Background Reading

Books reviewed in this section

Appropriate Technologyfor African Women Disk 1, File 01-1

Appropriate Technology Problems and Promises Disk 1, File 01- 2

The Barefoot Book Disk 1, File 01-29

Coming Full Circle Disk 1, File 01-21

Design for the Real World Disk 1, File 01-4

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High Impact Appropriate TechnologyCase Studies Disk 1, File 01-24

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Every machine that helps every individual has a place, but there should be no place for machines that concentrate power in a few hands and turn the masses into machine-minders, if indeed they do not make them unemployed.

Gandhi

Shall we forever resign the pleasure of construction to the carpenter?

... Where is this division of labor to end? and what object does it finally serve? No doubt another MAY also think for me; but it is not therefore desirable that he should do so to the exclusion of my thinking for myself.

Thoreau

The books reviewed in this chapter offer a variety of views on the cultural and economic aspects of technology choice, some of the political choices reflected in development strategies, and common technology needs in rural areas of the South.

E.F. Schumacher's **Small is Beautiful** has played a crucial inspirational role for much of the " A. T. movement." For readers interested in the hard economic basis for appropriate technology, there is no better reference than **Technology and Underdevelopmen**t. **Appropriate Technology: Problems and Promises** gives a historical perspective on factors that have influenced the development of practical technologies in the United States and China and explores a large number of policy issues that surround appropriate technology. This continues to rank as one of the most insightful books in the A.T. literature.

The A.T. Reader assembles in one place a set of the best articles and commentary on the subject from around the world. A thoughtful analysis of the problems and issues involved in transnational "technology transfer" is contained in

The Uncertain Promise. This volume is particularly concerned with the impact of alien technology on cultural value systems.

Coming Full Circle explores the increasingly accepted view that farmers should be directly involved in technology development that it is only through this involvement that acceptable innovations can be developed. If local participation in development projects is to be achieved, bureaucracies will have to change; this is the theme of **Bureaucracy and the Poo**r. **The Barefoot Book** takes a look at a whole range of professionals with intermediate levels of training. **Putting People First** provides valuable practical advice on making the people side of development projects work.

Paper Heroes, while favorably reviewing several particular tools and techniques, is critical of the many basic assumptions and perceived benefits associated with appropriate technology. For the most part these are "the excessive claims and unsubstantiated promises of paper heroes," argues the author.

The World of Appropriate Technology offers a picture of the institutions involved in this work. **Repairs, Reuse, and Recycling** discusses the technological alternatives in reducing the flow of valuable materials to dumps and landfills, an important step on the road to a more environmentally sound society.

The author of **Questioning Development** suggests that a critically important measuring stick for evaluating the worth of development projects should be their anticipated effects on the distribution of power in the community, nation, or the world.

Among the other books included in this chapter are sets of case studies of technologies and projects that offer insight into what has and has not succeeded in various circumstances. There are also publications that suggest what kinds of everyday activities in the South most urgently need improved technologies, and that give many examples of tools and techniques that may be appropriate.

Appropriate Technology for African Women and **Rural Women** are specifically concerned with the effects of technological change on Women's lives, and discuss improved technologies that might particularly help women.

Small is Beautiful, book, 297 pages, by E.F. Schumacher, 1973, £4.50 surface mail from ITDG; also available from TOOL.

Schumacher's famous introduction of the concept of "intermediate" (or " appropriate") technology has had a major impact on current thinking in the development field. Schumacher was a founder of the Intermediate Technology Development Group.

For Schumacher, solutions to the world's problems must embody the four qualities of smallness, simplicity, capital-saving, and non-violence. To that end he is a leading advocate of " appropriate technology" as a partial answer to global problems of

food and energy shortages, alienation, and poverty. In the developing countries, designed particularly to suit agricultural conditions that are different from those in the industrialized countries, this technology should be superior to the primitive forms of the past. Yet it should also be simpler, cheaper, and all but independent of the energy requirements of today's technology of the rich. "One can also call it 'self-help' or 'people's technology'" says Schumacher.

"The task, then, is to bring into existence millions of new workplaces in the rural areas and small towns. That modern industry, as it has arisen in the developed countries, cannot possibly fulfill this task should be perfectly obvious. It has arisen in societies which are rich in capital and short of labor and therefore cannot possibly be appropriate for societies short of capital and rich in labor. The real task may be formulated in four propositions:

1) Workplaces have to be created in the areas where the people are living now, and not primarily in metropolitan areas into which they tend to migrate.

2) These workplaces must be, on the average, cheap enough so that they can be created in large numbers without this calling for an unattainable level of capital formation and imports.

3) The production methods employed must be relatively simple, so that the demands for high skills are minimized, not only in the production process itself but also in matters of organization, raw material supply, financing, marketing, and so forth.

4) Production should be mainly from local materials and mainly for local use."

Schumacher on technological complexity: "Any third-rate engineer can make a machine or a process more complex; afterwards, it takes a first-rate engineer to make it simple again." An excellent book.

Appropriate Technology: Problems and Promises, **Disk 1, File 01-2**, book, 344 pages, edited by Nicolas Jequier, 1976, out of print, but may still be available from OECD Publications, 2 rue Andre-Pascal, 75775 Paris CEDEX 16, France; or from OECD Publications and Information Center, 2001 L Street, N.W., Suite 700, Washington, D.C. 20036-4910, USA; Part 1 (100 pages) is available in a special low-cost edition for sale only in the United States and developing nations, $3.50 plus $1.50 postage, from the Appropriate Technology Project, Volunteers in Asia, P.O. Box 4543, Stanford, California 94309, USA.

