
Where Do We Go From Here? The View From Times Square.

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I am a product of the city and the suburbs. My only contact with farms as a boy was to lean my head out of the car window and try to communicate with cows when we drove through the country. My first contact with agriculture as a reporter came in 1988, when I went to an Agricultural Research Conference in Beltsville, Maryland. There I heard ominous phrases I hadn't heard before — talk of “genetic erosion” and “seed morgues.” The conference was on the subject of germplasm preservation. One speaker after another stood at the podium proclaiming a crisis in the national germplasm preservation system.

As an environmental writer, I was interested in biological diversity, but at that conference I learned about an example of biological diversity that I had not heard of before. If I asked what place on Earth contained the most biological diversity, you might answer that it must be somewhere in the tropical rainforest. But I'm not sure that's right. I know a place where I can identify 500,000 genetically distinct organisms in the space of a few thousand square feet — an example of diversity that transcends even the incredible natural diversity of tropical rainforests. The place I have in mind is the National Seed Storage Laboratory in Fort Collins, CO. It's a fantastic repository of genetic diversity, containing thousands of varieties of corn and beans and wheat — and virtually every other crop you might name.

I mention it partly because it hasn't been mentioned during the conference, and, from the perspective of scientific research, I think it is important. The National Seed Storage Laboratory is one of the foundations on which biotechnology is built. We often think of biotechnology as almost a magical thing, capable of creating any kind of crop we can imagine. But biotechnology is actually a very limited thing: it can move genes around and manipulate them, take them from one species and put them into any other species. But, at

present, it is utterly unable to create entirely new genes that do entirely new things. From a scientific point of view, it is important to remember that without a treasure chest of genetic diversity, biotechnology isn't much good. There are many genes in that treasure trove that could produce crops that might solve some of the problems we've been discussing during the past few days. But there are two problems: One is that the seed storage laboratories are not getting enough money to preserve their collections. Seeds are living things, and they don't live forever. From time to time, they have to be taken out and planted, and then the fresh seeds can be harvested and put back into storage. That is not being done, and some of the sample envelopes in the seed storage laboratory now contain nothing but lifeless dust.

A second problem is that biotechnology companies are motivated by short-term financial considerations. They cannot choose genes to produce crops that might help solve some of the social and financial problems we've been discussing at this conference. If we want to use biotechnology to help feed the world's starving poor or serve other social aims that may not be profitable, we have two options: We can persuade government to do it, or we can mobilize public opinion to persuade biotechnology companies to donate technology to those who will never be able to afford to buy it.

Another thing I would like to mention is a word that comes up all the time in discussions at *Business Week* about economic trends. It's a bit of a surprise to me that it didn't figure more into discussions here. The word is: Internet. The Internet is transforming American business of all kinds, and it's happening extremely rapidly. To give you a New York example, the stock broker Merrill Lynch has long said that it wasn't interested in online trading on the Internet. Merrill Lynch felt that it offered superior products and services, that its knowledgeable brokers and researchers offered information that stock traders would be happy to pay a premium for. A couple of weeks ago, Merrill Lynch reversed course and said it would begin offering trading online. The economics of the Internet were simply overwhelming. Trading on the Internet was so much easier and cheaper than trading through a broker that Merrill Lynch was losing customers. It had no choice but to join the trend.

So my question to you is: What opportunities does the Internet offer to agriculture? How does it intersect with biotechnology? What, if anything, can it do to help make this technology available to those who cannot now afford it? One of the buzz words connected with the Internet is this mouthful: disintermediation. It is a complex bit of jargon for a simple idea: The Internet is, in many circumstances, removing the middle man in business transactions. People who want to buy stock don't need a broker. They can deal directly with the market. People can look at schedules and fares in airline computers without needing to consult a travel agent. Increasingly, it is possible to deal with wholesalers directly, avoiding retail markup. At this conference, many speakers have talked about the long chain between farmers and end-users. What can the

Internet do to shorten those long lines? I'm not talking about using the Internet as a research tool, or a communications tool. Those are important, but that is already happening. I'm talking about using the Internet as a marketing tool. What are the opportunities for E-commerce in agriculture? There might be a thousand reasons why I cannot sit in New York and order beef directly from a Nebraska farmer on the Internet. But maybe not. It's a question worth exploring.

And while we are on the subject of the long lines between farmers and end users, I think it is important to remind you how little we know from our perch in New York. This is the view from Times Square. Given the extremely rapid adoption of genetically modified crops in Nebraska and elsewhere in the Midwest, I assume I am now eating meat in New York that has been fed with genetically modified feed. Is that a reason for concern? It's hard to say. During the past few days, we have heard a lot of questions raised about the safety of genetically engineered crops. And we have heard just as many assurances that there is nothing to worry about. It will be a difficult issue to resolve. But one thing is very clear: many people are concerned about the potential health dangers of genetically modified crops, and that is an important thing to think about — whether they are right or wrong to be concerned. The point is that, in New York, we don't know, when we shop at the supermarket, whether we are buying food that ultimately comes from genetically engineered crops. The issue has been widely discussed in Nebraska by farmers, by researchers, and by those in the biotechnology industry. But it hasn't yet been widely discussed in New York, or in Washington, or in the press. Those discussions need to take place if people are to become informed about genetically engineered crops and make intelligent decisions about them.

As people discover that this revolution in agriculture took place without any national debate, they might decide they have been hoodwinked — and that could lead to a backlash in which many would decide to reject these foods out of hand. Many people might be perfectly happy to eat genetically modified foods, but nobody likes to be fooled. The monarch butterfly has been mentioned repeatedly during the conference. In the coming months, we might all forget about the monarch butterfly study. We really don't know whether monarchs are exposed to Bt pollen, and this concern might completely disappear.

Or it might not. Rachel Carson's cause got huge visibility in part because of her eloquent advocacy but also because the animal that was in danger was the bald eagle — the symbol of the country. Trying to predict the fate of genetically engineered foods is, at this point, a little like trying to predict what the stock market will do in the coming months. It could soar. The Dow Jones index could hit 12,000, or 15,000. But you would be prudent not to bet on it. Prices could just as easily turn sharply down. I don't know what the American public will think about the monarch butterfly research a year from now, but it would be

prudent to prepare for a public backlash. The monarch butterfly could turn out to be the bald eagle of biotechnology. I happen to think biotechnology is an important and useful tool. I don't necessarily see a conflict between biotechnology and alternative agriculture, or organic farming. I like to think of alternative agriculture and organic farming as the "soft paths" in agriculture. Biotechnology is the hard path. Both can help us get to a healthier, more profitable, more environmentally sustainable kind of agriculture. Both can be used for the good of consumers and for the good of farmers. Biotechnology can be used to produce improved crop varieties for organic farmers, allowing them to produce tastier foods and a wider variety of foods without using chemicals — and the opportunity to use fewer pesticides and other chemicals could help win consumer acceptance. Whether that happens will depend upon how this new technology is used. Using it to sell more herbicide offers nothing to consumers, and it isn't going to earn their acceptance of crop biotechnology.