

*The Sun, the Genome, and the Internet*, by Freeman J. Dyson

reviewed by [John R. Albright](#) in the [August 25, 1999](#) issue

An English theoretical physicist, Freeman Dyson came to America after World War II and held a coveted position at the Institute for Advanced Studies at Princeton. Now retired, Dyson has one of the most interesting minds of our time, concerned with topics ranging far beyond relativistic quantum field theory, the discipline that made him famous among physicists. In this book, the result of a series of lectures presented at the New York Public Library in 1997, Dyson's stories about science are accompanied by interesting digressions into history and politics.

One of Dyson's purposes is to take issue with the late Thomas Kuhn, the historian of science who taught us to use the word "paradigm" to mean a collection of scientific models that is both coherent and extraordinarily resistant to change. Kuhnian orthodoxy holds that scientific revolutions—the replacement of one paradigm by another—are spurred by the advent of superior ideas, almost independent of experimental data. Dyson believes that scientific revolutions are driven by hardware, not ideas. He tells how he once explained this directly to Kuhn, who in turn bellowed, "I am not a Kuhnian!" In science, as in religion, the founder of a new faith often rejects what the disciples have made of it.

Dyson's quarrel with Kuhn's disciples centers on the question of scientific realism. Like most scientists, Dyson believes that there is an objective reality and that it is our task to describe it as best we can. Kuhn's ideas are often invoked to support constructivism (the notion that the only reality is the one that humans construct) or deconstruction (the notion that traditional modes of thought, such as the concept of objective reality, are too restrictive and must be abandoned).

Dyson recounts the story of the hoax perpetrated by physicist Alan Sokal, who wrote a scholarly sounding but nonsensical paper, submitted it to a journal committed to the principle that science is a social construct, and got it accepted and published. The paper, cleverly written in academic jargon, purported to show that the physics of gravitation and quantum mechanics achieves validity only through its connection to the social forces of capitalism, militarism and patriarchy. (Dyson thinks that a biologist wouldn't be able to pull off such a hoax; a virus is for real.)

Another of Dyson's purposes is to engage in futurism, as he did in his 1985 Gifford Lectures, in which he pointed to three topics crucial to the future: genetic engineering, artificial intelligence and space travel. Genetics will continue to be important, he says, but he now thinks solar energy and the Internet will be more significant than the other fields, noting that they have already made great changes in society and will produce even more drastic alterations. Both will lead to increased decentralization, since we will no longer have to live in big cities to enjoy the comforts of readily available energy and communication.

Dyson then takes on sociologist Max Weber, claiming for Weber the view that ethics drives technology. Weber pointed out that the Protestant ethic in northern Europe and in America contributed to capitalism and its associated technology. Dyson does not deny the historicity of Weber's observations, but he takes the position that ethics may drive technology. He provides numerous stories to make his point, which is that our technology too often is used merely to make toys for rich people.