Here is the most significant publication on the subject of appropriate technology since Schumacher's **Small is Beautiful** appeared in 1973. The editor emerges as the most valuable contributor, providing a brilliant 100-page overview of the major policy issues that confront appropriate technology advocates. 19 articles by participants in the 1974 OECD conference on low-cost technology give a backdrop of some of the efforts and perspectives currently found among practitioners in the appropriate technology movement.

Jequier describes appropriate technology as a cultural revolution in the field of development (and spells out implications that virtually no one else was writing about at the time); identifies local people as the primary innovators of appropriate technology; points to the danger that appropriate technology research will be carried out mostly by groups from the rich countries, thereby stifling the development of research groups with this focus from within the developing countries and leading to the same technological dependency that currently exists; discusses the political implications of appropriate technology; poses questions for national government policy and for aid policy; contrasts decentralized with centralized research on appropriate technology; and explores many other "problems and promises" of the appropriate technology movement. In short, Jequier is among the first to try to identify the disagreements and problem areas facing appropriate technology enthusiasts; he draws up an agenda for discussion and action. Highly recommended.

The A.T. Reader: Theory and Practice in Appropriate Technology, **Disk 1, File 01-20**, book, 468 pages, edited by M. Carr, 1985, £12.50 from ITDG; also VITA and TOOL

Marilyn Carr has provided a valuable service by assembling in one place a selection of some of the best thinking on appropriate technology. More than 100 contributors discuss everything from economic theory and the nature of the innovation/product development process to specific experiences with choices of technology in real circumstances around the world. Readers will find this a good exposure to the ferment of ideas and observations that have come out of the A.T. movement over the past 15-20 years. The contributions are generally of a high caliber, and sure to be thought-provoking to even the well-read A.T. enthusiast. Recommended.

Technology and Underdevelopment, book, 320 pages, by Frances Stewart, 1977, £12.99 from ITDG.

Stewart leads the reader through the most comprehensive book to date dealing with the economic theory of appropriate technology and development in the Third World. The book is technical but can be absorbed by anyone with a modest background in economic jargon.

There are two parts: 1) a theoretical discussion of the nature of technology and the social consequences of its use, and 2) a set of case studies. The theoretical discussion is aimed at the reader familiar with conventional economic theory. The author points out precisely where the false assumptions and unwarranted extrapolations are found.

Stewart begins with a discussion of the nature of technology and the kinds of technical choices open to a developing country. She defines "technological choice" both in terms of product and the technology to create that product. Stewart states that the major reason developing countries are limited in their choice of technology is that technology has evolved to meet the different needs of developed countries. A new technology is more than a purely scientific achievement it reflects a society's needs, standard of living, tastes, and relative scarcity of labor, capital and resources. Thus it would be purely coincidental that an ideal technology would exist for a specific application in a developing area.

The author notes the usefulness of some but not all technologies used in the evolution of developed countries. If a technology becomes obsolete in the West purely because of changes in the relative prices of capital and labor, or due to shifts in consumer tastes, then that technology may be usable in a developing country. However, technologies that became obsolete due to technical improvements may be obsolete in any context. (The failure to make this distinction underlies much of the debate on the relevance of older industrial technologies.)

Another of Stewart's major themes is that technical choice is not a narrow choice of a particular technique at a particular time. Rather, a national economic system is either oriented towards foreign advanced technology or towards more appropriate technology. If the "modern" approach is emphasized, consumers, infrastructure, and urban concentration tend to lock the country into "foreign" technology. An indigenous technology may not be able to compete in such an environment, despite its overall social desirability. The point is that the national choice of technology and lifestyle is a social choice which will dominate the narrow choice of technology for a specific application.

Introduction to Appropriate Technology, Disk 1, File 01-9, book, 194 pages, 1977, edited by R. Congdon, RODALE, out of print.

Most of these lectures were originally given by members of the Intermediate Technology Development Group to a university audience in The Netherlands.

"Socially" appropriate technology is the subject, on the assumption that "all development must be for the benefit of as large a section of the population as possible, and not remain the privilege of a small elite."

The 12 lectures provide a range of insights into the nature and definition of appropriate technology, from the perspectives of members of ITDG. George McRobie's lecture, "Approach for Appropriate Technologists," gives a good overview of the rationale and work of ITDG. S.B. Watt's lecture on choosing water technologies is illustrative of some of the best thinking from that group (e g., "the professionals have become colonials in the sense that they have taken possession of the knowledge of technology a knowledge that all people should possess to be able to change their own lives.") Other subjects include agricultural tools, pedal power,

building, energy, chemicals, education, industrial liaison, social criteria for appropriate technology and production systems.

Harry Dickinson's concluding piece, entitled "The Transfer of Knowledge and the Adoption of Technologies," should be required reading for any person going overseas to do appropriate technology work. "As Westerners and as technologists we have a role to play but we must be self-critical about our own society before we have the wisdom and insight to be of any real value."

When Aid is No Help: How Projects Fail, and How They Could Succeed, Disk 1, File 01-27, book, 144 pages, by John Madeley et. al., 1991, £9.95 from ITDG.

