

# Genetically Modified Foods



Debating Biotechnology

Edited by

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## Reith Lecture 2000

HRH The Prince of Wales

**L**ike millions of other people around the world, I've been fascinated to hear five eminent speakers share with us their thoughts, hopes, and fears about sustainable development based on their own experience. All five of those contributions have been immensely thoughtful and challenging. There have been clear differences of opinion and of emphasis between the speakers, but there have also been some important common themes, both implicit and explicit. One of those themes has been the suggestion that sustainable development is a matter of enlightened self-interest. Two of the speakers used this phrase, and I don't believe that the other three would dissent from it, and nor would I.

Self-interest is a powerful motivating force for all of us, and if we can somehow convince ourselves that sustainable development is in all our interests, then we will have taken a valuable first step toward achieving it. But self-interest comes in many competing guises—not all of which I fear are likely to lead in the right direction for very long, nor to embrace the manifold needs of future

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"A Royal View," by the Prince of Wales, BBC Reith Lectures 2000 (Home/Respect for the Earth). Reprinted with permission.

generations. I am convinced we will need to dig rather deeper to find the inspiration, sense of urgency, and moral purpose required to confront the hard choices which face us on the long road to sustainable development. So, although it seems to have become deeply unfashionable to talk about the spiritual dimension of our existence, that is what I propose to do.

The idea that there is a sacred trust between mankind and our Creator, under which we accept a duty of stewardship for the earth, has been an important feature of most religious and spiritual thought throughout the ages. Even those whose beliefs have not included the existence of a Creator have, nevertheless, adopted a similar position on moral and ethical grounds. It is only recently that this guiding principle has become smothered by almost impenetrable layers of scientific rationalism. I believe that if we are to achieve genuinely sustainable development, we will first have to rediscover, or reacknowledge, a sense of the sacred in our dealings with the natural world, and with each other. If literally nothing is held sacred anymore—because it is considered synonymous with superstition or in some other way “irrational”—what is there to prevent us treating our entire world as some “great laboratory of life” with potentially disastrous long-term consequences?

Fundamentally, an understanding of the sacred helps us to acknowledge that there are bounds of balance, order, and harmony in the natural world which set limits to our ambitions, and define the parameters of sustainable development. In some cases nature’s limits are well understood at the rational, scientific level. As a simple example, we know that trying to graze too many sheep on a hillside will, sooner or later, be counterproductive for the sheep, the hillside, or both. More widely we understand that the overuse of insecticides or antibiotics leads to problems of resistance. And we are beginning to comprehend the full, awful consequences of pumping too much carbon dioxide into the earth’s atmosphere. Yet the actions being taken to halt the damage known to be caused by exceeding nature’s limits in these and other ways are insufficient to ensure a sustainable outcome. In other areas, such as the artificial and uncontained transfer of genes between species of plants and animals, the lack of hard, scientific evidence of harmful consequences is regarded in many quarters as sufficient reason to allow such developments to proceed.

The idea of taking a precautionary approach, in this and many other potentially damaging situations, receives overwhelming public support, but still faces a degree of official opposition, as if admitting the possibility of doubt was a sign of weakness or even of a wish to halt “progress.” On the contrary, I believe it to be a sign of strength and of wisdom. It seems that when we do have scientific evidence that we are damaging our environment, we aren’t doing enough to put things right, and when we don’t have that evidence, we are prone to do nothing at all, regardless of the risks.

Part of the problem is the prevailing approach that seeks to reduce the natural world including ourselves to the level of nothing more than a mechanical process. For whilst the natural theologians of the eighteenth and nineteenth centuries like Thomas Morgan referred to the perfect unity, order, wisdom, and design of the nat-

ural world, scientists like Bertrand Russell rejected this idea as rubbish. "I think the universe," he wrote, "is all spots and jumps without unity and without continuity, without coherence or orderliness. Sir Julian Huxley wrote in "Creation a Modern Synthesis" that "modern science must rule out special creation or divine guidance." But why?

As Professor Alan Linton of Bristol University has written, "Evolution is a manmade theory to explain the origin and continuance of life on this planet without reference to a Creator." It is because of our inability or refusal to accept the existence of a guiding hand that nature has come to be regarded as a system that can be engineered for our own convenience or as a nuisance to be evaded and manipulated, and in which anything that happens can be fixed by technology and human ingenuity. Fritz Schumacher recognized the inherent dangers in this approach when he said that "there are two sciences—the science of manipulation and the science of understanding."

