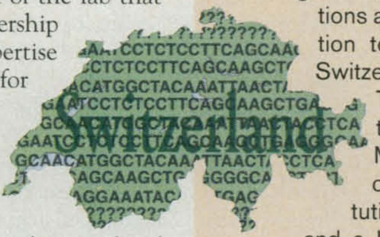
Global concerns

The pros and cons of multilaboratory high-energy physics collaborations are addressed. Opposition to genetic research in Switzerland (left) is defended. The Chief Executive of the United Kingdom's Medical Research Council explains his institution's funding policies, and a U.S. scientist suggests changes in funding by the U.S. National Institutes of Health. And a group of researchers discusses the possible effects of climate change on global disease incidence and distribution.



say that there are clear advantages to the multilaboratory partnership over the solo approach when the scale of the project is such that the annual project appropriation is a large fraction of budget of the lab that will be its home. The partnership can draw on the special expertise of each lab; avoid the need for a large short-term increase in personnel at the project home base; avoid the need to duplicate infrastructure that may exist at other labs; and ramp up to full speed faster, be completed faster, and thus cost less.

Of course, one rarely gets something for nothing, and the multilab approach is more complicated to manage. To pull it off successfully requires the commitment of all the laboratory directors involved, direct access to those directors by the project leadership when needed, a unified scheduling and budgetary system, and full authority vested in the project leader to move work around when the inevitable problems crop up that require such action. In our ß-Meson factory project, LBNL Director Charles Shank, LLNL Director Bruce Tarter, and I agreed to all of this at the outset, and Jonathan Dorfan, the project leader, is bringing the ß-Meson factory in on budget and on schedule.

Bill Appleton, Al Trivelpiece, and the other laboratory directors involved in the SNS know all of this. They are committed to the multilaboratory approach, including having the project leadership at Oak Ridge in full charge. The comment by Jim Decker of the Department of Energy (DOE) that this approach makes more fiscal sense than a single-laboratory approach is backed by experience. DOE has been the target of considerable criticism in Washington, part deserved and part undeserved. However, DOE and its laboratories do know how to build major projects, and the laboratories know very well how to work together. I have every confidence that the SNS will come in on time and on budget.

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As Lawler's article points out, the enthusiasm with which the neutron community has greeted the good news that the SNS will be built is somewhat tempered by the shutdown of the High Flux Beam Research (HFBR) reactor, the DOE's best neutron beam reactor, at Brookhaven National Laboratory. However, the response has not been to drive U.S. scientists "to work at more modern neutron sources in Europe," which is for most an impractical alternative. In fact, many of these scientists have sought to perform experiments at our National Institute of Standards and Technology (NIST) reactor, currently the most heavily used U.S. neutron facility, at the High Flux Isotope reactor at Oak Ridge, and at other DOE facilities. Unfortunately, there is no way to fully compensate for even the temporary loss of the HFBR reactor.

Lawler emphasizes the exciting new opportunities for neutron science offered by the SNS; it should be noted that, while high-powered spallation source projects are being planned or funded in the United States, Japan, and Europe, new or refurbished reactor sources also have been recently completed or approved in Germany, France, Japan, Korea, Indonesia, Australia, and Taiwan. High-performance reactor and pulsed neutron sources have complementary strengths, with reactors more efficient or cost-effective for many crucial applications, such as small-angle neutron scattering, crystal spectrometry, or isotope production. Thus, for the next generation, and likely beyond, neutron research will be widely served by both modern research reactors and emerging spallation sources.

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"More of the Same" in Switzerland?

Opponents of gene technology in Switzerland and elsewhere are portrayed as "mischievous..." (Rolf M. Zinkernagel, Editorial, 14 Nov., p. 1207) and "pseudoscientific and reactionary" (H. Olson, Letters, 9 Jan.,

p. 157) proponents of a "technological Stone Age" (Editorial, 14 Nov.). These accusations are symptomatic of the gulf between many scientists and thoughtful opponents of gene technology. The example of modern agriculture and the future role of genetic engineering is a case where divergent visions come sharply into focus. Modern agriculture is characterized by monoculture crops grown in degraded and often eroding soils. The majority of these crops are fed to animals raised under inhumane conditions that many organizations (including the World Health Organization) have characterized as harmful to human health. Simply put, these conditions are most probably not sustainable or environmentally sound, nor are they necessary to feed existing or projected world populations. It is also not easy to defend these practices for their ability to deliver low-cost food to the consumer. For many crops, consumers pay once in the supermarket and again with their taxes in the form of subsidies. Scientific research has contributed immeasurably to this state of affairs.