Most aid projects fail to achieve their hoped-for results, largely because the difficulties are enormous. Yet one would never know this from the stacks of final project reports that proclaim success and results in even the most dismal of outcomes. One of the great tragedies of development work is that failures are hidden and lessons that should be learned are not. The learning opportunities for development workers tend to be limited to their own experiences.

This short book is an attempt to unearth some interesting failures, and some successes, and try to learn what went wrong and how things might have been done differently. The author is particularly interested in the fact that in project after project targeting the poor, the better off among the poor get assistance while the poorest of the poor get nothing.

High Impact Appropriate Technology Case Studies, Disk 1, File 01-24, 76 pages, by Thomas Fricke, A.T. International, 1984, accession no. PB85 224806/AS, paper copies $13.95, microfiche $6.50, from NTIS.

Interesting examples of eight very successful appropriate technology efforts are collected in this book. Each of these technologies has benefited thousands to hundreds of thousands of people. The author identifies factors which have contributed to the success of each.

The Mark II deep well handpump in India represents an important experience with a simplified unit in which much of the maintenance and repair can be carried out at the village level.

Oral rehydration therapy has proven to be a very low-cost and simple technique for saving the lives of dehydrated infants suffering from infant diarrhea. UNICEF, WHO and many local organizations have launched programs to reach millions of people with this technology.

Argentina is now the world's leading producer of waterpumping windmills and has some 60,000 units operating domestically. The design is a reproduction of an Aermotor windmill from the U.S.

Bamboo-reinforced concrete rainwater storage tanks have been built by the thousands in drought-prone northeastern Thailand since 1979. Family members provide their own labor and pay for materials while obtaining technical assistance from a Thai voluntary agency.

In India, the use of bamboo materials and a technique for well sinking using labor-intensive methods has dramatically lowered the cost of installing tube wells for irrigation pumping. Tens of thousands of bamboo tube wells have been installed throughout India. A major advantage is that they can be used with portable, rented pumps instead of stationary ones.

The rural access roads program in Kenya has demonstrated the cost advantages of both labor-intensive construction techniques and maintenance by local villagers under contract for short road sections. "By early 1984, over 7,000 km of roadway had been completed."

A women's cooperative food processing organization in India has become a very successful business with sales of more than $4 million annually. Members are partners rather than employees and produce hand-rolled pappad in their homes.

In Tanzania, the decentralized production of thousands of carts and toolbar plows by two private enterprises is being met with strong market demand from farmers. This equipment has a high financial rate of return for farmers, who use it to put more land into production.

Experiences in Appropriate Technology, **Disk 1, File 01-6**, book, 150 pages, edited by Robert Mitchell, 1980, in English, French, and Spanish, Canadian Hunger Foundation, out of print.

Nineteen case studies reveal problems and possibilities encountered in appropriate technology efforts in a variety of countries. Good background reading to stimulate thought and discussion on important issues.

Participatory Approaches to Agricultural Research and Development: A State of the Art Paper, **Disk 1, File 01-22**, book, 111 pages, by William F. Whyte, 1981, $5.00 from Rural Development Committee, Center for International Studies, 170 Uris Hall, Cornell University, Ithaca, New York 14853, USA.

The agriculture and rural technology research, development, and extension approaches of the 1960s and 1970s failed to reach the majority of rural poor farmers. This volume summarizes and explains what has been learned from these experiences and new models of agricultural research and development that are working. These new approaches involve substantial farmer participation and much greater involvement of scientists in on-farm testing of new crops and crop combinations. "This approach focuses on searching out what the small farmer needs and can use. In this process, scientists must and can learn much from the small farmer."

This excellent explanation of the importance and benefits of farmer participation in research and development should be required reading for people doing rural technology development work of all kinds.

Coming Full Circle: Farmer's Participation in the Development of Technology, **Disk 1, File 01-21**, publication IDRC-189e, book, 176 pages, edited by Peter Matlon et. al., 1984, $12.00 from IDRC.

The need to include the farmer's perspective in agricultural systems research and technology development is now widely recognized by serious researchers. This book is an excellent collection of insights and observations by a group of 50 scientists with experience in using this approach, which is relevant to all kinds of rural technology development efforts.

"Researchers ... must learn as fast as possible what the conditions are in the areas where they are working and then get on with the task of doing something about the problems. The farmers have been in the area for years or for decades or for centuries.... They know what is going on.... In partnership with the farmers we have to set about to see what can be done to improve conditions, given all the factors that are there. If fertilizer is not available, then researchers should not worry about

fertilizer, although they can advise policy makers and infrastructure managers that it should be available. People doing research have got to address the systems that exist and stop finding excuses. They must stop saying they have a perfectly valid technology if only the policymaker would provide a fertilizer market. That does not help farmers."

For readers who are not yet convinced of the need to incorporate farmers' thinking into their work, this volume will provide ample evidence to change that. And readers who are already persuaded will find this a rich source of ideas to make their work more successful.

Strategies for Small Farmer Development Projects, Executive Summary, **Disk 1, File 01-26**, revised paper, 34 pages, by E.R. Morss et. al., USAID, 1975, microfiche $1.25, paper photocopies $8.32, from AID/DIS Clearinghouse, 1500 Wilson Boulevard, Suite 1010, Arlington, Virginia 22209-2404, USA.

