Changing the Nature of Nature: Corporate, Legal, and Ethical Fundamentals
(Description of the Presentation by Ralph Nader)

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Mr. Nader discussed NABC's *Vision Statement*, characterizing it as tremendously optimistic. He found the theme of that statement — of what "will" happen in the future — to be troubling in that, in the 1920s, a radical change in technology, with similarities to biotechnology, was championed by luminaries such as Thomas Edison and Henry Ford: to replace hydrocarbons with carbohydrates. Despite broad support, including deans of MIT and Harvard, for the concept of manufactured products from plants as raw materials rather than minerals, it did not come to fruition. Why not? Was the science faulty or the technology inadequate?

In fact, major industries, e.g. petrochemical, paper and auto, resisted the change to carbohydrates. The petrochemical industry expanded enormously in size, and products therefrom came to occupy all major market niches. Carbohydrate-based products could not compete, and the global repercussions include hazards in the workplace, environmental pollution, and waste-disposal costs.

How much is learned from history's lessons? Industrial hemp, for example, preceded petrochemicals by thousands of years, yet, despite this long lead time, it fell out of favor in the 1920s along with many other carbohydrate-based materials. The role of power in deciding directions — corporate power and the governmental power it reflects — should be probed at conferences such as this and not avoided as is usual. For example, over the past seven decades, little of USDA's research budget has been invested in carbohydrate development, whereas subsidies for the oil, gas, nuclear power and forest industries have been enormous. In the 1960s and 1970s, discussions of auto safety, albeit few, camouflaged the fact that executives in Detroit emphasized style while progress in engineering stagnated and never surfaced as a topic of debate. And we must learn history's lessons in terms of the corporate personality. The Greek sculptor

and architect Polyclitus (fifth century BC) said, “Character is destiny,” to which should be added, “but personality is decisive.”

In the early days of this country, corporations were tightly controlled and were granted sometimes only a 10-year state charter, renewable on the basis of good conduct. Products were restricted and expected to fulfill “a public purpose.” Public perception has since become blurred that there are obvious differences between corporations and human beings. People cannot be internationally ubiquitous, cannot dodge responsibilities or be temporarily bankrupt, and cannot pocket generous remunerations while avoiding full payment of creditors. The many differences between the corporate personality and the individual will affect whether the priorities of a biobased economy in the twenty-first century will be driven by corporate for-profit structure, or by government and university research with open exchange of information.

The corporate science of today contrasts with the traditional *modus operandi* chiefly in terms of:

- Proprietary and confidentiality agreements. When industrial priorities intersect with research at universities and public institutions, free exchange of scientific information and the peer-review process are compromised.
- Priorities. In general, corporate priorities differ from those normally perceived as being in the public interest. Pharmaceutical companies are marketing drugs for baldness, obesity, and potency, while neglecting research to tackle infectious diseases of enormous global relevance, such as malaria, tuberculosis, and AIDS. As reported recently by the New York Times, these same companies enjoy billion-dollar governmental subsidies.
- Power. Corporations hold political power by which to garner federal tax credits and subsidies. This power extrapolates to the presence of genetically engineered foods on supermarket shelves without being so labeled, whereas many consumers would welcome such information for reasons of religion, personal preference, or public policy.

So, on the one hand, corporations hold proprietary information, different priorities, and power, and, on the other, traditional science is dedicated to the free pursuit of knowledge for its own sake and for the common good. The playing field is not level, which should form the basis of discussions with concrete examples, citing Monsanto, ADM, etc.

In the area of bioengineered food, policy-making is fraught with unknowns. Part of the problem is that the technology has developed ahead of the scientific understanding that must underpin its regulation. Industry representatives have failed to address critical aspects of agricultural biotechnology:

- ecology,
- nutrition and disease dynamics, and
- basic molecular genetics.

The consequences of genetically engineering organisms across species barriers remain poorly understood. Technology outstripping science has led to trouble in the past; for example, decades of smog plagued Los Angeles before it was discovered that motor-vehicle exhaust was causal. And nuclear power plants were built to produce energy inexpensively, yet the resultant radioactive waste still cannot be stored safely for the long term. The distinctions between corporate science and its traditional university-based counterpart need emphasis.

Who will make the key decisions? Will it be a random process influenced by who has the funding to do the research, who has the political power, or who makes the discoveries that lead to implementation? Or will our supposedly democratically representative government have a say? The public has the right to know, in principle at least, and to participate in the deliberations. We should ask the question, "What do genetically engineered corn and soybean really do for the farmer and for the consumer, compared to the costs and the unknowns?" At a recent meeting between Monsanto representatives and citizen environmental groups, an Iowa farmer growing 3,000 acres of genetically engineered corn stated that his crop did not taste or yield better, but he was able to spend more time with his family because he spent less time weeding. His response should be measured against the misgivings about such crops and against the questions raised above regarding inadequate research.