In this technology-driven age, it is all too easy for us to forget that mankind is a part of nature and not apart from it. And that this is why we should seek to work with the grain of nature in everything we do, for the natural world is, as the economist Herman Daly puts it, "the envelope that contains, sustains and provisions the economy, not the other way round." So which argument do you think will win—the living world as one or the world made up of random parts, the product of mere chance, thereby providing the justification for any kind of development? This, to my mind, lies at the heart of what we call sustainable development. We need, therefore, to rediscover a reference for the natural world, irrespective of its usefulness to ourselves—to become more aware in Philip Sherrard's words of "the relationship of interdependence, interpenetration, and reciprocity between God, Man, and Creation."

Above all, we should show greater respect for the genius of nature's designs, rigorously tested and refined over millions of years. This means being careful to use science to understand how nature works, not to change what nature is, as we do when genetic manipulation seeks to transform a process of biological evolution into something altogether different. The idea that the different parts of the natural world are connected through an intricate system of checks and balances which we disturb at our peril is all too easily dismissed as no longer relevant.

So, in an age when we're told that science has all the answers, what chance is there for working with the grain of nature? As an example of working with the grain of nature, I happen to believe that if a fraction of the money currently being invested in developing genetically manipulated crops were applied to understanding and improving traditional systems of agriculture, which have stood the all-important test of time, the results would be remarkable. There is already plenty of evidence of just what can be achieved through applying more knowledge and fewer chemicals to diverse cropping systems. These are genuinely sustainable methods, and they are far removed from the approaches based on monoculture, which lend themselves to large-scale commercial exploitation, and which Vandana

Shiva condemned so persuasively and so convincingly in her lecture. Our most eminent scientists accept that there is still a vast amount that we don't know about our world and the life-forms that inhabit it. As Sir Martin Rees, the Astronomer Royal, points out, it is complexity that makes things hard to understand, not size. In a comment which only an astronomer could make, he describes a butterfly as a more daunting intellectual challenge than the cosmos!

Others, like Rachel Carson, have eloquently reminded us that we don't know how to make a single blade of grass. And St. Matthew, in his wisdom, emphasized that not even Solomon in all his glory was arrayed as the lilies of the field. Faced with such unknowns, it is hard not to feel a sense of humility, wonder, and awe about our place in the natural order. And to feel this at all stems from that inner heartfelt reason which sometimes despite ourselves is telling us that we are intimately bound up in the mysteries of life and that we don't have all the answers. Perhaps even that we don't have to have all the answers before knowing what we should do in certain circumstances. As Blaise Pascal wrote in the seventeenth century, "It is the heart that experiences God, not the reason."

So do you not feel that, buried deep within each and every one of us, there is an instinctive, heartfelt awareness that provides—if we will allow it to—the most reliable guide as to whether or not our actions are really in the long-term interests of our planet and all the life it supports? This awareness, this wisdom of the heart, may be no more than a faint memory of a distant harmony, rustling like a breeze through the leaves, yet sufficient to remind us that the earth is unique and that we have a duty to care for it. Wisdom, empathy, and compassion have no place in the empirical world, yet traditional wisdoms would ask "Without them are we truly human?" And it would be a good question. It was Socrates who, when asked for his definition of wisdom, gave as his conclusion, "knowing that you don't know."

In suggesting that we will need to listen rather more to the common sense emanating from our hearts if we are to achieve sustainable development, I'm not suggesting that information gained through scientific investigation is anything other than essential. Far from it. But I believe that we need to restore the balance between the heartfelt reason of instinctive wisdom and the rational insights of scientific analysis. Neither, I believe, is much use on its own. So it is only by employing both the intuitive and the rational halves of our own nature—our hearts and our minds—that we will live up to the sacred trust that has been placed in us by our creator—or our "sustainer," as ancient wisdom referred to the creator. As Gro Harlem Brundtland has reminded us, sustainable development is not just about the natural world, but about people, too. This applies whether we are looking at the vast numbers who lack sufficient food or access to clean water, but also those living in poverty and without work. While there is no doubt that globalization has brought advantages, it brings dangers, too. Without the humility and humanity expressed by Sir John Browne in his notion of the "connected economy"—an economy which acknowledges the social and environmental context within which it operates—there is the risk that the poorest and the weakest

will not only see very little benefit but, worse, they may find that their livelihoods and cultures have been lost.

