

Current Comments®

EUGENE GARFIELD

INSTITUTE FOR SCIENTIFIC INFORMATION®
3501 MARKET ST., PHILADELPHIA, PA 19104

Supporting Scientist-Colleagues in the Third World Is in Our Own Best Interest

Number 16

April 18, 1988

Despite many problems, researchers in the developing nations manage to produce a significant portion of the world's scientific output. Imagine what these scientists could contribute to the global community if their difficulties could be reduced. The introduction of advanced technologies (such as CD-ROM) will likely improve scientific communication and education in the developing nations. But just introducing new technology to these nations is insufficient; there must also be a corresponding effort by the industrialized nations in other areas as well—including government-to-government cooperation, personnel and logistical support for basic and applied research, and so on. Above all, however, there will have to be a concerted *commitment* by the developed countries to do these things. The well-being of science in the Third World is vital to us all. We are one intellectual community.

The following two editorials originally appeared in *THE SCIENTIST*[™].^{1,2} The first offers a suggestion on how to

ensure timely journal dissemination in the Third World. The second discusses a successful joint venture of the World Bank and the Brazilian government to promote science development.

Why should scientists of the industrialized nations be concerned with the plight of their colleagues in the developing world? Because science is nothing short of what I would call a *global enterprise*, an encompassing marketplace for the exchange of ideas that, ideally, knows no boundaries—whether geographical or otherwise. Due to this intrinsic quality of science, its health abroad will affect its health in our own backyards. I will be returning to this theme in future essays.

* * * * *

My thanks to David Pendlebury and Peter Pesavento for their help in the preparation of this essay.

© 1988 ISI

REFERENCES

1. Garfield E. How to boost Third World science. *THE SCIENTIST* 1(14):9, 1 June 1987.
2. -----, World Bank boosts Brazilian science. *THE SCIENTIST* 2(3):9, 8 February 1988.

With

EUGENE GARFIELD

How to Boost Third World Science

An International Effort Can Maintain the Information Flow

Reprinted from: *THE SCIENTIST*[™] 1(14):9, 1 June 1987.

Scientists in the Third World face many problems, not the least of which is funding. Of necessity, Third World nations can not yet support science at levels commensurate with those of the developed nations. Meeting the basic needs of their citizens leaves the governments of developing countries with few resources to expend on long-term investment in the form of scientific research. So it often happens in the Third World that university and government research centers are understaffed, equipment is outmoded, and facilities are substandard.

Despite these and other obstacles, science is pursued in the Third World, and in some places, like India and Argentina, it is pursued with vigor. As Michael Moravcsik recently noted (*THE SCIENTIST*, April 20, 1987, p. 11), scientists in the developing countries produce an estimated five percent of the world's scientific literature. Although this represents a small portion of the whole, it is remarkable—given social, economic, and sometimes political adversities—that the output is as high as it is.

Unfortunately, there is too little concern in the wider scientific community and in governmental agencies of the developed nations about the day-to-day problems confronting scientists in the Third World. Aside from neglect, there is prejudice as well. Some scientists in the developed countries wrongly dismiss work in the Third World as being of universally low quality, [but it should be noted that] recent and highly important work in superconducting materials was carried out in India and Beijing, [and] even in the mid-1960s, researchers in the People's Republic of China were the first to synthesize bovine insulin.

Admittedly, these examples are somewhat exceptional. But if much of the research in Third World countries is of low quality, isn't it reasonable to suppose that lack of support, both from home governments and the developed nations, contributes to that low quality?

One support problem of which I have long been aware is the poor access that scientists in the Third World have to the scientific literature. In many developing countries, hard currency is scarce or unobtainable, which makes difficult or impossible the purchase of foreign journals and books. Moreover, run-away inflation or swings in world markets against a local currency can greatly compound the payment problem. Even though a few publishers offer substantial discounts in nations where per capita GNP falls below a certain level, the problem often remains.

