

Biotech: The Next Wave

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Related: see the introductory essay “In the Image of Capital: the rise of biotechnology,” FE #320, Spring, 1985

We are entering the newest phase in the technologization of the world. As microelectronics continues to encroach everywhere, capital is preparing the next wave—that of biotechnology or genetic engineering. Just as nuclear power promised to give us electricity too cheap to meter, so biotech’s publicity promises miracles: it will heal the sick, give children to the infertile, cure cancer, deal with chemical pollution and feed the starving millions. The implications of this technology are so vast and far-reaching that its prophets now speak of the coming biosociety, just as publicists of the computer speak of the information society.

We may be forgiven for approaching this publicity with a jaundiced eye. The last time a new technology came along to feed the starving millions, capital gained and the millions still starve. That confidence trick, the Green Revolution, was presented to the world with great fanfare: the solution to world hunger was at hand. Yet in the words of J.W. Mellors, chief economist of the Office for International Development, US Dept. of Agriculture, the entire program for the Green Revolution was “in the first place a fertilizer sales project.” We need to examine carefully the goods that capital is hustling at present.

The jaundiced eye is necessary for another reason as well. All the indications are that we will pay dearly for these new products/profits. Just as capital’s chemistry is a chemistry of death (from Agent Orange to Seveso to PBB’s to Bhopal), just as capital’s physics is a physics of death (from Hiroshima to Three Mile Island), so capital’s biology and the technology capital will build on it will prove to be a biology of death. Our long acquaintance with synthetic chemicals should make us wary of allowing capital to introduce synthetic biologicals. Each new step technology takes brings us a step closer to the end of life on earth. Biotech represents a deepening of capital’s project of world domination, a move to a qualitatively new level, a restructuring of the living world in capital’s image, for capital’s profit.

Capital is currently restructuring around biotech. The massive investment in this area over the past decade is an indication of its importance. The Office of Technology Assessment has described biotech as a new frontier for capital (here technology assessment can be seen for what it is: technology promotion). Biotech presents not only a whole new wave of products, but also a basic new production process, thus giving capital another possible escape route from its present global crisis: a new source of energy and raw materials is what the genetic alchemists promise capital. And just as the original alchemists hoped to transform base metals into gold, so the new biotech alchemists hope to transform base life into capital. Through building a whole new production cycle on this technology, capital hopes to avoid the crash that will result from its continued outrageous pillage of the world’s natural resources. Those of us who are the natives would need to keep a close watch on the biotech cowboys of the new frontier.

Capital’s new, improved biotech world also contains the promise of new, improved biotech people. While masquerading under a concern for the infertile, reproductive technology moves toward a new form of quality control of the human product, the child, Taylorizes the reproduction process and changes the child into just one more commodity. Here capital dreams not only of the perfect child (or more correctly put, the perfected child) but of the creation of super-races and sub-races and life immortal for those who serve capital best (and only for them).

Origins of Biotechnology

This new technology finds its origins in the development of molecular biology in the past forty years. This development has been traced to the decision by the Rockefeller Institute during the 1930's to support basic research in biology on the understanding that such basic research was most likely to lead to extremely productive (and therefore profitable) results in the future. (Just as research at the nuclear level in physics led to powerful results, so an unlocking of the basic levels of life could lead to similar power.) The orientation of molecular biology was reductionist; its language of molecular biology presents a cybernetic vision of life reduced to its very bases, with the emphasis from the beginning on control. Molecular biology is an extension of the mechanical model to the living world. Animals are not living creatures but information processing systems as, when it comes down to it, is that group of animals known as people.

The terminology of molecular biology reflects this image of life as machine: "The living cell is a highly refined and carefully regulated production unit. It is a perfected biological automaton." A species then is "a unique combination of genetic elements, forming a unique automaton which is characterised by its own combination of regulatory circuits," and "By crudely mixing the bio-automatons Man [sic] and Mouse in a somatic cell hybrid, we have combined two computers composed of the same basic elements but with very different regulatory circuits." In his book *Algeny*, Jeremy Rifkin quotes Thorpe and Zangwill: "Principles derived from control and communications engineering are being increasingly brought to bear on biological problems and 'models' derived from these principles are proving fertile in the explanation of behavior." He also notes that Thorpe and Zangwill point out that "living organisms are more and more being described in terms of their thermal efficiency, information efficiency, capital costs, running costs and other technologically conceived criteria, such that "the distinction between engineering principles and biological principles is beginning to blur."