So if we are serious about sustainable development, then we must also remember that the lessons of history are particularly relevant when we start to look further ahead. Of course, in an age when it often seems that nothing can properly be regarded as important unless it can be described as “modern,” it is highly dangerous to talk about the lessons of the past. And are those lessons ever taught or understood adequately in an age when to pass on a body of acquired knowledge of this kind is often considered prejudicial to “progress”? Of course our descendants will have scientific and technological expertise beyond our imagining, but will they have the insight or the self-control to use this wisely, having learned both from our successes and our failures?

They won't, I believe, unless there are increased efforts to develop an approach to education which balances the rational with the intuitive. Without this, truly sustainable development is doomed. It will merely become a hollow-sounding mantra that is repeated ad nauseam in order to make us all feel better. Surely, therefore, we need to look toward the creation of greater balance in the way we educate people so that the practical and intuitive wisdom of the past can be blended with the appropriate technology and knowledge of the present to produce the type of practitioner who is acutely aware of both the visible and invisible worlds that inform the entire cosmos. The future will need people who understand that sustainable development is not merely about a series of technical fixes, about redesigning humanity or reengineering nature in an extension of globalized, industrialization—but about a reconnection with nature and a profound understanding of the concepts of care that underpin long-term stewardship.

Only by rediscovering the essential unity and order of the living and spiritual world—as in the case of organic agriculture or integrated medicine or in the way we build—and by bridging the destructive chasm between cynical secularism and the timelessness of traditional religion will we avoid the disintegration of our overall environment. Above all, I don't want to see the day when we are rounded upon by our grandchildren and asked accusingly why we didn't listen more carefully to the wisdom of our hearts as well as to the rational analysis of our heads; why we didn't pay more attention to the preservation of biodiversity and traditional communities or think more clearly about our role as stewards of creation? Taking a cautious approach or achieving balance in life is never as much fun as the alternatives, but that is what sustainable development is all about.

# An Open Letter to Prince Charles

Richard Dawkins

Sunday May 21, 2000

Your Royal Highness,

**Y**our Reith lecture saddened me. I have deep sympathy for your aims, and admiration for your sincerity. But your hostility to science will not serve those aims; and your embracing of an ill-assorted jumble of mutually contradictory alternatives will lose you the respect that I think you deserve. I forget who it was who remarked, "Of course we must be open-minded, but not so open-minded that our brains drop out."

Let's look at some of the alternative philosophies which you seem to prefer over scientific reason. First, intuition, the heart's wisdom "rustling like a breeze through the leaves." Unfortunately, it depends whose intuition you choose. Where aims (if not methods) are concerned, your own intuitions coincide with mine. I wholeheartedly share your aim of long-term stewardship of our planet, with its diverse and complex biosphere.

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Richard Dawkins, Charles Simonyi Professor of the Public Understanding of Science

But what about the instinctive wisdom in Saddam Hussein's black heart? What price the Wagnerian wind that rustled Hitler's twisted leaves? The Yorkshire Ripper heard religious voices in his head urging him to kill. How do we decide *which* intuitive inner voices to heed?

This, it is important to say, is not a dilemma that science can solve. My own passionate concern for world stewardship is as emotional as yours. But where I allow feelings to influence my aims, when it comes to deciding the best method of achieving them, I'd rather think than feel. And thinking, here, means scientific thinking. No more effective method exists. If it did, science would incorporate it.

Next, Sir, I think you may have an exaggerated idea of the naturalness of "traditional" or "organic" agriculture. Agriculture has always been unnatural. Our species began to depart from our natural hunter-gatherer lifestyle as recently as 10,000 years ago—too short to measure on the evolutionary timescale.

Wheat, be it ever so wholemeal and stoneground, is not a natural food for *Homo sapiens*. Nor is milk, except for children. Almost every morsel of our food is genetically modified—admittedly by artificial selection not artificial mutation, but the end result is the same. A wheat grain is a genetically modified grass seed, just as a pekinese is a genetically modified wolf. Playing God? We've been playing God for centuries!

