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As most of the publications reviewed throughout this book can be considered references, this chapter was created for special kinds of publications. These include books and periodicals that span many topic areas, several bibliographies, and directories of appropriate technology groups. Books that contain information on a number of technologies within a single general subject area have been placed in the corresponding chapters.

Entries in this chapter from Nepal, Bangladesh, France, Peru, Indonesia, Papua New Guinea, India and South Africa each contain information on a variety of technologies relevant to many developing countries. (See especially **People's Workbook** and the **Liklik Buk**.)

More Other Homes and Garbage is a valuable textbook and reference for calculations needed for a variety of technologies. **Field Engineering** and the turn-of-the century **Mechanical Engineer's Pocket-Book** are packed with hard-to-find technical information relevant to the rural areas of developing countries.

Four bibliographies have been included here. **Non-Agricultural Choice of**

Technique and **Economically Appropriate Technologies for Developing Countries** lead the reader to the literature on the economic implications of technology choice.

Appropriate Technology Information for Developing Countries is an attempt to cull and reevaluate U.S. AID and government research reports for possible relevance to appropriate technology efforts a difficult task. **Guide to Convivial Tools**, intended for librarians, identifies the books of a new discipline the study of the cultural, social, and political conditions necessary to allow democratically determined limits to industrial technology.

Rainbook and several other books are concerned with activities in the U.S.

The **Foxfire** books document historical technologies once widely used in the rural areas of this country.

Six directories of appropriate technology institutions are included. The most up-to-date is ITDGs aptly named **Appropriate Technology Institutions: A Directory**.

Readers operating information services or small libraries will find valuable advice in **Small Technical Libraries** and **How to Build Up a Simple Multidimensional Documentation System**. For those who just want to stir things up a little, two formula manuals contain a number of household product formulas that would also be relevant in the Third World.

More Other Homes and Garbage: Designs for Self-Sufficient Living, [Disk 2, File 02-47](#), book, 374 pages, by J. Leckie et. al., revised edition 1981, Sierra Club Books, San Francisco, out of print.

This valuable, easy-to-read textbook contains well-illustrated presentations that successfully make technical information available to people without formal technical training.

Topics include: alternative architecture, small-scale generation of electricity using wind power and waterpower, and solar heating of houses and water. The solar section contains useful charts such as the coefficients of transmission of heat for various building materials, and the proper solar collector orientation for different latitudes. Biogas digesters are discussed in the waste systems section, while the water supply chapter covers wells, solar distillation of water, pumps and water purification. Each of the chapters includes many sample calculations to aid the reader in understanding how to solve practical problems. The emphasis is on providing the reader with most of the necessary background information needed to design projects.

The new edition reflects a more sophisticated approach to the economics of alternative technologies, and advances made in commercially available materials.

The section on solar thermal applications, in particular, has been thoroughly revised.

While much of the content of this book is U.S. oriented, this can also be a valuable reference in developing countries, especially for understanding basic concepts and doing calculations correctly.

Field Engineering, [Disk 2, File 02-71](#), book, 251 pages, by P. Stern, F. Longland, et. al., 1936, revised 1983, £7.50 paperback, £15.00 hardback, from ITDG, also from TOOL.

Workers in developing countries have long needed a simplified, small engineering handbook for quick reference. This one was widely used in East Africa from its appearance in 1936 until after its revision in 1952.

The current, substantially revised 1983 edition contains much basic information on surveying, building construction and water supply. The many illustrations and emphasis on techniques make this a handbook that will be useful to people without any engineering background.

Simple surveying equipment and techniques are described along with how to set out building plots. The characteristics of different building materials are explained (wood beams, thatch roofs, tile roofs, reinforced concrete and more).

Pipelines and pumps for water collection and distribution, and basic latrine and privy designs are covered. Earthen road and timber bridge construction are followed by basic formulas for different power sources. Important design considerations, safe loads, etc. are set out for most of these topics.

Readers looking for more extensive engineering reference material should consult **The Mechanical Engineers' Pocket-Book** (1910 edition) included in the microfiche library (paper edition out of print).

The Mechanical Engineers' Pocket-Book, [Disk 2, File 02-74](#), book, 1461 pages, by William

Kent, 1910 edition, paper edition out of print. This long out-of-print engineering handbook contains information on a range of technologies and materials that are still commonly used or that could be used in developing countries, but have disappeared from current engineering handbooks. While most of the information contained within will not prove of use to most readers, the sheer size of this "pocket book" (1461 pages) means that it is peppered with interesting entries. These include, for example: steam engines (140 pages), human and animal power, strength of lime and cement mortar, stresses in framed structures (e.g. timber bridge trusses), pelton wheel sizes and specifications, sugar cane bagasse as a fuel, measuring water flow using "miner's inches" windmill capacity and economy, weight of materials for roofs, characteristics and splicing of wire and hemp ropes for power transmission and haulage, shearing strength of a wide variety of American wood species, and use of belts for power transmission.

Introductory and summary material is provided for each section of the handbook: strength of materials, geometry, calculus, mechanics, basic machines, water power, etc.

The reader is to be forewarned that some of the information contained in this book is no longer valid, as the composition of materials has changed over the years. However, for the range of technologies on which it is almost impossible to find any engineering information elsewhere, this is a welcome reference.