According to Yoxren, "The molecular biological schema purports to describe all organisms as...information-processing machines." With this kind of vocabulary "it was easy for the public to see the 'cracking' of the genetic code as the unraveling of a computer program and the discovery of the double-helix structure of the DNA molecule as an explication of a computer's basic wiring diagram. This coupling of such a conceptual framework to one that sees man [sic] as a physical, object virtually compels the conclusion that man [sic] may be designed and engineered to specification" (Joseph Weizenbaum). Thus if molecular biology began as a scientific project to theoretically reprogram biology, it has now proceeded to the project of reprogramming nature itself. Its success will see the extension of the mechanical model to all living beings, the victory of the machine over the organic world.

Science the Handmaiden of Capital

Biotech also represents the epitome of science as the handmaiden of capital. The biotechnologists themselves have been among the first to see the potential profit in their handiwork, leading to a rash of start-up companies in the field and, for those corporations who have come lately to the field, to the game of buy-your-own university or hospital, etc. This has also led to a closing of ranks; an original concern for dangers suddenly disappears in tandem with the increased capitalization of the technology. The assurances of safety are of course a gigantic con-job, but that was only to be expected.

Biotech shows the same characteristics of all technology: It destroys diversity (in this case, biological) and standardizes the world., It grows exponentially (reproductive technology combines with fiber optics; reproductive technology combines with information technology, etc.). It destroys its competition and destroys all other ways of doing things (New, improved biotech seeds will wipe out their natural competitors; Hubbard has pointed out that reproductive technology will inevitably replace human procreation). It is autonomous, tolerating no judgment from without and accepting no limitations (Check out some of the biotech prophets' statements for proof of this). That biotech's results tend towards irreversibility can be seen from the fate in store for some of our food plants.

With biotech we can also see that the similarities between the two great power blocs that divide the world between them are greater than any imagined difference. One example will suffice: Goodfield reports that Dr. Geoffrey Bourne of the Yerkes Primate Center in Georgia received two letters from the Darwin Museum in Moscow urging

him to try an experiment he was contemplating, which would have as its aim the creation of a hybrid between gorillas and people.

It's not possible here to explain the technology involved (Jeremy Cherfas's *Man-made Life* is a good popular account.) What I want to do is to look at biotech's intervention in one particular area—that of seeds. Basically the same lessons are to be learned from any of the areas in which capital intervenes genetically—plants, animals, people. Since agriculture is the area which is most likely to provide returns for capital first (OTA says genetic engineering “can play a major role in improving the speed, efficiency and productivity of...biological systems”) it is the area I want to focus on.

Rich Pickings in Agriculture

The pickings for genetic capital in agriculture are rich ones. One 1981 study put the agricultural market potential of biotech at \$50 to 100 billion a year, including development of “improved” crops and breeds of animals, as well as such novel concepts as herbicide-crop pairs. The area of seeds is a reasonably major part of that market and is furthermore an extremely secure market. In 1978 the world seed market was valued at \$10 billion. A large part of this market is obviously in the Third World: in 1980 “developing countries” spent about \$7 billion on improved seeds.

The seed market has seen three major changes over the past few years, relating to technology, firm ownership and ownership of genetic resources. The technological innovation is, naturally enough, the one that has been most publicized. “Potentially any gene or genetic trait can be inserted into any plant to produce any results,” salesman and plant geneticist Raymond Valentine of the University of California, Berkeley, told the readers of *Newsweek*. This is the beginning of the Green Revolution.”

This is an unfortunate comparison for Mr. Valentine to make. The original Green Revolution was an outrageous example of the technological fix in action. Ignoring the social roots of the problem of hunger, it concentrated on providing a technical solution to what it defined as the technological problem responsible for world hunger—lack of agricultural productivity. The technical fix came in the form of the introduction of new high-yielding varieties (HYV) of plants into the Third World. (A pivotal role in the development of these HYVs was played by the Rockefeller Institute's financial support for research in the area from the 1940s on.)

