Letters

Tar Sand Technology

As Philip Abelson seems to imply in his editorial of 14 December 1973 (p. 1087), world relationships, not world supplies, are more likely to provide the key to resolving the energy "crisis"—now and in the future. Self-sufficiency may be a popular interim measure, but it could be a dangerous precedent for both those that can afford it and those than cannot. Isolation, on the one hand, and devastation on the other, are not worthy pursuits.

In a perverse sense, the crisis on the politico-economic scene may have been beneficial in that the aims and roles of the consumers and the suppliers have undergone considerable scrutiny and irreversible change. These days it is almost superfluous to point out that global resources are finite, with or without growth. Perhaps, then, we might have anticipated a reappraisal of the corresponding consumer-supplier relationships. The challenge which has arisen lies in the development of mutually satisfactory adjustments. In essence, this challenge is one of international cooperation and can only be met through constructive discussion and thoughtful negotiation.

Against this backdrop, the Engineering Institute of Canada has scheduled a conference in Edmonton, Alberta, (17 to 19 April 1974) to provide both intensive and extensive discussion of the Athabasca Tar Sands—their potential, problems, and prospects. Tar sand technology is not as well developed as many believe. True, "conventional" mining methods can be used, but it would be grossly misleading to suggest that the technology is well developed for anything other than small accessible areas. It is reported, for example, that treatment of the tailings has yet to meet Albertan environmental standards.

The conference is intended to be technical and will include discussions of engineering, finance, and management; but it will be difficult to exclude political problems, which are, in a sense, the most important problems at this stage. I do not agree with Abelson's statement that "a combination of rigorous conservation and additional sources of hydrocarbons could free the world of the threat of chaos," but I do agree that intelligent development of resources such as the Athabasca Tar Sands is more than timely. Such a development could be the first example of international cooperation for large-scale energy or feedstock production, or it could be the last.

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Aid to Indochina

Scientific Aid to Indochina (News and Comment, 14 Dec. 1973, p. 1109) is the greatest thing that anyone could do for the people of that region next to bringing them a real and just peace.

It is disappointing, however, to read that North Vietnam alone is to benefit from such generous aid organized by highly reputed scientists. Other countries in Indochina, namely Laos, the Khmer Republic (Cambodia), and South Vietnam have suffered and continue to suffer from the war. Do not these people deserve the same help?

It is hard to understand why aid from a scientific community that is supposed to be politically neutral cannot be given in an unbiased manner to all people who desperately need it, whether they have asked for it or not. In the type of war that is ravaging Indochina, people have no time to read every announcement; they haven't even the time to protect their own lives.

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Copernican Observations

Allen L. Hammond (Research News, 28 Dec. 1973, p. 1329) states: "That the solar system is heliocentric and not geocentric was first proposed by the Polish astronomer Nicolaus Copernicus on the basis of telescope observations." In fact, Copernicus was far from the first to propose a heliocentric theory, his thesis did not rest upon new observations, and the telescope was not even invented until over half a century after his death.

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Berendzen is correct. It was Aristarchus of Samos who first proposed a true heliocentric theory. Copernicus, who reintroduced the theory into Western scientific thought, based his work in part on the lack of agreement between geocentric models and (non-telescopic) observations.—A.L.H.

Multinational Corporations

I read with interest the editorial by Philip Abelson "Corporations and the less developed countries" (30 Nov. 1973, p. 873). The international scientific community has long recognized that the developing nations ought to be in command of their own destinies (*1*). However, self-determination means economic emancipation. To foster their development and economy, the less developed countries have been advised to promote the science and technology that would suit their own resources and problems, instead of imitating the more developed countries. They also need to foster broader education and to encourage the formation of scientific and technological cadres. The problem, however, appears to be a circular one in that the planning and implementation of scientific and technological goals require a substantial amount of money which these nations do not have. Some foreign enterprises have not been willing to make this investment; rather than contributing to the development of the less developed countries, they have done their best to slow down technical and economic progress in the recipient countries. Thus, Abelson's statement that "the corporations have not con-

ducted much research and development in the LDC's [less developed countries]" makes all sorts of sense. Furthermore, as recent political events in the United States have shown, economic dominance and political dominance go together, and there are ample indications that some multinational corporations have been meddling in the internal affairs of less developed countries. This was brought up during the 22nd Pugwash Conference on Science and World Affairs in Oxford, England, in 1972. The Pugwash Continuing Committee stated then that "there are continuing threats to the security of other Latin American countries arising from activities of industrial monopolies owned and controlled by external interests" (*2*).

