basic argument — that "fixed limits to resources" determine that the developing nations can't develop (and we can't expand world trade) — has been supplemented with the importation of the more spiritual" types of environmentalist antiscience into the Third World.

Appropriate technology's British godfather

The godfather of this new spiritual awakening is a (now thankfully deceased) British "economist" by the name of E.F. Schumacher, whose book *Small is Beautiful* is the bible of our environmentalists at home and the appropriate technology crowd worldwide. Schumacher was no wild-eyed hippy, but a top-level insider of British policymaking circles and the British Colonial Office (now known as the Overseas "Development" Ministry. This Oxford grad began in the 1940s with the Fabian Society, through which he involved himself with the planning for the creation of the postwar international monetary system. In his written wartime commentary on the IMF proposals of Lord Keynes and the U.S.'s Dexter White, he criticized even the British proposal for not going far enough in creating a transnational agency that would be outside the control of any sovereign government.

His concerns were centered on the U.S. He viewed the Keynes proposal as a compromise, what the U.S. could be manipulated into agreeing to given that (as he explicitly stated) the U.S. would never agree to the kind of grand raid on the U.S. Treasury that bankrupt Britain wanted to carry out at the end of the war. But Schumacher confidently predicted that within 25 years the system would collapse anyway, and then the British could again get what they wanted — control over the international monetary system.

This gentleman's subsequent career carried through many agencies, including involvement in the British occupation of Germany, but he dedicated the last 15 years or more of his life to eradicating America's "edge" over Britain — namely science and technology. The author of the term "intermediate technology," he was the founder of the "Intermediate Technologies Group" in England in the early 1960s, which together with the International Development Service, a Colonial Office institution based at Sussex University, was the initiating force behind the appropriate technologies crusade.

Its spread since has been wide and effective. Remember the *Whole Earth Catalogue,* that do-it-yourself guide for the rock-drug counterculture which would have us all building our own outhouses in the spirit of "getting it on with nature"?

In this report we also feature an extremely competent statement by the scientific authorities of the Fusion Energy Foundation on why appropriate technology simply doesn't work, except as a method of mass murder. We leave it to the men and women of the American business community and labor movement to imagine for a moment what their economic future will look like in an appropriate technology world.

The vast markets for American capital goods, science, and technology that are potentially represented by a massive effort at the full-scale development of the developing nations is virtually unlimited — and the EMS and the efforts associated with it promise to provide the monetary and credit system to make that possible. What has been appropriate for America's growth and development — the highest level of science and technology known in human history — is no less appropriate for the billions in the developing nations of the world.

— Daniel Sneider

1. The Kissingerians plan U.S. policy

In November 1976 Henry Kissinger, then Secretary of State, called together some 800 business, labor, and other private-sector leaders for a meeting to plan the U.S. role in developing the Third World, and to prepare for the 1979 UN "Science and Technology" Conference. The gathering took place only months after the Non-Aligned movement's historic Colombo resolution calling for debt moratorium and high-technology development, which promised the final defeat of Kissinger's International Resources Bank scheme to mortgage all developing nation's economies for debt repayment, unless the Colombo current could be stamped out.

Among those at Kissinger's meeting were a number of his most loyal cothinkers: Sterling Wortman of the Rockefeller Foundation, infamous for its disastrous Green Revolution policy; Orville Freeman, president of Business International Corporation and, during his tenure as Secretary of Agriculture in the Kennedy Administration, responsible for shutting down U.S. food exports to the underdeveloped sector; G. William Miller, the asset-stripper head of Textron, who has since been installed as the head of the Federal Reserve; James P. Grant, president of the Overseas Development Council, which purveys the Kissinger-World Bank line among businessmen; and Frank Pace, Jr., president of International Executive Service Corporation.

Pace led off the meeting with a statement of purpose designed to make even "appropriate technology" sound good. "It is important to establish goals," he said, "not for the purpose of intermediate or appropriate technology in the developing countries, not for the purpose of developing new high-level technology,

The AT mafia: 'Back to 3,500 BC'

While the environmentalists have not yet been able to force windmills, human dung for fertilizer, and other Stone-Age naturalisms on any significant portion of the population in the advanced sector, the peoples of the Third World are seen as a more tractable target. A sample of appropriate technologies at work is offered by a recent issue of the magazine Mazingira: The world forum for environment and development *(No. 5, 1978), which is published "with the support of" the UN's Environment Programme. (The same UN environmental umbrella also shelters the Friends of the Earth and other environmentalist-lapping-over-into-terrorist operations.) The magazine's masthead notes that "Mazingira means environment in Swahili," and adds that it is printed on partly recycled paper.*

"Six developing countries are now in the process of testing and modifying a wind powered water pump which has been developed by the Intermediate Technology Group with financial support from Christian Aid . . . .

"The prototype was developed with help and hospitality from the Engineering Department of Reading University, UK.

"It is specifically intended for local production in workshops of light engineering plants.