The Next Whole Earth Catalog, large paperback book, 608 pages, edited by Stewart Brand, 1981, out of print, still available for \$5.00 from WEA.

The Whole Earth Catalog was started in an attempt to provide information about where to buy good quality tools (including books as "tools"). The **Catalog** expanded from that vision to include books, products and information on practically everything for the U.S. reader from environmental law through French cookware to mysticism.

The Whole Earth Catalog represents one of the best models for low-cost information exchange anywhere, but little from the **Catalog** is appropriate to the needs of developing countries. (In Papua New Guinea, development workers have produced a local catalog of information and resources available within the country. This is an excellent example of what can be done with this approach. See review of **Liklik Buk**, [Disk 2, File 02-44](#)).

Liklik Buk: A Rural Development Handbook/Catalogue for Papua New Guinea, [Disk 2, File 02-44](#), 270 pages, ATDI, second edition 1977, 1986 edition £11.95 from ITDG.

Liklik Buk contains a wealth of practical information for rural development in Papua New Guinea. Tells a great deal about who's doing what in PNG, and where to go for further information. There are 120 pages on crops and livestock, with attention to processing and utilization. Some coverage of village industries (good short description of silk-screen printing and soap making), food processing, and building and roads construction. 12 pages on health and nutrition.

The Design section includes many photos and drawings that are great sources of ideas; some of the equipment could be built from this information alone. Of particular interest are the pedal-powered thresher, winnowing machine, coconut scraper, oil press, and sugar cane crusher. Some information is presented on alternative sources of energy and water resource development.

An excellent model for what a national catalogue/handbook can be. Highly recommended.

China at Work, [Disk 2, File 02-77](#), book, 357 pages, by R. Hommel, 1937 (reprinted 1969), out of print in 1985.

The author lived in China between 1921 and 1930. In this remarkable book, he examines "primary tools, those which met people's basic needs: the handcrafting of tools, the providing of food, clothing, shelter, and transportation. The photographs and sketches are thoroughly documented and the various processes explained." There are more than 500 photos and sketches, and a very useful index with several hundred individual items of village technology listed.

Although much of the material in this book is quite dated and primitive, the book is so comprehensive that it undoubtedly includes a few useful items for any village technologist.

Teknologi Kampungan: A Collection of Indigenous Indonesian Technologies, Disk 2, File 02-60, book, 154 pages, by Craig Thorburn, June 1982, \$5.00 from Volunteers in Asia, Appropriate Technology Project PO Box 4543 Stanford CA 94309.

Successful, ingenious traditional technologies are used throughout the world and represent an important resource of human knowledge that should be tapped in appropriate technology development. The people of Indonesia, in the rural areas and urban "informal sector," employ a great variety of clever, resource-conserving, low-cost tools and techniques. Author Craig Thorburn has added 270 illustrations to an informative text that will allow readers to make, use, or adapt many of the best of these technologies to fit their own circumstances. Topics include agricultural hand tools, water lifting devices, metal working tools including a carbide gas generator for welding, fish traps and nets, crop threshing and processing equipment, stoves, three-wheeled cycles, construction techniques and materials, waterwheels, and a variety of other rural and small industry technologies.

Recommended.

Appropriate Technology: Directory of Machines, Tools, Plants, Equipment, Processes, and Industries, Disk 1, File 02-23, book, 280 pages, by M.M. Hoda, second edition 1977, Rp. 60 in India, US\$13.00 plus \$9.00 postage abroad, from Appropriate Technology Development Association, Post Box 311, Gandhi Bhawan, Lucknow 226001, U.P., India.

This book exposes the reader to some of the intermediate technologies that are relevant in Indian circumstances. Subjects include agricultural tools, crop processing equipment, crafts tools, village and cottage industries, transport, water supply, biogas, and solar devices.

More than 50 pieces of equipment are presented; the information has been compiled from a variety of sources. There are descriptions, drawings and construction notes for most of these. For the following items the material included appears to be sufficient for construction: six agricultural hand tools, hand crop duster, earth auger, hand seed drill, plant puller, seed dresser, oil drum forge, metal bending machine, equipment for parboiling rice, hand-operated workshop drilling machine, sugar cane crusher, equipment for making matches, equipment for making candles and soap, three-gear cycle rickshaw, water seal latrine, hand pumps, hydraulic ram pump, hand-operated washing machine, solar cooker, and forms for casting well rings.

One Hundred Innovations for Development, Disk 3, File 02-85, book, 80 pages, edited by Gillis Een and Sten Joste, 1988, £8.50 from ITDG.

This is a collection of inventions and innovations submitted for consideration as worthy of international awards for their significance and value. Many of these inventions pertain to water, sanitation, agroprocessing and energy technologies. Each of the first fifty items has a one-page description and illustration, giving a sense of why the authors felt this was important. The last fifty items have only a name and contact address.

Some of these items are well-known, others are not. Some are based on years of field experience and carefully proven technology, while others have come out of student projects.

One of our favorites is "bullet tree planting": "A mechanized tree-planting system based on 'bullets', which consist of rigid plastic plant pots made to narrow specifications. Each bullet is made of four identical pieces, which after planting are forced apart by the growing tree roots.... The seedlings in their bullets are injection planted with the aid of a manual planting" device, allowing rapid tree planting. This system is reportedly widely used in Canada.

