Tech Flesh 2: An Interview with Greg Bear

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CTheory: First, we would like to begin with a general question about science fiction, and your position as an SF writer. How would you characterize your work in relation to the actual sciences of genetics and biotech? What do you see as the role of SF in relation to the sciences?

Greg Bear: Science fiction has always functioned as an interface between scientists and the interested lay public. A fair number of scientists write SF, in part to relax, in part to publicly explain ideas near and dear to them and also perhaps to play with ideas their colleagues wouldn't appreciate seeing in formal journals. Many, many more scientists enjoy reading it (if they have time, after the journals, to read anything!). But SF also opens up the playing field to artists and writers who can explore scientific issues in ways scientific journals don't or won't. Social modeling of the implications of scientific discoveries is necessary to both science and society whether it be positive or negative or balanced!

I love talking with scientists and researching their work. Since I don't have to go after grants, or deal with academic institutions, I'm also free to explore notions and possibilities that could get working scientists in real trouble. That brings along both responsibility I try to get all the facts right and a sense of humility, when I realize how difficult it is to work in science today. Scientists do much of the modern world's heavy lifting.

CTheory: Your SF novels *Blood Music* and *Darwin's Radio* both deal with the ways in which genetics and biotech transform the human condition. But they also seem to be very different versions of what that transformation entails. What was the driving force behind these two books? Is there a connection for you between them?

Greg Bear: *Blood Music* followed hard on the dawning of my realization that DNA is a self-organizing cybernetic system a kind of neural network. The implications of that were staggering and at the time, working off my debt to visionary science fiction, I wanted to carry the idea quickly to its ultimate conclusion which came to resemble the worst nightmares of the early pioneers of nanotechnology. It's a parable of the consequences of knowledge and evolution of what happens when biological systems acquire supreme control over their environment. Some view it as a scary horror novel others as a tale of religious transcendence. To me, it's both change is both scary and enlightening.

Darwin's Radio follows on from biological speculations I made in two novels, *Legacy* and *Moving Mars*. I had postulated different kinds of biological systems on other planets, particularly in*Legacy*, which takes place on a planet aptly named Lamarckia, where the "masters" of ecosystems called ecoi survey their environment before making decisions as to what sort of new life-forms to put out in the "marketplace." With some chagrin, as I did more research in the late nineties, it became clear to me that, first, bacteria functioned as social organisms, with multicellular aspects and extraordinary abilities to cooperate, and then, that all elements in ecosystems probably did much the same thing, in many different ways. The final "revelation" took me back to *Blood Music*, with the growing conviction that every element in nature was also a web of competition and cooperation, the whole and the parts being much more aware of the environment, and able to react to it, than current theory allowed. DNA was once again "smart," and part of a layered series of natural "minds," able to make educated decisions and take risks. This was a bombshell to me and I knew that it would be to working biologists, as well. So I drew back from the more extreme SF elements of *Blood Music* and wrote a contemporary tale of human speciation, with a lot of informed debate about modern biology, biotechnology, and the implications of what we're learning as we unravel the genome. (I was so excited by what I had learned about bacteria, however, that I slipped a scientist giving a speech on the topic into my near-future crime novel, *Slant*, published a few years before *Darwin's Radio*.)

CTheory: In *Darwin's Radio*, we see the social and political consequences of radical evolutionary change, from mass media hysteria to the intricacies of governmental organizations such as the CDC. Do you think we're prepared as a society for the changes which genetics and biotech have to offer?

Greg Bear: Society is remarkably flexible, but the way it absorbs change is interesting more than just debate, there must be challenge, competition, argument, even fighting. People of good will can disagree violently at times and then, as more facts come in, as society is given a chance to absorb the new material and viewpoints and adapt to them, people change sides, stability is reached, and a new way of thinking is put into place that transforms our views of our world. It's a biological process!

