

Homo Carcinomicus

a look at planetary oncology¹

by Frank Forencich

When we think of cancer, we normally think of diseases of the human body: cancer of the lungs, breasts, liver and prostate. We think of viruses, DNA, asbestos, cigarettes and beta carotene. We think of surgery, radiation and chemotherapy.

There may be more to the picture, however; cancer may be far bigger than we think. A paradigm shift is under way. Instead of looking at neoplasia strictly as a disease of the human body, many of us are now beginning to see it as a dysfunction that can affect any living organism or ecosystem—even the Earth itself.

In 1979 James Lovelock introduced the Gaia hypothesis, which holds that the planet is a self-regulating or living organism.² But if the Earth is a living body, what physiological role do humans play? What kind of cells are we? Given the state of the planet and exponential human proliferation, the answer is unavoidable: cancer.

Numerous observers have remarked on the cancerous nature of human beings. In *Science* 13 May 1955, Alan Gregg suggested "that there are some interesting analogies between the growth of human population in the world and the increase of cells observable in neoplasms."³ In 1990 Dr. Warren Hern diagnosed the problem in his landmark paper "Why are there so many of us?"⁴ Nevertheless, "humans as cancer" has not yet become a topic of widespread discussion. Despite the popular acceptance of the Gaia hypothesis and the rise of environmental consciousness, the "humans as cancer" metaphor has been largely avoided.

The world is an animal.

—Plato

PHYSIOLOGY

In fact, the parallels between neoplastic growth and human population are astonishing.

- Both are proliferative disorders characterized by uncontrolled growth.
- Both tend to spread throughout the "body" of the organism.
- Both exert pressure on adjacent "tissue."
- Both continue to grow even under extremely crowded conditions.
- Both produce chemicals that have negative effects on remote regions of the organism.
- Both generate new vessels to support their growth.
- Both fail to "differentiate" in form and function.

Cancer is fundamentally a proliferative disorder, a failure to respond to normal growth controls. This is also humanity's problem. Ten thousand years ago there were probably no more than five million people on the planet. Today there are nearly six billion. The increase in population in the last 40 years has equaled the total increase from the dawn of the human species until 1950. World population is now growing by 10,000 people per hour.⁵

The problem with cancer is not only the reproductive output of individual cells, but also their extraordinary longevity. Normal cells have a pre-set, programmed life span. They develop, serve their purpose and then die. Cancer cells, on the other hand, do not die on schedule and have no limit to the number of times they can divide. They are, in a sense, immortal. Because they do not die, cancer cell populations continue to rise unless checked by some other force. Similarly, the increase in human population has been paralleled by a dramatic lengthening of human life expectancy. We are seeking to increase this to ever higher levels, aspiring, it appears, to achieve the longevity of the neoplastic cell.

In a healthy body, normal cells adjust their growth in relation to neighboring cells. When

population density reaches a certain limit, a feedback mechanism known as "contact inhibition" causes cell division to cease. When you squeeze a normal cell, it stops reproducing. Cancer cells, on the other hand, continue to proliferate in spite of crowding and grow to much bigger densities. Human "cells" exhibit the same characteristic. Population density has had little effect on rates of reproduction; experts estimate that by the year 2000, there will be 20 cities with more than 10 million people each. Modern humanity, like cancer, seems to have lost its sense of contact inhibition.

Cancer is notorious for its tendency to spread beyond the point of origin into other regions of the body. The process begins when tumor cells break away from the original mass, travel through the bloodstream or lymphatic system, attach themselves to new sites and begin growing. In short, they "colonize" the new tissue. Human metastasis works in a similar fashion. Since *hominids* first took form in Central Africa some 2 or 4 million years ago, we have spread across every continent on the planet. We now inhabit the world's deserts, rainforests, grasslands and high mountains. We have invaded and affected virtually all planetary tissue and are even making plans to extend our growth into the solar system and local galaxy.

The similarity between humans and cancer extends even to the details of the metastatic process. In the body, cancer cells infiltrate surrounding tissue through a process called angiogenesis. A neoplastic tumor secretes enzymes that destroy nearby cellular membranes, allowing capillaries to penetrate and provide nourishment. At this point, the tumor becomes vascularized and begins to grow extremely rapidly. On the macro scale, human beings pursue a similar strategy. The capillaries are the highways, railroads and canals that bring food and raw materials to cities and neighborhoods. When human beings colonize a new region or district, one of the first priorities is to clear the land and build these vessels to facilitate commerce with the "body" of the outside world. Once the roads are built, the community is "vascularized" and begins to grow rapidly.

