

SCIENCE

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EDITORIAL

The Case for Diversity

Science. Dr. Noitall, you are one of the great authorities on biodiversity, the heroic defender of endangered species, the man who came to the aid of the spotted owl, fought seafaring nations to save the baleen whale, protected the little snail darter, and stood bravely in the path of meteors to try to save the dinosaurs.

Noitall. A vast understatement of my true worth.

Science. What is the situation in the world today with regard to species extinction? We hear old species are dying and new species are not being formed.

Noitall. The situation is desperate. Humans are callously eating lions and tigers (instead of the good old vice versa), killing elephants and rhinoceri for their tusks, destroying butterflies with pesticides, windshields, and pavements—and acting as if only *Homo sapiens* deserves to live on the earth.

Science. And what species are you trying to save now?

Noitall. I am becoming the defender of the unpopular little species who have a poor media image—the *Mycobacterium tuberculosis*, the *Salmonella typhi*, the pneumococci, the syphilis spirochete, the AIDS virus, and the malaria parasite, to name a few.

Science. But those are horrible pathogens that are out to kill humans. Why should you want to be on their side?

Noitall. That is typical “speciesism,” as despicable as racism. We biodiversity people do not limit ourselves to lovable species; all God’s creatures deserve to live. To us, a bacterium wagging its flagella is like a dog wagging its tail.

Science. How can humans relate to bacteria and viruses that are basically stupid, without a cerebral cortex and devoid of higher moral concepts?

Noitall. Stupidity is in the eye of the beholder. Bacteria survive by swimming toward nutrients that are good for them and away from toxic substances that are bad for them—a simple strategy that *Homo sapiens* could learn to advantage. Bacteria exchange DNA rapidly to pass drug resistance genes from one bacterium to another, a bacterial Marshall Plan. One DNA transfer provides more information than a modern high school education.

Science. Well, most people are delighted the smallpox virus is extinct, and we’d like to do the same for the AIDS virus. Do you really think you’re generating any new species?

Noitall. In the past 20 years the agents that cause AIDS, Lyme disease, Legionnaires’ disease, multi-drug-resistant tuberculosis, and cryptosporidiosis have emerged as important new organisms. The tigers and elephants were no match for *Homo sapiens*, but bacteria are made of tougher DNA and I am encouraged by the response we’re getting.

Science. But no one likes salmonella or the yellow fever virus, so who can possibly be on your side?

Noitall. We have tremendous help in all branches of the government. There have been big de facto cuts in research budgets. Weakened humans lie in hospital beds where they serve as perfect incubators for new drug-resistant strains. Threats of price controls on drug companies have caused them to fire scientists and cut research budgets. Undisciplined use of antibiotics in prescriptions and for livestock growth is a great help; schools and day care centers are also helping us generate new bacterial and viral species.

Science. But is bacterial diversity really increasing?

Noitall. I only have figures for 1992, but in that year alone the United States spent \$4.5 billion in direct costs correcting hospital-acquired infection and \$4 billion in costs against drug-resistant infection. In a few years it’s going to be more dangerous to go to the hospital than to stay at home.

Science. But won’t you get a backlash from people who are afraid of these infections?

Noitall. What naïveté! The people are scared to death of one part of lead per billion in the drinking water, any chemical that contains chlorine, and radiation that’s less than that experienced by the city of Denver. They haven’t time to worry about the bus rider who’s coughing drug-resistant tuberculosis germs, or the deer that carries Lyme disease, or the decreases in research and surveillance workers to cope with the new threats.

Science. So, from your point of view, biodiversity, as seen in bacteria and viruses, is proceeding well.

Noitall. Swimmily, I’d say. It will also solve the overpopulation problem.

Daniel E. Koshland Jr.