Jeremy Rifkin:
fears of a brave new world

Interview by Amy Otchet

The most chilling prospect of all is letting the marketplace and consumers decide the future

Will wars be fought for the control of genes in the 21st century? Jeremy Rifkin fears the worst and explains why

What is the Biotech Century?
Our futurists have too narrowly defined the twenty-first century as the information age. In fact, a far more profound shift is taking place in the global economy. Computers and genes are beginning to fuse into a single powerful technological and economic force that is laying the foundation for the biotech century. Computers are increasingly being used to decipher, manage and organize the vast genetic information that is the raw resource of the new global economy. Already multinational corporations are creating giant life-science complexes from which to fashion a bio-industrial world.
There are tremendous short-term benefits—new plants and animals, new pharmaceuticals and energy sources. But it is naive to believe that these benefits come with no costs. The environmental, social and ethical implications of this science are chilling. Will the creation of cloned, chimeric and transgenic species mean the end of nature? Will the mass release of genetically engineered organisms into our biosphere mean genetic pollution and irreversible damage to the biosphere in the twenty-first century? What are the risks of making a “perfect” baby?

But how does this differ from our long-standing struggle to redesign nature?
It is true that we have been engineering nature since the dawn of the Neolithic revolution in agriculture, but the new gene-splicing technologies are qualitatively different. In classical breeding, it is only possible to cross close relatives in the biological kingdom. Today, however, we are no longer constrained by these biological boundaries. For example, scientists have taken the gene that emits light in a firefly and injected it into the genetic code of a tobacco plant, which when fully grown, glows twenty-four hours a day. We have not seen that in evolution. Genetically engineered plants, micro-organisms and animals bring greater risks.

In discussions surrounding the use of gene therapy to cure or prevent

human disease, you raise the question as to who should decide what is a "good" or "bad" gene. Are we heading into a new age of eugenics?
Yes, but it doesn't bear any resemblance to what we saw in Nazi Germany. The new eugenics is not social eugenics. It is banal and friendly. It is commercial and market-driven. Soon, prospective parents will be able to programme the biological future of their unborn children. They will feel pressure to rid their children of "undesirable traits". If you knew you were going to pass on a gene for leukemia, wouldn't you like to eliminate that from the sperm or the egg? And what about obesity or near-sightedness? Once we begin this journey, there is really no place to stop. Chilling eugenics issues will arise as we begin to see our children as the ultimate shopping experience.
We already see this happening. In the 1980s, the Genetech and Eli Lilly companies were awarded patents to market a new genetically engineered growth hormone to the few thousand children suffering from dwarfism in the United States. By 1991, the hormone had become one of the best selling pharmaceutical drugs in the country. Clearly, doctors were prescribing the drug to children who were just shorter than their peers. The companies are now pushing doctors to redefine normal shortness as an "illness".

Some critics have branded you as an alarmist—they consider your views to be anti-science. These critics go too far, but at some level, do you feel that we should restrain this new genetic science?
I believe that genetic science is invaluable; the question is not the science but the technological application of that science. We must choose between a hard path and a soft path to the twenty-first century. In the case of agriculture, for example, the hard path would lead to genetically engineered plants, environmental risks and health problems.
In contrast, the soft path would mean using the same genetic sciences to create a sophisticated and sustainable organic agriculture. The rule of thumb we ought to apply is clear: do no harm. Secondly, always choose the path that is least likely to foreclose opportunities for those not yet here and the one that is most able to sustain relationships instead of draining them.

Who is behind this new age of genetic commerce?
Giant life-science companies are manœuvering to control genetic commerce in the twenty-first century. The mergers and acquisitions going on in the life science industry rival those in the telecommunications, computer and entertainment sectors. The giant chemical companies are beginning to sell off their chemical divisions to concentrate solely on the life sciences. They are making the shift from the petrochemical age to the age of genetic commerce. Genes will be the primary raw material of the coming century just as oil, metals and minerals were in the colonial and industrial era.
The name of the game is patents. In the next ten years, we will have isolated virtually all 60,000 genes that make up the blueprint for the human race. Virtually every one of those genes will be the intellectual property of these life science companies for at least twenty years.

