SCIENCE WRITING: BEYOND WORDS

PAUL ICAMINA

In a collection of problems that Zen teachers use in guiding students toward spiritual release, a story is told about enlightenment. A monk asks the master Ummon: "What is Buddha?". "Dried dung", answers the master.

In a way, science and technology in Asia are "dried dung".

Many families in Indian villages, for example, own one or two animals. The dried dung from these animals is used as fuel. Unscientific though it may seem, cow dung is a crucial element of village energy supplies, far removed from nuclear power plants and oil pipelines.

In Asia, as elsewhere in the world, science and technology are such an integral part of everyday life that they are taken almost for granted. The farmers, for example, plant high-yielding rice varieties in fields ploughed with rented tractors. The fertilizers used, the pesticides selected, and the irrigation systems that will water the fields are all products of science and technology, whether the farmers know it or not.

Unfortunately, there is another side to the picture. The farmers don't usually know that fertilizers, if used excessively, can pollute streams; that pesticides can be poisonous to people and animals; and that water buffaloes can be as suitable as tractors and less costly. Moreover, in some Philippine provinces, farmers are exposed to parasitic snail fever while wading in contaminated fields. Others may lose their harvest to rats and other predators. Or the farmers may be landless.

What has land reform to do with science and technology? Analysis of the world hunger problem identifies two needs: more food in developing countries and its equitable distribution. A survey by the World Bank and the International Labour Organization carried out in India, Malaysia, Pakistan, and the Philippines, shows that a transition in each of these countries to small, uniform family farms would increase national agricultural production by as much as 19 percent in India to 49 percent in Pakistan.

Concentration of land ownership has also contributed to environmental degradation. In the humid tropics, landless farmers move into rain forests, destroying valuable timber and unique ecosystems in futile attempts to farm unfamiliar soils. Insecure tenancy also threatens long-term agricultural productivity by reducing personal incentives to conserve the soil. As farmers move from plot to plot, they see no reason to protect the quality of the soil they till.

The introduction of modern rice technology, although it has increased rice yields, also entails a higher capital investment for fertilizers, pesticides, and irrigation. "One adverse effect of modern rice farming", says Dr Yujiro Hayami, a Japanese agronomist, "is the increase of dependence on outside resources for farming." In a 1974-76 study, Dr Hayami found that 16 percent of a village's annual income of some U.S. $138 000 is paid out for fertilizers, chemicals,

and fuel. More than half of farmers' income goes for goods bought outside the village.

This is science and technology in Asia, far from the "pure" science of molecular biology or from the "sophisticated" technology of breeder reactors.

In this context, where does the popularization of science and technology fit in? As Mack Laing, founding editor of Depthnews Science Service put it: "Science is now so bound up with our lives that a newspaper that ignores it cannot claim to be informing its readership." Thus, from its inception in October 1976, Depthnews Science has sought to reflect the many faces of science and technology in a region that has retained many of its traditions while embracing the modern world.

The favourable reception given science and technology stories in Asian newspapers is due partly to the fact that Asian nations are waking to the need for more public appreciation of how science and technology can help national development efforts. Leaders in these countries argue that popularizing science helps people to understand and encourages them to cooperate in government actions on large-scale problems like conservation, pollution control, etc. Governments also argue that interesting the youth in science can lead to increases in the country's science personnel.

The developing world is now also realizing that public involvement in science and technology is needed to reach and maintain a healthy level of national development.

The key to increasing public awareness and understanding of science is the mass media. But in order to reach people, science stories must be presented in the vernacular. And as Professor P.P.G.L. Siriwardene, vice-chancellor of the University of Sri Lanka, notes, science popularization must be carried out "not in a haphazard manner, but as an important national venture." I also believe that science and technology stories can be effectively disseminated only if they are interesting and deal with the very stuff of human existence and survival.

Science writing in developing countries should not be confined to science *per se*. It goes beyond mere statistics on malnutrition, for example, and beyond the question of why the body needs food. An article dealing only with the physical aspects of malnutrition would be incomplete because it would ignore crucial aspects of the hunger problem.

A survey carried out by the Philippine Ministry of Health, for example, reveals that 85 percent of schoolchildren suffer from protein-calorie malnutrition, "very closely linked to the available food supply." On further examination, one will find that since 1960, farms devoted to food crops have shrunk while commercial crop lands have expanded. About 55 percent of total cultivated lands are devoted to export crops, much of them directly controlled by foreign interests.

India and the Philippines, early targets of the Green Revolution technology, are countries where food grain production increased dramatically. Yet, the World Bank reports that per capita consumption of food grains in India in 1975-77 had fallen below the level of 1970-72, and even below that of 1960-62. In the Philippines, rice production has doubled in the past decade, but the population's average consumption of grain has fallen to the lowest level in all of Asia, with war-ravaged Kampuchea the only exception.

The mechanics of science and technology in Asia are such that ordinary citizens feel helpless, if they are at all aware of the issues. So pervasive are science and technology (as is the ignorance about them) that one questions whether citizens are sufficiently informed to have a major voice in technical decisions that may have far-reaching consequences — the establishment of nuclear power plants, drug testing programs, and the construction of large hydroelectric dams, to give just a few examples.

A problem that plagues many developing countries is that of full access to information, however. The sale and promotion of dangerous drugs is one example. In the Dominican Republic, a painkiller called Novaldin is widely advertized using the picture of a child smiling because of the "agreeable flavour" of the drug. But Novaldin is the brand name of dipyrone, known to cause a fatal blood disease. The American Medical Association in fact warns that it should be used only as a last resort, a caution not voiced in the publicity materials distributed by the manufacturers.

Faced with such a situation, can science writers afford to be biased? Yes, in order to increase public awareness and disseminate information that is not often available to the public. I believe that science writers should be biased or, more accurately, responsive, toward what is beneficial and needed by people — provided, of course, that the facts support their view. Otherwise, the only information available to populations will be that which doesn't threaten the "status quo".

In the case of drugs, one must know that industrialized countries account for 90 percent of world output, and that in developing countries more than 30 percent of drugs may be imported. There is concern in these countries that the drug industry has been reducing its investments in research to develop more effective drugs to meet priority health needs such as the control of parasitic diseases. At the same time, herbal medicines, long used in most developing countries, have not been popularized because to do so would threaten the economic dominance of the multinational drug firms and their local partners.

Thus, science and technology cannot be separated from politics: Nor can science writing, if people are to have full access to information. To ignore science's social and political dimensions would reduce science and technology popularization to a superficial level. □

Paul Icamina is editor of Depthnews Science Service, *published by the Press Foundation of Asia in Manila, Philippines.*