"The wind machine has a 6-metre diameter and is capable of driving a variety of reciprocating piston, diaphragm, or inertia pumps. Output varies from 0.5 to 7.5 kW depending on wind speed. Different rotor and pump options allow it to be used either for low lifts with high volume or high lifts with low volume, for irrigation and borehole pumping respectively."

But even more "appropriate" is this plan for "Reviving Babylon's bricks" in the starving Sudan:

"An ancient brick-making process — first used in Babylon in 3,500 BC — is being revived in the Sudan in an attempt to find a local cheap source of bricks. In the Sudan, as in many developing countries, concrete blocks are expensive and local sun-dried bricks have low life expectancy and encourage the breeding of insects and fungi in their porous structure. Burnt bricks are of better quality, but are relatively expensive and make catastrophic demands on limited timber supplies.

Perhaps the most telling statement of purpose in the magazine appears in a caption to a picture. Below a photograph of an Oriental man carrying a heavy burden on a yoke is the comment:

"Age-old technology — perhaps painful, certainly appropriate."

but to arrange for present technology to be adapted to the needs and requirements of the small business and small farmers."

G. William Miller, for his part, proclaimed that it was obviously impossible to raise the Third World to:

> the same standard of living that exists in the United States . . . I don't believe that we have the resources in the world in terms of human managerial resources or labor resources, nor do we have the material resources to accomplish this in a short time.
>
> Nor would it necessarily be desirable to establish the American standard of living as it now exists, in many ways wasteful, in many ways perhaps less rewarding than alternate cultural opportunities, as the norm for the world. I don't suppose that any of us would propose, in thinking of the use of technology to create development in the world, that we try to close that gap instantly.

Another important speaker at Kissinger's meeting was H. Guyford Stever of the National Research Council. "Technology transfer, unless carefully grafted to local values and conditions, may be rejected," he said. "While technology is at the heart of the development process, a new and more mature attitude toward the application of technology has emerged." This more mature attitude, he explained, included the recognition that development could no longer be thought of in terms of "the reaching of a specific goal at a specific time," and that the "prevailing belief or hope for many years that development such as that achieved in industrialized nations could be transplanted to an LDC" (less developed country) was chimerical.

"Agricultural self-sufficiency" through appropriate technologies is the best the Third World can hope for, he concluded, and called on the private sector and international aid agencies to persuade the Third World to accept this as inalterable fact.

—Cynthia Parsons

The Stever report

Stever was chosen to prepare a report to help define the official U.S. stance at the United Nations conference. His paper was issued in April 1978. Titled "U.S. Science and Technology for Development: A Contribution to the 1979 UN Conference," it was put together with the help of the Brookings Institution as well as the National Academy of Sciences, which

Stever formerly headed, and declared itself in its introduction to be a "policy-shaping report."

Here are excerpts:

The goals of development. "The experience of the past quarter century has shown the limitations of equating growth with development. . . . The scarcity of petroleum, minerals, and usable resources, for example, affects world agricultural and industrial production and demands on the world's ability to produce food, jobs, and services."

Agriculture. "Increased crop production to feed the world's growing population can be achieved either by expanding the land area cultivated or by increasing average annual yields per hectare. The latter may be accomplished by applying more labor per hectare, (in the form of fertilizers, equipment, irrigation ditches, etc.) improving the biological factors that affect crop productivity, or making other technological improvements.

"Problems abound in this area. The costs of bringing land into production continue to rise, and the expense and environmental damage associated with production inputs constrain their use. People are beginning to question the wisdom of building ever more irrigation dams and using ever greater amounts of chemical fertilizers to grow crops. . . .

"Irrigation projects have frequently failed to meet expectations because the delivery, distribution, and drainage of water on farmers' fields are uneven, wasteful, poorly timed, and conducive to waterlogging and salinity."

Industry. "While there is no assurance of success, there is little doubt that their prospects for industrialization will be enhanced if developing nations evolve indigenous capabilities in research and development. . . . (but) the determinants of industrial growth in a developing economy including the role of technology as an input into industrialization are not well understood."

(The report proposes:)

"—creation of an international foundation with a multinational board and diverse international funding to manage a program of grants and contracts to existing research institutions around the world;

"—creation of a private international research center, with financing support from governments and private sources, governed by a distinguished multinational board of directors and shielded as much as possible from political influences;

"—creation of a research center or expansion of existing research capabilities within an existing international institution such as the World Bank."

Energy. "Unexploited energy resources exist in every country — nonrenewable fossil fuels such as petroleum, coal, natural gas and peat; nuclear and geotherman resources; or renewable resources based directly or indirectly on the sun. . . . we recommend that the United States indicate its intent to lend major new support for public and private research and development activities related to energy problems in developing countries. . . . using renewable energy sources . . . The work would have two objectives: conservation through energy-efficient designs and replacement of costly imports with indigenous energy sources. . . .