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References

1. See J. Rotblat, *Scientists in the Quest for Peace: A History of the Pugwash Conferences* (MIT Press, Cambridge, Mass., 1972), pp. 246–252.
2. *Scientists and World Affairs, Proceedings of the Twenty-second Pugwash Conference on Science and World Affairs* (Pugwash Continuing Committee, Oxford, England, 1972), pp. 29–35.

Abelson states in his editorial of 30 November 1973, that the less developed countries (LDC's) need the skills and know-how which the multinational corporations often are unwilling to provide.

My experience is confined to the petroleum industry, but I am convinced that many, if not all, multinational oil companies have been wholeheartedly giving know-how and training on a large scale to nationals of the LDC's. At the University of Tulsa alone, we have 300 students from Venezuela and the Middle East studying petroleum technology. Most multinational companies are staffed almost entirely by nationals. Newly formed government oil companies in the LDC's have no difficulty obtaining information about highly sophisticated exploration and production techniques by contracting American service companies and hiring experienced Americans. I am a member of a group that offers advanced continuing education courses around the world, and many of our students have been nationals of LDC's who have been sent by their companies.

The big lack in the LDC's is capital, but with their current nationalist and socialist politics they are unlikely to acquire any. Foreign capital is either rejected outright by the LDC's, or foreign companies are admitted and then harassed if they show a profit. Local capital accumulates very slowly because of high taxes and social legislation. Savings that should be invested are siphoned off into government bureaucracies. Inept and money-losing government enterprises, politically managed and loaded with surplus employees, turn what should be contributions to the economy into a drain on the public treasury.

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While the observations in Abelson's editorial are accurate, the conclusions he draws from them are rather beside the point.

The notion that "LDC's wish to achieve full independence from technological dominance" implies that creation of competitive national economies in the 19th and early 20th century sense is possible; that the governments of LDC's think in such terms; and that the multinational corporations can be considered "U.S. international firms," as in the title of Abelson's cited source (*1*). None of these implications will stand up under analysis.

The multinational corporation is not merely an American, British, French, or Dutch concern with operations in a number of foreign countries. The multinational corporation seeks assiduously to extricate itself from the political control and direction of the country of its origin, to pursue its own goals (growth and profit) without reference to the policies of either its country of origin or of the country within which it carries out its operations. Such neo-mercantile concepts as "balance of trade" have no meaning for it. It seeks to cosmopolitanize the directorate of its headquarters and its major field operations as well. It seeks to create, both within its country of origin and within the countries—LDC's or other—in which operations are carried out, a corporate citizenry whose first loyalty is to the firm and not to the political entity of the nation. Political leaders, whether in the country of origin or in the other countries in which it operates, are, insofar as possible, to be controlled by enrollment in or identification with the corporate citizenry. Where they cannot be controlled there are options

ranging from pullout (after all, IBM typewriters can be assembled as easily in Ecuador as in Colombia) to the initiation or support of their overthrow.

To whom is the technological know-how to be transferred in the LDC's? Surely not to the governments of the countries; certainly not to any eager group of local entrepreneurs anxious to develop a competing, national electric typewriter firm. The experience of past decades indicates that the Latin American managers who work for multinational corporations see their futures in terms of rising in the managerial hierarchies of these firms and not as participating in some turn-key operation resulting in the creation of a nationally controlled, modern industrial segment of their country's economy.

The multinational corporation increasingly is viewed as a novel entity, not only possessing economic and political power, but possibly capable of assuming actual political identity. If there is truth to this view, the real question, then, is, what is the relationship that will finally emerge between nation states, developed or not, and the multinational corporations?

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References

1. *U.S. International Firms and R, D & E in Developing Countries,* report of an ad hoc panel of the Board on Science and Technology for International Development (National Academy of Sciences, Washington, D.C., 1973).

Cancer and Adventists

The reference to "cancer incidence" among Seventh-day Adventists in Philip Abelson's editorial "Prevention of cancer" (7 Dec. 1973, p. 973) requires some clarification. Lifetime Adventists age 35 and over who live in California experience a cancer mortality rate (not incidence) that is 41 percent of that of all Californians. However, for all Adventists age 35 and over, the cancer mortality rate is 59 percent of the rate of all Californians. At present, there are no data available on "devout" Adventists, but an investigation of how components of the Adventist life-style relate to cancer incidence is now under way.

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