

“The Creation and Patenting of New Life Forms: A New Assault on Academic Freedom?” University Honors Lecture, SUNY at Buffalo, March 20, 1988.

The Creation and Patenting of New Life Forms: A New Assault on Academic Freedom?

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by
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Introduction

The past 15 years has witnessed many revolutions: medical, social, political, technological. But one with some of the most immediate potential implications for the University has received surprisingly little notice in the academic community and almost none in the society at large. It is my task this evening to describe this explosion within the University and reflect on what it is doing to us all.

A review of some 15 years of advances in biotechnology and our attempts to come to terms with their possibilities will be useful to establish the framework of moral, valuational, and professional ethical questions that support our discussion this evening.

A Selective History of Our Times

A small group of fellow scientists in the early 1970's asked Paul Berg, a Stanford University scientist active in recombinant DNA research, . . . how confident he was that the [E. Coli bacteria, that normally inhabit the human gut, which he was planning to use as hosts for experimental combinations of DNA fragments] . . . would not create a virulent disease reaction in humans, or that the creatures could be confined to the laboratory . . . Berg saw the dangers that would ensue if pathogenic agents were created in such experiments and escaped. He called together a group of prestigious researchers . . . (1)
in what is now referred to as the Gordon Conference.

The Gordon Conference of 1973 raised a set of issues and questions about potential hazards to human health and the environment posed by recombinant DNA research and development. The results of this Conference were striking and dramatic, for the participants

. . . announced that until safety standards could be worked out, they would observe a self-imposed moratorium on using the technique with tumor viruses and with certain other potentially harmful sets of genes. (1)

Two years later, biotech scientists from the world over assembled at Asilomar, California, in February, 1975, at the invitation of Berg and the National Academy of Sciences. This conference, culminating two years of discussions among biologists about the safety problems of conducting recombinant DNA research, recommended lifting the moratorium under the installation of recommended, NIH-implemented guidelines for such research. The final form of these regulations was issued by NIH in June of 1976.

The public was somewhat slow on the uptake, but in some instances took up the debate with a vengeance. In 1976, the Cambridge, Massachusetts, City Council set up a citizens review board, composed of eight city residents chosen by the City Manager who were neither participants in the Asilomar Conference nor molecular biologists. This panel recommended that the research could proceed within the city, but only under controls more stringent than those approved by NIH. They also recommended a Cambridge Biohazards Committee to oversee all recombinant DNA in the city, and demanded Congressional legislation to establish standards for both for-profit and not-for-profit research, and to establish a registry of all workers in the field for future epidemiological studies. Great Britain's Parliament commissioned a group of scientists from other fields to assess risks and benefits of recombinant DNA research; this group brought back the Ashby Report in January 1995. The University Committee to Recommend Policy for the Molecular Genetics and Oncology Program presented a report to the Vice-President for Research at the University of Michigan in March 1976. There was a critique of the report, a response to the critique, and a defense of the original report, all subsequently presented to the Regents of the University of Michigan. Senator Edward Kennedy criticized the Asilomar and Gordon conference scientists' attempts at self-regulation, "because scientists alone decided to impose a moratorium, and scientists alone decided to lift it."

In addition to community, university and political discussions of the Conferences and their topics and recommendations, dissenting biologists took the public stage. George Wald, Harvard Nobel Prize winning biologist, called for confining all recombinant DNA experimentation to one or a few national or regional laboratories for purposes of confinement and supervision, and for bringing industrial research and development using these techniques under federal control. His colleague at Harvard, Bernard Davis, called for modification of the HIA guidelines on the grounds that they were too restrictive and would retard the spread of the techniques; he also argued that the dangers of recombinant DNA had been excessively exaggerated.

While the debate raged, the U.S. Court of Customs and Patent Appeals decided, in 1979, to permit patenting of new organisms from the laboratory. Within a year, General Electric scientist, Ananda M. Chakrabarty, won a decision against the Commissioner of Patents and Trademarks by the U.S. Supreme Court, permitting patenting of an engineered strain of *Pseudomonas* bacteria that can completely digest crude oil. (2) There quickly followed in the same year a successful patent by Boyer-Cohen of a process of cleaving and recombining plasmids, with a number of readily-conceived commercial applications written into the application: production of nucleic acids and proteins, such as medically or commercially useful enzymes, that may have direct use in producing hormones and antibiotics, fixation of nitrogen, fermentation, use of specific feedstocks, and so forth.