Traditional Crafts of Persia, Disk 2, File 02-78, book, 304 pages, by Hans Wulff, 1966, MIT Press, out of print in 1985.

An inventory with photos of the traditional crafts and tools used. Major topics are metalworking, woodworking, building, ceramics, textiles, leather, and agriculture. Descriptive text. Among the most interesting items covered are: flour mills and rice hulling mills driven by wooden water wheels or vertical-axis windmills; the Qanat water supply system; and oil-seed milling.

People's Workbook, Disk 2, File 02-76, book, 560 pages, by Robert Berold et. al., 1981, 30.00 South African rands from Environmental and Development Agency, Box 62054, Marshalltown, 2107 Johannesburg, South Africa; also from ITDG and TOOL.

A wonderfully-illustrated, large reference book/catalog, this is full of practical information for rural development in South Africa. Major subjects are small farming (crops, animals, tools, draft animal power), water supply, health, building construction, working in groups and legal rights. The book begins with a lengthy comic book story of the history of South Africa.

This is the most extensive book of its kind, and should be of interest in many developing countries.

Mini Technology, Disk 2, File 02-45, booklet, 76 pages, by B.R. Saubolle and Andreas Bachmann, 1978, UNICEF/Nepal, out of print.

"This booklet is based very largely on the experience of the author, who was born and bred in India. It gives mostly Indian solutions to problems encountered in an earlier age before the onrush of modernity. It tells how to cool a house without air-conditioning, how to chill beer without a refrigerator, how to produce gas for cooking and lighting where there is no town supply, a way to make crows trap themselves, several ways of getting hot water at no expense, and so on and so forth." There are, in fact, four ways to cool food and yourself, four solar water heaters, an unusual solar dryer, several cookers and ovens, a self-closing water standpipe, some water filters, a one-person desk fan, a hand-held corn sheller, a fly trap, a fluorescent light insect trap, and an African bee hive.

Delightfully written and full of unusual devices that are otherwise largely undocumented.

Mini Technology II, Disk 2, File 02-75, booklet, 68 pages, by Andreas Bachmann and B.R. Saubolle, 1983, UNICEF/Nepal, out of print.

A companion volume to the original **Mini Technology**, this one provides details on more devices and techniques. Included are a water-powered pestle hammer, wooden winnowing fan, fence post driver, techniques for killing rats and repelling mosquitoes, and more.

The Journal of the New Alchemists, volume 1, **Disk 2, File 02-79**; volume 3, **Disk 2, File 02-80**; volumes 1-4 out of print, volumes 5 & 7 still available for \$7.00 each from New Alchemy Institute, 237 Hatchville Road, East Falmouth, Massachusetts 02536, USA.

The journals offer a sampling of the work of the New Alchemy Institute, an organization working with sophisticated appropriate technologies, primarily for temperate climates. The Institute also has a small farm in Costa Rica, at which some of its members spend part of each year. Each journal contains a mix of practical and theoretical articles, some of which are listed below.

Volume 4 (Disk 2, File 02-81, 148 pages) includes:

- a) description of intensive vegetable gardening activities
- b) solar algae ponds for aquaculture
- c) experiments with semi-enclosed fish culture systems
- d) cage culture of fish
- e) the Ark a "bioshelter" for Prince Edward Island
- f) backyard solar greenhouse
- g) "Return to the Feminist Principle"

Volume 5 (Disk 3, File 02-82, 152 pages, \$7.00) includes:

- a) New Alchemy sailwing windmill
- b) Green Gulch sailwing windmill
- c) Hydrowind development program (windgenerator using hydraulic fluid pumped to the base of the tower where it drives a generator)
- d) intensive gardening mulches, bean pests, energy efficiency, earthworms .e) permanent agriculture
- f) semi-enclosed aquatic ecosystems

g) small-scale trout farm

The Book of the New Alchemists, [Disk 1, File 02-24](#), 174 pages, edited by Nancy Jack Todd, 1977, New Alchemy Institute, out of print.

A collection of articles on the work of the New Alchemy Institute on Cape Cod, Massachusetts. This group carries out probably the most scientifically sophisticated work of any of the U.S.-based appropriate technology groups. The articles are about gardening and small-scale farming, aquaculture in small ponds, and "bioshelters" (primarily the Ark, a complex unit that combines passive solar heating, greenhouse food production, fish raising and human living quarters).

Twenty pages are devoted to strategies for ecological farming in Costa Rica, where some of the Institute members work part of the year. Most of these articles are reprinted from the earlier issues of the annual **Journal of the New Alchemists** (see review).

Pictorial Handbook of Technical Devices, [Disk 2, File 02-50](#), book, 600 pages, by O. Schwarz and P. Grafstein, 1971, reprinted 1990, \$55.00 from Chemical Publishing Company, Inc., 80 Eighth Avenue, New York, New York 10011, USA.

This is an idea book with 5000 illustrations. Major sections are: machine technology, magnetics and electronics, light and optics, industrial processes, power generation, structural engineering, [coDisk 1, File 02-50](#) ort heating and cooling, and measuring devices. Short descriptions are provided for some of the more complex devices. Materials used and exact dimensions are not given.

The Foxfire Books (volume 1, [Disk 1, File 02-32](#), \$15.95 hardback, \$13.95 paperback), Elliot Wigginton, advisor, prices of other volumes listed below, from Doubleday Consumer Services, P.O. Box 5071, Des Plaines, Illinois 60017-5071, USA; volumes 4, 5, and 6 available as boxed set (paperback) for \$20.85.