The UNESCO coupon program, established long ago, was designed to alleviate the difficulty of securing hard currency in Third World countries. The coupons, whose value is expressed in U.S. dollars, are issued in developing nations by the country's National Commission for UNESCO in exchange for local currency. The coupons are, in turn, accepted by many publishers, who can redeem them through UNESCO for payment in hard currency. They are good for the purchase of not only journals and books, but also audio-visual materials, school supplies, scientific instruments, laboratory equipment and technical machinery. The amount of UNESCO coupons that can be issued in a developing country is determined locally and varies from one country to another.

At present, 94 nations participate in the UNESCO coupon program: 58 nations sell coupons domestically and publishers in 36 nations are accepting them. South Korea makes extensive use of the program. I wonder whether this has contributed in part to that nation's recent dynamism.

Plainly, wherever in the Third World information access is improved, the productivity and quality of research will improve also. India, the giant of Third World science, is perhaps the outstanding example; there, better information flow has helped research in astronomy, astrophysics and biochemistry.

Despite the success of the coupon program in providing a means by which developing nations can make payment for scientific and educational materials, the materials, especially journals, are often greatly delayed or their flow regularly interrupted. Bureaucracies in many Third World nations move slowly. Such red tape can delay authorization for payment to journal publishers, even in UNESCO coupons, for many months or even a year after a renewal order has been placed. In some instances, a publisher will continue to ship materials despite lack of payment, but to do so gives no encouragement for payment. For the most part, publishers must warehouse current issues of the journals, or cancel the orders altogether. If payment is at long last received, the warehoused journals are then released or the orders reinstated.

Imagine the frustration of the scientist in a developing nation who must wait endlessly for a current journal to arrive. When the shipment finally comes, it often contains six to nine months' worth of back issues that were held up by delayed payment. In another few months, the cycle will start again. Such broken communication can seriously undermine scientific performance. Information, after all, is a perishable commodity, and in many circumstances such delays reduce the value and utility of that information. One result can be the unwitting duplication of research.

In my view, the UNESCO program should be extended or supplemented in the

following manner: I propose that an escrow account consisting of a reserve of UNESCO coupons or hard currency be established at an international bank or intergovernmental agency. This account would serve to guarantee to publishers payment of orders from participating Third World nations. With the confidence that payment would be forthcoming, publishers could keep scientific information flowing to the developing nations. Thousands of subscription renewals could be immediately honored by publishers. Scientists need not suffer any more from the inefficiencies and foot-dragging of local bureaucracies.

Many publishers are keen to help promote Third World science in any way they can, but the economic realities of business prohibit indefinite service without payment. An escrow account would remove a major obstacle now standing between publishers and scientists.

Conversations with publishers, with subscription agents, with scientists interested in improving communication with researchers in developing countries, and with officials at various U.N. agencies about this proposal have proved encouraging. Many suggested that The World Bank might help, but I learned that this institution has not in the past involved itself with the administration of a program of this kind. I do not see, however, why it could not maintain the escrow account on behalf of UNESCO or some other international organization. Surely, World Bank doesn't mean only Big Bank. Solutions to practical problems often require small-scale assistance.

I ask readers of *THE SCIENTIST* to join me in discussing the problem described above and the idea I have suggested for its solution. It is a problem worthy of the creative contemplation of scientists worldwide and, in particular, of those attending the Third World Academy of Sciences conference, which [was] convened in Beijing in September. Having gathered the best thinking on this matter, we can proceed with a formal proposal to the most appropriate agency. ■

With
EUGENE GARFIELD

World Bank Boosts Brazilian Science

Reprinted from: *THE SCIENTIST*™ 2(3):9, 8 February 1988.

Improving science and science education in Third World nations has long been a part of development programs initiated by multilateral agencies, such as the United Nations. But in recent years a new strategy—science *for* development—has emerged.

Instead of being merely one among many areas targeted for the overall educational, social and cultural improvement of a developing country, science is beginning to be emphasized as a sector in which development aid can produce outsized returns, especially economic returns.

In this issue of *THE SCIENTIST*, Abdus Salam points out that the Third World Academy of Sciences has adopted as one of its major themes "the direct application of science for economic development" (p. 20-21). He goes on to say that Brazil is one of only five developing countries that has charted a clear course of direct investment in science.