Critics of the status quo are often neither mischievous nor antiscience. They suggest, however, that scientific research, subsidies, regulations, and so forth be redirected to support sustainable techniques, many of which have been demonstrated to provide cheap, wholesome, and plentiful food to consumers. Sustainable agriculture is not "Stone Age." On the contrary, it substitutes a sophisticated (and scientific) understanding of soil and biological processes for synthetic fertilizers and pesticides of proven harm.

It is incumbent upon scientists to understand that there is often a case to be answered in the application and development of new technologies. Perhaps, having noted the state of their food supply, the citizens of Switzerland are having a hard time concluding that what they need is "more of the same."

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Response: Latham and Franco Cavalli (Letters, 9 Jan., p. 157) appear to misinterpret my plea for reasonable regulation of gene technology instead of radical bans. The proposition to be voted on in Switzerland would ban the generation, importation, and use of transgenic animals, including flies and worms; it bans the release of genetically modified plants, as well as four other organisms, including recombinant viral vaccines. Also, a mandatory proof of benefit plus proof of absence of potential danger would be demanded before gene technology experiments with any organism not already banned would be permitted. Swiss scientists fully support the strict regulation of new technologies. Regulation could be strengthened further by a collection of laws called Gen-Lex that are now being debated generally and in the Swiss Parliament. There also appears to be a general and accepted wish among the Swiss public that foodstuffs containing genetically modified products must be marked accordingly.

One of the key characteristics of the "Stone" or "Middle" ages was that decisions were made on the basis of prejudice and belief. History has shown that to ban or prohibit technologies or ideas on these grounds is neither reasonable nor a workable solution: Adam and Eve's apple, Prometheus's fire, and Galileo Galilei's support of heliocentrism are famous "bad examples."

Instead of demanding bans and statements about what we do not want, it seems better to me to state first what we do want to achieve. Should we not try to analyze and understand biology and nature first, and then decide what we want to do with our knowledge at national and international levels? In the context of the really big problems we confront, we are too many people who need to be better educated. We want to live better and longer, but fear many problems related to an aging society. We are often split between wishful thinking and what we effectively do ourselves in terms of respecting nature and preserving the environment. I am convinced that gene technology will help us solve some of these problems.

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MRC Commitments

Arthur Kornberg, in an editorial "'I'he NIH [National Institutes of Health] did it!" (12 Dec., p. 1863), refers to the U.K. Medical Research Council (MRC) in the context of worldwide "[t]rends to centralize and collectivize bioscience research support," leaving no room for the scientist to do something utterly original and unpopular.

Contrary to Kornberg's interpretation of the recent changes in the research funding schemes we introduced, the MRC is fully committed to supporting both the individual scientist and basic research. The main aim of the changes is to ensure that the individuals who receive MRC funding work in an intellectually stimulating environment with adequate infrastructure support. In our own institutes and units, most of which are embedded in universities, we have been able to maintain full support for our best scientists. It is, however, generally accepted that universities have not been able to keep up the physical environment and infrastructure (for example, laboratory facilities and technical support) that underpin MRC funding under the so-called "dual support" system in the United Kingdom. Our changes will in part contribute to correcting this problem. We also have a substantial fellowship program to provide career progression for the best researchers and a commitment to long-term funding of individuals. We have introduced special schemes for recently appointed university scientists to help them establish their careers and have provided a new scheme of short-term funding for high-risk, speculative, and innovative research projects. We believe that initiatives like this will enable young and emerging scientists to dictate the direction and pace of research in the future.

All our funding is awarded competitively with the use of scientific advisers numbering many hundred and is based on proposals from individual scientists (and this applies to researchers in our own institutes and units as well) who are personally responsible for the success or failure of their research program. At the same time, it cannot be denied that encouraging collaboration between researchers is as important as seeking out the most innovative and productive individuals.

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Kornberg describes the erosion of individual investigator independence as block grants from the NIH aimed at specific diseases have become more popular and the percentage of funds available for investigator-initiated projects (R01s) has declined.

NIH might ameliorate this problem by changing the way in which some block grants are administered. As one example, consider program project grants (PPGs). A PPG is a group of three or more research projects, each with approximately the scope of an R01, held together by mutual interest and the availability of shared core facilities funded by the grant. Instead of giving full budget authority over the entire grant to the principal investigator (PI) of the PPG, each of the subprojects might be independently