CTheory: *Darwin's Radio* also contains some interesting discussion about biological evolution and its relationship to sociobiology that social phenomena are driven by and can be explained by biology. What is your own view of sociobiological thinking? Was it important for you that the SHEVA virus was "naturally occurring" and not a product of genetic engineering?

Greg Bear: We can be awfully self-important when we try to assess our impact on nature and with good reason, because we're having a remarkable impact in a short period of time. But we're still subject to natural systems and their rules, and we're still open to surprise. I'm not an ideologue when it comes to how society is driven by biology except that I believe human society is firmly rooted in biology, and that biology, top to bottom, has a lot of interesting resemblances to social systems.

I once convinced a sociologist working for a government think-tank that DNA was a social system, but she balked at my description of social systems as biological! I suspect that many sociobiologists will strongly disagree with my observation that genes are social that while genes are often selfish, more often they must get along with hundreds of other genes to get any useful work done. That means that most genes are more like a Union laborer than a Hanta virus or a ravenous tiger.

Perhaps the simplest expression is that the tension of cooperation and competition found in society is the hallmark of every layer in living nature.

CTheory: As a non-scientist and an SF writer, which areas of genetics and biotech research intrigue you the most? What do you see as some of the most promising aspects of genetics and biotech? What are some of its pitfalls?

Greg Bear: All aspects of genetics and biotech are intimately related for me. What you learn in one discipline has almost immediate applications in another if you have the right conceptual tools. What causes me irritation now is watching brilliant biologists, doing exceptional work, trying to interpret their findings based on theories that seem to me totally inadequate to the task at hand. I have had the dizzying experience, several times, of reading about groundbreaking biology experiments, guessing at the outcome of the experiments before the paper has revealed them, and then watching the working scientists backpedal, express their dismay, or hide their real thoughts on what the experiment has revealed all the while expressing surprise that the experiments turned out as they did. I'm not psychic; I'm just using a different set of conceptual tools, as yet crudely shaped, unrefined, in some cases poorly conceived, but, I think, very promising nevertheless.

CTheory: *Blood Music* takes the reader on an incredible, intensive extrapolation from Virgil Ulam's biotech lab to an entire city composed of "wet" cells, individually and collectively communicating a unique form of consciousness what Virgil hears as the "music in the blood." Do you see this novel as an apocalyptic novel, a novel of transcendence, a cautionary dystopia, or something else? Is there some fascination with the "nonhuman" at play here?

Greg Bear: We are not who we think we are. The mind is the brain and body working together and reacting to the environment; the brain by itself cannot explain mind. In Western culture in particular, our inheritance from the Greeks and the Enlightenment is a kind of fiction about the role of Self and mind that people in other parts of the world Japan or India, for example find puzzling. The human mind is made up of elements that, if analyzed objectively, turn out to be remarkably "unhuman" in the Western conception. In other words, we are made of layers of different sorts of biologically based minds, strongly interconnected, but performing different tasks at different times in our lives, using shared resources. The conscious mind which is still consistently regarded as the true and reliable Self in our culture reacts after the fact to what these other minds do. Consciousness is a social interface, mandated by our nature as social animals. The conscious self is very useful, sometimes serving as a critical judge, after the fact, of our emotions and actions, but it's not the one in charge much of the time. (Marvin Minsky's *Society of Mind* is a key text in this debate, as well as Julian Jaynes and William James, Jung, and Freud, all of whom had different approaches to the same fascinating problem.)

In *Blood Music*, we are simply forced to meet all of our aspects in a democratic debate that includes the voices of the body, and most of us get voted out of office.

CTheory: Finally, if you could clone anyone in the world (but not yourself), or if you could hybridize any two people in the world (but not yourself as one of them), who would it be?

Greg Bear: Chiune Sugihara, the Japanese diplomat with the extraordinary social conscience, and Barbara McClintock, who first understood the ecological nature of the genome. (Tomorrow, a different set of names!)

Greg Bear is the author of *Darwin's Radio*, *Blood Music*, *Queen of Angels*, and *Slant*. His next novel is entitled *Vitals*.

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