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About the Institute

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

Important statements to read

Population and Panaceas

A Technological Perspective

Paul R. Ehrlich and John P. Holdren

Today more than one billion human beings are either undernourished or malnourished, and the human population is growing at a rate of 2% per year. The existing and impending crises in human nutrition and living conditions are well-documented but not widely understood. In particular, there is a tendency among the public, nurtured on Sunday-supplement conceptions of technology, to believe that science has the situation well in hand—that farming the sea and the tropics, irrigating the deserts, and generating cheap nuclear power in abundance hold the key to swift and certain solution of the problem. To espouse this belief is to misjudge the present severity of the situation, the disparate time scales on which technological progress and population growth operate, and the vast complexity of the problems beyond mere food production posed by population pressures. Unfortunately, scientists and engineers have themselves often added to the confusion by failing to distinguish between that which is merely theoretically feasible, and that which is economically and logistically practical.

As we will show here, man's present technology is inadequate to the task of maintaining the world's burgeoning billions, even under the most optimistic assumptions. Furthermore, technology is likely to remain inadequate until such time as the population growth rate is drastically reduced. This is not to assert that present efforts to "revolutionize" tropical agriculture, increase yields of fisheries, desalt water for irrigation, exploit new power sources, and implement related projects are not worthwhile. They may be. They could also easily produce the ultimate disaster for mankind if they are not applied with careful attention to

their effects on the ecological systems necessary for our survival (Woodwell, 1967; Cole, 1968). And even if such projects are initiated with unprecedented levels of staffing and expenditures, without population control they are doomed to fall far short. No effort to expand the carrying capacity of the Earth can keep pace with unbridled population growth.

To support these contentions, we summarize briefly the present lopsided balance sheet in the population/food accounting. We then examine the logistics, economics, and possible consequences of some technological schemes which have been proposed to help restore the balance, or, more ambitiously, to permit the maintenance of human populations much larger than today's. The most pertinent aspects of the balance are:

1) The world population reached 3.5 billion in mid-1968, with an annual increment of approximately 70 million people (itself increasing) and a doubling time on the order of 35 years (Population Reference Bureau, 1968).

2) Of this number of people, at least one-half billion are undernourished (deficient in calories or, more succinctly, slowly starving), and approximately an additional billion are malnourished (deficient in particular nutrients, mostly protein) (Borgstrom, 1965; Sukhatme, 1966). Estimates of the number actually perishing annually from starvation begin at 4 million and go up (Ehrlich, 1968) and depend in part on official definitions of starvation which conceal the true magnitude of hunger's contribution to the death rate (Lelyveld, 1968).

3) Merely to maintain present inadequate nutrition levels, the food requirements of Asia, Africa, and Latin America will, conservatively, increase by 26% in the 10-year period measured from 1965 to 1975 (Paddock and Paddock, 1967). World food production must double in the period 1965-2000 to stay even; it must

triple if nutrition is to be brought up to minimum requirements.

Food Production

That there is insufficient additional, good quality agricultural land available in the world to meet these needs is so well documented (Borgstrom, 1965) that we will not belabor the point here. What hope there is must rest with increasing yields on land presently cultivated, bringing marginal land into production, more efficiently exploiting the sea, and bringing less conventional methods of food production to fruition. In all these areas, science and technology play a dominant role. While space does not permit even a cursory look at all the proposals on these topics which have been advanced in recent years, a few representative examples illustrate our points.

Conventional Agriculture. Probably the most widely recommended means of increasing agricultural yields is through the more intensive use of fertilizers. Their production is straightforward, and a good deal is known about their effective application, although, as with many technologies we consider here, the environmental consequences of heavy fertilizer use are ill understood and potentially dangerous¹ (Wadleigh, 1968). But even ignoring such problems, we find staggering difficulties barring the implementation of fertilizer technology on the scale required. In this regard the accomplishments of countries such as Japan and the Netherlands are often cited as offering hope to the underdeveloped world. Some perspective on this point is afforded by noting that if India were to apply fertilizer at the per capita level employed by the Netherlands, her fertilizer needs would be nearly half the present world output (United Nations, 1968).

The co-authors are affiliated, respectively, with the department of biological sciences, and with the Institute for Plasma Research and department of aeronautics and astronautics, Stanford University.

¹Barry Commoner, address to 135th Meeting of the AAAS, Dallas, Texas (28 December 1968).

