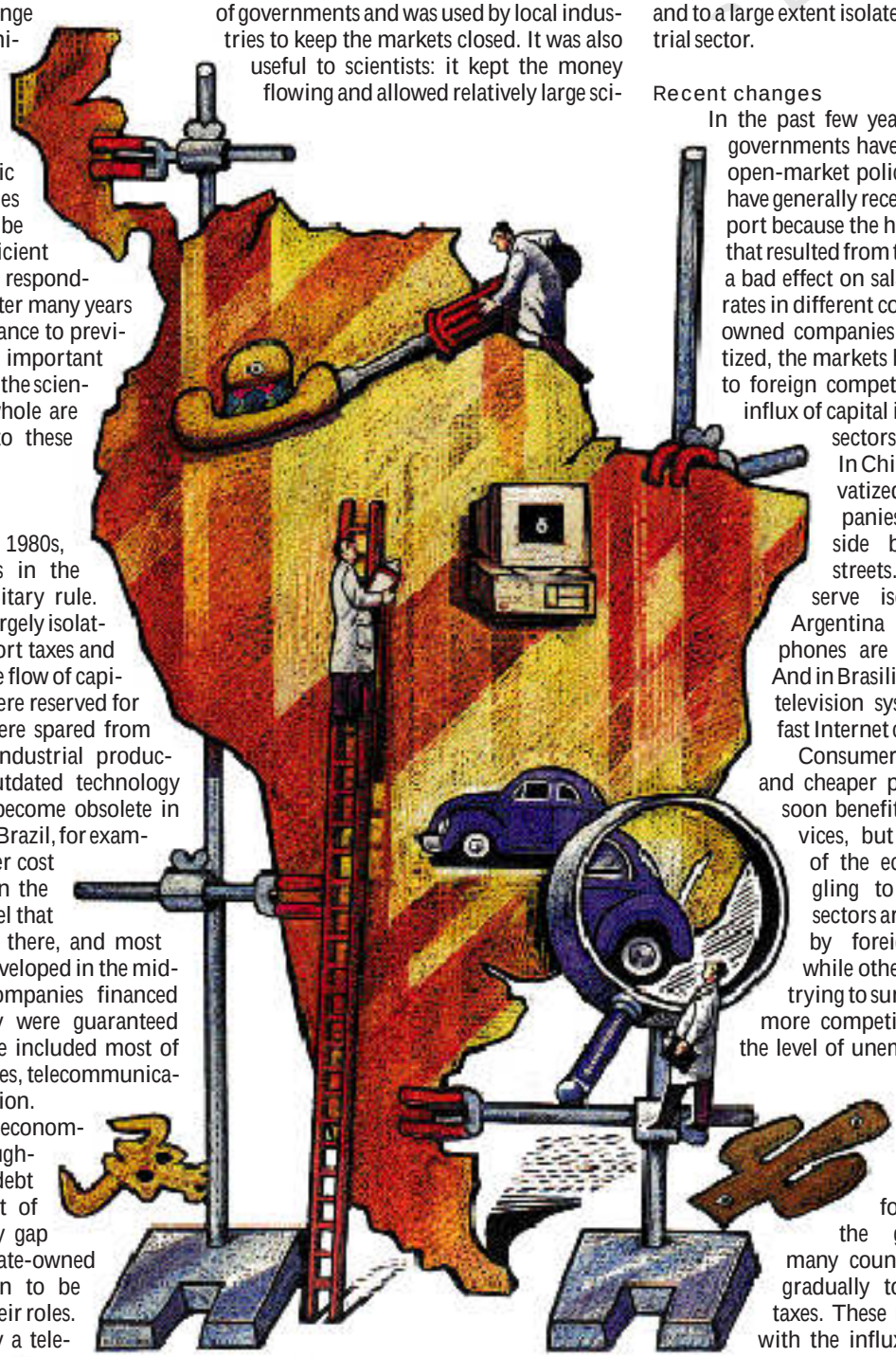
Adapting to change in Latin America

The recent political and economic changes in Latin America provide a challenge to the scientific community. They may be the very stimulus needed to improve the quality of research.

