The persistence of vision

Freeman Dyson on the future of the universe and the endurance of the past. BY MARK WILLIAMS

Imagined Worlds
By Freeman Dyson
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Wired capitalists might like to think they're growing the planet's electronic nervous system. From another perspective, though, they're merely building the 21st century's virtual malls and gated suburbs. For truly *big* visions, you need someone like Freeman Dyson.

In the late '50s, the physicist, mathematician, and—HERRING readers may be startled to learn—father of EDventure Holdings' Esther Dyson proposed sending a manned spaceship powered by nuclear bombs on a leisurely tour of the solar system. He had the charming idea of colonizing comets and, in the absence of gravity, growing genetically reprogrammed trees on them to "heights" as great as a hundred miles for air and warmth. He also hypothesized that, after a few thousand years, any civilization that had spread throughout its solar system would cannibalize its gas giant for raw materials to build an energy-capturing globe around its sun: the famous Dyson sphere.

Quantum leap

Hans Bethe, who won the 1967 Nobel Prize in physics for explaining our sun's thermonuclear processes, recalled teaching Mr. Dyson at Cornell: "He was probably the most gifted graduate student I ever had . . . a man who could do everything with his left hand and spend the rest of the day reading *The New York Times*."

Mr. Dyson made his reputation when he synthesized two unreconciled theories of quantum mechanics. After 1943, physicists had grown frustrated by the infinities that multiplied unworkably whenever existing quantum theory was used to calculate more than approximations of the behavior of elementary particles. In 1947, two men emerged with solutions: Julian Schwinger, with an almost impenetrable edifice of mathematics, and Richard Feynman, with his own private, mathematically unjustified quantum mechanics, in which antiparticles traveling backward through time were the least alarming feature. Although only a graduate student, Mr. Dyson understood Feynman's ideas and had the mathematical brilliance to see how they could be reconciled with Schwinger's equations, thus producing a workable theory of quantum electrodynamics.

Great physicists and mathematicians are notoriously the scientific world's prodigies, achieving their biggest breakthroughs before their mid-30s. But if Mr. Dyson hasn't since conceived anything as significant as that synthesis, he has thought and done other interesting things. His new book, *Imagined Worlds*, grew from lectures given in 1995 and revisits themes from his 1979 autobiography, *Disturbing the Universe*. Here again, Mr. Dyson explores through J.B.S. Haldane's *Daedalus* and H.G. Wells's *Time Machine* the cataclysmic possibilities that biotechnology will unleash. Here also, the insistence that someday space travel and habitation should become cheap enough to make government funding unnecessary; here, too, the readiness to extrapolate to when we become a million species throughout this galaxy and then to the imagination's limits, when intelligence undertakes cosmic engineering projects to shape the universe itself.

Imagined Worlds offers much else, including the most compelling manifesto that this reviewer has read for the overwhelming benefits of allowing new technologies to subject themselves to Darwinian processes—and to stand or fail on their own merits. Yet where did these visionary preoccupations come from?

This spaceship, this England

In *Disturbing the Universe*, Mr. Dyson claimed his obsession with the future was a reaction to his English childhood: "Six hundred years, for anybody who grew up in Winchester, is not a long time. I knew that if I could go six hundred years into the future I would see a lot of things more interesting than old churches." Amid medieval buildings and hedged fields in that rural landscape, which sometimes seems the most cultivated on the planet, one can easily imagine a thousand years passing and generations of sleepers being born and going to lie down under the grass.

If one also happens to be an English schoolboy with the least bit of imagination, one inevitably sees those church steeples as rocket ships poised to blast up from that green countryside. "Science is my territory, but science fiction is the landscape of my dreams," Mr. Dyson writes in *Imagined Worlds*. Those dreams show the especial influence of two English writers, Wells and Olaf Stapledon; and, of course, Mr. Dyson wants it both ways, with the green Earth/England maintained for when his space-faring, immortal descendants

return. Earth's population of mortal humans will provide an anchor for the posthuman racial consciousness: "In the long run, the central problem of any intelligent species is the problem of sanity."

Such speculation itself can seem mad. But in an essay about innovation in physics, Mr. Dyson once wrote: "When the great innovation appears, it will almost certainly be in a muddled, incomplete and confusing form." He added, "For any speculation which does not at first glance look crazy, there is no hope."

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