While the introduction of these HYVs was supposed to increase food production in the Third World and thus miraculously feed the starving millions (who are starving because of the power and property relations in their countries which deny them access to land to grow food for themselves: the land is needed to grow cash crops for sale to the developed world), the HYVs presented major problems: while they demanded large amounts of fertilizer, water and pesticides (which are often unavailable or too costly) their output was often even lower than that of domestic varieties resistant to diseases, parasites and drought, while the domestic seeds were cheaper as well. The real effect of the Green Revolution is summarized in the table below showing countries' pesticide and fertilizer costs:

Year: 1965
pesticide costs: \$150 million
fertilizer costs: \$400 million
Year: 1970
pesticide costs: \$297 million
fertilizer costs: \$600 million
Year: 1975
pesticide costs: \$876 million
fertilizer costs: \$3.7 million

These figures represent spiraling price increases, not real increasing consumption. Since the Green Revolution aggravated the social causes of hunger, the poor are worse off than ever. The new wave of biotech seeds—inasmuch as they also are touted as a solution to world hunger—are set to repeat the experience of the Green Revolution, only this time with even more tragic results.

The introduction of new technologies into seed breeding is occurring in conjunction with two other major movements by capital. In one the traditional seed industry is being swallowed up, on one side by food multinationals like RHM, on the other by drug and agrochemical manufacturers such as Ciba-Geigy. The other is a major movement by capital to “develop” those remaining regions of wild genetic diversity still in existence. Obvious examples here are the “development” of the tropical rain forests of Amazonia and the destruction of central American rainforests to grow hamburgers for North America. A side-effect of this “development” will be a major loss of the remaining reservoirs of wild genetic diversity, while such generic diversity as remains in the developed world is also continually under attack by capital’s development.

Narrowing of Genetic Diversity

This narrowing of genetic diversity in the developed world stems directly from the industrialization of agriculture as well as capital’s general depredations. It has been estimated that 90 per cent of the fruits, vegetables and corn varieties that were grown in the US in 1900 aren’t around any longer. Botanists in the US Fish and Wildlife Service estimated in 1982 that 3,000 plant species in the US may disappear in the next few decades.

Primary causes include strip mining, water and air pollution, the spread of housing and industrial developments, and over-collection by commercial concerns and hobbyists. Others have estimated that by the year 2000 perhaps 20 percent of all species will have disappeared and possibly 30 to 70 percent of the world’s plant species.

The vertical integration into seeds by two highly concentrated and integrated production sectors and the destruction of free and wild genetic resources find their connection in the patenting of seeds, the transfer of a common resource into private property, the transformation of the seeds of our food into genetic capital. This seed patenting—and the later more general gene patenting—makes it possible for capital to own life. Capital is now moving to take final control of the food supply on this planet. And capital is doing this in the traditional way: cornering the market and wiping out the competition. Eventually we will be able to eat only what capital allows to be grown. Already multi-nationals are cornering the markets in various seeds. This patenting of seeds was essential for the multinationals to move into the seed market: the first week after the UK plant breeders’ rights act was introduced, Rank Hovis McDougall bought 84 seed companies.

This presents corporate capital with the possibility of unparalleled power. As Pat Mooney says, “If you control the seed, you are on the way to controlling the entire food system; what crops will be grown; what inputs will be used; and where the products will be sold...Any person or group controlling successfully a certain variety of genetic resources—whether it is stored in a cold-storage depot or is grown on a certain marked-off area—exercises indeed an almost absolute political and economic power.” Thus the corporations become avid seed collectors and custodians. It’s also worth noting that state capital has copped on to this as well: the USSR started conserving genetic resources early and is claimed to have the most extensive seed collection of wild and cultured plants.

Needless to say, companies which dominate breeding of certain varieties will be concerned with maximizing acreage to force competitors out of the market and enjoy the advantages of monopoly. The new seeds also have the marvelous benefit, for capital, of wiping out their natural competition, as the new varieties will destroy local competitors. The *Global 2000* report notes “High-yielding varieties are being adopted everywhere, replacing the myriad native strains that local farmers have developed over centuries. These strains, often uniquely suited to local conditions, are rarely preserved when farmers shift to high-yield varieties.” Just as pesticides and fertilizers destroy their natural competitors, thus increasing agricultural dependence on chemicals, so the new varieties of plants will replace their former natural competitors.

Yet the new varieties are also weaker. Selective breeding actually undermines the species’ general ability to survive. To quote Rifkin again, “Studies over the years have shown that when a species is bred to eliminate genetic diversity, the resulting homogeneous strains lack the variability necessary to promote their survival.”

