Is everything in our universe knowable?—mathematical proofs provide an answer. On the possibility of transgenic maize being planted in Mexico, "It seems paradoxical to argue that it is necessary to protect the genetic background of corn when, for 6000 years of traditional breeding, we have protected only alleles important for humankind." And finer points of firearm regulation and safety issues are discussed.

Limits to Our Knowledge

In his Editorial "Endless pathways of discovery" (14 Jan., p. 229), Floyd E. Bloom writes, "[T]he most remarkable conclusion to emerge from this exercise was the realization [(*1*)] that in the millennium we are about to leave, humanity's knowledge of its place in the universe has moved from St. Thomas Aquinas's view that knowledge was of two types—that which man could know and that which was 'higher than man's knowledge' and not to be sought through reason—to the belief begun with Newton's *Principia* that our universe and all within it are indeed knowable." In this century Kurt Gödel showed in his incompleteness theorem (*2*) that there are true statements that cannot be proved to be true, and Alan Turing (*3*) showed that an analogous problem lies at the foundation of the mathematics behind computing machines. Gregory Chaitin (*4*) has provided new proofs of these theorems based on information theory and has argued that such incompleteness is natural and widespread. To say that there are true statements that cannot be proved is to say that there are some things that we just cannot know, that are beyond human reasoning (*5, 6*)—which brings us full circle, back to Aquinas.

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Transgenic Maize in Mexico: No Need for Concern

According to pre-Hispanic traditions, gods gave native Mexicans the first maize seeds and from then on, and for thousands of years, maize has been a vital element to the Latin American cultures. Biologically, maize is an orphan plant and has only one relative, the annual teosinte (*1*). Morphologically the two are similar, but they differ strikingly in the pistillate inflorescence (what becomes the cob). For our discussion, the most notable difference is that the maize cob is solid, whereas the teosinte cob is brittle and comes apart at maturity. Molecular analysis has shown that maize was domesticated in the Balsas River drainage (Mexico) 6000 years ago (*2*). Primitive cobs found in caves and other archaeological sites share the same characteristics: they are of small size and are, invariably, solid. This is of major importance—viable seeds can only be released by mechanical means (basically by humans). Maize does not disperse itself and therefore does not exist as a free species in nature.

The effect of maize genes in teosinte plants. The solid cob (top) is from a hybrid plant, and its seeds must be dispersed mechanically, unlike the seeds of teosinte (bottom).

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Recently, some biotechnology companies have requested authorization to plant and market transgenic maize in Mexico. Several ecological groups have raised concerns about the potential risks of introducing such plants to Mexico, where maize originated. The main concern regarding the possible effects on the native maizes and relatives has little if any scientific basis; it is more related to cultural factors rather than biological ones. Arguments stating that maize is genetically fragile are weak. It seems paradoxical to argue that it is necessary to protect the genetic background of corn when, for 6000 years of traditional breeding, we have protected only alleles important for humankind. Even if we decide to protect the actual genotypes, there should be no need for concern. Any transgene transferred inadvertently to native maizes can be removed from the progeny by selecting against the incorporated trait. Maize is always under strong artificial selection, and therefore natural selection has no practical meaning for the species.

On the other hand, transgenes cannot be established in a natural population of teosintes. Any teosinte recipient of maize pollen is at risk of transmitting to its progeny the trait of not being able to release its seeds, just as in maize (see the figure at left). The transference of an allele from teosinte to maize is a natural process. The opposite can only happen if the hybrid seeds are mechanically released. Still, fixation of a (trans)gene or allele in a teosinte population would be impossible if it did not confer an evolutionary advantage to the species. The *bt* gene, for example, would most likely not confer any advantage to teosinte because pests are not a natural selection factor in the wild. The transgene would be lost like the thousands that never conferred adaptative advantages to the recipient plants.

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Firearms the Target

Several aspects of the arguments Susan B. Sorenson presents in her Policy Forum "Regulating firearms as a consumer product" (*Science*'s Compass, 19 Nov., p. 1481) warrant comment. To begin with, the number of motor vehicle deaths she cites is due to accidents, whereas the number of deaths by firearms includes deaths from homicides, suicides, legitimate shootings by police officers and private citizens in defense of themselves or others, and accidents. These are not equivalent statistics.

Regarding "smart guns," or personalized guns, the proposed laws mandating these guns exclude law enforcement officers at their own request because they need a reliable weapon and one that can be used by a fellow officer in an emergency. In addition, the collaboration between the National Institute for Justice and handgun manufacturers has led to the conclusion