A Nation of Promise, Problems

With abundant natural and human resources, Brazil resembles the proverbial sleeping giant. Generations of commentators have predicted that when finally awakened, it will play a dominant global role. During the "economic miracle" of the late 1960s and early 1970s, Brazil attained an annual growth rate of some 10 percent. That performance certainly fueled speculation about the nation's potential. But growth has slackened considerably and now the country is saddled with enormous social and economic problems, most notably the largest foreign debt of any Latin American nation and an inflation rate of over 300 percent.

Support for science was sacrificed during the years immediately following the industrial boom. Money continued to flow to oil refining, nuclear power, telecommunications and computers, but basic research, especially at universities, sputtered from a lack of funds and inadequate facilities and equipment.

In 1982 the military government, prompted by the complaints from the science community and worried about diminishing prospects for long-term growth, sought out advice from the World Bank on how to improve the nation's scientific infrastructure. Since 1985 there has been new money for science, especially for research at universities and government laboratories, largely because of a cooperative program worked out by the Bank and the Brazilian government.

Together, Brazilian and World Bank officials fashioned the Program for Support in the Development of Science and Technology (PADCT), which was designed to overhaul and modernize scientific research planning, funding and administration. Under the terms of the program, the Bank extended to the Brazilian government a loan of \$72 million, which the government agreed to match with \$140 million of additional or new money for science.

These funds are now supporting about 1,000 projects in areas vital to economic development: biotechnology, chemistry and chemical engineering, and geosciences. Funding for instrumentation, as well as for the repair and maintenance of existing equipment, is also part of the package. Moreover, PADCT funds, especially from the Brazilian side, are being spent for upgrading science education at the primary and secondary lev-

els, for improving science information networks, and for strengthening science policy-making and management. Although not all the loan funds are yet disbursed, an assessment of the program's effectiveness was recently undertaken by a team of development and science experts, both Brazilians and foreigners.

Among the successes so far is a better coordination of Brazil's five science agencies (FINEP, the Agency for Financing Studies and Projects; CNPq, the National Council for Scientific and Technological Development; CAPES, the Coordinating Agency for Advanced Training of High-level Personnel; the Secretariat for Industrial Technology; and the Ministry of Science and Technology). Also improved is the system for importing scientific equipment and supplies, such as chemicals, a process that was formerly a nightmare of bureaucratic and foreign exchange difficulties. Finally, PADCT has helped establish a system of peer review for the awarding of research grants; previously seniority and sometimes political considerations took precedence over considerations of merit in funding projects.

More recently, Bank officers have helped the Brazilians formulate a funding system that protects the buying power of grants from the depleting effect of run-away inflation. Instead of issuing the funds in the *cruzado*, Brazil's unit of currency, they are denominated in a standard unit, transferable

into *cruzados* but continually adjusted to compensate for inflation.

An Important Experiment

Nobel laureate Henry Taube of Stanford University, who served on the international team reviewing PADCT, gives the program high marks, especially in its effort to establish a peer review system of research funding. "It is an important experiment and it ought to be continued," he says. The Bank is, in fact, now considering the possibility of a follow-on loan, which may have a greater focus than the first on building up centers of excellence in research.

The World Bank's program for improving science in Brazil is praiseworthy. It also deserves wider attention in the scientific community, which in the past has heard a lot about the Bank's failures in that nation, specifically the failure of a massive regional development program in the state of Rondonia that had a damaging impact on the environment and on indigenous populations. Last spring Bank president Barber Conable introduced reforms, including an expansion of the Bank's environmental staff, which should ensure that past mistakes will not be repeated.

Multilateral agencies, such as the United Nations and the World Bank, receive lots of media attention when their efforts go awry. It is only fair that when they succeed we give them commensurate notice. ■

Gain a new perspective.
Learn a new point of view.
Face a challenge. Be entertained. Get a little
angry. Become better informed. Get involved.
Read capsulized commentaries on scientific
and technical articles from the popular and
professional press that make all
these things possible, and more.

ISI®
Press
Digest

© 1986 ISI
CC-4479