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DEPARTMENT OF BIOLOGICAL SCIENCES

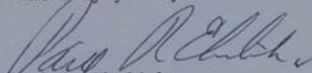
June 11, 1971

George B. Van Schaak
The Morton Arboretum
Lisle, Illinois 60532

Dear Mr. Van Schaak,

Thanks very much for your letter of May 31st and your
comments on Survivor.

Sincerely yours,



Paul R. Ehrlich
Professor of Biology

PRE:st



THE MORTON ARBORETUM

Joy Morton, founder

LISLE, ILLINOIS 60532 Phone: WOODLAND 8-0074

May 31, 1971

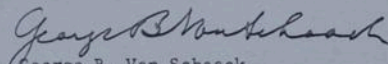
Dr. Paul Ehrlich
Stanford University
Stanford, California

Dear Dr. Ehrlich,

Your 'How to be a survivor' is marvelously well done--not exactly pleasant reading, but very stimulating.

Enjoyed very much your recent address at Elmhurst. Your 'bounce' is electric--do you carry a rechargeable battery?

Sincerely yours,


George B. Van Schaack

Encl.

The Crisis

The explosive growth of the human population is the most significant terrestrial event of the past million millenia. Three and one-half billion people now inhabit the Earth, and every year this number increases by 70 million. Armed with weapons as diverse as thermonuclear bombs and DDT, this mass of humanity now threatens to destroy most of the life on the planet. Mankind itself may stand on the brink of extinction; in its death throes it could take with it most of the other passengers of Spaceship Earth. No geological event in a billion years—not the emergence of mighty mountain ranges, nor the submergence of entire subcontinents, nor the occurrence of periodic glacial ages—has posed a threat to terrestrial life comparable to that of human overpopulation.

Most of the members of modern societies have now seen pictures of the Earth as seen from the vicinity of the moon, and they must have a new awareness of the finite size of our planet. In comparison with many celestial bodies, it is a rather small ball of rock. It is also possibly a unique ball of rock, for its surface is populated by a vast variety of living organisms that depend for their existence on a thin film of atmosphere, which is itself, in part, a product of those living things.

If *Homo sapiens* is to continue as the dominant species of life on Earth, modern man must come soon to a better understanding of the Earth and of what he has been doing to it. Yet many people—as a result of the excitement over the successful landings of men on the moon—are better informed (and perhaps more curious) about conditions on the surface of that dead satellite than they are about the damage being done by overpopulation and overdevelopment to the only life-supporting planet we know.

Only recently have Americans been astounded to learn that many millions of their own fellow citizens go to bed hungry every night. Most of us, of course, have vague ideas about starvation in India or about Brazilians living

In their well-written book, Population, Resources, Environment, Paul and Anne Ehrlich have produced a fascinating account of a terrifying picture of our environmental crisis - a maximally succinct statement for enlightening our understanding. So, I am not going to tell you any more about the book, for I want the impact you will feel as you read it unmodified by any representation or interpretation of mine of what I have found in it. Rather, I am going to write a brief epilogue on communication, for never has anyone written more desperately hopeful that he will be heard, and my interest is that you should hear the Ehrlichs.

In their first sentence they affirm the population explosion to be the most important heretofore event of the past million millennia.

I do not disagree with them. But their statement makes me think of some other highly significant events in a rather shorter span of time - let us say, 2,000, 000 years, more or less.

These events, taken in number, form a series, it is of significant in structure. I refer to the events more explicitly defined below which are ^{called to mind} ~~highlighted~~ by the seven words: language, writing, alphabet, printing, telegraph, wireless, television.

language
writing
printing
tele-
tele-wireless
tele-visual

language
writing
printing
telegraph
(tele) wireless
television.

BC 1,000,000

BC 3,000

1450

1750

1890

1920

1,000,000

4500

400

40

30

1450
1750

.0045

.094 20

.125 1.25

.75 5



$$\frac{.1}{.0045} = \frac{100.0}{45}$$

$$\frac{.125}{.1} = \frac{125}{100} = 1.25$$

$$\frac{.6}{.125} = \frac{600}{125} = 5$$

PLAYBOY

July 8, 1970

Dear Mr. Ware:

It is our pleasure to send you the enclosed interview with Paul Ehrlich, reprinted from the August issue of PLAYBOY Magazine.