It is important that the question of who decides, tough as it is, should be answered by the many rather than by the few, with consideration given to the needs of overworked family farmers, of whom so many are in dire straits even after nine years of national economic growth. Will family farmers and their producer cooperatives survive and retain independence, or will they go the way of chicken farmers who, indentured to Tyson, Perdue, etc., make a profit of just a nickel per broiler (240,000 per year = $12,000). Some call this poultry peonage.

If the increasingly integrated technology patterns of multi-national companies result in further losses of family-farms, then rural America, with its traditional independence and its cultural and political creativity, will be sacrificed. Is that an acceptable risk without clear-minded projections and thorough debate?

In contrast with the statement by English philosopher Alfred North Whitehead (1861–1947) that science has to keep its options open for revision, much corporate science fails in this regard because of entrenchment of investments and technologies. The infernal internal combustion engine is one such entrenched technology: it has changed little in 110 years with its high incomes from sales and service and its built-in obsolescence.

Revision options are key, and this leads to a consideration of the *NABC Statement 2000 on Agricultural Biotechnology: Promise, Process, Regulation and Dialogue*, which, in Mr. Nader's opinion, is so self-assured that it fails to address adequately what may go wrong. For example, the *Statement* suggests that "what

is" should be given more weight than the never-ending and untestable "what if?". Would scientists at the Council for Responsible Genetics (more on the CRG later) concur with the concept that the most important risk from a product is inherent to that product not to the process by which it is made, i.e. that identical products, however they are made, pose identical risk? And would scientists at the CRG concur that the genetic roulette is less predictable in organismal than in molecular genetic improvement?

There are other issues that should be considered at this and future conferences. When huge sums of money are invested in industrial-scale production of crops, there are global consequences in terms of land control. Is it possible that reform acts in the developing world will result in new ownership patterns with land-control by large corporations? Apparently aware of this point, over a million farmers in India six years ago protested the restrictions that patenting of seed by Cargill and other agribusiness companies would impose on them culturally and economically; that demonstration received no press coverage in the United States.

With good planning, many exciting opportunities — unrelated to genetic engineering — would exist for small-holding farmers, such as industrial hemp. Industrial hemp must become a political issue, and a media issue, to be released from the medieval yoke enforced by the DEA. It should be held up as an object lesson on how the most versatile plant on earth, in terms of its multiplicity of uses, has been suppressed and that suppression ignored. Certainly in environmental terms, industrial hemp is superior to the alternatives that are used in its place.

Current emphasis on biotechnology as a means of alleviating hunger denies the central fact that malnourishment results chiefly from unequal distribution of food, lack of access, and from poverty. As an analogy, two million people die yearly from tuberculosis, most of them in the developing world, even though the cure is available, as are resources for delivery. Power structure is the chief determinant of whether a technology is delivered.

It should be stressed that many innovations in agricultural biotechnology are driven by profit rather than by need, e.g. soybean has been genetically modified to sell more of a particular herbicide. This sequence of events will become more common as seed patents increasingly affect farm practices.

According to Mr. Nader, the integration of the seed and chemical industries accelerates per-acre expenditures, which will affect patterns of agricultural credit. Consolidations into larger, fewer farms will parallel the vertical integration of biotech companies. The editorial of an agribusiness newsletter recently stated: "Get real, farmers! We are not far away from having fifty integrated production units in this country delivering food and fiber." Consolidations in the beef, pork and poultry industries are already occurring; with only fifty production systems, farmers would be integrated into contract units with little bargaining power, as has been the misfortune of chicken farmers.

The promise of increased yields from genetically engineered seed is yet to be realized. Other, traditional, approaches exist to improve crop yields and to alleviate post-harvest losses from rodents, fungi, etc., that plague developing countries. It is arrogant to presume that exogenous untested technologies that have neither cultural nor historical context do not jeopardize long-standing practices and customs. The spiritual aspect of economic activity in agrarian societies is often underestimated. For example, in northeast Brazil, the many available varieties of corn play specific roles in the local diet and in customs and festivals.

On one hand, deliveries of clean water, immunization against devastating diseases, extension advice to foster traditional practices, land reform and agricultural credits remain beyond reach for many, yet biotechnology is viewed as a cure for what ails the developing world. A Nobel Prize awaits the person who achieves that integration.

