

nature

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Dream to reality in 25 years?

THE photocopier could hardly be called an unmixed blessing of 20th-century civilisation, but few would deny the substantial benefits it has conferred— or the number of jobs it has rendered unnecessary. Aware of the substantial cost (in foreign exchange) of photocopiers, the Indians set about designing one which could be produced by their domestic industry. In terms of the quality of copy delivered, the prototype devised at India's National Physical Laboratory in New Delhi, was as good as any model produced elsewhere. But, the innocent Western visitor asked, why is the loading of paper, the mounting of the material to be copied, the passage of exposed paper through developer still done by operators? Surely if you can apply high technology to the reproduction process, you can apply it to all other things going on in the machine. In our office the secretary just presses a button.

The reply to this rather insensitive question epitomises the dilemma of science and technology in the developing world—to make machines too automatic is to put people out of work, and the unemployed cannot look to a generous social welfare system to tide them over. Better a man employed on a modest wage doing a monotonous job; after all there is no shortage of manpower.

Such machines *versus* men, productivity *versus* employment issues have, of course, been raising themselves in a variety of guises all over the world for nearly two centuries, but this instance neatly illustrates the sort of clash in values that has endlessly to be resolved when developed technology encounters the developing world. These thoughts were occasioned by an important and little-reported lecture given, last week, by the Commonwealth Secretary-General, Mr Shridath S. Ramphal, former Attorney-General of Guyana, to the Science Policy Foundation in London.

Mr Ramphal's theme is that policymakers should be asking "what kind of science policy will contribute most to the eradication of poverty through a process of self-reliant economic advance that is consistent with social justice, environmental harmony and popular participation?" It is "appropriate technology" that should be at the centre of the development debate, not technology transfer. Technology, claims Mr Ramphal, is like genetic material in that it bears the code of social values of the society in which it was produced and sustained—export the technology to a region where the social values are

different and it may even prove counterproductive.

A science policy in the developing world that is closely allied to, indeed subservient to, social policy, is not without its problems, as Mr Ramphal recognises. There are bound to be many scientists whose interests could never be channelled in socially useful directions, and yet it would be disastrous to start a witch-hunt to hound all genuine intellectuals out and into the first job available in the developed world. The problem here is in differentiating between the distinguished thinker whose very presence at a particular university or laboratory raises the overall quality of the work done and students produced there, and the hanger-on who attempts Western-style research incoherently and inconsequentially (Mr Ramphal's words).

Another major difficulty is the small size of many developing countries. Sixty of them have populations of less than 5 million, so the rapid accumulation of a "minimum critical mass of scientific talent" committed to well defined social values is not going to be easy. Ideally, regional centres and policies could be evolved, but the scientist's famed supranational spirit often means in reality regular trips half way round the world rather than just over the border.

Nor, Mr Ramphal points out, can the developed world stand back and let the developing world try and work it out alone—"the internal values of the world scientific community cry out for change . . . development [should] be the substantive goal of the science policy of the industrial world".

Many will believe that the case made, while strong on idealism, is weak on realism. The scientific community, pushed into being a tool of social policy, might react in a thoroughly conservative way amid cries about pursuing excellence for its own sake and truth wherever it may lead. And yet evolution is occurring, particularly among young scientists, in their views on the functions of science. Provided the pace does not carry things too far towards revolution, and provided that ideologists are not allowed to make all the running, thereby deterring many excellent but apolitical scientists, there is a real chance that what today seems like an unlikely dream for the developing world could, by the year 2000 be an effective reality. The issue is worth wider discussion in the developed world than it has so far received. □