By 1980 Harvard president Derek Bok proposed to its faculty that Harvard become a minority stockholder in a biotechnological company and license that company "for exclusive use of a faculty member's patentable discoveries." The faculty of Arts and Sciences responded negatively to the proposal, and it was withdrawn. (6) Almost simultaneously, UCLA filed suit to protect its interests in a line of research begun at UCLA and later placed under contract to Genentech by the commercial firm, Hoffman LaRoche, for the production of interferon.

The public and scientific debate has largely been preoccupied since the 1970s and early 1980s with recurring fears and reassurances about the safety of recombinant DNA techniques. Jeremy Rifkin's public interest group successfully delayed the introduction of a strain of bacteria that prevents frost formation on plant leaves: it is now in experimental use in California. The editor of *Science*, commenting in an issue devoted to frontiers in recombinant DNA in June 1987, wrote:

How is it, now that the tools appear to be more powerful than was expected [at the time of the Gordon Conference], that there can be confidence that these experiments no longer threaten humankind? The answer has two parts. First, much is now known about the events that lead to

uncontrolled growth of cells and about the safe application of recombinant DNA. Second, experiments have revealed that genetic engineering has been occurring in nature for eons without catastrophic consequences Nature's genetic engineering through selection is much slower than modern laboratory manipulation, but it has been going on for billions of years. That fact can not only induce some humility in molecular biologists but also ease some fears of onlookers.

Yet within three months, the newspaper *The Scientist* reported a breakout of cancer in a French laboratory that was identical to that produced by the rare gene being inserted into viral transports in the laboratory's experimental protocol.

Rifkin is certainly right in noting, in his testimony before Congress, that we have failed adequately and fully to address questions of liability as well as safety. Apart from those essentially utilitarian concerns, however, there are less dramatic, less discussed, but all the more disturbing questions arising from the creation and patenting of new life forms. One of the effects of Asilomar seems to have been to divert attention away from a group of side-ranging, more philosophical questions. We not turn to them.

Are We Making Life?

There is a conceptual issue involved in the phrase, "creation of new life forms," and the conceptual issue lies in how and where to draw a line between "creation" of a new life form and "modification" or "manipulation" of an old one. As Dismukes has put it, to call intervention in the normal processes by which strains of bacteria exchange genetic information "Human handiwork" "wildly exaggerates human power and displays the same hubris and ignorance of biology that have had such devastating impact on the ecology of our planet." (3) Such arrogance perhaps leads to the notion that our understanding of the fundamental mechanisms of life is approaching completeness and that we are in a position to create nature after our own desires.

The conceptual link between "creation of new life forms" and an exclusive patent right is through those forms being the result of someone's own efforts. But of course the new life forms that are being produced by means of the technology of recombinant DNA differ from manufactured objects; even if we grant that a new bacterium is the product of some person's or laboratory's effort, its subsequent generations of offspring are not the products of human effort, but of natural bacterial reproduction. My Datsun, despite all my efforts to coax and coddle it, will never produce another Datsun. The capacity of self-reproduction is a hallmark of the distinction between living and nonliving; the notion of patenting a life form threatens to muddle our capacity to keep clear on such elements of thought.

L.B. Cebik has objected that, in granting the patentability of new forms of life, the Supreme Court is not undermining the concept of life. It holds that it is merely "necessary to determine whether an entity, living or inanimate, qualifies as an invention by determining whether there has been sufficient manipulation, directly or indirectly (e.g., via machinery or designed chemical processes), by human beings to qualify the resultant entity as human made." (1) But of course such a judgment will be valuational and philosophical. Short of putting together from non-organic elements a cluster of functioning genes and a cell body to house them, such research will always borrow from the "natural technology" of living systems, always be working within the natural confines of organisms not of human invention. Any judgment that a modified organism is human made has got to involve a deliberate turn away from the facts of nature.

Is Patenting New Life Forms Just?

"The stated purpose for granting patents is to promote the progress of science and technology . . . ,

[by] securing for a limited time to inventors exclusive rights to their inventions and thereby protect them from competition that could deny them the chance of enjoying the fruits of their labor.” (1) Since the development of modern recombinant DNA techniques is the produce of research that has gone on for decades under public funding in universities, there is a serious question as to whether a few individuals and companies should reap the benefits of the years of research sponsored by the public through its tax dollars. An altered bacterium is much more like a new technique than like a marketable product, in that it is the source of marketable products (at least in the cases of bacteria that produce insulin, interferon, and so forth). Ownership of techniques is highly dubious, but perhaps defensible when the techniques are human techniques. How can humans justly claim to own *bacterial* techniques?