We would be delighted to hear -- and would certainly value -- any comments you have concerning this interview which we might use in our Letters to the Editor column.

Sincerely,

A. C. Spector sky

A. C. Spector sky
Editorial Director

ACS:kdh
Encl.

THE PLAYBOY BUILDING • 919 N. MICHIGAN AVE. • CHICAGO 60611

PLAYBOY INTERVIEW: DR. PAUL EHRLICH

a candid conversation with the outspoken population biologist and prophet of environmental apocalypse

In the three years since biologist Paul Ehrlich wrote "The Population Bomb"—a chilling scenario of the world's fate if people and their principal by-product, pollution, continue to multiply unchecked—the book has sold 1,250,000 copies and its author has become the chief spokesman for what promises to be the most important campaign of the Seventies: the crusade to save the environment. Ehrlich is very much in demand; clubs, colleges, magazines and networks find his message of ecological doom so compelling that he can't possibly answer every summons: "I get around two dozen requests a day and I'm booked solid for the next year."

Despite the scientific nature of what he has to say, Ehrlich has become controversial: one San Francisco columnist, Charles McCabe, called him "the Cassandra of contraception" and "in his own way . . . more dangerous than Hitler." Ehrlich endures this kind of irrational vituperation because he thinks the situation is desperate. "Some of my colleagues think it's too late, that we've already done too many irreparable things, given birth to too many people. They've given up. I think we may have some time, not much, but enough to turn things around and save ourselves, if we start now. That's why I'm doing all this traveling and speechmaking. Not because I like it but because I want my daughter to enjoy a full life, and I'd like to live another few years myself."

Ehrlich came naturally to biology. As a child in Philadelphia, he was fascinated

by butterflies (he wrote a book on the subject in 1961) and pursued his interest with a biology degree from the University of Pennsylvania in 1953 and an M.A. and a Ph.D. from the University of Kansas. After a short stint at the Chicago Academy of Sciences, he joined the faculty of Stanford University, where he served for three years as director of graduate study for the department of biological sciences. Currently a full professor of biology, Ehrlich considers himself a scientist and researcher by profession and a missionary for the ecology movement only by reluctant choice. A rare combination of natural eloquence and articulate expertise in population biology—the study of how species naturally control their growth and size—made him from the beginning of his teaching career one of those special professors who both trouble and inspire students. During one recent semester, he and associate Dr. Richard W. Holm taught an undergraduate course that drew over 700 interested students—an indication that Ehrlich has no trouble meeting the current student demand for relevance in the classroom. In fact, some of his pupils were the first to carry his message beyond the confines of academe. As a result, Ehrlich found himself making presentations and being interviewed frequently around the San Francisco Bay area.

On one of those occasions, he so impressed David Brower—then head of the most prestigious American conservation organization, the Sierra Club—that the

two made arrangements for a book by Ehrlich to be published by Ballantine as part of a Sierra Club series. Ehrlich worked every night for three weeks and produced "The Population Bomb," an effort that has been consuming almost all of his waking hours ever since. "One thing I didn't know about writing a book is how much people are willing to listen to you talk about it. In my case, that's a very helpful phenomenon. Through interviews, talk-show appearances and that sort of thing, I've been able to get through to thousands of people who will never read my book, nor any other, for that matter. I'm told that my two appearances on the Johnny Carson show generated some of the heaviest viewer response in the program's history. So I must be reaching people."

Ehrlich reaches people because, unlike many scientists, he feels no trepidation about leaving the laboratory and entering the political arena. He is president of a group called Zero Population Growth that is dedicated to stopping population growth and environmental deterioration in this country through political action. In every speech, he attacks the national leadership for its ecological ignorance and irresponsibility, sometimes calling the President and other Government officials, simply, "boobs." Because audiences, particularly the young, respond enthusiastically to this kind of blunt talk, Ehrlich is a coveted speaker at college and university programs aimed at mobilizing environmental activism.

Although Ehrlich takes seriously his



"The water in some rivers is becoming too polluted to purify, and evidence is accumulating that DDT in our fatty tissues has reached levels high enough to cause brain damage and psychosis of the brain."



"Our large population is responsible for air pollution that could lead to massive starvation in the United States within the next two decades—because air pollution thins the water in the biosphere."



"No action has been taken to save the environment. And the Administration is talking about doing—emission standards for automobiles and so forth—like a child who says he will be a doctor."