The large, anonymous crowds in which we now teem began with the agricultural revolution, and without agriculture we could survive in only a tiny fraction of our current numbers. Our high population is an agricultural (and technological and medical) artifact. It is far more unnatural than the population-limiting methods condemned as unnatural by the Pope. Like it or not, we are stuck with agriculture, and agriculture—all agriculture—is unnatural. We sold that pass 10,000 years ago.

Does that mean there's nothing to choose between different kinds of agriculture when it comes to sustainable planetary welfare? Certainly not. Some are much more damaging than others, but it's no use appealing to "nature," or to "instinct" in order to decide which ones. You have to study the evidence, soberly and reasonably—scientifically. Slashing and burning (incidentally, no agricultural system is closer to being "traditional") destroys our ancient forests. Overgrazing (again, widely practiced by "traditional" cultures) causes soil erosion and turns fertile pasture into desert. Moving to our own modern tribe, monoculture, fed by powdered fertilizers and poisons, is bad for the future; indiscriminate use of antibiotics to promote livestock growth is worse.

Incidentally, one worrying aspect of the hysterical opposition to the possible risks from GM [genetically modified] crops is that it diverts attention from definite dangers which are already well understood but largely ignored. The evolution of antibiotic-resistant strains of bacteria is something that a Darwinian might have foreseen from the day antibiotics were discovered. Unfortunately, the warning voices have been rather quiet, and now they are drowned by the baying cacophony: "GM GM GM GM GM GM!"



Moreover, if, as I expect, the dire prophecies of GM doom fail to materialize, the feeling of letdown may spill over into complacency about real risks. Has it occurred to you that our present GM brouhaha may be a terrible case of crying wolf?

Even if agriculture could be natural, and even if we could develop some sort of instinctive rapport with the ways of nature, would nature be a good role model? Here, we must think carefully. There really is a sense in which ecosystems are balanced and harmonious, with some of their constituent species becoming mutually dependent. This is one reason the corporate thuggery that is destroying the rainforests is so criminal.

On the other hand, we must beware of a very common misunderstanding of Darwinism. Tennyson was writing before Darwin, but he got it right. Nature really is red in tooth and claw. Much as we might like to believe otherwise, natural selection, working within each species, does not favor long-term stewardship. It favors short-term gain. Loggers, whalers, and other profiteers who squander the future for present greed are only doing what all wild creatures have done for three billion years.

No wonder T. H. Huxley, Darwin's bulldog, founded his ethics on a repudiation of Darwinism. Not a repudiation of Darwinism as science, of course, for you cannot repudiate truth. But the very fact that Darwinism is true makes it even more important for us to fight against the naturally selfish and exploitative tendencies of nature. We can do it. Probably no other species of animal or plant can. We can do it because our brains (admittedly given to us by natural selection for reasons of short-term Darwinian gain) are big enough to see into the future and plot long-term consequences. Natural selection is like a robot that can only climb uphill, even if this leaves it stuck on top of a measly hillock. There is no mechanism for going downhill, for crossing the valley to the lower slopes of the high mountain on the other side. There is no natural foresight, no mechanism for warning that present selfish gains are leading to species extinction—and indeed, 99 percent of all species that have ever lived are extinct.

The human brain, probably uniquely in the whole of evolutionary history, can see across the valley and can plot a course away from extinction and toward distant uplands. Long-term planning—and hence the very possibility of stewardship—is something utterly new on the planet, even alien. It exists only in human brains. The future is a new invention in evolution. It is precious. And fragile. We must use all our scientific artifice to protect it.

It may sound paradoxical, but if we want to sustain the planet into the future, the first thing we must do is stop taking advice from nature. Nature is a short-term Darwinian profiteer. Darwin himself said it: "What a book a devil's chaplain might write on the clumsy, wasteful, blundering, low, and horridly cruel works of nature."

Of course that's bleak, but there's no law saying the truth has to be cheerful; no point shooting the messenger—science—and no sense in preferring an alternative world view just because it feels more comfortable. In any case, science isn't all bleak. Nor, by the way, is science an arrogant know-all. Any scientist worthy of

the name will warm to your quotation from Socrates: "Wisdom is knowing that you don't know." What else drives us to find out?

What saddens me most, Sir, is how much you will be missing if you turn your back on science. I have tried to write about the poetic wonder of science myself, but may I take the liberty of presenting you with a book by another author? It is *The Demon-Haunted World* by the lamented Carl Sagan. I'd call your attention especially to the subtitle: *Science as a Candle in the Dark*.

