TRANSGENIC CROPS IN CHINA* (1)

Commercial cultivation	Environment release	Field trials
Cotton (eight varieties)	Cotton (at least 15 other varieties)	Cotton (more than 20 other varieties)
Sweet pepper (three varieties)	Maize	Rice
Tomato (one varieties)	Tomato	Tobacco
	Potato	Peanut
	Rice	Casaba
	Poplar	Chinese cabbage
	Tobacco	Sweet potato

*Authorized by the Office of Agricultural Biological Genetic Engineering Safety Administration of the Ministry of Agriculture of China (OFABGESA).

in environment release, seven crops in field trials (*1*), and at least 20 other crops in development.

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Unite Efforts and Conquer Mysteries of Artificial Genetics

In his News Focus article "Creation's seventh day" (14 Jul., p. 232), Robert F. Service highlights some recent work in artificial genetics, emphasizing the controversy that might surround "a new life form" and the distinctive personalities of some scientists who have taken up the challenge. Entertaining reading, of course, but amid the discussion of personalities it remains most important to identify ways that artificial genetics might change the landscape of science. Here are just two.

First, why is it so difficult to move in vitro artificial genetics into a living cell? Buried in this question are the mechanisms by which living systems achieve precision when precision is important—in particular, in DNA replication (*1, 2*). Efforts to implement artificial genetics show that we understand far less about the enzymology and chemistry of precision than we thought (*2*), especially where DNA is involved. Second, since the Enlightenment, science has divided itself into two traditions, one from natural history, the other known as "physical science." Explanations in natural history use models of the past, consistent with physical laws, but not determined by them. Physical science explanations use universal models of atomic structure or mathematics. The two traditions are often adversarial in the culture, in academic departments, and (consequently) in education. Research in artificial genetics shows that if these two traditions can be joined, the combination has great power (*3*). For example, precision in biology will be better understood when we understand the history through which precision evolved. But only a few U.S. research laboratories have the advantage of moving smoothly from geology to evolution to chemistry to informatics. How should we join these traditions? A challenge, for sure.

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