of human numbers has features in common with the proliferation of cancer cells. In a healthy body, genetic controls enable a large number of individual cells to live together harmoniously as a single organism. Genetic switches signal normal cells when it is time to divide and multiply, and when it is time to break apart and be absorbed by neighboring cells. When the genetic switches are damaged, as by chemicals, radiation, or viruses, they can get locked in the "on" position. This turns normal cells into malignant cells that divide and multiply in disregard of the health of the entire organism.

When humans lived in semi-nomadic bands in harmony with an environment they did not dominate, they limited their numbers so as not to exceed the supply of food they could gather, scavenge, and hunt. Nor did they produce more young than they could carry between seasonal camps. Their contraceptive measures included coitus interruptus (withdrawal), pessaries, and prolonged breast-feeding to depress the hormones that trigger ovulation. When these methods failed, they resorted to abortion and infanticide. Like normal cells in a healthy body, hunter-gatherers seemed to know when to stop growing.

However, technological and cultural contaminants upset this delicate natural balance, permitting humans to multiply beyond numbers compatible with the harmonious health of the global ecosystem. The first and still the foremost contaminant was fire. By 400,000 years ago—perhaps even earlier—hunter-gatherers had learned to control and use fire. Thus began the transformation of humans from just another large mammal in competition with other fierce predators into the undisputed overlord of all species, plant and animal. Addiction to combustion has defined human existence ever since, and has escalated into the current orgy of fossil-fuel burning with the potential of overheating Gaia and jeopardizing the existence of all her inhabitants.

Fire was generally benign when used by hunter-gatherers to thin dense forests into more open and park-like landscapes supporting more game. But the increase in food supply that more effective hunting and the cooking of tough meat and fibrous vegetable matter made possible swelled hunter-gatherer populations. As humans proliferated and spread out, overhunted and overgathered, large game and suitable wild foods became less abundant. This made hunting and gathering less efficient, leaving horticulture, which previously hadn't been worth the extra effort, as the only viable alternative.



Clearing forests to farm began some 10,000 years ago in Asia Minor. About 2000 years later, shifting horticulturists began slashing and burning their way northwestward across Europe. They overwhelmed and pushed aside less numerous hunter-gatherers before giving way in turn to agriculturalists whose plow cultivation of permanent fields permitted more intensive food production and denser populations.

Agriculture condemned peasants to a short, harsh life of monotonous toil, an inadequate diet,

illustration by Sarah Lauterbach

the constant threat of crop failure and starvation, and exposure to virulent contagious diseases. It fostered social stratification and sexual inequality, cruel treatment of animals, despotism and warfare. And it encouraged further cancer-like encroachment on wilderness to feed increased populations and to replace fields and pastures eroded and depleted of soil fertility by overcropping and overgrazing. The elites that came to dominate sedentary agrarian societies caused still more woodland to be cleared and marshland to be drained to maximize production they could expropriate for their own use. This economic surplus, in turn, helped support an increasing concentration of people in river valleys, along seacoasts, and in cities.

The massing of humans into cities is all too similar to the way crowded cancer cells harden into tumors. Whereas normal cells in a tissue culture stop reproducing when they come in contact with other cells, cancer cells continue to divide and pile up on top of one another, forming clumps. Normal cells display contact inhibition, growing only to the limits of their defined space and then stopping. Cancer cells never know when to quit.

Likewise, human populations grow even under extremely crowded conditions. The very essence of civilization is the concentration of people in cities. As scattered farming villages evolved into towns, and some towns became trading, manufacturing, ceremonial and administrative centers, the city was born. Fed by grain grown in the provinces and served by slaves seized there, the administrative centers of empires grew large; Rome may have reached one million people at its height in 100 C.E. Yet not until industrialization and the extensive exploitation of distant resources after 1800 did cities really begin getting out of hand; and in 1900, still only one in ten people lived in cities. Half will in 2000, with 20 metropolitan areas expected to have 10 million or more people each.

The propensity of modern cities to spread out over the countryside—absorbing villages, destroying farm fields, filling in open land, and creating vast new agglomerations—was noted early in this century by the Scottish garden-city planner Patrick Geddes. Geddes (1915) identified half a dozen such "conurbations" in the making in Britain, and he foresaw the approach of a 500-mile megalopolis along the northeastern Atlantic seaboard in the United States. Geddes compared urban sprawl to an amoeba, but it fell to his American protege Lewis Mumford to liken disorderly, shapeless, uncoordinated urban expansion to a malignant tumor, observing that "the city continues to grow inorganically, indeed cancerously, by a continuous breaking down of old tissues, and an overgrowth of formless new tissue" (Mumford 1961, p. 543).