The FDA is about six years behind in its promise to develop standards to address the possibility that genetically modified foods may contain new allergens or toxins, and their recent pronouncements do nothing to alleviate concerns. Likewise, the EPA, rather than imposing regulations, continues to promise guidelines.

The old “one pest, one chemical” model has been superseded by “one pest, one gene.” Although the number of genes is almost infinite, very little is known of their relation to resistance or how they may be exploited to address the problem of development of resistance by pests.

The USDA spends an inadequate sum on risk assessment, only one to two million dollars per year of the biotech research budget. This illustrates the pressures that influence the USDA's research priorities. Significant federal funds are spent on biotechnology, and there is need for assessment of accompanying effects of the Bayh-Dole Act (by which universities are encouraged to collaborate with commercial concerns to promote patenting and the utilization of inventions arising from federal funding). Some are of the opinion that passage of the Bayh-Dole Act into law has poisoned relationships among university researchers, with its encouragement to draw proprietary distinctions and to wheel and deal. This raises the question of whether non-profit institutions can remain sufficiently independent of corporate entanglements for the benefit of society and for the maintenance of free initiative and scientific exchange — a topic worthy of inclusion on a future agenda.

In the recently published book *Natural Capitalism: Creating the Next Industrial Revolution*, Paul Hawkin, Amory Lovins and L. Hunter Lovins discuss opportunities to improve resource productivity, to get more from less of a raw material. This approach is being put into practice by Interface, Atlanta, GA, the largest manufacturer of carpet tile in the world, which is moving towards zero pollution; if part of a process or product does not add value, it is eliminated. Hawkin, a practical businessman, cites many similar examples in his book.

Also, he cites a professor who has drawn up a cost budget for one pound of hamburger meat: one hundred pounds of mid-west soil and a thousand gallons of ice-age water from the aquifer. Other examples in the book include, the manufacture of a semi-conductor chip produces one hundred thousand times its own weight in waste; a lap-top computer generates close to four thousand times its own weight in waste; two quarts of gasoline and a thousand quarts of water are needed to produce a quart of Florida orange juice; and one ton of paper requires ninety-eight tons of various inputs. Mr. Hawkin has suggested the objective of ten-fold increases in productivity and efficiency, with all the attendant benefits.

The Council for Responsible Genetics, founded in 1983 by scientists at Harvard and MIT, monitors developments in new technologies as they relate to human genetics and commercial biotech and the environment. The CRG encourages informed public debate on the social, ethical, and environmental issues. Their recently published *Genetic Bill of Rights* for consumers covers policy issues, privacy rights, and questions of disclosure; it should be required reading for all stakeholders.

Mr. Nader emphasized that these comments and observations should not be viewed as negative on biomaterials, which hold promise for small-holding farmers, for the environment and for poor people abroad. However, any technology that is driven by a distorted power system can be misused and become a monster. It can fail to deliver on its promise, like pharmaceutical research, and it can help concentrate power, which, in the wrong hands may be very anti-democratic and invade privacy. It is important to bear in mind all these aspects, which is why there is need for a more deeply deliberative democracy with increasingly more citizens engaged in discussions of the serious problems society faces.

We are entertaining ourselves to death. No longer a weekly Saturday afternoon outing to the Bijou theatre for twelve- and thirteen-year olds, entertainment is accessible twenty-four hours a day and is the focus of much of the media, which no longer deal with sensible issues. This conference should be on C-Span, and in newspaper headlines instead of the continuous fodder of Elian Gonzalez, O.J. Simpson, reprobate celebrities, etc. For functional and normative reasons, there is need to encourage understanding, commitment, and skepticism in the citizenry. The jurist Learned Hand (1872–1961) said, "Whatever our constitutions, whatever our laws may be, the only basic hope for a democratic society lies in the public sentiments of its people, namely its civic culture." This holds true for the emergence of biotechnology, which is likely to be enormously, fundamentally, and irretrievably transforming for the planet as a whole; we must tread very carefully indeed.

"A free society made up of free people" brings to mind the definition of freedom expressed by the Roman orator Marcus Cicero (106–43 BC): "Freedom is participation in power." Many centuries ago, an anonymous Chinese sage

commented, “To know and not act is not to know.” Inhibition and self-censorship that are concomitant with excessive concentration of power must not encumber free sharing of information by those who are informed.

Most of Mr. Nader's comments were related to food and applications of biotechnology, rather than to agriculture's expanding role in the twenty-first century, the theme of the Keynote Session. However, as noted, he did express support for the development of biobased industrial products.