This important summary of a USAID-funded study of strategies for small farmer development finds that overall project success is affected most heavily by local action. The most important components of local action were found to be 1) small farmer involvement in decision-making in the implementation phase of a development project, and 2) small farmer resource commitment (labor and cash) to a development project. Chalk one up for community participation! This is essential reading with implications for all areas of community development.

Bureaucracy and the Poor: Closing the Gap, book, 258 pages, edited by David Korten and Felipe Alfonso, 1983, paperback $13.50 from Kumarian Press, 630 Oakwood Avenue, Suite 119, West Hartford, Connecticut 06110-1529, USA.

The management of development efforts to successfully incorporate local-level needs and priorities is the theme of this volume. Experience from around the world is presented to illuminate the common obstacles that tend to prevent development bureaucracies from achieving their stated goals. Development professionals will find much familiar here, and may also be able to use this material to anticipate likely future difficulties in their own programs.

"This review of obstacles to participation at the agency, community and societal levels shows the difficulties of the participatory approach. Often many of these obstacles are ignored in program design and management; hence it is not surprising that many efforts to evoke participation do not work. Success requires major transformations in the way an agency performs its task, in the way the community relates to the agency, and in the way the society views the poor and their rights. Such transformations are inevitably slow and filled with setbacks. But the reasons for seeking participation are compelling. There are clearly no pat answers to solving the problems, but the struggle to find them evidenced in numerous programs around the world adds a healthy dimension to the world development experience."

An underlying theme is that most of the government agencies now in place were created during a period in which highly centralized decision-making was the expected pattern. Thus the structures of these bureaucracies do not easily lend themselves to greater participation at the local level. A variety of actions to make these organizations more responsive and thus more successful are suggested. The authors concede the uncoDisk 1, Fileortable truth that politics is an undeniable part of efforts to reach the poor. Some interesting parallels are drawn between the skills needed for entrepreneurial management and those needed in management of development efforts. More evidence is presented that suggests that outstanding managers can often find a way to overcome typical difficulties; yet the need is clearly for programs that will succeed with average managers.

Not surprisingly, the authors go farther in identifying the nature of these problems than in articulating convincing solutions. The stories of a few extraordinarily effective institutions are certainly hopeful. The lessons of this book may be best absorbed by members of nongovernmental organizations not immobilized by inertia, indifference, self-interest, and the sheer enormity of the problems that entangle government bureaucracies.

Readers able to plow through the difficult language and sentence structures, and the partially redundant contributions from different authors, will find valuable thought-provoking insights here, gleaned from many years of experience.

Recommended.

Putting People First, book, 430 pages, edited by Michael Cernea, 1985, World Bank, $24.95 from Oxford University Press, 200 Madison Avenue, New York, New York 10016, USA.

This book is a collection of thirteen essays with practical advice on making the people side of development projects work successfully. Topics include irrigators' organizations, new land settlements, and projects for livestock, fisheries, forestry, and rural roads.

Robert Chambers, one of the world's most sensible observers of the rural development scene, makes some excellent recommendations on how to gather information quickly and cheaply for rural development projects. (See also **The Art of the Informal Agricultural Survey**, by Robert Rhoades, reviewed elsewhere in the A.T. Sourcebook).

"Decision makers need information that is relevant, timely, accurate, and usable. In rural development, a great deal of the information that is generated is, in various combinations, irrelevant, late, wrong, or unusable anyway. It is also often costly to obtain, process, analyze, and digest.... The challenge is to find more cost-effective ways for outsiders to learn about rural conditions ways that lead closer to the optimal in tradeoffs between the cost of collection and learning, and the relevance timeliness, accuracy, and actual beneficial use of the information and understanding that is obtained."

There is a constant, continuing need for such information. "Rural development projects are not like construction work, with engineering blueprints which precisely predetermine what will be done, but rather like voyages into uncharted areas where direction and steering will change with new soundings and sightings. Techniques of rapid rural appraisal (RRA) are hardly a new radar to prevent shipwreck, but they may at least reduce the dangers by showing more clearly and more quickly what is happening."

"... (C)ost effectiveness has its own rigor and should generate its own values.

Two linked principles can be suggested: optimal ignorance and appropriate imprecision. "Optimal ignorance refers to the importance of knowing what facts are not worth knowing. It requires courage to implement. It is far, far easier to demand more and more information than it is to abstain from demanding it.... "Appropriate imprecision refers to the fact that especially in surveys, much of the data has a degree of accuracy which is unnecessary. Order of magnitude and direction of change are often all that will be used."

The author goes on with some excellent advice on how to successfully conduct a quick survey.

The Barefoot Book: Economically Appropriate Services for the Rural Poor, **Disk 1, File 01-29**, book, 97 pages, edited by Marilyn Carr, 1989, £8.95 from ITDG.

The concept of intermediate services is best known in rural health care, especially with the "barefoot doctors" of China. The basic idea is that people with basic training can, in most cases, provide sufficiently skilled assistance to solve the most common problems encountered in poor communities.

This book applies the "barefoot" concept to a whole range of other professionals with intermediate levels of training. Included are veterinarians in India and Nepal, lawyers and bankers in Bangladesh, mechanics in India, builders in Iran, Guinea and the Sudan, and management consultants in Kenya.

"Technology for the Masses", **Disk 1, File 01-10**, January-February 1977 issue of **Invention Intelligence** magazine, National Research Development Corporation of India, out of print in 1985.

