Deliberately Choosing Uncertainty by Rejecting Science

By John Cairns, Jr.

> It's not hard to make decisions when you know what your values are.
>
> —Unknown

> The most difficult thing is the decision to act, the rest is merely tenacity.
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> —Amelia Earhart

> Decision is the spark that ignites action. Until a decision is made, nothing happens.... Decision is the courageous facing of issues, knowing that if they are not faced, problems will remain forever unanswered.
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> —Wilfred A. Peterson

The ancient Greeks made a distinction between the words *sapientia* and *scientia*. *Scientia* connotes knowledge, and *sapientia* connotes wisdom that is the result of integrating knowledge skillfully. The Greeks believed that the only knowledge of value is the kind of knowledge that leads to wisdom. The quest for knowledge and wisdom is much different in today's society.

In the United States, some "... legislation is fundamentally anti-science, just as the rhetoric that supports it is grounded in willful ignorance.... [S]cientists [are described] as 'elitist' and 'arrogant' creatures who hide behind 'discredited' institutions" (Editorial, 2011). "Worse yet, antiscience is big business" (e.g., Oreskes and Conway, 2011). Since the antiscience campaign in the United States is very well funded by special interests, the assault on science is likely to continue. The field of science provides evidence that can reduce risks and uncertainty. The assault on science means that *Homo sapiens* is choosing uncertainty by assaulting the source of evidence — science.

One of the pejorative words used to denigrate scientists is *elite*. Of course, an elite group usually exists in every profession, sports, or human activity. This distinction is used to describe the best — the super achievers — in each category, and a huge difference exists between superb performance and mere privilege. Human nature urges one to excel in one's performance as determined by a "jury" of one's peers. The survival of human civilization in a rapidly changing world is almost certainly dependent, in large part, on knowledge generated by the global scientific community — whose scientists are judged as elite by their colleagues. In most cases, the label is the consequence of performance rather than a self-determined description.

The twentieth century was an era of specialization in science. Even in a particular discipline, such as biology, chemistry, or physics, most scientists barely had time to keep up with the vast literature in their area of specialization. Recognition, if any, came from scientists in one's area of specialization. Respect from colleagues in research for competent data gathering and analysis was all that most hoped for and cherished. Not many scientists expect to receive widespread recognition since the category of science is so broad. On the other hand, some climate scientists and those in related disciplines have published articles on global warming and other types of climate change in peer-reviewed scientific journals that have been perceived as threats to the well-being of some corporations and other special interest groups. These articles produced a hostile reaction similar to publications on the adverse effects of tobacco smoke on human health. Rachel Carson's *Silent Spring* produced the same antagonistic reaction. Eventually, the scientific evidence triumphed in the assault on Carson, but many

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lives might have been saved if trust had been placed in the scientific process and precautionary measures been put in place immediately.

The eight interactive global crises — human economy, climate change, exponential human population growth, ecological overshoot, biotic impoverishment and the reduction of biodiversity, renewable resource depletion, energy allocation, and environmental refugees (Cairns, 2010) — continue to worsen, and only science can provide much of the evidence essential to the prevention of major catastrophes. "[We] have involved ourselves in a colossal muddle, having blundered in the control of a delicate machine, the working of which we do not understand" (Keynes, 1930). The Biosphere has already changed irreversibly as a result of humankind's unsustainable practices, such as rapid growth on a finite planet with finite resources.

Homo sapiens is already in big trouble, and keeping civilization intact will require both science and wisdom. A few illustrative problems follow.

(1) The most urgent need is to replace the perpetual growth economy based on throw-away consumerism with an economy that does not destroy Earth's biospheric life support system.

> Like the debate over climate change itself, the debate over climate economics looks very different from the inside than it often does in the popular media. The casual reader might have the impression that there are real doubts about whether emissions can be reduced without inflicting severe damage on the economy. In fact, once you filter out the noise generated by special-interest groups, you discover that there is widespread agreement among environmental economists that a market-based program to deal with the threat of climate change — one that limits carbon emissions by putting a price on them — can achieve large results at modest, though not trivial, cost. There is, however, much less agreement on how fast we should move, whether major conservation efforts should start almost immediately or be gradually increased over the course of many decades (Krugman, 2010).

(2) The oceans cover about 70 percent of Earth's surface, so they obviously are a critical component of the biospheric life support system. The future of the world's oceans is uncertain because of the many stresses upon them. Arguably, the most important is the switch from mildly alkaline to mildly acidic as a result of carbon dioxide. Since the solubility of carbon dioxide is greatest at low temperatures, the effects will probably be most severe in polar regions. Reduction in anthropogenic carbon greenhouse gas emissions is the obvious solution, but no global agreement has been reached on this important issue yet.

