SCIENCE FOR DEVELOPING COUNTRIES

Mano Singham

Symposia on science and development—that is, the issues confronting developing countries—tend to follow a predictable pattern. First an attempt is made to define what "development" is or should be. This is followed by efforts to define what kind of science is appropriate for developing countries. Then a search is made for areas of overlap between these two working definitions to determine which areas of science and technology are relevant to the needs of development. Finally, the question is addressed of how to encourage scientists in less developed countries to work in those areas.

Unfortunately, this is all a waste of time, since the opinions of scientists on this topic are almost invariably ignored by the actual decision makers. The development goals and strategies the latter choose to pursue are determined by the immediate political, economic and social pressures in the country, and these in turn are influenced by the national ideology—whether capitalist, socialist or a so-called mixed economy. While scientific bodies are frequently set up to advise governments, the persons appointed to these bodies are typically picked for their loyalty to the government in power. Their role usually is to enforce government policy on the scientists rather than to influence the policy itself.

The question of what *kind* of science is appropriate for developing countries is usually resolved with near unanimity at these science-and-development symposia. It is widely held that research in basic or fundamental science is a luxury developing countries cannot afford and that what they need is applied or engineering sciences. These symposia then go on to formulate practical recommendations, the most popular of which is that a conference or workshop should be organized to bring together scientists from developing countries to learn about some currently fashionable "useful" branch of technology, such as wind power or obtaining energy from manure. The hope is that they will return and apply it to the benefit of their own society, and perhaps even improve upon it.

It would be interesting to know how many participants in such conferences and workshops even *work* in those fields upon their return. I suspect the number is very small. Conferences are useful only if one already has a reasonable familiarity with the technical aspects of the subject. But scientists in a developing country rarely obtain the *ongoing* support necessary to achieve this familiarity. It is hardly reasonable to expect them to become experts overnight and then return to their countries and be productive.

Why do science-and-development symposia tend to pursue this ineffective program? I think it's because many of the people from developing countries who attend them are not practicing scientists but either bureaucrats or former scientists who have long since stopped doing any research and are now full-time administrators. Such people have no real understanding of the problems that scientists face. They do, however, usually have very strong views on what constitutes "useful" and "useless" science. They also tend to view practicing scientists as somewhat irresponsible children who, unless firmly guided into "useful" science, will fritter away their time in "useless" science. For these people, "useless" science is synonymous with basic science while "useful" science is synonymous with applied science. But these definitions are irrelevant, because they do not address at all the real problems that practicing scientists face in the developing countries.

The biggest problem is that they are treated with contempt by their own governments and scientific establishments. (The "thinking" behind this attitude is that scientists who return to their home countries do so *only* because they cannot get jobs abroad and hence must be no good—a perfect example of a self-fulfilling prophecy!) If any problem in the country needs to be solved, the leadership seeks a foreign or even expatriate consultant charging high fees, without even considering that there might already be an expert in the country.

There are also other problems to be faced. Though photocopying facilities, high-quality secretarial and graphics services, computer time, basic chemicals and equipment, and technical staff are all usually available in the country, the scientist rarely has the resources to use them. Finally, most journals are either not available or have large gaps in their subscriptions, and there is lack of contact with fellow scientists in the same field of research.

The problems are enormous, but that does not mean that no solutions are possible. It all depends on what one hopes to achieve. My suggested solution is based on the assumption that despite their problems, developing countries produce large numbers of creative and talented scientists. The goal should be to identify those persons and supply them with some of the resources they need to be productive. This could be done by extending the established practice of

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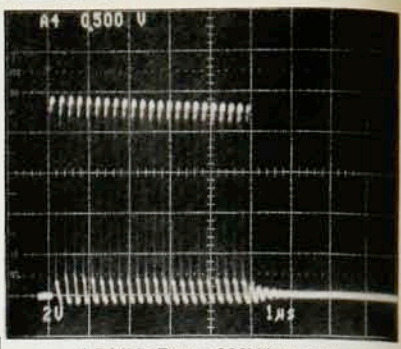

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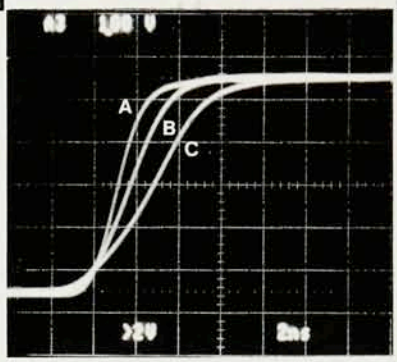

