SCIENCE

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LETTERS

Biotechnology Regulation

Henry I. Miller's Policy Forum about reinventing biotechnology regulation (16 Dec., p. 1815) asserts most persuasively that a product should be assessed by what *it* is and what *it* can do and not *how* it was created. Analogously, we evaluate scientific hypotheses and theories on their predictive consequences and not on how they were conceived. Applying that ideal to biotechnology, however, is problematic in several respects. First, unlike in the case of chemicals, it is impractical and too costly to specify precisely the chemical structure (genomic and phenotypic) of an organism. Modifying an inert chemical structure and modifying an organism are two very different things. Therefore, it is not surprising that there has been considerable debate and discussion about how to evaluate the product of genetic modification and whether its potential risks should be given priority over the native organism or over classical methods of hybridization.

Second, the regulatory system that we have adopted to evaluate the risks of chemicals, whatever its shortcomings, has developed over half a century. A new molecule, whether in a drug or a pesticide, however it is constructed, can be precisely characterized and is subject to canonical toxicological testing. No standardized tests are available for genetically modified plants and microorganisms, as the traits of potential concern are too varied. We may be interested in whether a newly introduced organism outcompetes an indigenous strain or whether a plant that has been modified with herbicide resistance releases the resistance plasmid to local weeds. Of course, without specificity and without standard tests we could still treat all organisms alike regardless of how they came to be. Is the fact that we can move genes around more easily and with greater specificity with recombinant DNA techniques a reason to place a higher regulatory burden on such a process?

In the area of regulation, practical choices are frequently made because of the limitation of funds. Under the insecticide and food protection acts, we regulate newly introduced chemicals more rigorously than those that were in use before the passage of the law. Under the Environmental Protection Agency's current standards, the plant growth regulator Alar would not have been approved, not because of politics but because of its toxicological profile. Miller may be correct about dangerous products coming from classical genetics. There has and there should continue to be concern about crosses between wild varieties and domesticated crops. No one doubts that some dangerous berries and mushrooms can be produced by classical hybridization. But those processes took time and are now being surpassed by techniques that can get products to market faster and with a false sense of security, precisely because of the hubris involved in the untested idea that we are better at predicting the outcome.

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AIDS Proposal

In 1991, we, the Group for the Scientific Reappraisal of the HIV/AIDS Hypothesis, became dissatisfied with the state of the evidence that the human immunodeficiency virus (HIV) did, in fact, cause AIDS.

Specifically, we have proposed that researchers independent of the HIV establishment should audit the Centers for Disease Control's records of AIDS cases, bearing in mind that the correlation of HIV with AIDS, upon which the case for HIV causation rests, is itself an artifact of the definition of AIDS. Since 1985, exactly the same diseases or conditions have been defined as "AIDS" when antibodies are present or presumed to be present, and as "non-AIDS" when HIV and antibodies are absent. Independent professional groups such as the Society of Actuaries should be invited to nominate members for an independent commission to investigate the following question: How frequently do AIDS-defining diseases (or low T cell counts) occur in the absence of HIV? Until we have a definition of AIDS that is independent of HIV, the supposed correlation of HIV and AIDS is a mere tautology.

Other independent researchers should examine the validity of the so-called "AIDS tests," especially when these tests are used in Africa and Southern Asia, to see if they reliably record the presence of antibodies, let alone live and replicating virus.

The bottom line is this: the skeptics are eager to see the results of independent sci-

entific testing. Those who uphold the HIV "party line" have so far refused. We object.

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Mayan Archaeology

One of the most important principles in science is that of the priority of ideas. We need to know who proposed an idea, who supported or opposed it, and when it was ultimately accepted or rejected. That is one of the reasons that *Science* ends its articles with phrases like "[ms received] 20 May 1994; accepted 15 September 1994."

The idea that Calakmul was the capital of a powerful state rivaling Tikal (T. Appenzeller, "Clashing Maya superpowers emerge from a new analysis," Research News, 4 Nov., p 733) is not new. It was advanced and published 21 years ago in *Science* by Joyce Marcus (*1*). It was later confirmed by William J. Folan of the Autonomous University of Campeche, Mexico, during 15 years of archaeological research at Calakmul.

In 1972, most Mayanists considered Tikal the sole "capital" of the lowland Maya. In 1973, Marcus pointed out that at least three other Maya cities—Copán, Palenque, and Calakmul (whose emblem glyph she identified)—were listed as equals to Tikal on stelae at Copán and Seibal. She pointed out in later publications that Calakmul had the largest number of carved stelae of any Maya site and that its emblem glyph was mentioned more often than that of any other Maya city (*2*).

Most significantly, Marcus discovered that the secondary centers below Calakmul (places such as Sasilhá, Oxpemul, Altamira, Uxul, and Naachtún) were spaced almost equidistant from each other and from Calakmul, forming what geographers call a "k-7 administrative lattice." Such a lattice clearly indicates that Calakmul was the "central place" of a powerful state, one which held sway even over cities as large and important as Naachtún and Uxul.

On the basis of Marcus' findings, and with the support of the National Geographic Society, Folan began in 1982 a long-term research project at Calakmul. He and his collaborators soon discovered that the city was much larger than expected and had a density of structures higher than that of Tikal (*3*). Folan also extended his surveys outward toward the secondary urban centers which made up Calakmul's administrative lattice, finding incontrovertible evidence linking them to Calakmul. In fact, it was partly as a result of Folan's discoveries that the Mexican government recently spent millions of pesos reconstructing Calakmul as a major tourist attraction. Folan and Marcus continue to collaborate on a study of Calakmul and its satellite cities.

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