In his important book, *A Theory of Justice*, John Rawls argues that one of the major ethical principles that would be universally elected in an optimal choice situation is the principle of difference: any social and economic inequalities, if they are to be morally defensible, must be arranged so that they benefit the least advantaged. (5) The application in the present case is straight-forward. Only if granting special rights of ownership of a patent and the benefits of its monetary returns to someone or a small group is the best way of achieving fair distribution of a research product collectively produced can such an uneven distribution of rights and benefits be defended. But we have already enormous problems in the uncritical assumption that the best way to achieve the widest distribution of the products of research is through commercial exploitation. What assurance is there that it will be profitable for the commercial holders of patents to produce the products desired by those with very limited resources? National health insurance or a full-fledged national health service would have served to open the benefits of research to the poor, but the current movement away from that and the reaffirmation that health care is to operate as much as possible on “free market” principles lowers our expectations that development will follow the dictates of need and not of profitability. Granting exclusive ownership of some part of the animal or vegetable kingdom provides no clear view of the goal of a populace for which the benefits of the technology should be justly and fairly attainable.

Furthermore, to entertain the idea of individual, corporate, or even university patenting of new life forms is to lose sight of the interest of society itself which has already entered into a social contract with the inventor, providing university facilities, laboratories, computers, salaries, benefits, and research funding through federal and state government grants. When this partnership is successful, one of the partners should not be entitled to the profits at the expense or to the detriment of the others.

Finally, we must look to the current pressures in Washington to slash the federal budget. It is understandable that universities and researchers, faced with increasing scarcity of federal funds for basic research, are jumping into the arms of business. As James Muyskens has put it, “The current shortage of funds and the lack of general support for basic research may be seen as the occasion to turn adversity to the researcher’s advantage. If the only choices are no research or research at the behest of industry with the researchers becoming industry’s well-paid servants, we would choose the latter.” (4) It is not hard to see that, in responding to the pressures of the federal deficit through developing their own corporate business identities, universities are opening a Pandora’s box.

Does the University Place its Traditional Roles and Values at Risk by Moving into the Arena of Corporate Values?

There are seven areas in which the values of the corporate marketplace clash essentially with the traditional values of the academy, undermining its educational and critical roles in society, and substituting contrary values for the traditional ones.

1. Replacement of Education of Students with Training Students as Technicians

The first, and in many ways most central function of the university has been education. This is the place in which the transmission of the cultural values of open criticism and free inquiry have ennobled young minds. This is the breeding ground for the next generation of educators. This was, until the revolutionary jettisoning of the structured curriculum in the 1960s and 1970s, the place where the uneasy clash of the natural sciences, social sciences, and humanities took place in the lives of all students. From this struggle emerged scientifically well-read, humanistically literate, and socially and politically passionate men and women to chart the course of compassionate wielding of knowledge throughout the world.

The transformation of the university into clusters of businesses and entrepreneurial centers endangers the tradition of liberal education, for it readily replaces the mind-opening, divergent functions of liberal education with the convergent closure of the technician's training. The young will increasingly look to the university not for education but for career training. Those of us in education for a couple of decades are well aware of the contrast between our intellectual lives as students and those of today's undergraduates. We went to college to have our beliefs hammered into convictions. We reveled in the struggle with the tough, perennial questions of the relation of individual to society, of causal explanation and personal responsibility, of why we are, of what purposes we shall serve. There are few places in society where, for a time, one can afford the luxury of coming to terms with destiny, with ideas, and with the love of learning for its own sake. The transformation of the university threatens a perhaps unique cultural function and role, essential to preservation of the broad, liberal values of our society.

2. The University as Conscience of Society: Academic Freedom

A second, closely related role of the university is to serve as critic of society and its mores, as Socratic gadfly wherein we indulge social criticism ranging from the anarchy of the far left to those of the far right, from theology's lofty but sometimes dismaying visions of our divine origins and callings to the social commentary of the naked streaker funning the gauntlet of communities that teaches the wisdom of mixing amusement with shock. Academic freedom, the protection by the university community of its faculty and students' rights of unfettered inquiry and criticism, has served, despite the assaults of the House Un-American Activities Committee and of administrators whose disfavor faculty and students provoke from time to time, to protect and further this role of the university as social and political critic.

Corporations generally avoid institutions like tenure, preferring the corporate culture of encouraging loyalty to the vision of corporate officers and discouraging internal criticism. Woe be the individual who dares to go public with criticism of a product or action of the corporate leadership. Isolation, demotion, dismissal, and blackballing of malcontents are standard corporate tactics to keep potential malcontents and critics in line. As the university moves in the direction of adopting corporate values and structures, will its role as social critic and its institutions of academic freedom and tenure be supplanted?