(3) Marine protection areas show promise in restoring important marine fisheries, especially if global management of fishing stocks and "less fishing everywhere" occurs (Dalton, 2010). However, rapid climate change may negate the high hopes for their efficiency.

(4) A major threat to civilization and the environment is not getting the attention it deserves: billions of metric tons of carbon are "stored" as frozen hydrated methane in the ocean and in permafrost. If this carbon thaws and is released to the atmosphere in sufficient quantities, runaway climate change is the probable result. Continued anthropogenic greenhouse gas emissions will probably accelerate the release of this stored carbon, which would accelerate the rate of global warming. Robust evidence is already showing that carbon is being released from both sources. A recent report states: "The rate of release of carbon into the atmosphere today is nearly 10 times as fast as during the Paleocene-Eocene Thermal Maximum (PETM), 55.9 million years ago, the best analog we have for current global warming...Rate matters and this current rapid change may not allow sufficient time for the biological environment to adjust" (*ScienceDaily*, 2011). If these findings are confirmed, active, positive feedback loops may not be necessary for runaway climate change.

(5) Agricultural productivity is declining — food riots in various parts of the planet, including countries that export petroleum, have raised awareness of this change. The problem is exacerbated by continued exponential human population growth. As usual, the poor suffer most from rising prices — an inevitable result of demand exceeding supply. "In the United States, when world wheat prices rise by 75 percent, as they have over the past year, it means the difference between a $2 loaf of bread and a loaf costing maybe $2.10. If, however, you live in New Delhi, those skyrocketing costs really matter: A doubling in the world price of wheat actually means that the wheat you carry home from the market to hand-grind into flour for chapatis costs twice as much" (Brown, 2011). Since the poor spend a larger percentage of their income on food, this situation creates social unrest.

(6) "Sea level rise gives climate change an address" (Strauss, 2011), and that address is all the coastal

areas of the world. Especially at risk are those areas "under 1-6 meters in elevation (about 3-20 feet)" (Strauss, 2011). Melting glaciers and expansion of water volume as a result of warming is already under way. "For coastal American cities with populations above 50,000 people, about nine percent of the land lies below one meter in elevation" (Strauss, 2011). Even cities such as Baltimore, MD, which is distant from the ocean but on the Chesapeake Bay, have 11.5 percent of the land area under 6 meters and, thus, are at risk for inundation (Strauss, 2011). How can humankind justify failing to prepare for such disasters? The glaciers are melting and water expands when warmed, so lack of action is inexcusable.

Conclusions

By doing little or nothing about the major global crises, humankind is creating an alien planet appreciably different from the one in which *Homo sapiens* evolved and flourished. Only science can provide much of the information that *Homo sapiens* needs to survive, and science is under assault for providing evidence of the consequences of unsustainable practices that are perceived as a threat to some powerful special interest groups. Humankind is producing more material goods than the generating ability of renewable resources to replace raw materials from the finite Biosphere on a finite planet. The unpopular news is that severe consequences occur when the universal laws of biology, chemistry, and physics are ignored. The "merchants of doubt" can neither suspend nor revoke these laws. ■

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References

Brown, L. R. 2011. "The new geopolitcs of food." *Foreign Policy* 15 Apr (http://www.foreignpolicy.com/articles/2011/04/25/the_new_geopolitics_of_food).

Cairns, Jr., J. 2010. "Threats to the biosphere: eight interactive global crises." *Journal of Cosmology* 8:1906-1915.

Dalton, R. 2010. "Reserves 'win-win' for fish and fishermen." *Nature* 463:1007.

Editorial. 2011. "Into ignorance: vote to overturn an aspect of climate science marks a worrying trend in U.S. Congress." *Nature* 471:265-266.

Keynes, J. M. 1930. *The Great Slump of 1930*. London: The Nation & Athenæum 20 and 27 December (First Edition).

Krugman, P. 2010. "Building a green economy." *The New York Times Magazine* 7 Apr (http://www.nytimes.com/2010/04/11/magazine/11Economy-t.html).

Oreskes, N., and Conway, E. M. 2011. *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. New York: Bloomsbury Press.

ScienceDaily. 2011. "Carbon release to atmosphere 10 times faster than in the past, geologists find." 6 June (http://www.sciencedaily.com/releases/2011/06/110605132433.htm).

Strauss, B. 2011. "American cities and the rising sea." *Climate Central* 15 Feb (http://www.climatecentral.org/blogs/new-study-highlights-180-us-cities-most-at-risk-of-sea-level-rise/).