Cancer and human population are also related in their metabolism, the consumption of resources and production of waste. In the early 1930s Otto Warburg discovered that cancer cells use more glucose and secrete higher amounts of lactic acid than normal tissue. This is analogous to human populations that consume high levels of natural resources while generating enormous quantities of waste materials.

Another curious similarity lies in the process of differentiation. As normal tissue grows, it follows a developmental pathway, a genetically programmed sequence of changes in structure that lead to a specialized cell or tissue type such as bone, liver, connective or neural tissue. When cells mature they begin to perform the normal functions of that tissue. Significantly, they also stop reproducing. Cancer cells, however, are defective in differentiation. They get stuck on the developmental pathway and fail to develop the unique forms and functional characteristics of normal cells. In this sense, cancer is a problem of development.

We see a similar process at work on the macro scale. Like cells, human beings also differentiate. As individuals, we develop specialized social roles: one person becomes a farmer, another becomes a computer programmer, another a poet. We each follow a developmental and educational pathway that leads to unique professional form and function. Failure to achieve a functioning social role can be described as a failure to differentiate. When educational quality and economic

opportunity deteriorate, we too experience a problem of development.

Human beings also differentiate, culturally. A tribe or ethnic group develops its own unique rituals, practices and world view; it is a specialized form that makes a unique contribution to the human cultural landscape. A variety of differentiated cultural forms makes it possible for the social organism to adapt to changing conditions. Loss of cultural diversity, like loss of biodiversity, threatens survival of the larger organism.

PROGNOSIS

When we undertake a comprehensive examination of the biosphere, we find it impossible to escape the conclusion that the planetary patient is seriously ill, possibly dying. The symptoms are severe—ozone depletion, global warming, deforestation, loss of biodiversity, topsoil erosion—all the result of a rampaging and over-consumptive human population. Our major social "organs" are losing their effectiveness because of over-crowding; governmental, judicial, health care and transportation systems are all saturated and near gridlock. The patient is clearly in pain.

If an oncologist were to make a diagnosis of patient Earth, he would probably declare it a State IV condition: "The tumor is no longer encapsulated: metastasis is widespread throughout the body. Little chance for cure, although there are some notable exceptions." "Since the growth is highly metastasized, it is probably malignant; we are experiencing an "oncologic emergency." We must act now.

TREATMENT

When treating a cancerous human body, the oncologist generally has three treatment options available—"cut it, burn it, or poison it" (surgery, radiation, or chemotherapy). Incredibly, this is exactly what we have been doing to the biosphere: cutting, burning and poisoning the major planetary "organs." Obviously, we are attacking the wrong target; we are behaving as if Gaia herself was the disease. This is like an immune system dysfunction in which the body attacks its own tissue.

Obviously, we need to target the growth of humanity, but for the planetary oncologist, cutting, burning, or poisoning the human neoplasm is not a viable option. Genocide would be, at best, a short-term solution that would not solve the problem of proliferation. Even if you could somehow make 2 billion humans vanish from the biosphere, growth would surge to fill the gap; after 50 years, the patient would suffer a relapse. Moreover, abruptly raising the death rate would have a whole host of side effects and repercussions that would endanger the patient just as surely as the current crisis.

Instead, we need a treatment that is systemic and rehabilitative. The population problem is more than just sheer numbers. Explosive growth rates depend on numerous social, cultural and biological factors: poverty, lack of access to health care, and denial of women's rights to name a few. Simply reducing birth rates will not be sufficient; the "treatment" must act on several levels. Just as a good oncologist will apply a variety of treatments in tandem, we too must apply several treatments simultaneously. In addition to the obvious need for vigorous birth control programs, we must:

- completely revise our economic and cultural philosophy away from growth and toward sustainability;
- reduce our consumption of resources;
- redistribute the wealth between North and South;

- enhance the rights of women
- devote more attention to the health and welfare of children
- promote "differentiation therapy," increased educational and economic opportunity for individuals and cultures;
- protect healthy "tissue," especially wilderness areas;
- slow the metastasis whenever possible with growth controls at all levels;
- moderate our death control efforts: make medical practice more life affirming and less death defying;
- start behaving more like physiological participants in the functioning of the organism and less like invading pathogens.

The treatment for this oncologic emergency must begin with education and awareness. Oncologists agree that the most valuable tool in the fight against cancer is public education; the more people know about risk factors and prevention, the easier the treatment. What is true for the micro level is also true for the macro level; of all the treatments that we might use against global cancer, by far the most promising is education and ecological consciousness. The cure for cancer is awareness of our relationship to our "host."

