BOOK REVIEW

Helen Anne Curry, *Evolution Made to Order: Plant Breeding and Technological Innovation in Twentieth-Century America* (Chicago and London: The University of Chicago Press, 2016), x + 285 pp., illus., index, bibl. $45.00, cloth, ISBN: 9780226390086

The genetic manipulation of plants and animals by human beings has occurred for millennia, before anyone had the slightest knowledge of genes or the role they played in heredity. Through a wide variety of practices that include selection, inbreeding and hybridization, humans have created a diversity of domesticated plants and animals for an equal diversity of purposes. Such practices developed in many cultures, on all inhabitable continents. By the eighteenth century, agricultural innovation in many cultures, including European, was increasingly undertaken by wealthy landowners whose economic security permitted the risk of failure; by the nineteenth century many governments began to look upon “agricultural improvement” as a strategic investment in the national economy, and scientific expertise in relevant subjects were cultivated by state-supported institutions dedicated to agricultural research and education. And perhaps inevitably, as it became clear that money could be made through such practices, private corporate and philanthropic investment followed suit.

In *Evolution Made to Order: Plant Breeding and Technological Innovation in Twentieth-Century America*, Helen Anne Curry demonstrates the intersection and overlap of American agricultural and industrial priorities and practices, and the interdependence of plant breeding (which already had received a shot in the arm with the advent of Mendelism in the early 1900s) with emerging technological innovations. In three neatly wrapped sections, with a summative introduction preceding each, Curry addresses plant breeders’ and geneticists’ use of x-rays early in the century, of the chemical colchicine between the World Wars, and of post-WWII atomic radiation, to produce alterations in individual genes and in the arrangement and number of the chromosomes. The most straightforward narrative within each section focuses on the co-development of plant breeding and plant genetics in relation to these specific technologies, and Curry identifies the most important
figures in science pursuing these research programs and details their research practices and results. Later chapters of each section examine the attitude, practices, and motivations not only of geneticists and plant breeders but also of government agencies, equipment manufacturers, commercial enterprises, the popular scientific press, and amateur gardeners eager to exploit the scientific research to achieve novelty in the garden. It is in these chapters that Curry pursues the more interesting connections among technological innovation, and the institutions and practices that permitted and often encouraged those connections.

As she notes in her introduction, the point is not to document successful research programs or applaud the achievement of looked-for goals. Rather, Curry’s analysis of the persistent generation of what proved to be “outsized expectations” (p. 8) for these technological interventions in the face of consistently disappointing results are part of a larger and more significant story. Deftly untangling multiple “story lines,” Curry identifies several cross-cutting themes that strengthen her argument for a shared technological and industrial vision: a passion for controlling, speeding up, even perhaps surpassing natural processes with technologies to harness evolution to human ends; the development and encouragement of scientific fads that sweep along both scientists and the public in the face of dissenting opinions; and the enlistment of amateurs in these faddish scientific practices through the creation of commercial products, specifically via altered seeds or technologies that allow the altering of seeds.

In each section Curry illustrates the induction of agriculture and plant breeding into what might be called the technological industrial complex of the twentieth century through a series of case studies and examples. In section I, the development at General Electric of research into the genetics of flowering plants through the use of x-ray-generated mutation produced a patented lily, which Curry uses persuasively to argue for the enlistment of plant breeding into the industrial research lab and its values. In section II, the promotion of colchicine kits for the use of home gardeners illustrated the exportation of scientific and industrial values into the hands of amateurs, whose garden plots might be the site of significant evolutionary change, with geneticist A. F. Blakeslee presciently imagining an engineered genetics in the scientific future. (I confess that I do not fully understand Curry’s argument about the importance of tinkering in the history of technology as she applies it in this section, unless she means to celebrate the home gardeners who actually injected seeds with colchicine themselves.) And in section III, Curry demonstrates the integration of breeding and genetics with the
Cold War military industrial complex. In this case the initiative was taken not by geneticists or breeders, but by political leaders and officials of the Atomic Energy Commission committed to promoting a positive public outlook on atomic energy through its applications in energy production, medicine, and agricultural improvement, of which irradiated “atomic” seeds would be a part. Throughout, Curry reveals the extent to which David Burpee and other seed producers used these technologies in search of novelty for their catalogues.

There is a darker undertone here; the very dangers posed by atomic radiation, from which the public’s fears were to be deflected, meant that the research needed to be closely controlled in government facilities like Brookhaven National Laboratory. And in this instance the nuclear and agricultural technologies were wielded within a specific geopolitical purpose; the production of irradiated seed integrated the United States’ Cold War atomic diplomacy with its agricultural diplomacy, sharing irradiated seed and the technologies they produced to reward allies and woo new ones. And still the playful and hyperbolic rhetoric in the public arena continued, my hands-down favorite being an ad for “Dr. Speas’ Atomic-Energized Seeds and Plants,” which declared: “It’s new! It’s Amazing! It’s at WALGREENS!”

Throughout the book Curry raises key questions and builds important arguments, to which she returns in a suggestive Epilogue, about the overarching industrial values (to which I would add corporate values) that dominated the context of doing science in the twentieth century. She demonstrates the very real overlap of scientific, commercial, and industrial practices, and what might be called an obsession with prediction and control extending from the management of industrial processes to the management of life. In this case the value of the technology was not only the need of investigators for novel forms, whether as the focus of genetic research or as the source of profit for breeders and seed producers. Investigators also hoped that these technologies would ultimately provide pin-point specific predictable genetic alteration. Curry’s arguments make clear why, despite being consistently disappointed in the latter goal, researchers persisted in their search for that goal, which of course was ultimately achieved through the support of molecular biotechnological research in corporate research laboratories such as Monsanto’s. The extraordinary success of molecular biotechnology, Curry wryly observes, is far less publicized and advertised thanks to changing public attitudes towards science and manipulation of the natural world from the 1960s onward. Despite Curry’s important point throughout the book that the push to control and manipulate
evolution was broadly located across many disciplines and kinds of institutions, spanning the professional/amateur divide, she offers in her Epilogue an important analysis of the ways in which the research locus has shifted from public institutions working in the public interest, and seed companies promoting the participation of home gardeners, toward large-scale corporate investment in research to produce and control products marketable not to home gardener but to participants in global industrial agricultural production.

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