This special issue of the magazine **Invention Intelligence** deals with the prospects for affordable technology for rural India. Strategies for rural industry and rural development are discussed. One proposal includes a national upper consumption limit for individuals. In evaluating the role of science and technology, one author states: "We have yet to make properly documented studies on our traditional skills and practices and systematically explore the possibilities of both learning from and contributing to them, in order to evolve appropriate technology for the masses"

Several articles on energy sources describe the progress of the Indian biogas programs, the scope for the use of wind power, possible direct solar devices, the substitution of organic fertilizers for energy-intensive chemical fertilizers, and the increased use of waterways for transport. Tree-and-pasture plantations are proposed to make maximum use of solar energy for fuel, food and fodder.

Commenting on the importance of the bullock cart, one author notes that the total investment in carts and animals exceeds the total investment in either the railroad system or the road network in India. He proposes a number of design improvements for the bullock cart.

Low-cost housing, dairy farming, aquaculture and increased water use efficiency in irrigation are among the other topics discussed. Relevant reading for much of the South.

Appropriate Technology for African Women, **Disk 1, File 01-1**, report, 101 pages, by Marilyn Carr, 1978, African Training and Research Centre for Women, United Nations Economic Commission for Africa, P.O. Box 3001, Addis Ababa, Ethiopia, out of print.

"An increased emphasis on 'intermediate' technologies promises to do much to lessen the inequalities between the urban and rural areas, and between rich and poor families. Its effect, however, will be limited unless increased emphasis is also given to the women who, especially in the rural areas, have the major responsibility for lifting their families out of poverty. Agricultural, rural and national development will be a slow and difficult process if the women, who form half the population and, in some countries, represent up to 80% of the agricultural labor force, continue to be denied access to knowledge, credit, agricultural extension services, consumer and producer cooperatives, labor-saving devices, and income generating activities."

Extension programs that neglect the roles of women often have disappointing results. "Thus, in one West African country, although extension workers had shown the men the correct depth to dig the holes, coffee continued to die due to bent tap-roots because it was the women who were doing the digging."

Many improved village technologies could distinctly help rural women, "who are the drawers of water, the hewers of wood, the food-producers and often the overall providers for the families of Africa." In the main part of this report, the author identifies some of the activities for which intermediate technologies are needed to ease the burdens of rural women and some of the possible technologies to choose from. Also included are descriptions of a wide variety of village technology related programs in Africa and an annotated bibliography on women and technology in Africa.

Rural Women: Their Integration in Development Programs and How Simple Intermediate Technologies Can Help Them, **Disk 1, File 01-15**, booklet, 84 pages, by Elizabeth O'Kelly, 1978, out of print in 1985.

O'Kelly discusses the daily tasks of women in Asia and Africa, the concept of intermediate technology, and particular technologies that would tend to make life easier for rural women without reducing their role and status. She recommends hand-operated seeders, push carts and wheelbarrows, fencing, threshers, winnowers, improved hand-operated rice mills, corn mills, improved grain storage units, heavy gauge black polyethylene sheeting for sun-drying, fuelwood plantations, biogas plants, solar dryers for vegetables and fruits, improved stoves, hay box cookers, rooftop catchment water tanks, pumps, water filters and latrines.

She notes that "the part that women play in village life in general and in agriculture in particular, is consistently underestimated and many programs are drawn up on the assumption that it will be the men who will he carrying them out when, in fact, it will be the women." And when technologies are directed towards women's work, "care needs to be taken that these do not unintentionally reduce their standing."

Organizations for rural women should be created "beginning in a small way in one or two neighboring villages and continuing by working outwards in ever-widening circles." This is more likely to be successful than top-down initiatives which often lose their thrust before they have filtered down through the bureaucracy to the local level. She describes successful efforts of this kind in the creation of corn mill societies in the Cameroons and women's groups in Sarawak.

Design for the Real World, **Disk 1, File 01-04**, book, 318 pages, by Victor Papanek, 1974, $10.95 from Academy Chicago Pubs., 213 W. Institute Pl., Chicago, IL 60610, USA. The author is a UNESCO International Design Expert and former Dean of the

School of Design at the California Institute of the Arts. His basic thesis is that designers should design for use and address real human needs. Instead, today most design is for style and planned obsolescence. Papanek attacks the wasteful, irresponsible use of design in the industrialized world and provides hundreds of examples of inexpensive, long-lasting, highly useful products that he and others have "designed for the real world." He is opposed to patents because he feels ideas should be made freely available.

Although most of the book is directed towards proposed changes in the industrialized world, the author frequently discusses innovative designs that address the needs of the developing world's villagers.

Papanek provides hundreds of ideas and a starting point for responsible, socially useful design. Many photos and illustrations.

Village Technology in Eastern Africa, **Disk 1, File 01-25**, book, 60 pages, UNICEF, June 1976 seminar report, free from UNICEF, Eastern Africa Regional Office, P.O. Box 44145, Nairobi, Kenya.

Here is an excellent introductory book, relevant to most Third World countries. It includes a review of the basic concepts of appropriate technology and an overview of potential A.T. tools and techniques for agriculture, food preservation, preparation of nutritious infant foods from local sources, and water supply. Criteria for evaluating rural energy needs and affordable alternatives are presented.

