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LETTERS

Women in Biomedicine: Encouragement

"Women in biomedicine: Still slugging it out" (Random Samples, 29 Oct., p. 650) notes very real problems facing women who work in a predominantly male environment in research science. However, we disagree with the article's assertion that success-minded young women would "be well advised to forget about babies." This notion, which persists despite studies to the contrary (1), contributes unnecessarily to the anxiety that women experience throughout their scientific training. It is regrettable that many women do not have nearby senior colleagues whose examples would challenge this myth.

We write as women scientists who have children and who have also been successful in our research careers, as judged by criteria such as tenure, positions on review panels and editorial boards, teaching awards, and scientific honors. We are a diverse group in terms of the age at which we had children, the paths our careers have taken, and our marital and financial status. We can all testify that combining parenthood with a professional career is not easy; that it requires two major (and sometimes conflicting) commitments of mind, heart, and time; but it can be done, and the rewards of doing so are great.

Our intent in this letter is not to tell people what they should do on such a personal matter. But to women—and men—who decide that they wish to be both parents and scientists, we want to offer the encouragement that it is possible to do so.

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References

1. J. R. Cole and H. Zuckerman, in *The Outer Circle: Women in the Scientific Community*, H. Zuckerman, Ed. (Yale Univ. Press, New Haven, CT, 1991), pp. 157–170.

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Shamans and Patent Lawyers

The issue of 10 December contains an apparently inadvertent juxtaposition that illustrates a growing contradiction between the trajectory of certain genetic engineering activities and tenets of liberal culture. A short article in *ScienceScope* ("NIH biodiversity grants could benefit shamans," p. 1635) announces five bioprospecting research projects in the Third World that would "enrich" traditional healers. Another article in *News & Comment* by Constance Holden (p. 1641) discusses a growing split in the discipline of anthropology between the physical-biological wing and cultural anthropology, and it provides a point of reference for understanding the former article.

Shamans do not "own" indigenous pharmacological lore; they are simply custodians of the community's information storehouse. The ownership of knowledge and the trap-

pings of patents are elements of North Atlantic cultures, not Third World ones. When I led workshops at the Rio de Janeiro EcoSummit in 1992, indigenous leaders warned about attempts to impose foreign legal and property regimes on their people, referring to "the abhorrent position of accepting that the living diversity of this planet can be reduced to patented private property" (1). In the words of a cultural anthropologist quoted by Holden, this is "a form of cultural colonialism."

Do we really believe we can protect and preserve indigenous tribes and their cultures yet still expect them to partake in a world of patent lawyers and infringement litigation? Will the white American in his "Banana Republic" outfit (pictured and identified in the *ScienceScope* article) help or harm the shaman, awkwardly pictured bare-chested and unnamed [and thus rendered "invisible" (2)]? Will we destroy his culture in order to save it, as we did with Vietnamese villages 20 years ago?

Using what value system does the official of the World Resources Institute conclude that giving shamans patent rights "would be a big step ahead" rather than a step back? Certainly not the value system of the Guaymí of Panama, a portion of whose genome was the subject of a U.S. patent application [only recently withdrawn after strenuous objections by the tribe (3)], or of Chief Leon Shenandoah of the Onondaga Nation (in New York State) who recently urged the National Science Foundation not to fund the Human Genome Diversity Project (that would take and store genetic samples of several hundred isolated and "endangered" human communities), calling it "unethical" because "[i]t violates the group rights and human rights of our peoples and indigenous peoples around the world" (4).

In most indigenous cultures, medicinal knowledge is an example of a "group right," not the patentable property of shamans or a "resource" for First World corporations, scientists, "biodiversity experts," or government officials to privatize.

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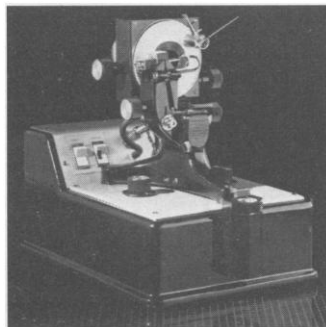
References and Notes

1. V. Shiva, "Patenting Life Forms," *Third World Resurgence*, No. 38 (1993), p. 4.
2. R. Ellison, *Invisible Man* (Random House, New York, 1952).
3. Patent claim WD 9208784 A1. Currently, there are at least two patent applications, submitted by U.S. agencies, that are pending on portions of genomes of Third World peoples (Papua New Guinea and Solomon Islands peoples, respectively): WO 9303759 and WO 9215325 A.
4. L. Shenandoah, letter to Jonathan Friedlaender, National Science Foundation, 8 November 1993.

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