Fact or Fiction?

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The Ozone Hole

Is the sky falling? Will I get cancer because of the ozone hole? Are animals going blind because of the hole? Should I worry about the ozone hole?

These are questions I received during radio interviews for my book *Challenging Environmental Mythology* over the past months. Surprisingly to me, these were asked much more frequently than many other questions about the environment. Since I didn't cover the ozone layer in my book or previous columns, it's about time I reviewed this topic.

Concerns about the global environment effects of CFCs (chlorofluorocarbons) began to surface in the 1970s.[1] Researchers had discovered that the amount of ozone above the Antarctic land mass was falling by more than 50 percent each spring and then gradually returning to its previous level by early summer.[2]

In the 1980s it really became an issue as the media highlighted the "hole" suggesting this would lead to increased cancer deaths and also reporting extensive injury to animals. Reports of rabbits and sheep in Chile being blinded by high UV levels were bandied about and the same was said for deformed frogs.[3] A Greenpeace spokesperson even suggested that "it wouldn't be surprising" if polar bears began to go blind because of the ozone hole.[4]

While on the topic of pronouncements from concerned citizens and the media, Gregg Easterbrook adds, "Since 1985, environmental lobbies have issued dire warnings during the austral spring months, when Antarctic ozone readings are going down. No pronouncements are issued during the following austral summer months, when the ozone layer readings head back up. You've seen the headline "Ozone Hole Opens" in October (austral spring) newspapers. Ever seen the headline "Ozone Hole Closes" in a January (austral summer) edition?"[5] Scare tactics sell and arouse the populace! So what else is new?

Chlorine chemistry has been blamed as the cause of the October ozone decrease in the hole, rather than purely meteorological effects based on dynamics or direct solar influences related to the solar cycle, report S. Fred Singer and others.[6] However, there is no clear evidence of global ozone depletion.[7] The most probable major source of the chlorine is man-made CFCs widely used in air-conditioning, refrigerators, cleaning compounds, and other applications.[8] In the stratosphere, CFC molecules release their chlorine atoms which are highly efficient destroyers of ozone molecules. "By repeatedly reacting with ozone molecules and free oxygen atoms, a single CFC molecule can destroy thousands of times its weight in ozone molecules." report Joe Bast *et al*.[2]

These concerns led to The Montreal Protocol on Substances That Deplete the Ozone Layer, a landmark international agreement designed to protect the stratospheric ozone layer. The treaty was originally signed in 1987 and substantially amended in 1990 and 1992. The Montreal Protocol stipulated that the production and consumption of compounds that deplete ozone in the stratosphere—chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform—were to be phased out by 2000 (2005 for methyl chloroform).

What about effects on humans?

Roger Bate reports that climate scientist Fred Singer, the University of Virginia professor who invented ozone monitoring equipment, claims there has been no increase in dangerous ultraviolet radiation reaching the earth. Skin cancers have doubled over the past twenty years because white-skinned northerners burned themselves on holiday in the sun in the 1960s and 1970s. But this increase has nothing to do with chemical emissions and the ozone layer, which is still protecting us adequately from the sun's rays.[9]

A number of scientists report that a five percent decrease in the ozone layer is equivalent to moving south anywhere between 60 to 70 miles (Palm Beach to Miami, or from Seattle to Tacoma). An increase in altitude of one thousand feet would produce the same result.[10,11]

The worst case projection for the twenty-first century ozone depletion is a composite increase of 15 to 20 percent in surface ultraviolet radiation in the Northern Hemisphere. Would this spell disaster? Gregg Easterbrook quotes John Frederick, an atmospheric scientist at the University of Chicago, "It's nothing to get a 20 percent increase on a purely natural basis. Sunlight grows more intense as one moves toward the equator, and thus ultraviolet radiation increases as well. Mexico City, Miami, San Diego, and other cities on the mid-equatorial latitude band naturally receive about 20 percent more ultraviolet radiation than cities like Boston, Rome and Seattle. If a 20 percent increase in ultraviolet exposure were going to be so damaging, there should be no life in Florida."[12]

What about animals?

Animal blindness caused by the ozone hole is possible, but was never likely given that even when the hole is at its worst ultraviolet readings at the South Pole are dramatically lower than at the equator, where animals see just fine.[4]

Researchers at the University of California, conducted analyses of the eyes of blinded sheep and found the affliction to be the result of a common eye infection completely unrelated to ultraviolet light.[13] Parasites, not UV exposure, have recently been found to be the cause of missing legs, etc., on frogs and other amphibians.[3]

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In Memoriam

Carl Archer

Carl Archer, a 36-year veteran of the coatings industry, and a territory sales manager for Eckart America, has passed away.

"Carl was a good friend and colleague, and a valued member of the Eckart sales team," said John Kruzel, Director of Sales—Coatings and Plastics, for the company. "He was well known and respected within the coatings industry."

Prior to joining Eckart, he worked with Millennium Chemicals (formerly SCM chemicals), Louisville, KY. Earlier in his career he worked with American Cyanamid Company, Dallas, TX.

Archer graduated from Arizona State University with a BS degree in chemistry.