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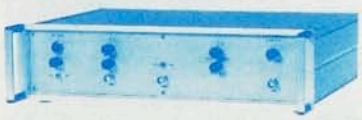

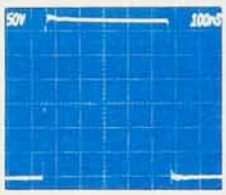

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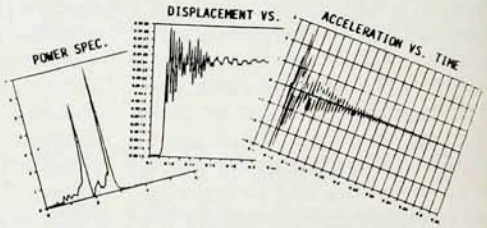

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research grants and peer review into the international arena. It would be necessary first to establish a source of funds. Scientists in the developing countries would then be invited to submit research proposals to the funding organization. The organization would pass the proposals on to international peer review groups, which would evaluate them and award grants. The peer review groups should comprise only active research scientists from both developing and developed countries. Bureaucrats and amateur "science and development" types should be carefully weeded out because they cannot evaluate the scientific merits of the proposals.

The grants would primarily cover the cost of travel for about two months of the year to attend conferences or visit other research institutions. This is most important, since it would enable the scientist to have contacts and collaborations with other scientists and also would provide access to much-better-equipped libraries, where the scientist can fill in the gaps in knowledge caused by the absence of journals at the home institution. Host research institutions are often able to provide a stipend to cover local expenses, provided a collaborator can pay for travel to and from the institution. The grants could also pay for computer time; subscriptions to some journals; basic equipment; support for research assistants; and secretarial, graphics and technical assistance.

The philosophy behind this approach is that we should not try to improve the conditions of all the scientists in all the countries. This is too big a task and is the rightful responsibility of the governments in those countries. A more realistic goal is to try to enable the creative scientists to be productive. Awards of as little as $2500 per scientist per year will usually be sufficient. It would be a mistake to regard these research grants as "aid," since what will actually happen is that in return for a relatively small financial commitment, the scientific community will be getting the services of some of the best scientists in the world.

Implementing this proposal will help in development in two ways. First, it will remove some of the main frustrations that lead scientists in developing countries to emigrate. Second, it will enable the scientists to keep abreast of the latest developments, and they will then be able to judge which new technologies are most appropriate for their country, as well as assist in training technical personnel to use the new equipment.

It could be argued that by making the distinction between productive and unproductive scientists more important than that between "useful" and "useless" science, I am sidestepping the question of whether basic science should be pursued at all in developing countries. It is undoubtedly true that the problems of hunger, shelter and health are far more important than the abstract pursuit of knowledge. But in the world of skewed priorities that we inhabit, it is not at all clear that depriving the scientist of his funding will result in that money's being used to solve these problems. The way things are, it is far more likely that the money will go to funding yet another symposium on science and development!

It is necessary to make two clarifying remarks at this point. First, I am not taking the view that the entire debate on science and development is a sham. It is an important subject and there is a need for serious, scholarly studies of it. Second, I am not necessarily favoring support of basic science over so-called intermediate (or appropriate) technology. What I am saying is that the best research of *any* kind will only come from people who have the *ongoing* support to carry out their ideas to fruition. I would expect that in actual fact most scientists will eventually work on applied science projects of relevance to their countries, since they will realize that they have a greater chance of making original contributions in those fields. What is important is to let the scientists themselves (both applicants and review-board members) decide where they can be most useful and productive.

New ideas are important in the development of *any* society. Creative people, whether they practice "useful" or "useless" science, tend to have more ideas than others. When those creative people are allowed to flourish in the universities and research institutions of a developing country, they will stimulate the best in the students, who, let us not forget, will eventually end up as the leaders of that society. It is these creative people who will push the local technology further. It is they who must confront and solve problems as they arise. Ultimately, the basic issues of underdevelopment can be resolved only in the global political arena, and we must be realistic about that. All that we as scientists can do is to try to support the people who have good ideas. Otherwise they will surely stop having them, and then everyone, everywhere, will be the loser. ■