A malignant tumor develops its own blood vessels as it grows. Similarly, cities vascularize with aqueducts, electric power lines, highways, railroads, canals and other conduits. A tumor uses its circulation network to pirate nutrients from the body. Similarly, cities parasitically tap the countryside and beyond to bring in food, fuel, water, and other supplies. However, just as a tumor eventually outgrows its blood supply, causing a part of it, often at the center, to die, inner city neighborhoods and even older suburbs often atrophy. Alan Gregg (1955) noted this parallel 40 years ago, observing "how nearly the slums of our great cities resemble the necrosis of tumors."

Humans are increasingly concentrated along seacoasts. Sixty percent of the world's people now live within 100 kilometers of a seacoast. In Australia, one of the world's most highly urbanized nations, nine of every ten people live along the coast. The boom in international trade, from which coastal areas receive a disproportionate share of the benefits, helps explain the worldwide trend; but the pattern goes back thousands of years and parallels yet another carcinogenic process: metastasis.

In metastasis, a tumor sheds cancer cells that then migrate to distant sites of the body and set up secondary growths. The medium for the migration of the cells is the blood and lymphatic systems. In the ancient world of the Mediterranean, another fluid—water—facilitated the migration of people and goods. The Phoenicians, Greeks, Carthagenians and Romans all took advantage of the relative ease of travel and transport by water to establish colonies all around the Mediterranean. At the height of the Roman Empire, no fewer than 500 settlements flourished along the African coast from Morocco to Egypt.

Just as secondary tumors in the human body destroy the tissues and organs they invade, colonizers of the ancient Mediterranean devastated the fertile but fragile ecosystems of the coastal regions they colonized. They logged coastal forests for ship timbers and building materials, to provide charcoal to fire bricks and pottery and smelt mineral ores, and to create farm fields and pastures. Overcropping, fires, sheep and goats prevented regeneration. Intense winter rains washed the thin, easily eroded soil down hillsides into coastal plains to smother farm fields, choke the mouths of rivers, create malarial marshes, bury port cities and strand many of them miles from the sea. The slopes, left barren, have not recovered to this day.

The voraciousness of secondary tumors as they invade and consume tissues and organs has its counterpart in the orgies of destruction that states and especially empires have engaged in for 5000 years. In many cases, the destruction has exceeded what was in the destroyer's own self-interest. Many invaders routinely obliterated the cities they conquered, massacred their inhabitants, and destroyed their fields and flocks instead of just taking them over. Carpet bombing of cities and the mass slaughter of their civilian noncombatant populations during World War II constitute the modern equivalent. Ancient Romans ransacked their empire for bears, lions, leopards, elephants, rhinos, hippos and other live animals to be tormented and killed in public arenas until there were no more to be found. European invaders of North America and Siberia did in the fur trade from which they so hugely profited by the self-defeating overkill of fur-bearing animals.

Human destruction of ecosystems has increased relentlessly since industrialization. The annihilation of 60 million bison on the North American Great Plains was made possible

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by the intrusion of railroads and the invention of the repeating rifle. The reckless exploitation of whales was speeded by the invention of the explosive harpoon, cannon-winch and engine-driven ship. Enormous nets towed by today's factory trawlers permit oceans to be strip-mined for fish—and any other creature unlucky enough to become ensnared in these curtains of death. Tractors and other modern farm machinery alternately compact and pulverize topsoil, increasing its vulnerability to erosive winds and rains. Chain saws and bulldozers level forests faster than axes and hand saws ever could. Dynamite and drag line excavators permit strip mining on a scale hitherto unimaginable, decapitating mountains, turning landscapes into moon craters, and rendering islands such as phosphate-rich Nauru in the South Pacific all but uninhabitable. Boring holes in the earth to get at minerals, of course, resembles the way cancer bores holes in muscle and bone. As Peter Russell (1983, p. 33) has observed, "Technological civilization really does look like a rampant malignant growth blindly devouring its own ancestral host in a selfish act of consumption."

Just as a fast-growing tumor steals nutrients from healthy parts of the body to meet its high energy demands, industrial civilization usurps the resources of healthy ecosystems that their natural plant and animal inhabitants depend on for survival. In 1850, humans and their livestock accounted for 5 percent of the total weight of all terrestrial animal life. Today, that portion exceeds 20 percent, and by the year 2030 it could reach 40 percent (Westing 1990, pp. 110-111).

