versity Convention (Policy Forum, 25 June, p. 1900). We believe this picture is unjustified and neglects the importance of preserving irreplaceable biological resources. Genetic diversity, the raw material of biotechnology and pharmacology, will be greatly reduced over the next several decades unless financial incentives are established for developing countries to preserve genetic resources. The Biodiversity Convention represents a first attempt to develop a framework within which developed and developing nations share in protecting genetic resources as well as in the profits that may result from their exploitation. The purpose of the treaty is not to destroy incentives for biotechnological research, but to create new financial incentives for conservation.

Burk *et al.* point to language in the treaty (*1*), such as articles 16 and 19, that could appear to threaten the intellectual property rights of corporations. However, there are equally strong sections on access to genetic resources. Article 15, which is devoted to this subject, states in part that (p. 828)

[e]ach Contracting Party shall endeavour to facilitate access to genetic resources . . . by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention.

Traditionally, collectors representing foreign corporations and governments have enjoyed essentially unrestricted access to the genetic resources of developing nations, but in recent years this has become less acceptable to those nations and to the public in industrialized societies. Whether or not the United States ratifies the Biodiversity Convention, "the era of free scientific access to biological resources is over" (*2*). Venezuela, for one, has already denied access to its forests to U.S. botanists in response to the refusal of President Bush to sign the Biodiversity Convention in Rio in 1992.

As Burk *et al.* correctly point out, much of the language of the treaty is vague and lends itself to various interpretations. Much of it will be more explicitly defined by the Conference of the Parties over the coming years. The United States and other industrialized nations are unlikely to accept any interpretation that is at odds with the long-term interests of the biotechnology industry and with their systems of intellectual property rights. The Biodiversity Convention embodies the belief that the developed and developing nations will have to work together if we are to save any significant portion of our dwindling biological heritage (*3*).

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References

1. *Int. Leg. Mater.* **31**, 818 (1992).
2. J. H. Barton, *BioScience* **42**, 773 (1992).
3. A. Gore Jr., *J. NIH Res.* **4**, 18 (1992).

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Science and Restoration

In the special section "Environment and the Economy," the article by Leslie Roberts "Bringing vanished ecosystems to life" (25 June, p. 1891) raises some provocative questions about the style of restoration being promoted by Stephen Packard, scientific director of The Nature Conservancy in Illinois. Packard's efforts are not scientific studies in the same way that farming is not agricultural research. Even if he is able to establish something resembling a savanna, there will be scant objective information to tell us how to proceed with the next restoration.

In contrast, data from labor-intensive restoration of the Greene Prairie (and also the Curtis Prairie) at the University of Wisconsin, Madison, Arboretum provide valuable information about how restoration efforts could proceed (*1*). The important difference between these two approaches to restoration is not how tedious one might be, but rather how well each is documented and whether we can learn from each about restoration.

During the restoration of the Madison Arboretum prairies, efforts were made to document how plantings were done, and sites were sampled at regular intervals to record changes in the restored vegetation. Detailed studies of remnant prairie vegetation by John Curtis and his students provided end points for the restoration. Management procedures that are widely accepted today (for example, occasional burning) were documented over many years, beginning in the 1940s, before they gained wide acceptance. Even so, at the first Midwest Prairie Conference held at Knox College in 1968, many persons questioned whether it was good management to occasionally burn prairies.

As a result of the early efforts of Curtis and others, today we can restore prairies with relative ease. Rather than diminish the approach taken by science, it would behoove practitioners of restoration to

recognize the contributions science has made, and continues to make, in understanding the process of ecological restoration (*2*).

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References and Notes

1. V. Kline, in *John T. Curtis: Fifty Years of Wisconsin Plant Ecology*, J. S. Fralish, R. P. McIntosh, O. L. Loucks, Eds. (Wisconsin Academy of Sciences, Arts, and Letters, Madison, WI, 1993), pp. 51–56; E. Howell and F. Stearns, in *ibid.*, pp. 57–66.
2. In this regard, the Society for Ecological Restoration has recently launched a journal, *Restoration Ecology* (Blackwell Scientific). The first issue was published in March 1993.

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The Chlorine Controversy

Ivan Amato's News & Comment article "The crusade against chlorine" (9 July, p. 152) captures the muddled thinking of non-experts who abuse science to achieve a social agenda. The article and some of the individuals quoted therein interchange environmental issues and health effects as though they were the same. There may be good reasons for reducing the impact on the environment of some chlorinated compounds. This is discussed in an in-depth review (*1*) by an expert panel of which I was a member. Nevertheless, the contribution of chlorinated compounds to human health effects is another issue. For example, the benefits of DDT in malaria prevention far outweigh any theoretical human cancer hazard, as do the benefits of drinking-water chlorination. In fact, there is no chlorinated compound that has been proved to be a significant human cancer hazard (*2*). To the contrary, the drug toremifene, which contains chlorine, does not induce cancer