Fernando C. Reinach

The countries of Latin America are undergoing rapid and sweeping changes both politically and economically. They now have democratically elected presidents, there has been large-scale privatization, and their economies are open to foreign trade and investment and have stabilized. These changes provide a challenge to the scientific community and the universities. They can either come out of this turmoil reinvigorated as strong players in the economic progress of their countries or allow themselves to be put aside as inefficient machinery incapable of responding to new demands. After many years of stagnation and resistance to previous governments, it is important that the universities and the scientific community as a whole are prepared to respond to these challenges.



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Historical problems

During the 1970s and 1980s, most of the countries in the region were under military rule. Their economies were largely isolated because of high import taxes and strong restrictions to the flow of capital, and local markets were reserved for local producers who were spared from foreign competition. Industrial production was based on outdated technology imported after it had become obsolete in developed countries. In Brazil, for example, a personal computer cost seven times the price in the United States for a model that was out of production there, and most new cars had engines developed in the mid-1950s. State-owned companies financed with borrowed money were guaranteed monopoly by law; these included most of the oil and steel industries, telecommunications and power generation.

In the late 1980s this economic model collapsed throughout the region. Foreign debt and inflation grew out of control, the technology gap increased, and the state-owned companies were shown to be incapable of fulfilling their roles. Anyone needing to buy a telephone in Brazil could buy it on the black market for around $3,000 or could wait in line for up to three years. Inflation rates of 1,000% a year were not uncommon in Brazil, Argentina and Chile.

There was no real economic need to invest in science, but the rhetoric of 'science-based development' kept science alive. This rhetoric fulfilled the nationalistic objectives of governments and was used by local industries to keep the markets closed. It was also useful to scientists: it kept the money flowing and allowed relatively large scientific communities to grow in many Latin American countries. Graduate schools developed in the main universities, and many students were sent abroad for PhDs or postdoctoral work. Basic science survived and grew with the limited funds available. As a result, Brazil, Argentina, Chile and Mexico all have sizeable scientific communities, based mainly in the state-owned universities and to a large extent isolated from the industrial sector.

Recent changes

In the past few years, newly elected governments have implemented an open-market policy. These changes have generally received popular support because the high inflation rates that resulted from the old system had a bad effect on salaries. At different rates in different countries, the state-owned companies are being privatized, the markets have been opened to foreign competition and a large influx of capital is reshaping many sectors of the economy. In Chile, competing privatized telephone companies have rival booths side by side on the streets. Cellular phones serve isolated areas in Argentina where land-line phones are still unavailable. And in Brasilia the regular cable television system comes with fast Internet connection.

Consumers can enjoy better and cheaper products and will soon benefit from better services, but a large fraction of the economy is struggling to survive. Whole sectors are being wiped out by foreign competition, while others are desperately trying to survive by becoming more competitive. As a result, the level of unemployment is at a record high in Argentina and is growing steadily in Brazil.

In an attempt to force competition, the governments of many countries have begun gradually to reduce import taxes. These reductions, along with the influx of capital from

foreign companies constructing modern production facilities, will force the outdated production sector to modernize.

The challenge ahead

I believe that economic pressure will change the relationship between science and society. The question is whether the scientific community is willing and prepared to make the best of the changes.

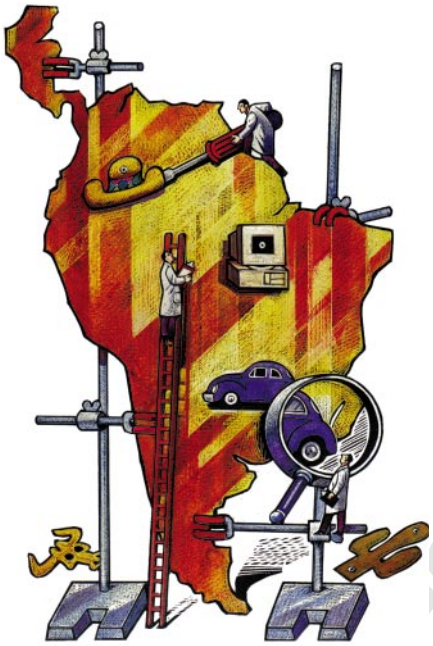
It is clear that much of the demand for new technology will be supplied by importation from abroad, as exemplified by the recent agreement between the Massachusetts Institute of Technology and the federal granting agency Financiadora de Estudos e Projetos FINEP in Brazil. But it is also clear that part of this demand will converge on the universities and the scientific community, if for no better reason than that the industrial sector expects some return on its taxes — in Latin America most universities are supported fully by the government. In São Paulo, Brazil, state universities receive around 10% of the state taxes; sooner or later they will have to have something to show for it.