The Foxfire Books document the daily lives and traditional tools and techniques of the mountain people of the eastern United States. Much of each volume is given to interviews and conversations with old-timers in the region. As an historical record, these books have proved immensely popular, selling over 1 million copies. Photos and drawings are abundant.

Because the books were written to record the history of these rural people, they do not attempt to point out where technical improvements can be made. For those who would like to use these as practical references, this is a considerable obstacle, made worse by the fact that most of these techniques have remained nearly unchanged for probably 150 years. Some of the contents of each:

Foxfire Book 2, [Disk 1, File 02-33](#), 410 pages, 1973, \$12.95 paperback.

Beekeeping techniques; wild plant foods; making an oxyoke, wagon wheels, a wagon, a tub wheel for a vertical-axis water-powered grain mill; raising sheep for wool, and carding, spinning, and weaving cloth; how to make a loom.

Foxfire Book 3, [Disk 1, File 02-34](#), 511 pages, 1975, \$12.95 paperback.

Tanning hides; making banjos and dulcimers, a lumber kiln, a smokehouse, butter churns, brooms, brushes, dolls and hats; using an animal-powered mill to crush sorghum for syrup and candy (same as a sugar cane crushing mill).

Foxfire Book 4, [Disk 2, File 02-35](#), 496 pages, 1977, \$14.00 paperback.

Making knives and carving wood; making fiddles, wooden plows and sleds, wooden water pipes, traps, and cheese; gardening; building a still furnace (for alcohol production).

Foxfire Book 5, [Disk 2, File 02-36](#), 511 pages, 1979, \$12.95 paperback, \$19.95 hardback.

Blacksmithing and gun making (flintlock rifles 230 pages); bear hunting.

Foxfire Book 6, [Disk 2, File 02-37](#), 507 pages, 1980, \$12.95 paperback, \$14.95 hardback.

Making a gourd banjo and song bow, toys and games (170 pages), shoes and wooden locks; an old water-powered sawmill.

Simple Working Models of Historic Machines (Easily Built by the Reader) [Disk 2, File 02-54](#), book, 79 pages, by A. Burstall, 1968, MIT Press, out of print in 1985.

Thirty-five different machines are presented in the form of drawings of simple working models. The emphasis is on the essential operating features of the machines. Most of the devices can be built with woodworking tools in a small workshop; some of them, however, require machined metal gearing. A description of the origin and use of each is provided.

The drawings include: great wheel lathe, treadle lathe, screw cutters for wooden screws (male and female threads), a variety of pulleys and other lifting devices, Chinese spoon-tilt hammer, escapement mechanisms in clocks, two kinds of bellows, and machines for pumping and raising water (Archimedes' screw, chain pump, suction pump, diaphragm pump, hydraulic ram).

The intent of the author is to "encourage a talent for experimenting and improvising." The drawings illustrate important principles in mechanical engineering. They can either serve as the basis for practical applications of these principles, or as teaching models. "Much appeared to be learned by feeling and touching a working model that otherwise eluded the students when only diagrams, slides, or cinema films were used."

Village Technology Handbook, Disk 2, File 02-64, book, 430 pages, VITA, 1970, revised 1988, \$19.95 (overseas orders add \$3.00 for surface mail, \$5.00 for airmail) from VITA; Spanish and French editions also available from VITA for \$14.95 each; also available from TOOL.

"This handbook describes techniques and devices which can be made and used in villages. Hopefully the book will generate new ideas as well as pass on information which has already been tried."

The book "was conceived by VITA volunteers in 1962 as a means of bridging the technical information gap which keeps the world's villages from learning from one another's experience. The book's aim is to gather in one publication information from many sources which has been found helpful in villages."

Subjects covered include:

- a) Developing water resources (including basic well-drilling or digging information, such as how to make a hand-operated earth boring machine).
- b) Water lifting and transport (chain pump for irrigation, pipelines, hydraulic ram pump).
- c) Water storage and water power.
- d) Water purification (for example, sand filters).
- e) Health and sanitation (principles of latrine building).
- f) Agriculture (earth-moving devices for irrigation and road-building, underground irrigation using tiles, tile-making, grain drying, two-person bucket sprayer, backpack crop duster).
- g) Food processing and preservation (for example, iceless refrigerator).
- h) Construction (concrete, bamboo, making glues).
- i) Miscellaneous (solar water heater, hand-operated washing machines, soap making, building a kiln for pottery, silk-screen printing, and winding a spring).
- j) An appendix with conversion charts for English to metric units.

Due to the great amount of village technology development work that has taken place in the last 15 years, this book is somewhat out of date. It still makes a good introductory book and reference.

Soft Tech, Disk 2, File 02-56, book, 175 pages, edited by Jay Baldwin and Stewart Brand, 1978, out of print in 1985.

A compendium of the "soft technology" sections articles and reviews of products and books from past issues of the **CoEvolution Quarterly** (itself an extension of the **Whole Earth Catalog** see reviews). What is "soft technology" to the editors? "Soft" signifies that something is alive, resilient, adaptive, maybe even lovable."