"Never before in the history of the earth has a single species been so widely distributed and monopolized such a large fraction of the energetic resources. An ever-diminishing remainder of these limited resources is now being divided among millions of other species. The consequences are predictable: contraction of geographic ranges, reduction of population sizes, and increased probability of extinction for most wild species; expansion of ranges and increased populations of the few species that benefit from human activity; and loss of biological diversity at all scales from local to global" (Brown and Maurer 1989).

Decline in diversity is common to both cancer and civilization. In both cases, heterogeneity gives way to homogeneity, complexity to simplification. Malignant cells fail to develop into specialized cells of the tissues from which they derive. Instead, "undifferentiated, highly malignant cells tend to resemble one another and fetal tissues more than their adult normal counterpart cells" (Ruddon 1987, p. 230).

De-differentiation in human societies is at least as old as agriculture and animal husbandry. Farmers have been replacing diverse species of native plants with pure stands of domesticated crops for thousands of years. Instead of the thousands of kinds of plants that pre-agricultural peoples gathered for food, just seven staples—wheat, rice, maize, potatoes, barley, sweet potato and cassava—now supply three-quarters of the caloric content of all the world's food crops. The world's astonishing abundance and variety of wildlife is going fast, with many species soon to be seen only in zoos and game parks, their places taken by cattle, sheep, goats, pigs and other domesticated livestock.

Despite their value in providing wildlife habitat, modulating flood waters and filtering out pollutants, more than half of the world's swamps, marshes, bogs, seasonal flood plains and other wetlands have been drained, dredged, filled in, built on or otherwise destroyed. Temperate forests dominated by trees of many species and of all ages are giving way to single-species, same-aged conifer plantations supporting far fewer birds and other

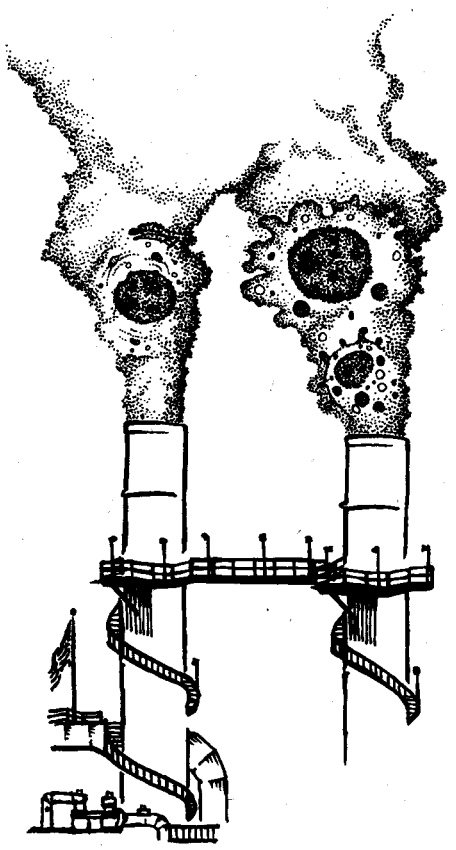

illustration by Sarah Lauterbach

wildlife. And the tropical forests that harbor more than half of all species on Earth are being mowed down faster than their bewildering biodiversity can be identified, leading some experts to warn that we are causing the greatest mass extinction since the disappearance of the dinosaurs 65 million years ago.

The tendency of civilizations to homogenize and impoverish ecosystems is nowhere clearer than in urban areas. Major cities are becoming indistinguishable from one another in appearance and undifferentiated in function. Central business districts so resemble one another that travelers can be forgiven for forgetting whether they are in Boston, Brussels or Bombay. Shanty cities in poor countries look alike, as do suburbs in rich countries.

As Lewis Mumford pointed out more than 30 years ago, the archetypal suburban refuge in the United States consists of "a multitude of uniform, unidentifiable houses, lined up inflexibly, at uniform distances, on uniform roads, in a treeless communal waste, inhabited by people of the same class, the same income, the same age group, witnessing the same television performances, eating the same tasteless pre-fabricated foods, from the same freezers, conforming in every outward and inward respect to a common mold, manufactured in the central metropolis. Thus the ultimate effect of the suburban escape in our time is, ironically, a low-grade uniform environment from which escape is impossible" (Mumford 1961, p. 486).