Already it is recognized that new high yield varieties of corn lose their resistance to particular pests within ten years, thus necessitating the introduction of yet another product. The new seeds that capital will develop for the global market will be stunning in their uniformity, and this production of new seeds for the global market will lead

to the disappearance of older and more regionally appropriate varieties as they cannot compete economically with the global economies of scale the new seeds will profit from.

A Spectacular Poverty

These new seeds will therefore be open to the same dangers as assailed the uniform Irish potato crop, leading to the Irish famine in the 1840s. The possibility of major crops being wiped out is now being spoken of as a not-too-distant danger. If the previous mechanization of agriculture led to the loss of hundreds of varieties of apples and pears, then the present mechanization may lead to the actual disappearance of corn or maize or carrots. This is indeed a spectacular poverty to impose on the world.

Yet capital will be able to turn even minor genetic catastrophes to profit. If a variety of plant is wiped out, development of a new variety will cost more: therefore prices will increase and with them profits. The pesticide treadmill will be joined by a seed treadmill, with new products constantly being introduced by virtue of the nature of the technology itself—not just the technology of seeds, but the overall agrotechnology of which seeds are becoming a central part.

While the use of genetic engineering in plants is still only at an exploratory stage, its use in animals is far advanced. We are familiar enough at this stage with factory farming, with the image of animal as product and as machine and with it the “need” to increase productivity. This emphasis only on those aspects of an animal’s life that lead to greater productivity and profitability has led to the various concentration camps and prisons involved in the practice of factory farming. These will seem like nothing compared to the indignities capital intends to commit on our animal brothers and sisters in the next stage. (See for instance Business Week’s image of the coming cow—a veritable factory for the production of milk and other agricultural products.)

In pursuit of this image, diversity of animals is already being reduced. “Due to artificial insemination, changes in livestock populations that might formerly have taken centuries now take place in a few decades. About 80 percent of the cattle strains indigenous to Europe and the Mediterranean are threatened with extinction.” (*Global 2000*). Even within the chosen breeds, diversity is being dangerously diminished: prize bulls’ semen is used to fertilize prize cows and up to 40 embryos can then be transferred to be carried by less prized and productive animals. This lack of diversity will spread as thousands of animals will be raised from one animal’s seed. This increased breeding for specific traits—only those linked with productivity—will diminish the animal’s overall survival capacity through diminishing variation in the available gene pool.

Even if we ignore the poetic arguments for diversity and vitality, this simplification of the environment is a major threat to the continued health of the environment. In a simple system, a blow against one constituent of the system can have a major effect on the whole system, while a similar blow against a more complex system can be more easily absorbed. In the field of food, the dangers of simplification and uniformity have been amply demonstrated.

A Qualitatively New Project

The preservation of genetic diversity has been recognized as a basic asset for continued planetary survival by such august bodies as the U.S. National Academy of Sciences and the *Global 2000* report. Supranational bosses’ organizations express concern at the possible future loss of essential genetic diversity; the American Chemical Society’s *Environmental Science and Technology* magazine recently printed an article presenting this genetic diversity as “genetic capital” just waiting there to be exploited and whose destruction through shortsightedness lessens critically the amount of natural capital available for circulation.

Capital has always advanced through the destruction of diversity and the simplification of the natural environment. Only that which can exist on a balance sheet is important: all else is externalities. As Jacques Camatte remarked in *Against Domestication*, “The earth’s diversity of life forms has always been a sign of its health. But now capital erases this variety by rationalizing as many life processes as it can grasp. It reaches into every remote and

once-beautiful part of the world, claiming that all independent life and the support-environment of that life is now nothing more than 'material' for capital's own processes. What was once autonomous from any singular purpose but crucially linked to its surrounding ecology, is now yanked from such a context into the monolithic, monocultural use of capital: everything is nothing more than feed for the ravenous commodity-producing machines."

Up to now capital has contented itself with subordinating the natural world to its economic cycles, returning it to the rhythms of the market (using hormones to hasten fattening and growth, etc.).