The emphasis here is on technologies that can be used in the U.S. Much of this book provides access to products identifying who is making and selling the best quality and most unusual practical tools from hand tools to machines and renewable energy measuring devices. In this sense **Soft Tech** is a buyer's guide for a "highly evolved toolbox." You'll also get a look at solar gadgets for U.S. homes, the 1891-1930 California solar water heater boom, energy-efficient cars and mopeds, folding bicycles, wood-burning for space heat, underground buildings, owner building strategies, passive solar design, and the New Alchemy Ark.

RAINBOOK: Resources for Appropriate Technology, Disk 2, File 02-51, book, 256 pages, by the editors of **RAIN Magazine**, 1977, out of print.

A compilation of information that has appeared in **Rain Magazine** (see review) plus a lot of new material. Describes reference materials, activities of U.S. groups, and includes articles on: appropriate technology, place, economics, creating community, communications, transportation, shelter, agriculture, health, waste recycling, and energy. The emphasis is on changing the U.S. towards decentralized, environmentally appropriate technology, and having fun doing it.

Like the journal **RAINBOOK** is the best single reference for Americans looking for excellent resources for changing lifestyles so that we consume less of the world's resources, while becoming fuller human beings ourselves.

Fichier Encyclopedique du Developpement Rural, Disk 1, File 02-28, folders of leaflets, available for 130 Francs per year, add 60FF foreign postage, from RESEAUX La Lettre du GRET, 34, rue Dumont d'Urville 75116-Paris, France

These are sets of leaflets, in French, on a wide variety of village technology topics. The information is taken from French sources and international sources such as VITA and Brace Research Institute. References for additional information are given in each case. These leaflets offer an introduction to the concepts and applications of many successful technologies. Some of the topics covered: soil-cement block making, raising grapes and making wine in the tropics, water supply, bamboo construction, and cane crushing for sugar production.

GRET has a large collection of other French language publications on village technologies, and we urge readers in French-speaking countries to write to them for their publications list.

MINKA: A favor de una autentica ciencia campesina, Disk 2, File 02-46, journal, edited by Grupo Talpuy, 3 issues per year, subscriptions \$30.00 per year to Latin America, \$35.00 per year to all other countries, from MINKA, Apartado 222, Huancayo, Peru.

This Spanish-language journal provides the rural people ("campesinos") of Peru with information on locally successful appropriate technologies. MINKA is committed to a search for local solutions to local problems, through the development of a more scientific approach among the campesinos. It emphasizes technologies that have come out of the people's own experiences, such as the waterpumping windmills built at Miramar. An attractive mix of drawings, cartoons, photos and articles present information on a wide variety of subjects. Each issue concludes with a project for children, with simple plans for a working model of a tool or machine. Past issues have covered topics such as: "Is Mechanization Progress? For Whom?", plans for a locally-designed spade that is easily made and repaired, plans for a chain pump that can be built in a village, and a description of traditional Inca and pre-Inca water technologies. There are also reviews of illustrated manuals that can be of practical use to campesinos.

To the question "Do the campesinos read?", the editors answer that publishing is always done in cities, on topics that city people want to read about. By publishing a journal in a popular format on topics of direct concern to the campesinos and with their input, the editors hope to encourage a wide readership in the rural areas of Peru.

An outstanding example of a local communications resource for the sharing of local ingenuity and information on appropriate technologies.

Simple Technologies for Rural Women in Bangladesh, Disk 2, File 02-53, book, 70 pages, by Elizabeth O'Kelly, 1983, free from UNICEF, CPO Box 58, Dhaka-1000, Bangladesh.

This is a compilation of simple equipment that can be made or purchased in Bangladesh and many other developing countries. Only single drawings or photos are included for most examples; for some items this is sufficient information to make them.

The book begins with a description of the activities of rural women in

Bangladesh, and the tools and equipment they use. Some employment-generating activities that could benefit rural women are suggested. Potentially relevant technologies presented have been taken from a variety of sources (FAO, ITDG books and equipment catalogs, the **A.T. Sourcebook**); these include vegetable coolers, cooking stoves, threshers, winnowers, and water pumps. Some manufacturers' addresses and a bibliography are included.

The author notes that "the division of labor between the sexes ... needs careful study especially as in many countries the women enjoy considerable prestige as the growers of food for their families—which they will lose if the pattern of living is changed too drastically."

Economically Appropriate Technologies for Developing Countries: An Annotated Bibliography, Disk 1, File 02-27, book, 123 pages, compiled by Marilyn Carr, ITDG, 1976, revised 1981, out of print.

This is an annotated list of 308 "reference materials on the economic aspects of intermediate technology and its appropriateness." Studies are of the following categories of technologies: agriculture, housing, manufacturing, power

sources, water supplies, health services, and transport. Most of the studies "have been aimed at assessing how 'intermediate' techniques compare in terms of capital and labour productivity, employment generation, cost of production, and generation of surplus with more conventional techniques." Many of the conclusions of the reports are given.

Appropriate Technology for Rural Development: The ITDG Experience, Occasional Papers 2, [Disk 2, File 02-70](#), booklet, 31 pages, by D.W.J. Miles, 1982, £3.95 from ITDG

As the best known of all the A.T. organizations, the Intermediate Technology Development Group (ITDG) is contacted by people from all over the world. This short booklet provides a nice summary of the experiences, philosophy and current strategy of the group. It will aid readers in understanding what ITDG has defined as its primary tasks, and thus what kinds of assistance and collaboration may be possible.