The Karen Village Technology Unit, a demonstration center with working tools and machines, a workshop, and a simple laboratory for testing A.T. devices is described here. This was one of the first efforts of its kind.

The extension systems discussed in this book differ from the conventional "top-down" approaches. "Thinking based on 'introduction' of appropriate technology tends to foster an attitude that the technology is something brought in from outside. Whereas, it would probably be more useful to think in terms of the 'generation' of the technology within the society."

Radical Technology, **Disk 1, File 01-13**, book, 304 pages, by Godfrey Boyle, Peter Harper, and the editors of **Undercurrents Magazine**, 1976, out of print in 1985.

An "extensively illustrated collection of original articles concerning the reorganization of technology along more humane, rational and ecologically sound lines. The many facets of such a reorganization are reflected in the wide variety of contributions to the book. They cover both the 'hardware' the machines and technical methods themselves and the 'software' the social and political structures, the way people relate to each other and to their environment, and how they feel about it all."

Radical Technology gives a thorough treatment of what for many is the logical application of the concept of appropriate technology to the developed countries. Thus, while coming from a different perspective, it does cover nicely (though briefly) such topics as biodynamic agriculture, composting, agribusiness, hydroponics, solar energy, water power, metalworking, and transport, along with the more expensive intermediate technologies of printing and communications. Essays alternate with factual presentations.

Unquestionably, the recent popularity of appropriate technology stems at least in part from the energy/environmental/cultural crisis in the West. This book provides a good overview of some of the thinking going on in the West in response.

"Radical Technology encompasses much that is meant by 'alternative technology' but sees these new, liberating tools, techniques and sources of energy as part of a restructured social order, and aims to place them directly in the hands of the community."

Repairs, Reuse, Recycling : First Steps Toward a Sustainable Society, Worldwatch Paper 23, **Disk 1, File 01-14**, booklet, 45 pages, by Denis Hayes, 1978, out of print but a few copies are still available for $2.00 from Worldwatch Institute, 1776 Massachusetts Avenue N.W., Washington, D.C. 20036, USA.

This report critically examines the flow of most materials from their sources (a mine, forest, or crop) to the dump. The imperatives for recycling materials are reviewed: increasing scarcity and energy expense of recovering non-renewable resources; political tensions caused by uneven distribution of resources worldwide; and escalating environmental costs and hazards.

Three basic approaches to sustainable resource use are waste reduction (emphasizing more durable appropriate technologies), waste separation, and waste recovery. Examples of recent recycling programs illustrate the importance of scale for recovery systems. Centralized high-technology recovery facilities depend on long-term guarantees of a steady flow of waste materials. Any programs which actually reduce the flow of waste then threaten the financial viability of the high-cost recovery facilities. "A more sensible approach would be to first see how much of the problem could be solved by comprehensive programs for reducing waste, recycling, and composting. Appropriately-scaled resource recovery facilities could then be constructed to process the remaining waste."

A well-documented paper, pointing to the importance of both "technical fixes" and social reorientation.

Technology and Employment in Industry, **Disk 1, File 01-17**, book, 389 pages, edited by A.S. Bhalla, 1981, revised 1985, Swiss Francs 37.50 (US $26.25) from ILO Publications,.International Labour Office, CH-1211 Geneva 22, Switzerland; or ILO Publications Center, 49 Sheridan Avenue, Albany, New York 12210, USA.

A collection of case studies: can-making in Kenya, Tanzania and Thailand; jute processing in Kenya; textile manufacturing in the United Kingdom; sugar processing in India; manufacturing cement blocks in Kenya- running engineering industries in Colombia; metalworking in Mexico; and extracting and processing copper and aluminum in the United States, Zambia, Zaire, and Chile.

"The studies demonstrate quite clearly that substitution possibilities exist in industry in both core and ancillary operations. This conclusion, based on empirical evidence, is important, since it has often been assumed that there is no choice of techniques in manufacturing industry. Secondly, the range of available techniques can be widened by re-designing or copying older designs and blueprints with local engineering adaptations, or through local manufacture of equipment. Thirdly, quite often the use of capital-intensive techniques, where more labor-intensive ones could have been used equally efficiently, is due not to the fact that there are no other technical possibilities in industry there are but to imperfect knowledge and inappropriate selection systems."

This book strays rather far from our focus on home-built and village-level technology, but the conclusions are significant from the point of view of village industries and other small-scale industries to which they may be linked.

Towards Global Action for Appropriate Technology, **Disk 1, File 01-18**, book, 220 pages, edited by A.S. Bhalla, 1979, Pergamon Press, out of print.

A set of essays examining the need for and nature of national and international mechanisms to support appropriate technology research, development and dissemination. Nicolas Jequier writes about some of the non-economic criteria that should be considered in evaluating possible appropriate technologies. Ajit Bhalla discusses the elements of a basic needs

strategy for development, and policy choices to make appropriate technology part of that strategy. Amulya Reddy offers a framework for understanding why existing R&D institutions in developing countries do not generate appropriate technologies, and what shifts in policy and orientation are needed to ensure the development of A.T.s within some of these institutions. Willem Floor describes the activities of the U.N. agencies, and how they do or do not touch on appropriate technology. Paul Marc Henry, Reddy and Stewart present a final 13-page proposal for a "new international mechanism for appropriate technology," a non-governmental organization to be associated with, but outside of, the United Nations.

