"SEE YOU LATER, ALLIGATOR. AFTER A WHILE CROCODILE"

Lyrics by Bill Haley

Research on exposure effects on female alligators from agricultural chemicals "showed signs of ovarian failure and infertility, essentially giving what would be a human woman in her 20s or 30s the body of a 50-year-old" (Kropf 2011). This finding brings the Bill Haley lyrics of the 1950s to mind. "Ancestors of the American alligator appeared 200 million years ago" (Louisiana Alligator Advisory Council, http://www.alligatorfur.com/alligator/alligator.htm), and soon Americans may not be able to "See you later, alligator." "The alligators of South Carolina are the latest 'canary in the coal mine' species. They are animal-sentinels that will help tell whether and how far along the flood of pollutants, toxins and agricultural runoff in state water are on their way toward adversely affecting humans" (Knopf 2011). However, very few people seem to be noticing, which is astounding since humans have much in common physiologically with the other species with whom they share the planet. Humans are not paying attention and are driving many species to extinction. A probable answer is that most humans do not perceive themselves as part of the Biosphere, although all life forms on Earth are.

One assumption could be made that global warming could benefit the American alligator because increased temperatures should enable it to expand its range northward. Furthermore, melting glaciers and ice packs will result in sea level rise, enabling the alligator to occupy low elevation coastal areas that were previously not available. Hazardous chemicals affecting the alligator's reproductive ability and health might well negate the "advantages" of temperature increase and the availability of new habitat. Any estimates of risk should involve all major factors or the environment will be saying "farewell" to many species instead of "see you later."

Humankind's obsession with economic growth has diverted attention from two high risk practices.
(1) Nothing should be manufactured that cannot be beneficially reintroduced into the biospheric life support system upon which all species and the economy depend. One example is plastic — ubiquitous in the 21st century, but, once used by humans, it should not be reintroduced in the biospheric life support system (e.g., Freinkel 2011). For most of the 3½ billion years that life has existed on Earth, the waste (output) of one species could be used as a resource (input) for one or more other species. However, plastic is not only useless to the biospheric life support system but is harmful both physically and toxically. Turtles can be caught in plastic mesh, and many other creatures have been injured in various ways.
(2) No manufactured products or waste products should be released into the environment in quantities that the biospheric life support system cannot beneficially assimilate. One toxic effect of plastics comes from phthalates.

> *Phthalates are a class of chemicals added to a number of common consumer products. In 1994, close to 87% of all phthalates in the United States were used as plasticizers, or softening agents, in vinyl products. . . . Eating, breathing and skin contact, as well as blood transfusion, are all ways, either together or alone, that phthalates make their way into our bodies. . . . eating is probably the main route by which humans are contaminated with diethylhexyl phthalate (DEHP), the most widely used phthalate plasticizer. DEHP migrates into food from certain foodwraps during storage. Similarly, we are also contaminated with other commonly used phthalates such as dilsononyl phthalate (DINP)* (Coming Clean 2001).

Clearly, estimating the assimilative capacity for phthalates of the biospheric life support system is a difficult task since many routes can take them into the human body. Phthalates in plastic are accumulating in the environment, so the risk of further contamination in the bodies of humans and other life forms will continue to increase.

The Risk of Mass Extinction

Paleontologists have identified five global mass extinctions over the past 540 million years in which the number of species declined by over 75% in massive biotic turnovers in a geologically brief interval (http://bolpark.physics.umd.edu/WN11/wn030411.html). Recovery from each mass extinction took millions of years. Persuasive evidence indicates that mass extinction six is already under way. Since a huge number of species on Earth have yet to be identified or studied, estimating the rate of loss is difficult, but it is clearly higher than replacement rate. The sixth mass extinction differs from the first five because it is the result of human activities, although the first

and second mass extinctions were the result of global climate change (Eldredge 2001). The sixth mass extinction may also be different because of the rate of change.

Alligator mississippiensis (the American alligator) is at increased risk because of toxins and agricultural runoff produced by another species – *Homo sapiens* – which could, if continued, hasten its extinction. Species extinction is a continual event. "Surprisingly, mass extinctions probably account for the disappearance of less than 5% of all extinct species — 95% of species extinctions occur between mass extinctions" (Cairns 2009). In short, all species are vulnerable to extinction at any time (Erwin 2008). In fact, *Homo sapiens* could be just anther transient species (Cairns 2007).

The fact that extinction is the norm — a process that is inevitable, such as aging and death — is not exactly comforting. In some cultures, elders receive great respect — after all, great luck and stamina helped them achieve old age and, along the way, some wisdom. Sustainable use of the planet, if practiced and achieved, might actually increase the time that *Homo sapiens* has on the ecological stage of the evolutionary theater. However, what humankind could do to achieve sustainability and what it is doing are far apart. If humans were working to achieve sustainability, the eight global crises (Cairns 2010) would not have all worsened, but they have. "In all previous ages . . . Asian and European civilization [*read* "Western culture"] had shared the same basic values. Quite recently, though, a Europe infected with a despiritualized hypermaterialism had whirled off on its own destructive tangent, imperiling human dignity and even survival" (Gandhi in Paine 1998, p. 238).

Ecological Footprints by Nation

A vast difference exists in the size of the ecological footprint of each nation (http://www.footprintnetwork.or/en/php/GEN/page/footprint). Information on ecological footprints leads to some important questions: How much more of Earth's resources can *Homo sapiens* take for itself without causing biospheric collapse and mass extinction? In short, what is the tipping point due to biospheric lack of adequate resources that will cause biospheric collapse? How many resources will be available per capita when the human population reaches 10 billion?

Conclusions

The same chemicals that adversely affect the alligator also affect humans adversely. At the global level, what is bad for the biosphere is also bad for its component species, including humans. Humankind cannot protect only those parts of the biosphere perceived to be beneficial to humans — it must protect the entire system. Each individual must act in a way that, if everybody on the planet acted in a similar fashion, life on Earth would not be threatened. To accomplish this goal, humans must share the same values. Given the present state of the world, such an achievement is difficult to visualize — as difficult as visualizing extinction. Life existed on Earth for approximately 3½ billion years without humans. The planet needs the Biosphere and its huge array of species, but it does not need *Homo sapiens*.

Acknowledgments. I am indebted to Darla Donald for transcribing the handwritten draft and for editorial assistance in preparation for publication and to Paula Kullberg, Paul Ehrlich, and Karen Cairns for calling useful references to my attention.

LITERATURE CITED

Cairns, J., Jr. 2007. Is *Homo sapiens* just another transient species? *Asian Journal of Experimental Sciences* 21(1):13-32.

Cairns, J., Jr. 2009. Is *Homo sapiens* just another stochastic event in the history of life on Earth? *Asian Journal of Experimental Sciences* 23(1):285-292.

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

Coming Clean. 2001. Case study: phthalates. http://www.chemicalbodyburden.org/cs_phthalate.htm.

Eldredge, N. 2001. The sixth extinction. ActionBioScience June http://www.actionbioscience.org/newfrontiers/eldredge2.html.

Erwin, D. H. 2008. Lessons from the past: biotic recoveries from mass extinctions. *Proceedings of the National Academy of Sciences* 98(10):5399-5403.

Freinkel, S. 2011. *Plastic: A Toxic Love Story.* Houghton Mifflin Harcourt Publishing Company, New York, NY.

Kropf, S. 2011. Gators give warning. The Post and Courier 10July

Paine, J. 1998. *Father India: Westerners under the Spell of an Ancient Culture*. Harper Perennial, HarperCollins Publishers, New York, NY