What is involved now, however, is a qualitatively new project. The biotechnological project involves restructuring the natural world not as heretofore in the destruction of those living beings external to capital's project, or an obstacle to its progress, but in the creation of altered and then new living organisms—plants and animals now, people later—whose reason for existing is that they serve well the function of valorizing capital. Biotech promises a new world based on the logic of the market—a world made over in the image of capital, where what is important about tomatoes is not their taste but their ease of packaging and processing, where the whole natural world is redesigned to fit in with commodity production.

That this world will be an impoverished one is beyond question. "As bioengineering technology winds its way through the many passageways of life, stripping one living thing after another of its identity, replacing the original creations with technologically designed replicas, the world gradually becomes a lonelier place. From a world teeming with life, a world spontaneous, unpredictable, dynamic, rhapsodizing, we descend to a world stocked with living gadgets and devices, a world running smoothly, effortlessly, quietly, without feeling. In the end, it is companionship we give up, the companionship with other life that is at once both indescribable and essential, and without which existence becomes a meaningless exercise." (Rifkin) Just as with electronic communications technology, we are rapidly fabricating a total psychological environment for ourselves; so now are they intending to create a total physical environment for us. In both cases the original (in the first case meaning, in the second case biological uniqueness), is destroyed and replaced with manufactured simulacra.

In spite of the fact that gross simplification of the biosphere is a recipe for increasing vulnerability and disaster, long-term considerations cannot stop the immediate search for profit. Capital continues to think and operate only in the short-term, despite its many planners and forecasters. This has already been shown by the undermining of life through the proliferation of nuclear and toxic production.

Considering this, one Irish comrade has formulated the situation thusly: "If the nuclear state is the end of the logic of growth, then the toxic state is the growth of the end of logic." The problem here is that capital has only one logic—the logic of accumulation and the market—and this is a very thin logic on which to base the construction of a living world.

Reduction to One Logic

Reduction to one logic—and a simple one at that—leads to ignorant tampering with whole complex systems on the basis of simplistic understanding. Thus in "medicine" women are topped up with hormones to affect one part of the system—the reproductive system—and our medical wizards are surprised when they discover this affects other parts of the same system. With the complexity of ecological and biological systems, it is particularly dangerous to intervene on the basis of ignorance. (For one example, how are we to know that "nonsense DNA" does not perform some important function we cannot guess?) Yet those scientists exploiting the biotech area happily proclaim their ignorance, their logic being that since there is so much still to be known, there will be so much more to exploit as their knowledge of the area grows. Ignorance to these people leads to no suggestion of restraint.

The publicists of the new biotech congratulate us that we are living in interesting times, at the beginning of a new era. "The redesign of existing organisms and the engineering of wholly new ones mark a qualitative break with humanity's entire past relationship to the living world." (Rifkin) Biotech's blithe apologists can see this new relationship only as a good one. Peter Singer, having lost all the sense and sensitivity he displayed in his book on animal liberation, proclaims: "If the creation of new forms of life seems a god-like power, what more noble goal can humanity have than to aspire to it?" He notes also that "we have before us the prospect of acquiring supremacy over the very forces that have created us." While Jonathon Glover advances the slithery argument that we should

look at the creation of subhumans through mixing human and animal lines not as a subhuman to be pitied but as a super-animal whose existence we have enriched. As Wizenbaum says, there are more than enough people who are willing to sacrifice the human population for science's sake.

Another comrade, facing the nuclear issue, had this to say: "Maturity is the wisdom not to use all the power you have. 'Taboo' is what to do while you're waiting for wisdom. It's not like law exactly. Laws are political; taboos, religious. If a taboo has to work, something has to be sacred. Your next question is precisely the right question."

Like the man said, what we need now is the wisdom not to use methods whose effects we can't judge. But we're not going to be given a voice in this matter unless we force them to listen. So far no one has been asked to approve the use of these methods. They are already in use and will continue to be used, as the opportunities they offer capital and the state are too great to resist. For our children, says Rifkin, "Nature will no longer be something they are born into, but rather something they program."

We are entering into a decade of genetic confrontation. This confrontation is likely to lead to some strange and unusual alliances, as radical feminists and traditional church people oppose reproductive technology, animal activists attack intervention in animal genetics and environmental and worker activists oppose the dangers of industrial biotechnology. Our first priority must be to demystify and attack the uses of this new technology, exposing who benefits from it and who suffers. The stakes in this struggle are the highest we have come up against yet, but are also an indication of how far capital may fall if we succeed.

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