

there needs to be regulation, but it should be regulation for the benefit of species, not for the benefit of idealism. I don't mind if people lie in front of bulldozers to put their idealistic views, but I object to people putting our wildlife in front of bulldozers to protect their idealistic views, and that is what is happening at present.

*IPA: What do you find is the reaction of the wider environmental movement to Earth Sanctuaries?*

Suspicion. The environmental movement is split into two parts, profit and not-for-profit; business and charity. I guess that business is always suspicious of charities and charities are suspicious of business. There are more green businesses coming on line, and they all have a part to play.

The not-for-profit organizations form an extreme breadth of groups. If you look at the extreme left, you see groups which are basically government funded to lobby and protest. There is an interesting symbiosis there: generally Labor governments give a fair bit of funding to green groups and they generally support Labor governments. This has built up over time. Those groups don't believe you should do things, they believe you should just talk about it.

Then there are the ones in the centre, the ones which collect money from the public to do good things—groups such as WWF and RSPCA. They collect enormous amounts of money. Much of it goes on administration, some of it in public relations to collect more money.

Then you get to the right side, such as Greening Australia and other groups, which involve volunteers actually doing things. Yet they are not allowed to be on the conservation councils because they are not regarded as 'green' enough.

There is a big, broad, range of groups there: as much breadth there as is there in business.

We get on very well with some groups, and are opposed by others. The groups on the left oppose us very heavily but we get together with the groups on the right and do joint projects with them.

*IPA: Thanks for speaking with us, is there anything you want to say in conclusion?*

If anybody has any sense, they would buy our shares. The future will tell that they are an excellent buy now.

*IPA: Thank you very much.*

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# Facts versus Phantoms

BRUCE N. AMES

**I**T is popular these days to espouse an apocalyptic vision of the future of our planet. Pollution is being blamed for global warming and ozone depletion, pesticides for cancer. Yet these and many other environmental causes are based on weak or bad science. The reality is that the future of the planet has never been brighter. With the bankruptcy of communism, the world is, one hopes, on the path to democracy, free markets, and greater prosperity. Science and technology develop in a free society, and free markets bring wealth, which is associated with both better health and lower birth rates. Scientific advances and free markets can also lead to technologies that reduce pollution at the lowest cost. A market for pollution rights is desirable—polluting shouldn't be free—and is much more effective than a bureaucratic monopoly. In my scenario for the future, I would like to see environmentalism based on scientific fact, directed at solving real problems rather than phantoms.

An example of this problem is the public misconception that pollution is a significant contributor to cancer and that cancer rates are soaring. As life expectancy continues to increase in industrialized countries, cancer rates (unadjusted for age) also increase; however, the age-adjusted cancer death rate in the United States for all cancers combined (excluding lung cancer from smoking) has been staying steady or decreasing since 1950. Decreasing since 1950 are primarily stomach, cervical, uterine, and rectal cancers. Increasing are lung cancer (which is due to smoking, as are 30 percent of all US cancer deaths), melanoma (possibly due to sunburns), and non-Hodgkin's lymphoma. Cancer is fundamentally a degenerative disease of old age, although external factors can increase cancer rates (cigarette smoking in humans) or decrease them (eating more fruits and vegetables).

A second misconception is that high-dose animal cancer tests tell us the significant cancer risks for humans. Approximately half of all chemicals—whether

natural or synthetic—that have been tested in standard animal cancer tests have turned out to be carcinogenic. These standard tests of chemicals are conducted chronically, at near-toxic doses—the maximum tolerated dose—and evidence is accumulating that it may be the high dose itself, rather than the chemical per se, that is the risk factor for cancer. (This is because high doses can cause chronic wounding of tissues or other effects that lead to chronic cell division, which is a major risk factor for cancer.) At the very low levels of chemicals to which humans are exposed through water pollution or synthetic pesticide residues, such increased cell division does not occur. Thus, they are likely to pose no or minimal cancer risks.

The third misconception is that human exposures to carcinogens and other toxins are nearly all due to synthetic chemicals. On the contrary, the amount of synthetic pesticide residues in plant foods is insignificant compared to the amount of natural pesticides produced by plants themselves. Of all dietary pesticides, 99.99 per cent are natural: they are toxins produced by plants to defend themselves against fungi and animal predators. Because each plant produces a different array of toxins, we estimate that on average, Americans ingest roughly 5,000 to 10,000 different natural pesticides and their breakdown products. Americans eat an estimated 1500 mg of natural pesticides per person per day, which is about 10,000 times more than they consume of synthetic pesticide residues. By contrast, the FDA found that residues of 200 synthetic chemicals, including the synthetic pesticides thought to be of greatest importance, average only about 0.09 mg per person per day.

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