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EDITORIAL

Gene Technology and Democracy

In Switzerland, a proposal is being voted on next year that, if accepted, will result in the constitutional prohibition of gene manipulation. The ban would encompass the use and patenting of gene-modified animals (including flies and worms) and the cultivation of gene-modified plants.

This Genschutznitiative (gene protection initiative) not only threatens biomedical research but also puts Swiss democracy to the test. Here, citizens decide on individual issues by public vote after careful debate and evaluation. This direct form of democracy is regularly used to test new initiatives and to oppose parliamentary decisions at the national level, and is held following the collection of a relatively small number of signatures. While we consider this to be the best form of democracy, it is not without difficulties and possible limitations, some of which may become apparent in this case.

Until recently, Switzerland was best known for its watches, tool machines, cheeses, chocolates, banks, direct democracy, and alphorns. While some of these features have waned in importance to our country's identity, we have retained the alphorns and are now also among the leaders in biomedical sciences in terms of originality, impact, and output, according to a recent article in *Science* [R. M. May, *Science* **275**, 793 (1997)]. The Genschutznitiative seriously threatens both this position and the competitiveness of the Swiss pharmaceutical industry.

Proponents of the initiative, supported by the Green movement and the Socialist party, mischievously claim that gene-modified plants cause allergies and that science is one step away from the creation of supermonsters. They assert that scientists lack ethics, morals, and a sense of responsibility, and that they have let the public down on too many occasions; they conclude that gene technology must be banned from Switzerland, signaling the rest of the world to follow suit. None of these arguments are substantiated. Indeed, scientists agree fully to the regulation of gene-modified animals and plants by law, but they are opposed to prohibition. That both houses of the Swiss parliament have come down against the Genschutznitiative is comforting, but there may be a gap between the views and knowledge of politicians and that of the general public—only the referendum will tell.

The Genschutznitiative is an extension of three referendums in the past 15 years on a total ban on animal experimentation; these resulted in severe restrictions on the use of animals in research. Why does Switzerland have this anti-gene technology movement? Is it unique to Switzerland? In fact, the Swiss are generally interested in, and supportive of, science. However, it is difficult to understand genes and gene regulation, molecular biology, gene technology, and their impact on society. We therefore need better and continuing education in biology, not only in schools but through television, radio, and newspapers, particularly the tabloid press. Scientists must play their part in dispelling the shaky image of both themselves and of science in general, and in explaining the new approaches and how they may be applied to benefit all of society.

The renewed questioning of science in Switzerland reflects an ongoing difficulty in reconciling the wish for an ideal, unbroken Green world with increasing energy consumption, mobility, living standards, and health. Victimized small groups such as scientists may ease the consciences of some (hopefully not too many) but it will not solve the problem. And, since the initiative does not prohibit the import and use of drugs, foods, and medical advances produced by gene technology, it demonstrates an element of hypocrisy and lack of appreciation of life within the global village.

The present initiative reflects an increasing tendency toward a bad woodcutter's approach to decision-making—trees can be left standing or felled, but not trimmed or otherwise cared for. This represents a challenge to democracy: If the Swiss continue to fill their constitution with prohibitions, Switzerland will become ever more insular within Europe and may revert to a scientific and technological Stone Age and to life as Europe's poor relation. However, I approach the vote with great optimism. In the past, difficult questions on nuclear power, support for the arts, and the purchase of fighter aircraft, to name but a few, have been debated seriously and decided upon responsibly. There is reason to believe that good sense will again prevail.

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