The whole idea of patenting genes is a scam. Under US and European statutes, you have to prove that you have invented something that is novel, non-obvious and useful. So consider the example of a chemist in the nineteenth century isolating helium which is not obvious and certainly useful. Now that chemist can patent the technique used to isolate helium but not the element. That's because helium is not an invention but rather a discovery of nature.
But in 1987, the US Patent Office issued a simple paragraph saying that it was possible to patent any genetically modified life form except a human being after birth. The only reason for excluding patents on humans is that the US Constitution forbids slavery.

But aren't you oversimplifying the issue. The patents don't really cover the genes. They are awarded to companies and researchers to legally protect the methods invented to isolate or use them.
They are actually patenting the genes. There are patents on thousands of human and animal genes. For example, Myriad Genetics has isolated a gene that causes breast cancer, especially in Ashkenazi women (of Eastern European Jewish origin). The company has a patent on that gene—it is their invention. If any woman in the world goes for a screening for that breast cancer gene, part of the fee that she pays is in the form of a royalty to the company.
Imagine the case of a chimpanzee with one human gene in its genetic code. The patent office would now consider that entire chimpanzee to be an invention. This is a gross violation of the mandate of the US Patent Office and its statutes. We are now challenging this in the US patent system.

How can you effectively try to counter this trend given the tremendous financial stakes involved?
I have joined with the distinguished cell biologist Dr. Stuart Newman of New York Medical College. We have submitted a patent to the US Patent Office containing thirty claims covering all the human-animal chimeras (human-chimpanzee chimeras, human-pig and other combinations) for medical purposes. As of now, there are no existing patents on this kind of chimera.
If we are granted this patent, we will claim a "genetic conservancy" to forbid any researcher from crossing human-animal boundaries with embryonic cells for twenty years so that countries can have the time to debate this issue and hopefully pass the appropriate legislation to outlaw all transgenic organisms. We are also seriously considering whether to test the patent statutes in the European Union.

The US and the World Trade Organization in particular have been pressuring developing countries like India into adopting the US model of patent laws to protect their natural resources from exploitation. How would you advise them?
Two positions are being championed. I think both are inappropriate. One position is that of the life-science companies. The other is that of many of the developing countries who are saying, "Look, these are our resources, just as oil is in the

Middle East. We should be compensated. Otherwise, it is biopiracy."
But how do you ever compensate for the blueprints of life? Secondly, who do you compensate? Indigenous knowledge and resources cross all tribal and national boundaries. For example Merck and Company have an absurd relationship with Costa Rica. They give a local non-profit institute a million dollars for access to all the country's rich genetic diversity. Who does this institute represent?
The gene pool should not be reduced to commercial exploitation by either governments or companies. I am hoping that genetically-rich countries like India will take the lead in developing a third way in which we keep the gene pool open—as we did with Antarctica—by covenant and treaty. If this doesn't happen, we are going to have gene wars in the twenty-first century as we had wars over oil, metals and minerals in the industrial era. This commercial competition and conflict over ownership and control of the gene pool will further divide the haves and the have-nots.

If this is such an important issue, why has there been so little public debate? Is the media to blame?
For the most part, the science and business journalists have treated the issue anecdotally, reporting on a new food crop here or a medical breakthrough there. Some of the science writers have a cozy relationship with the molecular biologists and the biotech companies which they don't want to jeopardize. They also don't feel confident in challenging the scientists. But more importantly, the media have not yet understood the larger context because they have focused so closely on the information revolution. But once the context shifts to the broader economic arena of genetic commerce, all of the issues we have discussed will be on the public agenda.

Is the industry trying to hinder this debate?
There is no conspiracy. Its just that the commercial floodgates are opening very quickly and the biotech business leaders are just trying to make as much money as they can and advance their portfolios as fast as possible. They don't even see the broader context. The last thing they want is to be slowed down by debate. They want to believe there will be no problems.
At a deeper level, there is a new libertarian streak which insists that the market should be the final arbitrator. This way you can avoid a debate and just assume that the marketplace will decide as to what kind of technology should be used and how. To me, the most chilling prospect of all is letting the marketplace and consumers decide the future evolution of our species and other creatures.