Globalization of the economy is enclosing the entire world in a single market for machine-made goods that are increasingly standardized whatever their country of origin. Western material values and capitalist commodity culture, led by American television, movies, music, street fashions and fast food, are dominant internationally. Local and regional individuality, along with indigenous cultures, languages and world views, are fading fast.

The decline of natural and cultural diversity is as threatening to the planet as undifferentiated cells are to the cancer patient. Whereas a well-differentiated prostate cancer tends to grow slowly, remain localized and cause no symptoms, a poorly differentiated one often spreads aggressively. Similarly, traditional farmers who keep weeds, pests and plant diseases in check by rotating crops, fertilizing naturally, and maintaining the tilth of the soil don't threaten Earth's health the way single-crop plantations relying on pesticides, synthetic fertilizers and heavy machinery do. Unfortunately, monocultural agriculture is becoming the norm on every continent.

Hemorrhaging is still another symptom of the carcinogenic process. The first sign of cancer is often spontaneous bleeding from a body orifice, discharge from a nipple, or an oozing sore. Vomiting can warn of a brain tumor or leukemia. Signs that Earth, too, has cancer abound. Cities vomit human sewage and industrial wastes into adjacent waterways. Mines and slag heaps ooze mercury, arsenic, cyanide and sulfuric acid. Wells gush, pipelines leak and tankers spill oil. Farm fields discharge topsoil, fertilizers, pesticides and salts to silt up and poison rivers and estuaries. Cattle feedlots add manure. Most serious of all, deforested, eroded hillsides hemorrhage floods of mud.

Fever is another symptom of cancer in both humans and the planet. Cancer patients become fevered because of increased susceptibility to infection caused by a depressed immune system. Chemotherapy and irradiation can also cause fever, as can temperature-elevating substances released by a malignant tumor. Global warming is the planetary counterpart. Waste products released by industry and motor vehicles, deforestation and other feverish human activities pump inordinate quantities of carbon dioxide, nitrous oxide, methane, chlorofluorocarbons and other greenhouse gases into the atmosphere where they trap heat and raise temperatures.

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Wasting, or cachexia, is still another sign of advanced cancer. A cancer patient becomes fatigued and weak, losing both appetite and weight as the tumor releases toxic hormones and makes metabolic demands on the body. "Many cancer patients die not of cancer itself, but of progressive malnutrition" (Rosenbaum 1988, p. 264). The planetary counterpart includes loss of forests, fisheries, biodiversity, soil, groundwater and biomass.

It's not in a tumor's self-interest to steal nutrients to the point where the host starves to death, for this kills the tumor as well. Yet tumors commonly continue growing until the victim wastes away. A malignant tumor usually goes undetected until the number of cells in it has doubled at least 30 times from a single cell. The number of humans on Earth has already doubled 32 times, reaching that mark in 1978 when world population passed 4.3 billion. Thirty-seven to 40 doublings, at which point a tumor weighs about one kilogram, are usually fatal (Tannock 1992, pp. 157, 175).

Like a smoker who exaggerates the pain of withdrawal and persists because the carcinogenic consequences of his bad habit don't show up for 20 or 30 years, governments generally avoid the painful adjustments needed to prevent social, economic and environmental disasters in the making. "Governments with limited tenure, in the developing as well as in the developed countries, generally respond to immediate political priorities; they tend to defer addressing the longer term issues, preferring instead to provide subsidies, initiate studies, or make piecemeal modifications of policy"(Hillel 1991, p. 273). So it usually takes a crisis, often a catastrophe, before even the most commonsensical action is taken—and then it is often too late to avoid irreversible ecological damage.

Is the prognosis for the planet as grim as it is for a patient with advanced cancer? Or will infinitely clever but infrequently wise *Homo sapiens* alter geocidal behaviors in time to avoid global ruin? Even the most pessimistic doomsayers concede that humans have the capacity to arrest Gaia's deteriorating condition. Cancer cells can't think, but humans can. Cancer cells can't know the full extent of the harm they're doing to the organism of which they are a part, whereas humans have the capacity for planetary awareness. Cancer cells can't consciously modify their behavior to spare their host's life and prolong their own, whereas humans can adjust, adapt, innovate, pull back, change course.

Gaia's future, and humans' with it, depends on their doing so. ▮

Wild Earth will cosponsor World Population Awareness Week, 27 October to 2 November 1996. WPAW is a commemorative week created to foster awareness of the environmental, economic, political, and social consequences of rapid worldwide human population growth. For more information contact The Population Institute, 107 Second St., NE, Washington, DC 20002; (202) 544-3300.

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