National policy initiatives and programs , and international institutions can all play a major role in improving the climate for A.T. work. In reality, however, many of the most effective A.T. efforts around the world were initiated without government and international agency support. This volume unfortunately does not discuss the possibilities for in-country and international cooperation among grass-roots appropriate technology groups themselves, often forced to operate without policy support or funding.

The World of Appropriate Technology: A Quantitative Analysis, **Disk 1, File 01-23**, book, 210 pages, by N. Jequier and G. Blanc, 1983, English edition out of print, French only $15.00 from OECD, 2 rue Andre Pascal, 75775 Paris Cedex 16, France.

After studying the growth of institutions and activities in the late 1970s, the authors came to the conclusion that appropriate technology thinking had been far more accepted by governments and large institutions than had been previously supposed.

"Governments have become the main source of funds for A.T. activities throughout the world, and their weight tends to be particularly high in the developing countries .... Sociologically speaking, the A.T. movement has many features in common with the intellectual elites that brought about political revolutions in other places and other times. Not only because of the educational level of its members, the urban location of its activities or the intensity of its communications networks, but because of a much more subtle phenomenon of termite-like penetration into the decision-making circles of governments, industry, banks, political parties and trade-unions."

The authors illuminate the linkages among groups, the levels of funding and staffing, and the strengths and weaknesses of the A.T. movement as it existed at the time. The concluding remarks provide another set of provocative insights in keeping with the high standards of Jequier's previous book.

Appropriate Technology: Problems and Promises (see review).

Tools for Conviviality, book, 119 pages, by Ivan Illich, Heyday, $8.95 from WEA.

Illich used the unfamiliar term "convivial" in a special way "as a technical term to designate a modern society of responsibly limited tools .... People need new tools to work with rather than tools that 'work' for them. They need technology to make the most of the energy and imagination each has.... A convivial society should be designed to allow all its members the most autonomous action by means of tools least controlled by others. People feel joy, as opposed to mere pleasure, to the extent that their activities are creative.... We must recognize the nature of desirable limits to specialization and output.... Common tools would be incomparably more efficient than primitive, and more widely distributed than industrial devices."

The language used in this book is often rather difficult, while the subject matter is theoretical and philosophical. Illich makes an interesting contribution to a philosophy of appropriate technology that would be applicable to both rich and poor countries. The book is a critique of the system of industrialization which destroys people's capacity to do things for themselves. Illich sees "conviviality" as one of the primary treasures still remaining in small communities of developing countries that has already been tragically lost in the industrialized countries .

Illich comments on the housing industry in Latin America: "Components for new houses and utilities could be made very cheaply and designed for self-assembly .

People could build more durable, more coDisk 1, Fileortable, and more sanitary dwellings as well as learn about new materials and systems. But instead of supporting the ability of people to shape their own environment, the government deposits in these shanty-towns public utilities designed for people who live in standard modern houses. The presence of a new school, a paved road, and a glass and steel police station defines the professionally built house as the functional unit, and stamps the self-built home a shanty."

The Politics of Alternative Technology, book, 204 pages, by David Dickson, 1974, $7.00 Tom Universe Books, 381 Park Avenue South, New York, NY 10016 USA.

Dickson examines the "modern" technology of the industrialized countries and concludes that "technology, originally developed as a means of raising man above a life of poverty, drudgery and ill health, now shows its other face as a major threat to sanity and survival."

The book includes a summary of the basic principles of "alternative" or "utopian" technology (involving community production and social organization), the characteristics that distinguish it from the dominant technology, and its relationships to the individual, the community, and the environment. Throughout the book, the author argues that the development of modern industrialized technology has been a reflection of and a reinforcement of existing dominant political interests.

There is a chapter on intermediate technology and the South, providing a critique of the view that intermediate technology has no political component. "Political changes will neither flow automatically from, nor be determined by, the technology. They must be introduced separately as part of the general political struggle for emancipation. Truly appropriate technology can only come from the demands of the people by whom and for whom it is to be used, once they have successfully realized their own political and economic strength."

The Uncertain Promise: Value Conflicts in Technology Transfer, **Disk 1, File 01-19**, book, 324 pages, by Denis Goulet, 1977, $6.50 from Overseas Development Council, 1717 Massachusetts Avenue N.W., Washington D.C. 20036, USA.

"This study of value conflicts in technology transfer has attempted to peel away the mystifications which veil the true impact of technology on societies nurturing diverse images of development. Technology is revealed herein as a two-edged sword, simultaneously bearer and destroyer of values. Yet technology is not static: it is a dynamic and expansionist social force which provides a 'competitive' edge enabling its possessors to conquer economic, political, and cultural power.

Consequently, Third World efforts to harness technology to broader developmental goals are paradigmatic of a still greater task: to create a new world order founded not on elitism, privilege, or force but on effective solidarity in the face of human needs. The gestation of a new world order poses two troubling questions for all societies: Can technology be controlled, and will culture survive?"

"Technology is indispensable in struggles against the miseries of underdevelopment and against the peculiar ills of over development. Technology can serve these noble purposes, however, only in those societies in which ideology, values, and decisional structures repudiate the tendency of technology to impose its own logic in striving after goals."

"At least three values must now be internalized in any efficiency calculus: the abolition of mass misery, survival of the ecosystem, and defense of the entire human race against technological determinism... It is no longer correct to label some procedure efficient if it exacts intolerable social costs, proves grossly wasteful of resources or imposes its mechanistic rhythms on its operator.... Firm managers and designers of technology will need to explore ways of becoming integrally efficient that is, of producing efficiently while optimizing social and human values."