3. Secrecy and the Closing of Free Exchange of Ideas and Information.

Academic freedom is foreign to the corporation that, wedded to profit, may not tolerate the disruptive and disloyal questioning of the directions of corporate research and development by its agent researchers. But the corporate penchant for jealously guarding its most productive techniques through imposition of rules of secrecy, while forgivable as a part of the system of developing and distributing the proven fruits of technological advance, must be counterbalanced by the open and free exchange of basic and applied research results among individuals of differing institutional commitments. This is a fundamental fact of the sociology of knowledge: advances,

revolutions in thought, breakthroughs in solving intractable problems occur best in an atmosphere of open and rapid exchange of ideas, discoveries, techniques, and personnel between the laboratories and departments of the world community of scholars and scientists. For the university even to contemplate moving into the corporate research and development model risks the destruction of a well-spring of advancing knowledge.

4. Commitment to Objectivity About Safety, Risks, Benefits, Preferability, Efficacy

A fourth way in which the values of the corporation, driven by the profit motive, clash with those of the traditional academic institution relates to the previously-mentioned sources of accountability of these institutions. Corporations are ultimately accountable to their stockholders and lender. They must produce new products and services, introducing them in ways that capture lucrative markets. The primary commitment is to profit; the question of safety and efficacy of a corporation's products is subordinate to the question of profit. So is the issue of need, or preferability, of the public good. Universities, to the extent they are funded by public tax dollars, have a built-in incentive to serve and protect the public's interests in health and safety, and a mandate to watchdog the society's elements, whether governmental or corporate, in the public interest. It is no surprise that Jeremy Rifkin has not been invited to speak to the board of Genentech, or Ralph Nader to Chevrolet Corporation's Directors.

5. Whether the Search for Truth?

A former graduate student of a university researcher who had accepted a small grant from a commercial pharmaceutical house to investigate the efficacy of a new drug in an animal model applied to the corporation for further research finds. The application was met with hostility, the corporate representative commenting, "There's small chance we will fund any more of your research, since it didn't prove what it was supposed to under the last grant." Another graduate student was hired as a research assistant for a part-time law school professor with a full legal practice, who told him, "I want you to prove that Hobbes held for human free will." The graduate reported that his research had conclusively demonstrated that Hobbes was clearly a determinist and rejected any account of free will, whereupon the law professor dismissed him for not doing what he was told to do. These examples show how the pursuit of goals other than truth don't sit well in an institution traditionally committed to it, and illustrate the tension between the search for truth and the manufacture of results.

6. Getting Full-time Service from Someone with Outside Commitments

Sixth, those of us who work in departments in which some colleagues have developed businesses have noted with increasing dismay that fewer and fewer are around to perform the full, daily services of university education. (7) This is a symptom of the commercialization of education, of the diversion of its staff from a primary commitment to education and its requirements of scholarship and teaching, to the Corporation and its requirements of profitable productivity. Education comes off the poorer, for fewer are left to do its work.

7. Traditional Academics as Second-class Citizens

Finally, we witness today in the institution of the university a growing unease that the faculty member who is not bringing in income to the institution, in the form of research grants, is not paying his or her way. With the commercialization of the academy, we are a short step away from those whose presence is endured in order to maintain the appearance of an educational institution

serving the subordinate role of conduits for technicians and employees of our more entrepreneurial colleagues. In reporting the Harvard faculty's rejection of President Bok's stock ownership proposal, the journal *Nature* observed, "For a time, Cambridge seems to have been thick with anxiety about secrecy, academic freedom, and the like, but perhaps the clinching argument against the commercial venture was that the university could not, in the arrangements proposed, avoid discriminating in favor of those on whose research its financial prospects seemed to depend. In a college of supposed equals, some would be more equal than others."

Conclusion

This is not the first time that the academy has been confronted with a challenge to its role, integrity and traditions. But those of us who have been drawn to it because it represents the last bastion of unfettered thought and the fullest hope of continuity with the best in our culture's checkered past must view with grave concern this newest of those assaults. For the source is within our already flagging sense of who we are, as university scholars and teachers. Those of you who pause with us for a time, and especially those of you who contemplate joining the life of the academy, should not only monitor with care the progress of the university's flirtation with corporate identity but enter the open and challenging discussion of those tendencies. Your futures as potential academics, and the possibilities of your future children for a liberal education, may well depend on the outcome of this debate.

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