"We see serious 'training gaps' at four levels:

–at the artisanal level, we see a need for practical training for people who will be using appropriate technologies, such as brick makers

–at the enabling level of supervisors, foremen and managers of labor-intensive operations

–at the professional level ... for designers and operating staff of institutions and enterprises....

–at the political level, where planners, administrators and decision-makers need exposure to the wide variety of governmental and institutional changes which may support and make more effective implementation and expansion of A.T. programmes."

Intermediate Technology in Ghana: The Experience of Kumasi University's Technology Consultancy Centre, [Disk 2, File 02-40](#), book, 111 pages, by Sally Holtermann, ITDG, out of print.

Case studies are presented which document the Technology Consultancy

Center's experience with projects for manufacturing glue, soap, animal feed, glass beads, brass casting, nuts and bolts, and for broadloom weaving, and the development of a "plant construction unit." Each project is analyzed in the context of the local economy and government policies. Background information on the TCC may be valuable to people wishing to replicate the TCC model.

Guide to Technology Transfer in East, Central, and Southern Africa, [Disk 2, File 02-38](#), book, 134 pages, by Anthony Ellman, Bruce Mackay, and Tony Moody, 1981, Commonwealth Secretariat, out of print.

Many people in East, Central and Southern Africa are dependent upon equipment purchased at high cost from Europe while low-cost, locally-adapted alternatives are available within the region. This guide catalogs a variety of equipment for agriculture and home industry. It includes good drawings and ordering information. Country guides for Botswana, Kenya, Lesotho, Malawi, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe give data on the countries' agriculture, transportation, freight companies, trade regulations, and customs tariffs. This is a good model for catalogs covering other regions too.

Field Directors' Handbook, [Disk 1, File 02-29](#), loose-leaf notebook, about 400 pages, edited by Brian Pratt and Jo Boyden, 1981, 1985 edition £11.95 from Oxfam Publications, 274 Banbury Road, Oxford OX2 7DZ, England; also from ITDG and TOOL.

This manual, designed as a guide for Oxfam field staff in evaluating, supporting, and advising community development projects, is a survey of key approaches to assessing and approaching rural needs. The **Handbook** includes sections on agriculture, health, social development, humanitarian programs, and disaster relief. It is a good overview of approaches to participatory needs assessment, project planning, and techniques that facilitate high degrees of participation.

Appropriate Technology Research Projects, [Disk 1, File 02-20](#), book, 66 pages, by M.M. Hoda, \$1.00 plus postage from Appropriate Technology Development Association, P.O. Box 311, Gandhi Bhawan, Lucknow 226001, U.P., India.

This is a notable little book because it suggests possible student projects on practical applications of appropriate technology, and lists a large number of such projects currently being undertaken.

"It requires some imagination to conceive and formulate the problems and introduce them in the institutions. Real life problems should be given to the students rather than theoretical problems, if the maximum benefit is sought to be derived from them. Before that can be done, the concept of appropriate technology has to be fully understood to apply its principles for the solutions of the problems. There are many constraints and impediments which seriously restrict the scope of working in a rural surrounding, like absence of electricity, lack of communication, unavailability of materials, servicing and repairs. The designer has to keep all of these aspects in mind in order to design equipment suitable for village use."

The author also discusses: the early beginnings of the village technology movement in India and the important roles played by Tagore, Gandhi, and the Sarvodaya movement; the current situation in India; the emergence of the Appropriate Technology Development Association; and the philosophy that underlies appropriate technology.

[World Neighbors in Action](#), quarterly newsletter, \$10.00 per year airmail (free to southern developing nations) from World Neighbors, 5226 North Portland, Oklahoma City, OK 73112, USA; also available in Spanish and French.

This newsletter sometimes has how-to-do-it information. In particular, the following issues may be of interest (\$1.25 each):

Vol. 4, No. 1E: how-to section on visual aids.

Vol. 6, No. 1E: information on soil testing.

Vol. 6, No. 2E: how-to section on contour ditches for soil conservation (Disk 1, File 02-67).

Vol. 7, No. 1E: information on growing, pruning, and grafting fruit trees.

Other printed materials from World Neighbors include:

a) **Visual Aids Tracing Manual** (Disk 2, File 02-65, 20 pages, \$2.00): Ideas and step-by-step instructions for making filmstrips by drawing on polyvinyl or acetate plastic. Pages of drawings included to aid an extension worker in making his or her own filmstrips. Available in English, Spanish, and an African edition in French.

b) **The Use of Radio in Family Planning** (Disk 2, File 02-63, \$2.50): 60 Pages of text and 100 pages of appendices including family planning radio scripts from 18 countries.

c) **Introducing Family Planning in Your Neighborhood** (Disk 2, File 02-42, 40 pages, \$3.50):

Designed to help family planning workers organize their approach in the community, and to enable other community development workers to include family planning motivation in their current extension work. Includes 14 "experience stories" illustrating some of the problems faced and how they have been overcome.

d) There are two catalogs of identical information, one in English and one in Spanish. Both list all of World Neighbors overseas development publications including filmstrips, flip charts, newsletters and books on agriculture, food production, health care and nutrition, community development, and family planning. Ordering information is included. Catalogs are free. There are now more than 75 filmstrips listed. Prices of the filmstrips start at \$10.00. About half of these are on family planning. Other subjects include: rat control, fish farming, mushroom growing, grain storage, taking soil samples, small plot irrigation, rabbit raising, and the proper care of young and sick children.

