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Optimism in Evolution

OPINION

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When the dog days of summer come to an end, one thing we can be sure of is that the school year that follows will see more fights over the teaching of evolution and whether intelligent design, or even Biblical accounts of creation, have a place in America's science classrooms.

In these arguments, evolution is treated as an abstract subject that deals with the age of the earth or how fish first flopped onto land. It's discussed as though it were an optional, quaint and largely irrelevant part of biology. And a common consequence of the arguments is that evolution gets dropped from the curriculum entirely.

This is a travesty.

It is also dangerous.

Evolution should be taught — indeed, it should be central to beginning biology classes — for at least three reasons.

First, it provides a powerful framework for investigating the world we live in. Without evolution, biology is merely a collection of disconnected facts, a set of descriptions. The astonishing variety of nature, from the tree shrew that guzzles vast quantities of alcohol every night to the lichens that grow in the Antarctic wastes, cannot be probed and understood. Add evolution — and it becomes possible to make inferences and predictions and (sometimes) to do experiments to test those predictions. All of a sudden patterns emerge everywhere, and apparently trivial details become interesting.

The second reason for teaching evolution is that the subject is immediately relevant here and now. The impact we are having on the planet is causing other organisms to evolve — and fast. And I'm not talking just about the obvious examples: widespread resistance to pesticides among insects; the evolution of drug resistance in the agents of disease, from malaria to tuberculosis; the possibility that, say, the virus that causes bird flu will evolve into a form that spreads easily from person to person. The impact we are having is much broader.

For instance, we are causing animals to evolve just by hunting them. The North Atlantic cod fishery has caused the evolution of cod that mature smaller and younger than they did 40 years ago. Fishing for grayling in Norwegian lakes has caused a similar pattern in these fish. Human trophy hunting for bighorn rams has caused the population to evolve into one of smaller-horn rams. (All of which, incidentally, is in line with evolutionary predictions.)

Conversely, hunting animals to extinction may cause evolution in their former prey species. Experiments on guppies have shown that, without predators, these fish evolve more brightly colored scales, mature later, bunch together in shoals less and lose their ability to suddenly swim away from something. Such changes can happen in fewer than five generations. If you then reintroduce some predators, the population typically goes extinct.

Thus, a failure to consider the evolution of other species may result in a failure of our efforts to preserve them. And, perhaps, to preserve ourselves from diseases, pests and food shortages. In short, evolution is far from being a remote and abstract subject. A failure to teach it may leave us unprepared for the challenges ahead.

The third reason to teach evolution is more philosophical. It concerns the development of an attitude toward evidence. In his book, "The Republican War on Science," the journalist Chris Mooney argues persuasively that a contempt for scientific evidence — or indeed, evidence of any kind — has permeated the Bush administration's policies, from climate change to sex education, from drilling for oil to the war in Iraq. A dismissal of evolution is an integral part of this general attitude.

Moreover, since the science classroom is where a contempt for evidence is often first encountered, it is also arguably where it first begins to be cultivated. A society where ideology is a substitute for evidence can go badly awry. (This is not to suggest that science is never distorted by the ideological left; it sometimes is, and the results are no better.)

But for me, the most important thing about studying evolution is something less tangible. It's that the endeavor contains a profound optimism. It means that when we encounter something in nature that is complicated or mysterious, such as the flagellum of a bacteria or the light made by a firefly, we don't have to shrug our shoulders in bewilderment.

Instead, we can ask how it got to be that way. And if at first it seems so complicated that the evolutionary steps are hard to work out, we have an invitation to imagine, to play, to experiment and explore. To my mind, this only enhances the wonder.

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