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THE BACK PAGE

RESOURCES AND POPULATION: A WAGER

Julian L. Simon

Many natural scientists such as physicists Murray Gell-Mann, William Shockley, and Andrei Sakharov have worried about human population size and growth. Henry Kendall, speaking for the Union of Concerned Scientists (including 99 Nobelists), asks nations to "stabilize population growth." A 1993 Science Summit on World Population, organized by the U.S. National Academy of Sciences with 59 other scientific academies (including Albania, Cuba, and Mongolia) stated: "Humanity is approaching a crisis point with respect to the interlocking issues of population, environment, and development" because "The Earth is finite."

Yet, almost every measure of material and environmental human welfare in the United States and in the world shows improvement rather than -deterioration. The long range trends are examined in 50 articles in *The State of Humanity* (Basil Blackwell, 1996). These are some of the findings:

- On average, people throughout the world live longer and eat better than ever before. After a millennia of almost no improvement, things began improving 200 years ago in rich countries, 50 years in poor countries.
- Fewer people die of famine than in earlier centuries.
- The real prices of food and other raw materials, showing increased natural-resource availability rather than scarcity, began dropping rapidly in the last 200 years.
- The major air and water pollution in the advanced countries has been lessening rather than worsening, particularly in the last 40 years.
- Maximum transport speeds have zoomed upwards in the last 200 years, and in the mid-19th century, maximum message speeds went from 30 miles an hour to the speed of an electrical impulse.
- Income and wealth rose above subsistence for more than a small minority for the first time in human history, beginning 200 years ago.

Many assert that these benign trends cannot continue indefinitely because of some physical limit. One supposed limit is the land area for agriculture. But this constraint may well be loosening rather than tightening, and less land may be needed even as population continues to grow, making more land available for recreation and wilderness. Best commercial practice now uses land millions of times more efficiently than did early humans. On a single acre (0.4 hectare) a hydroponic farm using artificial light raises a ton of food every day, enough to feed a thousand people. And if land were to become more expensive, one could choose to build the factory 100 stories high rather than a single story, and multiply the output per acre by 100. And so on, without practical limit.

Another candidate limit is the quantity of raw materials such as copper. Biologists deride as "alchemy" the notion that these quantities could be augmented by transmuting one element into another. But physicists know that there is no physical impossibility, only a cost factor. Besides, the declining real costs of all raw materials make transmutation unnecessary in the foreseeable future.

Another commonly-mentioned limit is energy, and the Second Law of Thermodynamics is cited. But the Second Law is only meaningful within some bounded space. And it is quite clear that the relevant bounded space includes our sun, whose lifetime is not relevant on a human time-scale.

To epitomize the matter, I have a standing offer to wager a week's or month's pay that any trend in material human welfare will improve rather than get worse. You pick the trend, the country, and the future year. Anything I win goes to fund research.

Some ecologists criticize economists' thinking about limits because it seems to violate common sense. "[To] a scientist [these ideas] are in the same class as the idea that Jack Frost is responsible for ice-crystal patterns on a cold window," writes Paul Ehrlich. He laments the "blunders... economists... commit when they attempt to deal with problems of population, resources, and environment."

Economists think that the whole world is just a market system, and that free goods are infinitely supplied. They are a discipline built on transparent mistakes, from the point of view of a physicist or a biologist.

In the economics of population growth, as in physics, common sense can lead one astray. Indeed, common sense is more dangerous here than in physics because one is less willing to acknowledge that one's daily experience does not apply than with respect to high speeds or small particles. With natural resources, for example it makes perfect sense that there is a fixed stock of them; as some are used up there must be less left. Yet, the economic scarcity of a resource is defined by its price _ and natural resources become less and less scarce economically with every passing decade and century.

The theory of impending scarcity is falsified by all the data from the past. And across-nations comparisons do not show a negative effect of population growth upon economic growth; population density is even correlated positively with economic growth. If physicists will inspect and respect the data, perhaps they will reject the discredited common-sense theory - first-edition Malthusianism based on fixed physical limits, a theory that Malthus himself abandoned in his second and subsequent editions. As the great 19th century economist F.Y. Edgeworth noted: "The treating as constant what is variable is the source of most of the fallacies in Political Economy."

The following theory fits the data: Population growth and increase of income expand demand, forcing up prices of natural resources. The increased prices and the opportunities for productive research trigger the search for new supplies. Most seekers fail, but eventually some succeed, and new sources and substitutes are found. These discoveries leave humanity better off than if the shortages had not occurred. Hence human beings create more than they destroy, on balance.

Bob Park asked: "Doomsayers often preface their warnings with 'if we don't take steps to prevent it.' Is it possible that their warnings have helped produce a better environment?" I answer: Those who warn against real trouble help. Even if the warning is wrong, I do not criticize unless the warner is willfully ignorant or dishonest. But some forecasts are knowingly exaggerated or false. Atmospheric scientist Stephen Schneider says:

"Scientists should consider stretching the truth to get some broad base support, to capture the public's imagination. That, of course, entails getting loads of media coverage. So we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention about any doubts we might have... Each of us has to decide what the right balance is between being effective and being honest."

I know of no evidence that false warnings of doom on balance are beneficial. And in the absence of such evidence, I continue to believe that professing the truth is humanity's best hope.