Small Technical Libraries, Disk 2, File 31-768, booklet, 40 pages, by D.J. Campbell, 1973, reprinted 1980, UNESCO, out of print in 1984.

In this valuable little book you will find lots of good ideas that will prove very helpful in organizing and effectively operating a small technical library to support the work of a small research institute or technical information clearinghouse. The author emphasizes frequent meetings with the research staff to better understand and provide for their information needs, and make them aware of newly arrived reference materials of possible interest.

Recommended.

How to Build Up a Simple-Multidimensional Documentation System on Appropriate Technology, Disk 2, File 02-73, paper, 8 pages, by Urs Heierli, 1982, Swiss Francs 3.50 from SKAT.

The addition of a card catalogue to a small library allows information to be found more easily by creating a simple index. This is because several or many cards can be filed on a document, allowing the user to find it when looking at cards for any major topic covered by that document. For example, a paper describing a wind-powered irrigation pump in Thailand might have cards filed under "windpower," "irrigation," "waterpumping," and "Thailand." If shelf placement is the only system of filing, a document can only be found by looking in one place.

This short paper describes a simple card catalog. For a more extensive discussion of how to organize and operate a library for the specific needs and interests of your organization, see **Small Technical Libraries**.

Microcomputers in Development: A Manager's Guide, paperback book, 188 pages, by Marcus D. Ingle, Noel Berge, and Marcia Hamilton, 1983, \$16.75 plus postage from Kumarian press, 630 Oakwood Avenue, Suite 119, West Hartford, Connecticut 06110-1529, USA.

"There is little question that within several years microcomputers will play a substantial role in the less developed countries. At the same time we must recognize the potential for dysfunctional as well as beneficial effects of the introduction of microcomputers. Microcomputers can build or *block* the maintenance of a collaborative relationship within working groups. There are many indications that *how* the microcomputer is introduced will influence its success profoundly. For example, the capabilities of microcomputers can give the illusion that centralized control is appropriate for situations that require greater local autonomy for effective performance of tasks. Finally, whatever the potential net advantages of microcomputers in a specific situation, one must reckon with and be prepared to cope with the transitional costs and difficulties involved in the introduction of any new technology."

"This guide is intended for development personnel who are associated with the management of projects or institutions. It focuses on individual managers, management teams, or related support personnel who are likely to purchase a single-user microcomputer or who already have one and are interested in expanding and sustaining its use in a development organization."

Written specifically for use in development work in developing countries, this book provides a solid overview of what the introduction of a microcomputer can mean to a project or institution, examining both positive and negative aspects. A good deal of attention is paid to assessing whether a microcomputer would be of use in a given situation, and how to select the proper equipment and software. Examples are given of how microcomputers have been used in the development context, and several systems which were purchased for work in development are given as examples of complete packages.

Some of the equipment described is no longer available or has been replaced by better alternatives, and some of the experience reported has now become outdated. However, we imagine that these shortcomings will be corrected in a new edition of the book scheduled in 1986.

Appendices include information on how to provide a stable, safe electrical power supply for the computer, and lists of periodicals and names and addresses of computer manufacturers. Very useful.

The Women's Computer Literacy Handbook, book, 254 pages, by Deborah L. Brecher, 1985, \$10.95 plus \$1.50 postage from The New American Library, Inc., P.O. Box 999, Bergenfield, New Jersey 07621, USA.

This clearly-written book uses non-technical language to introduce the terminology, hardware (or physical components), and software (or programs) of microcomputers, providing the reader with a solid understanding of the basic concepts. It includes very good explanations of software for word processing and data base management. Although some of the material is quite sophisticated, the text never gets heavy and difficult to read.

For those planning to purchase a computer, there is some discussion of the important categories (IBM-compatible, CP/M, etc.), but no attempt is made to present an exhaustive list of products. Since this book is intended for a U.S. audience, the numerous special considerations for developing countries are not treated. Equally appropriate for women and men.

Dick's Encyclopedia of Practical Receipts and Processes, [Disk 1, File 02-26](#), book, 607 pages, originally published in 1870, reprinted 1974, out of print in 1985.

This book is from an era when American families were largely self-sufficient.

It contains 6400 formulas and recipes for a wide range of household and small workshop processes. It is not a cookbook, but instead covers subjects such as making soap entirely from natural raw materials, waterproofing, making glues and cements for many different applications, and making paints, inks and lacquers. The majority of these recipes will probably not be relevant to appropriate technology practitioners, but there is such an enormous volume of information here that the useful material may still make the book a good purchase.

Some of the terms used are no longer common in English, and a large number of the basic chemicals and substances will be unfamiliar. However, it may be easier to obtain these basic substances in some developing countries that have chemist's shops remaining from colonial times.

We suggest this book for use only by people who understand English well.

The Formula Manual, [Disk 1, File 02-31](#), by Norman Stark, 1975, 1980; out of print in 1986.

This volume is filled with 558 formulas for household products, many of which are relevant to the Third World. All have been chosen to be made in the home, with simple tools. Thus some of these might be appropriate for production in small-scale industry efforts in the Third World. Equipment needed is very simple: double boilers (one pot sitting on top of a second pot filled with water), wooden spoons, mixing bowls, measuring cups, thermometers.