But how do you explain the vehemence with which scientists respond to anyone questioning their work?
There is a certain arrogance in science, especially when a particular science is coming of age. We saw this with the chemists and physicists and now we see it with the biologists. This arrogance is rooted in the old Baconian science which is based on power. Bacon called nature a "common little harlot. She is wild. We must tame, squeeze, mould and shape her," he said. "Knowledge is power. We

can be the masters of our destiny."
Many microbiologists—but not all of them—find it exciting to be able to control destiny, to be able to be God. They are the only ones who can not only decipher the code of life, but administer it. They believe that if we were capable of understanding their work, we would be in favour of it. But for them being informed means knowing it as they do and accepting their moral view of it. These scientists do not really believe in the democratic process. We saw the same thing with petrochemical pollution and nuclear energy.

Is there a link between this arrogance and the growing disregard for the idea that a species has an essential nature or an intrinsic value?
Yes, this is critical. Living beings are no longer perceived as birds and bees but as bundles of genetic information. All living beings are drained of their substance and life becomes a code to be deciphered. There is no longer any question of sacredness or specialness. How could there be when there are no longer any recognizable biological boundaries to respect? In this new way of thinking about evolution, structure is abandoned. Everything is pure process. So you can mix and match, and cross anything you want in the biological kingdom.
The laws of nature are being rewritten to conform with our latest manipulation of the natural world. The old Darwinian notion of the "survival of the fittest" is being replaced by the "survival of the best informed". Human beings, the best "information processors" in the biological kingdom, are now advancing the evolutionary process by reprogramming nature using genetic engineering tools.
This new cosmology offers the ultimate justification for a hard-path science. It assures us that we are following the natural order of things and simply moving in the same direction as nature has already set out for us. In the next step on this path, molecular biologists won't speak of genetic engineering, which is too cold. Instead they will consider humans and other creatures as unfinished works of art. Biotechnology will be seen as powerful "artistic tools" allowing us to finish the canvas.

After a frightening outlook for the next century, your book ends with "the rest is up to us". This is frustrating. What can we do?
It would be absurd to lay out blueprints as to what should be done. Instead, I have made a diagnosis of two different paths for the next century. It is up to the public and the next generation in particular to politicize and argue, challenge and express their views in the streets, in the courts, the media, and so on.
When great technological and commercial revolutions sweep over civilizations, there is always a window of opportunity to deal with the changing power relationships and ask what we want.
We have to see past the myths that science is value-free and technology is neutral. If you start with the idea that the life science corporate agenda is simply the next stage in evolution—that just because we can do something means that we should or will do it—then there is no point in having a debate.
By recognizing the power of the new technologies, we should ask: is that application an appropriate use of power? Is that power manageable or

uncontrollable? Is that power going to potentially foreclose our options or the options of those not yet born?

Aren't you being rather optimistic? Don't you think that the lack of debate reflects a serious flaw in society's institutions?
I am neither an optimist nor a pessimist. I don't know if this generation will do the right thing. But I am hopeful that it will. It can create different avenues for change instead of relying on the institutions of society which maintain and represent the status quo.
However, activism is not just about shouting from the rooftops. Our passion and intuition have to be built into an intellectual framework. We must not only have a basis for discussion but an alternative vision.

Do you believe that public opinion will have the sway needed for a soft path to the biotech century?
I am saying that there is no public opinion yet. Once the focus shifts to genetic commerce, debate will escalate exponentially—not just on the part of activists but also within industry. This is not just big corporations against the citizens—there will be a push and pull in the marketplace.
In agriculture, for example, there will be a major battle between organic producers and distributors and the biotech companies for consumers. The same will be seen with medicine and health. The pharmaceutical companies are going to push hard path drugs (which I don't necessarily oppose) and further down the line somatic and germ-line therapy. On the other side, the insurance companies will push to use the same science to produce sophisticated preventive health care rather than paying for expensive drugs and therapies to heal the sick.

Does UNESCO have a role to play in the debate?
It would be interesting if UNESCO could provide a galvanizing place so that the non-governmental organizations could have more sway. UNESCO doesn't necessarily have to take a position but through the International Bioethics Committee it could offer a forum to debate the complexities of these issues.