Julian L. Simon is a Professor in the College of Business and Management at the University of Maryland, College Park. He is editor of The State of Humanity (Basil Blackwell, 1996).

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Don't Bet All Environmental Changes Will Be Beneficial

by Stephen H. Schneider, Prof., Dept. of Biological Sciences and Sr. Fellow Inst. for International Studies, Stanford University

Editor's note: Professor Schneider was offered space to express his views following the publication of an erroneous quote attributed to him in the March issue. The opinions expressed are the author's and not necessarily those of the APS, its elected officers or staff.

Perhaps you shouldn't believe me, at least that is what Julian Simon's characterization of my views of environmental threats would lead you to believe in *APS News* Back Page article (March 1996, pg. 12). Simon "quotes" me directly, as supposedly saying "Scientists should consider stretching the truth..." to get good publicity for their cause. After the March issue was in print, Simon notified the editor that this false and very damaging statement was incorrect. What he hasn't yet admitted is that even what he states to be the "correct quote" is still an out-of-context misrepresentation of my views, a distortion he persists in perpetuating even months after I personally told him of the context of the original quote.

The Simon *APS News* article offers to bet environmentalists "...that any trend in material human welfare will improve rather than get worse." This article echoes an editorial essay entitled "Earth's Doomsayers Are Wrong" that appeared in the 12 May 1995 *San Francisco Chronicle* open forum. Simon then said that "Every measure of material and environmental welfare in the U.S. and the world has improved..." and that "All long run trends point in exactly the opposite direction of the doomsayers" Thus he implied that few, if any people would likely accept his bet since for the past 25 years the pessimists have been "proven entirely wrong." When my Stanford colleague, Paul Ehrlich, and I took up his challenge (1) and named 15 environment-related trends we were willing to bet would deteriorate, Simon refused claiming to the *Chronicle* (18 May 1995) that "I do not offer to bet on the progress of particular physical conditions such as the ozone layer" (as if its decline were not a negative measure of environmental welfare!).

In November, 1995, I debated Simon on Lateline, the Australian TV equivalent of the US Nightline program, on the issue of the *Chronicle* bet. In a segment they did not air, Simon charged that I advocate exaggerating science to enhance the appearance of environmental threats. To bolster this charge he resurrected an oft-quoted, but usually out of context partial quote, from a *Discover Magazine* interview (2) in 1989 in which I decried soundbite science and journalism by pointing out that nobody gets enough time in the media either to cover all the caveats in depth, (i.e., "being honest") or to present all the plausible threats (i.e., "being effective"). During the TV debate, months before Simon's *APS News* article appeared, I pointed out that he was taking only part of the full quote and that part was seriously out of context - this is the same source he "quoted" in *APS News*. The full quote follows, where I have italicized what portions of it Simon quoted and bracketed what I did not say but he attributed to me in the *APS News* article:

"On the one hand, as scientists we are ethically bound to the scientific method, in effect promising to tell the truth, the whole truth, and nothing but—which means that we must include all the doubts, the caveats, the ifs, ands, and buts. On the other hand, we are not just scientists but human beings as well. And like most people we'd like to see the world a better place, which in this context translates into working to

reduce the risk of potentially disastrous climatic change. To do that, we need, *[Scientist should consider stretching the truth] to get some broad base support, to capture the public's imagination. That, of course, entails getting loads of media coverage. So we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention about any doubts we might have.* This "double ethical bind" we frequently find ourselves in cannot be solved by any formula. *Each of us has to decide what the right balance is between being effective and being honest.* I hope that means being both."

Vested interests have repeatedly claimed I advocate exaggerating threats. Their "evidence" comes from partially quoting my *Discover* interview, almost always -like Simon - omitting the last line and the phrase "double ethical bind." They also omit my solutions to the double ethical bind: (a) use metaphors that succinctly convey both urgency and uncertainty (pg. xi of Ref. 3) and (b) produce an inventory of written products from editorials to articles to books, so that those who want to know more about an author's views on both the caveats and the risks have a hierarchy of detailed written sources to which they can turn. (3,4,5) What I was telling the *Discover* interviewer, of course, was my disdain for a soundbite-communications process that imposes the double ethical bind on all who venture into the popular media. To twist my openly stated and serious objections to the soundbite process into some kind of advocacy of exaggeration is a clear distortion. Moreover, not only do I disapprove of the "ends justify the means" philosophy of which I am accused, but, in fact have actively campaigned against it in myriad speeches and writings. Instead, I repeatedly advocate that scientists explicitly warn their audiences that "what to do" is a value choice as opposed to "what can happen" and "what are the odds," which are scientific issues (e.g. p. 213 of Ref. 3). I also urge that scientists, when they offer probabilities, work hard to distinguish which are objective and which are subjective, as well as what is the scientific basis for any probability offered. For such reasons I was honored to receive, in 1991, the AAAS/Westinghouse Award for the Public Understanding of Science.

If the readers of *APS News* are confused by all this rancor and want a fair and balanced treatment of environmental scientific and policy debates, they can turn to the several National Research Council or IPCC assessments, (6) in which words like "any," "all," "every," and "entirely" are scarce, and citations are quoted or paraphrased in their proper context.

References

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6. Intergovernmental Panel on Climatic Change (IPCC), *Climate Change 1995. The Science of Climate Change*. Edited by J.T. Houghton et al. (Cambridge Univ. Press, Cambridge, UK, 1996).

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