Henry Strow

The AESF Connecticut Branch has reported the passing of long-time, former Waterbury Branch member Henry Strow, 95. He was born in Auburn, IN, and graduated from Purdue University during the Great Depression. He joined the staff of General Motors, Detroit, MI, in 1932, and joined the Detroit Branch the same year.

In 1936, Strow was hired by MacDermid, Inc., and moved to Waterbury, CT, where he transferred his AES membership. He served in the technical service department at MacDermid for about 10 years before starting his own company, Tru-Brite Chemicals. He did so with the assistance of Harold Leever, an executive of MacDermid. Tru-Brite Chemicals became well known for providing concentrated brass plating solutions, to which users needed only to add water to create a brass plating solution.

Strow was an expert in brass plating and gave many seminars and training sessions on the subject. He authored a number of papers, and for many years, authored the brass plating section of the *Metal Finishing Guide Book*.

A past president of the Waterbury Branch, Strow was active until failing health prevented him from attending meetings.

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Summary

S. Fred Singer sums it up as follows, "The Antarctic ozone hole is genuine and will continue as a temporary thinning of the layer every October. It has stabilized and may diminish in the future. Ozone depletion at our latitudes has been less than 5 percent and has stopped altogether since 1992. The depletion is small in relation to the natural fluctuations, which can reach some 100 percent from day to day. No steady increase of average solar ultraviolet radiation has been measured on the ground so far."[3]

The area of thinning over Antarctica, measured around 12.5 million square km on September 1, 2004, half the size estimated in September 2000.[14]

Bjorn Lomborg looks at it this way, "The case of the depleted ozone layer and the solution through restrictive protocols is seen as a success story, in which the world community finally pulled itself together and put the environment before money. For this reason among others the ozone story is often quoted as a successful application of the principle of caution and of environmental awareness in general. However, it is worth pointing out that the implementation of the CFC ban was strictly profitable. It was actually relatively cheap to find substitutes for CFC and at the same time the advantages were quite clear-cut."[15]

The words I like best are those of Christopher Stone, "Aside from the uncertainty, it is intriguing, considering the relatively high level of publicity the problem has drawn, to note how low the speculative peril is compared with the number who are indubitably dying each day now, with hardly an eyelash batted, from unsanitary water, malaria, measles, tetanus, and other diseases."[16]

References

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2. Joseph L. Bast, Peter J. Hill and Richard C. Rue, *Eco-Sanity*, (Lanham, Maryland, Madison Books, 1994), 64.
3. S. Fred Singer, "Mastering the problem of environmental quality," *Environment & Climate News*, **4**, 14, February 2001.
4. Gregg Easterbrook, *A Moment On Earth*, (New York, Viking, 1995), 537.
5. Gregg Easterbrook, *A Moment On Earth*, 536.
6. S. Fred Singer, "Stratospheric Ozone: Science and Policy," in *The State of Humanity*, Julian L. Simon, Editor, (Oxford, UK, Blackwell, 1998), 537.
7. Aaron Wildavsky, "But is it True? A Citizen's Guide to Environmental Health and Safety Issues," (Cambridge, Massachusetts, Harvard University Press, 1995), 338.
8. *Environmental Politics*, Michael S. Greve and Fred L. Smith, Jr., Editors, 129.
9. Roger Bate, *Life's Adventure: Virtual Risk in a Real World*, (Oxford, Butterworth Heinemann, 2000), 109.
10. S. Fred Singer, "My Adventures in the Ozone Layer, Earth Day '96," The Heartland Institute, April 22, 1996, Page 18.
11. Hugh W. Ellsaesser, "Why the U.S. Should Abandon the Montreal Protocol … Now!", *Citizen Outlook*, **11**, 2, November/December 1996.
12. Gregg Easterbrook, *A Moment On Earth*, 530.
13. Joseph L. Bast, Peter J. Hill and Richard C. Rue, *Eco-Sanity*, 70.
14. Julio Godoy, "The Return of the Ozone Layer," Inter Press Service News Agency, September 14, 2004.
15. Bjorn Lomborg, *The Skeptical Environmentalist*, (Cambridge, UK, Cambridge University Press, 2001), 274.
16. Christopher D. Stone, *The Gnat Is Older Than Man*, (Princeton, New Jersey, Princeton University Press, 1993), xix.

Answers to I.Q. Quiz #411

1. True. The term "winning" in the context of "winning a prize" was coined for recovering a metal electrolytically.
2. False. Embrittlement is a severe loss of *ductility* or *toughness* in a metal or alloy.
3. True. Though phosphating is the preferred term, both refer to a conversion coating process, which forms an adherent phosphate coating on a metal by immersion in an appropriate phosphating solution.
4. False. Chromating is a conversion coating process that forms an adherent chromate coating on a metal by immersion in an appropriate chromating solution. Chromatizing is a process for improving paint adhesion on aluminum or aluminum alloys by treatment with a solution of chromic acid.
5. True. Purple plague involves the formation of brittle intermetallic compounds at aluminum wire/gold bonding pad intersections. Moisture and temperature can cause this problem. The color purple is characteristic of one of the intermetallics formed, when seen under the microscope.