This book offers an insightful examination of the values implicit in technological society; international mechanisms, and high financial and social costs of transnational transfer of industrial technology; and basic strategies and policies in the Third World to channel technology to serve development goals. For those who can make their way through the difficult (even for native English speakers) language used, this will make excellent background reading for the discussion of appropriate technology policies.

Sharing Smaller Pies, **Disk 1, File 01-16,** leaflet, 38 pages, by Tom Bender, 1975, out of print in 1985. This is the American response to **Small is Beautiful**.

"There is no longer any doubt that our age of affluence based upon depletion of our planet's non-renewable energy and material resources is at an end and that major changes must be made in every aspect of our lives."

"Medicine, architecture, law, education, transportation, social work, and civil engineering have all followed the path of increasingly professionalized, more restricted, and less beneficial application of their skills."

"We need skill-developing rather than labor-saving technologies."

This leaflet includes an excellent 6-page discussion of the meaning of appropriate technology for industrialized nations. A thoughtful look at what has gone wrong in America's high-technology society, and explanations of a new set of values which might help us move toward a society characterized by "stewardship not progress" and "enoughness not moreness."

Paper Heroes: A Review of Appropriate Technology, **Disk 1, File 01-11**, paperback book, 181 pages, by Witold Rybczynski, 1980, 1991 edition $9.95 from Viking Penguin, 120 Woodbine Street, Bergenfield, New Jersey 07621-0120, USA.

Paper Heroes is an attack on both romantic myths and basic assumptions of the "appropriate technology movement." The author has himself done some very important work on low-cost technologies, co-authoring, for example, the instant classic **Low Cost Technology Options for Sanitation in Developing Countries** (see review in WATER SUPPLY AND SANITATION chapter). Amid a small but growing literature of backlash against appropriate technology values and assumptions, this represents the first lengthy critique of A.T. by an "insider."

Rybczynski begins by attacking Schumacher. **"Small is Beautiful** ... did not attempt a reasoned argument but appealed directly to the emotions.... (It) was first and foremost a diatribe against modernization." He deplores a "California youth culture" concept of technology that he attributes to spinoffs from the **Whole Earth Catalo**g, in a lengthy digression from his main theme. He claims that Illich, Ellul, and others who have significantly influenced A.T. thinking are "modern Luddites," dismissing the original Luddites of early 19th century England as "a kind of anti-technological Ku Klux Klan." Rybczynski was probably correct at the time when he claimed that "A.T. could be described as an inverted pyramid a great deal of verbiage and speculation resting on few accomplishments."

The situation has changed since 1980, however, as witnessed by many of the books reviewed here. Having laid waste to what he considers "the excessive claims and unsubstantiated promises of paper heroes,' the author switches to a more positive tone, favorably describing several specific technologies that might be called A.T. Readers are warned about the problems of appropriate technology strategies that attempt to use conventional aid mechanisms

and institutions as the vehicles for reaching the poor. The author suggests alternatives to aid, with technology choice left to the people in the Third World. "A more successful approach, which is particularly evident in soft tech, is the provision of information on intermediate technologies directly to the individual.... It permits the individual to decide what is appropriate, it supports decentralization, and, almost by definition, it ensures that the individual establishes a healthier control of his technology.... It could also be argued that the successful A.T. antecedents such as rural medicine in China, the Vietnamese sanitation program, or Gandhi's hand-spinning campaign, have all been primarily information strategies. The decentralization of technique has been the result of the much more important strategy of the decentralization of knowledge."

An excellent chapter on China takes a hard look at imaginary and real lessons to be learned from that nation's experience.

Rybczynski also reminds us of a distinction between "social change" and "social reform," arguing that technological change always brings some social changes, but no technology, in and of itself, brings social reform. "Better technology (of any kind) can certainly not be a substitute for social reform. Landlordism, powerful rural elites, conservative banks, and rapacious money lenders all conspire to maintain the poverty of the landless peasants."

In the end, Rybczynski has produced a thought-provoking critique. Yet he does not seem to succeed in discrediting the propositions that 1) many technologies contain within them cultural and political biases, and 2) there are other paths to the future than that of the Western industrial model.

Questioning Development: Notes for Volunteers and Others Concerned with the Theory and Practice of Change, **Disk 1, File 01-12**, booklet, 48 pages, by Glyn Roberts, 1981, £3.00 from ITDG.

A discussion of some philosophies of development currently in practice around the world; "ideas which may be useful to anyone who wonders about the changes he is helping to bring about." The author suggests that "we shall clearly have to come to an agreement as to what we mean by development. Paradoxically, this is something which many 'development' personnel have never faced up to.

Despite years in the Aid business, they have always been too busy getting on with the job to worry much about the overall picture." People use the word "development" to describe many different types of activity, many of which do more harm than good to the people affected. "We are all agreed, no doubt, that Development means healthier, happier, fuller and more meaningful lives for everyone. Earlier this was simply rephrased as 'Development = the more equal distribution of power among people.' " As a result of "looking at the development in terms of power, we may gain insight into the cause of poverty in our own countries. We may find that the differences traditionally noted between the 'advanced' and the 'less developed' nations are less important than the similarities."