"Developing countries must continue to seek and exploit their own reserves of fossil fuels, but the greatest long-term prospects for increased energy supplies lie in exploiting renewable resources. Especially important are decentralized technologies which may provide energy to rural areas without the need to develop far-flung electric power grids such as those on which the United States has come to depend . . . Some promising technologies have been developed and others are on the drawing boards based on solar energy used directly (e.g., heating, distillation, photovoltaic conversion) or indirectly (e.g., wind, biomass, hydropower) . . . .

"(The U.S.) could help universities or private sector institutions in developing countries to complement policy analysis by government agencies. Much constructive review of U.S. policy is done outside the government; organizations like the Brookings Institution, the American Enterprise Institute for Public Policy Research, Resources for the Future, Inc. . . . The U.S. might explore potential contributions to encouraging the development of such institutions in developing countries."

Appropriate technologies. "The 1979 Conference is certain to address the question of whether sound industrialization in the developing countries requires the availability of special technology . . . (because) economic conditions in developing nations differ in a number of respects from those of the industrialized nations. Typically, developing nations have rather large proportions of general skilled craftsmen and relatively fewer persons with highly specialized technical skill . . . (and) a low rate of capital formation so that they are characteristically capital-poor when compared with industrialized nations.

" 'Appropriate technology' " as used in this chapter means technology that is optimal for a particular situation in a particular developing nation, given that nation's economic and social conditions and goals. For example, if a nation's overriding goal is to maximize national income, the technologies used should be those that are most efficient, given relative factor costs within the nation. If, on the other hand, a nation's goals stress creating jobs over maximizing national income, more labor-intensive technologies might be chosen. Indeed, for many nations this would imply technologies that are capital-saving and-or labor-intensive compared to corresponding technologies used by industrialized nations. It would also imply technologies that are relatively easily learned by

workers with no prior industrial training or experience and technologies to produce goods that are less specialized, simpler to use, and more versatile that similar products made in the industrialized nations."

Negotiation on technology imports. " . . . The U.S. should sponsor workshops to develop negotiating skills. Such workshops are currently offered at Georgetown University and Harvard University, for example. The UN also sponsors such programs . . . It might be desirable to hold some of these workshops directly under the auspices of an international organization such as the World Bank or UN agency. . . . Technology transfers may have negative impacts on the United States as a whole or on certain geographical regions, economical sectors and income groups."

Health. "We propose that the United States encourage expanded international support for efforts to demonstrate effective approaches to providing these services widely and at low cost . . . would emphasize preventative services (including nutrition, family planning, and environmental sanitation), relatively simple technology, and extensive use of community health workers and other paraprofessionals, along with intensified training for physicians in delivery of primary health services. Many small-scale programs along these lines have worked well, but with such notable exceptions as those in the People's Republic of China and Cuba, few have been effective on a large scale.

"Given the nature of the needs in the fields of health, nutrition, and population, the initiatives recommended are somewhat more concerned with 'soft technology' (methods of management, organization, education, information, research, and evaluation) than with equipment. We suggest the need to develop new technologies, but, in general, we are more concerned with adapting and transferring existing technologies . . . . "

2. Why appropriate technology can't work

One of the most authoritative voices against environmentalism in general and appropriate technology in particular is that of the Fusion Energy Foundation, a nonprofit organization devoted to the encouragement of the most advanced technologies. The August 1978 issue of the Foundation's journal, Fusion, *carried a statement on appropriate technology and its antidote, titled "World Development Requires the Most Advanced Technologies," portions of which we excerpt here:*

The primary goal of development is to increase the standard of living and educational level of the population. The only possible way of increasing per capita consumption is to increase per capita production — the productivity of labor. In turn, the productivity of labor can be increased only by the application of new technologies that substitute inanimate energy and machinery for human labor. By increasing productivity, such new technology increases the standard of living directly. At the same time, by reducing the time the society as a whole must work to maintain the current level of consumption and the existing means of production, increased productivity generates a surplus that is available for expanding the economy as a whole. The combination of increased consumption levels and increased leisure time available for education makes possible the production of a more highly skilled workforce, which, in turn, allows the implementation of still more productive technologies, continuing the cycle of growth and development. Such is the process by which the most developed economies in the advanced and the developing sectors actually achieved their current success.

From this description of the goals and methods of development, it follows that the criterion for development strategy is the maximization of the rate of development. Our aim must be to maximize the rate of increase of labor power or productivity, and thus the rate of increase of the overall social surplus.

From these very elementary considerations it can be seen that the strategy of appropriate technologies is not one that encourages development. The very basis of this approach is to maximize the labor intensiveness of the technologies employed in the developing countries; in other words, to minimize labor productivity. By attacking the very motive force of development — increases in labor productivity — Such a strategy necessarily preserves existing backwardness . . . .

The failure of appropriate technology

What, in fact, will be the consequences of widespread implementation of a policy of labor-intensive development? What is proposed is the mere extension of the present low levels of productivity to a wider proportion of the existing population—an increase in the intensiveness of labor by the population as a whole. At the very best such a process can result in only very modest increases in production in proportion to the additional labor employed, increases barely sufficient to cover the increased consumption necessitated by productive output. No added surplus is generated, and thus no basis for continued growth produced. In fact,