This demand will force us to confront economic reality. Can universities continue in complete isolation from the industrial sector, concentrating all their research effort on basic science teaching? Or should they instead spend a fraction of their effort in the generation and transfer of new technology to the industrial sector? Although most scientists agree that they should make this change, few realize that it will force universities down a road that will drastically change their nature.

To move in this direction, universities will have to learn a whole new set of skills. Institutions where consultancy work is currently forbidden will have to learn how to regulate it while preserving academic quality and basic science. An environment that has recently learned to value publication as a measure of productivity will now have to learn to evaluate technological projects where publication is sometimes irrelevant. These issues, which are part of the daily lives of scientists in Europe and the United States, are still not being discussed in Latin America.

Effects of change

If the university is not to be transformed into an institution devoted only to applied research, and strong basic science is to be maintained alongside research efforts directed at providing technology for the industrial sector, then the perceived value of science must increase. Such changes are already apparent in many countries. In Chile, for example, university faculties are expected to generate part of their income from consultancy work. Financing bodies, such as FAPESP and PADCT in Brazil, have programmes that support projects based on direct collaborations between industry and



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universities. In Argentina, many small biotechnology companies have been set up by scientists, a move given further impetus by a period of very low wages.

But if the scientific community does not respond well to the changes, there may be increased resistance towards these changes from the universities or, even worse, governments may pull out from the universities before the changes have time to happen. Signs of this trend are already being seen in Brazil: the government, frustrated with its inability to rationalize spending in the federal universities and without the political power to impose selective cuts on the worst units, is slowly squeezing the budget across the whole sector. These signs are particularly worrying, because in Latin America, state-owned institutions are rarely extinguished but rather left to die through terminal neglect and lack of funding.

Economic pressure will also change the way funds are allocated to universities and scientific research; this is presently widely recognized as being wasteful. The present system pays salaries to non-productive staff and results in poor peer review of scientific projects and a bloated and inefficient administrative infrastructure. It has been argued that the percentage of the gross national product spent on science in Latin America, although lower than that spent in developed countries, is sufficient to support the growth of science if it is targeted at the relatively few productive scientists. Despite this, universities have always been compared with state-owned companies that were equally badly managed. The effects of privatization and the consequent increase in productivity will remove this comparison and raise public awareness, and hopefully create a strong demand for increased accountability and clear indicators of efficiency.

If successful, this process may result in a remodelled administrative structure with an end to early tenure decisions (some universities in Brazil grant tenure with full salary before a PhD is obtained), the firing of unproductive faculty and staff, the trimming of administrative costs, and increased financial independence of universities through endowments and other forms of financing.

But these are difficult changes. Most scientists in Latin America are poorly paid public servants who have a job for life, a salary paid by the government, and guaranteed early retirement on full salary. At the University of São Paulo, about half of the salary bill goes to retired faculty and staff. These privileges, unknown in developed countries, are considered important by staff and have historically helped to guarantee a degree of freedom of speech in the universities. Are faculty members prepared to trust a democratic government and exchange these privileges for a higher salary?

Again, if the universities resist the inevitable change they may fare badly. If the universities are deemed to provide poor value for money, and privatization continues to reap rewards, society might decide it can live without public universities. Governments may then be tempted to privatize the whole university system or replace it with private, for-profit teaching universities.

I believe that science in Latin America is at a difficult crossroads. As an optimist, I see the situation as a unique opportunity. The economic changes offer the right combination of pressure and incentives to allow dramatic improvement in the quality of the science produced in Latin America and in its possible effect on the development of the region. This chance must not be wasted. The scientific establishment in Latin America is like a species confronted with a large change in environment: if flexible enough to adapt it will evolve, otherwise it may face extinction. □

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