

list of Stephens, Stephanies and similars now dwarfs the list of doubters, making a clear statement about where mainstream science stands.

That statement does not, and is not intended to, inform scientists. But it buttresses their long-term futures. To ensure that the supply of competent young researchers and policy-makers does not fail, the public should be educated in a vital, unifying principle of biology. Yet teachers are often pressured to keep evolution out of the classroom or to teach it as a scientifically controversial theory, particularly in the United States.

The NCSE, which is based in Oakland, California, is committed to tackling such attacks. It is perhaps most famous for organizing plaintiffs in the 2005 case *Kitzmiller v. Dover*, in which parents in Pennsylvania sued a school board for requiring that intelligent design be taught in public schools. The case was decided in favour of the parents, a ruling that is credited with keeping intelligent design out of classrooms across the United States. But the NCSE has probably had a similar impact in its quieter battles: it provides resources for science advocates, so that they do not have to reinvent the wheel when helping teachers who are told to skip evolution, to misrepresent it as controversial or to teach it alongside unscientific ideas. And the centre adapts to current needs: last year, it branched out to include climate change in its education efforts.

Eugenie Scott, executive director of the NCSE for the past 26 years, announced her retirement last week. The scientific community has much to learn from her example in the fight against pseudoscience. Too often, scientists are ignorant of how students outside their own labs are being educated. In the worst cases, scientists can actually hurt the cause for science education by alienating the people whom they hope to persuade: in their attempts to engage, they may seem condescending or use arcane arguments that fail to connect with teachers, parents, students and other community members.

Science is necessary to defuse anti-science efforts, but not sufficient. Rather than simply deploying artilleries of scientific facts, the NCSE addresses the motivations and tactics of those who would misrepresent research. These individuals and groups are driven not by facts, says Scott,

but by ideologies and identities such as ‘fundamentalist Christian’ or ‘political conservative’. Scott’s strategy is to attack what she calls dichotomous thinking: false assumptions that a churchgoer cannot believe in evolution or that a scientist cannot believe in a higher power. When, in 1995, the US National Association of Biology Teachers issued a statement describing evolution as “impersonal” and “unsupervised”, Scott and others called successfully for those words to be removed, arguing that science could not address such questions.

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Another strategy is to put together coalitions of people from diverse backgrounds to provide multiple perspectives. Faith-based communities can express concerns about one religious view being favoured over another. Parents can argue for their children’s clear thinking and academic futures. Scientists can talk about the scientific process and why accuracy in schools matters, but should also participate, where applicable, as parents, community members or people of faith.

Scientists and their institutions can encourage public outreach. Articulate researchers are no longer frowned on for being able to engage with a broader public, but they are not always supported; their institutions should consider how to recognize those who communicate science to society.

Scientists will need to learn to shift gears. As professionals, they must advocate for their own research, explaining why their grant should be funded or their papers published. When it comes to celebrating science more generally, they should bring the same passion to describing the work that is most likely to engage the public. The late evolutionary biologist Stephen Jay Gould (honoured in the NCSE’s list of Steves) established his professional reputation through accounts of his own gritty field work, but popularized science more through his discussions of the work of others. With support from the NCSE and similar efforts, scientists can further not only science education, but science itself. ■

Together we stand

To reach a sustainable future, we must merge economic and environmental agendas.

In the middle years of the last decade, when political concern over climate change was at its height, politicians liked to boast that they had broken the link between economic growth and greenhouse-gas emissions. They hadn’t, as the impact of the global financial crisis and the tentative recovery showed: emissions in some places slowed temporarily but have now resumed their worrying rate of increase.

Although countries such as the United Kingdom did manage to reduce their carbon pollution, this was a product of specific policies such as a shift from coal to gas for electricity generation, and not a more fundamental sign of a shift in the economic sands. Protecting the environment is an added cost that many politicians and business leaders would prefer to avoid. Not to bother makes things cheaper. And despite the rhetoric of environmental campaigners, that remains an uncomfortable truth, at least in terms of the climate problem. Carbon emissions are a hallmark of energy use — and it is cheap and available energy that has made the modern world.

The antagonism between protection of profit and protection of the environment will continue for as long as the two are seen as separate pursuits. And although there are signs that people in China are starting to question their nation’s pursuit of the first and not the second (see Q. Wang *Nature* 497, 159; 2013), the rapid economic development of countries such as China, India and Brazil raises the stakes and the risk to a sustainable future still further.

Development is a right, of course. Poorer nations are entitled to follow the path to prosperity, especially when their economic growth is measured in terms of reduced childhood mortality and increased access to clean water, as well as industrial output. But it is in all of our interests to find a more sustainable way for them to do so.

Global goals, international targets and multilateral pledges in this arena can sound hollow. There is little evidence, for instance, that the United Nations’ Millennium Development Goals have achieved what they set out to do. When these goals expire at the end of 2015, should they be renewed? And, if so, with what? The answer to the first is an unequivocal ‘yes’. A goal is something to strive for, as well as a result. Targets set agendas and steer policy. A possible answer to the second has just been published on the website of the United Nations’ Sustainable Development Solutions Network (unsdsn.org).

The group proposed ten new Sustainable Development Goals for the next 15 years, each with three draft targets. Some of the language is vague and some of the goals sound like platitudes. But drill down only a little and there are some well-informed suggestions. And some brave ones: a “rapid voluntary reduction of fertility” to address overpopulation, and reform of business accounting and tax regimes among them.

Perhaps most importantly, the draft goals fuse the economic and environmental agendas in a way that the Millennium Development Goals do not. The measure of a national economy, the goals say, is meaningless without a sense of how that bottom line has been achieved, and how it affects people and the planet. The economic currency of gross domestic product, for so long used as a benchmark of a country’s performance, could be tweaked to include social indicators and how well a country respects environmental criteria, such as the concept of planetary boundaries that should not be exceeded. The draft report is open for comments until next week. ■

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