The fundamental difference between a cancer cell and human being is the capacity for "host awareness." The malignant cancer cell knows only its local cellular environment; the chemical and neural impulses that act on the cell membrane. A lung cancer cell, for example, cannot travel outside its host and discover the totality of its predicament; it can only "think locally."

A human being, on the other hand, has the ability to become aware of her global host. Through travel, study and communication, a person can discover the larger organism of which she is a part. She can see the effects of her behavior and the implications for her own survivability. Most important, she can change her behavior to be consistent with the health of the host.

Host awareness is vital to the treatment process. The more contracted, local or ego-logical our state of mind, the more neoplastic our behavior is likely to be. The more expanded, global and eco-logical our consciousness, the healthier our relationship with the planetary body. Death by cancer is not inevitable if we pay attention to the welfare of the host. Unlike a cancer cell, we can exercise personal and political choices. We can understand the ways of the host. We can act to save Gaia and thus ourselves.

The biggest obstacle to effective treatment is denial. No one wants to talk about planetary cancer; the subject is strictly taboo in almost every field of discourse. But treatment demands that we overcome the social and psychological obstacles to cancer and human population growth: fear, procrastination in seeking treatment, reluctance to self-treat, and denial that the condition actually exists. The planetary oncologist must act to bring the issue into the public forum. We must force the issue of human population into the spotlight and keep it there.

As with all cancer cases, time is precious. If we procrastinate in treating our condition, we will be forced to face two extremely unpleasant alternatives. On one hand, we have to suffer the extremely high level of "collateral damage" that comes with aggressive treatment. The longer we delay in controlling our growth and reducing our consumption, the more radical the treatment will have to be. Drastic measures such as government mandated family size limits, enforced birth control, and severe rationing will cause collateral damage in the form of repression, martial law, tyranny and widespread social conflict.

If, on the other hand, we fail to take action, the consequences will be grim indeed. The carrying capacity of the biosphere is finite; only so many humans can live on the planetary body. If we do not change our behavior, Gaia will treat the problem for us. Our death rates will go exponential through famine, disease and density-inspired violence. The human population will be reduced, one way or the other.

The extent and severity of global cancer calls for immediate and decisive treatment; palliative or "Band-Aid" treatments will not be effective. Unfortunately, most current environmental action is directed as symptoms, not at underlying causes. Action on air pollution, deforestation and recycling is necessary, to be sure, but primarily serves to relieve the patient's short-term suffering, not effect a cure. Without vigorous birth and growth control, our environmental efforts will amount to little more than "planetary hospice care"—aid and comfort to the dying.

Accepting the proposition of "humans as cancer" can be terrifying and depressing. No one wants to think of himself as a malignant cell. No one wants to think of his community as a tumor. The implications are intimidating; the specter of planetary cancer demands that we reevaluate our basic beliefs on such subjects as motherhood, family, growth, health, birth control, social responsibility and criminal behavior. This treatment process will be resisted by many people, cultures and organizations.

Nevertheless, the payoff of this inquiry could be tremendous. "Humans as cancer" describes us as a disease agent, but it also puts us into an intimate relationship with the natural world, our host. In this perspective, we are not apart; we are of the Earth. We may be defective in growth control, but we are nevertheless cells in a larger organism. Even as neoplastic tissue, humanity does belong to the Earth.

When we ask the question "are we cancer?" we place ourselves in a new universe of relationships and possibilities. Simply by accepting the possibility of "humans as cancer," we declare ourselves willing to review our most closely held assumptions about who we are, what our role is, and what constitutes intelligent and moral behavior. This acceptance may be exactly the prescription we need to effect a cure.

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NOTES

¹ An extended discussion of this subject will appear in an upcoming book by Frank Forencich.

² Lovelock, J.E. *Gaia: A New Look at Life on Earth* Oxford University Press 1979

³ Gregg, Alan "A Medical Aspect of the Population Problem Science", May 13, 1955

⁴ Hern, Warren "Why Are There So Many of Us? Description and Diagnosis of a Planetary Ecopathological Process" *Population and Environment: A Journal of Interdisciplinary Studies* Vol. 12 Number 1 Fall 1990

⁵ *Vital Signs: The Trends that are Shaping Our Future* Lester Brown Worldwatch Institute

⁶ *Cancer: The Outlaw Cell* Richard E. LaFond, Editor American Chemical Society. Chapter 2 "Cell Growth and Cancer" Arthur B. Pardee and James G. Rheinwald