The author claims that some of the formulas have been "modified from large scale manufacturing quantities to small batches that are suitable for the do-it-yourselfer," and that "all are tested under actual use conditions."

There is a listing of the usual sources of supply for the chemicals used (mostly drugstores, hardware stores and grocery stores in the U.S., though sometimes chemical supply houses). All these chemicals are defined in an appendix.

Some examples: waterproofing mixture for concrete, waterproofing mixture for canvas (using soybean oil and turpentine), mixtures to protect wood from fire and termites, biodegradable laundry detergent, mixture for fireproofing cloth, chimney soot remover, safe cockroach poison, airtight seal for canning, bay leaves used in stored flour and cereals to repel insects, liquid glue, mixtures for the repair of holes in galvanized roofing sheets, automobile radiator leak sealer, and tire leak sealer.

Knots for Mountaineering, Camping, Climbing, Utility, Rescue, Etc., [Disk 2, File 02-43](#), booklet, 27 pages, by Phil D. Smith, 1975, out of print in 1985.

Fifty-six useful knots are illustrated and briefly described in an informative "how to do it" pamphlet. Includes many variations on the common loops, splices, and hitches which should allow those with some prior experience in utility rope work to apply the most appropriate knot to the job at hand.

Appropriate Technology Institutions: A Review, Occasional Papers 7, [Disk 2, File 02-69](#), book, 74 pages, by Richard Whitcombe and Marilyn Carr, 1982, £3.95 from ITDG.

"The broad purpose of this study is ... to review, classify and analyze the experience gained in the establishment and operation of AT institutions, to identify their purposes and objectives, strengths and weaknesses, achievements, and problems." The discussion is based upon ITDG's familiarity with some 60 appropriate technology institutions. Unlike the other booklets in this series on institutions, this one does not primarily list and describe particular institutions. Instead, the authors have attempted to make some conclusions about A.T. institutions as a group.

"Examples of projects which have taken technologies beyond the pilot stage into widespread production and use are very thin on the ground."

"Non-governmental organizations that concentrate on a few technical subject areas in which their staff have specific expertise have often worked successfully on rural technology programmed both in establishing small rural industries and in improving living standards in rural communities. Without institutional affiliation they have had to develop a methodology for utilizing the research and development facilities and extension services of others, and some have become skillful at this, thus allowing concentration of their own resources on neglected aspects of the implementation process."

A Guide to Appropriate Technology Institutions, [Disk 2, File 02-72](#), book, 124 pages, by Angela Sinclair, 1985, £5.95 from ITDG.

Here are interesting 2-5 page summaries of the historical evolution and activities of each of some 40 A.T. institutions around the world. This will allow the reader to quickly get a basic understanding of the major players in this field. ITDG has also published in-depth reports on several of these organizations, issued as separate books, and a directory which simply lists addresses of a much larger number of groups (see review of **A.T. Institutions: A Directory**).

Appropriate Technology Institutions: A Directory, [Disk 2, File 02-68](#), booklet, 36 pages, ITDG, 1987, £3.95 from ITDG.

In the interest of creating a low-cost, up-to-date listing of active appropriate technology institutions, ITDG has published this directory of some 180 groups worldwide (addresses only). ITDG intends to regularly update this list.

Appropriate Technology Directory, [Disk 1, File 02-21](#), book, 361 pages, by Nicolas Jequier and Gerard Blanc of the Development Center of the Organization for Economic Cooperation and Development (OECD), 1979, \$22.50 in English or French, from OECD Publications Office, 2 rue Andre Pascal, 75775 Paris Cedex 16, France; or OECD Information and Publications Center, Suite 1207, 1750 Pennsylvania Avenue N.W., Washington D.C. 20006, USA.

"The idea for such a 'Who's doing What' in the field of appropriate technology grew out of hundreds of requests for information addressed to the OECD Development Center In trying to provide these answers, we soon discovered that the number of organizations involved in developing and diffusing 'appropriate,' 'intermediate,' or 'soft' technologies was considerably larger than anyone had suspected.... What we have attempted to do here is to present in a standardized way ... all the basic information about organizations involved in the promotion of appropriate technology, both in the industrialized and developing countries."

280 groups and organizations are listed alphabetically by country. Text on each organization includes information about origin, funding, main objectives, examples of technologies worked with, and future plans. Data on scale of activities, budget, and staffing are also given when available.

Tinker, Tailor, Technical Change: Technologies from the People, Disk 3, File 02-84, book, 288 pages, edited by M.S. Gamser, H. Appleton, and N. Carter, 1990, £10.95 from ITDG.

This volume offers a grab bag of case studies of localized technologies and technical knowledge that are not widely understood within "professional" circles. The most unusual of these include a Kenyan coffee pulper, artificial reefs in India, and a pipe-frame multipurpose tool bar in India (perhaps the only successful animal-drawn multipurpose tool bar anywhere). Other topics include improved stoves, Nepalese watermills, and Nigerian cassava graters, all of which are given more in-depth coverage in other books. Little technical information is provided on any of these technologies; the focus is on the evolution and local response to the technologies.

The history and evolution of the Indian multipurpose toolbar is particularly noteworthy, as the toolbar has been successful in Gujarat, but similar devices have been unsuccessful virtually everywhere else. By 1989, 236 different fabricators in Gujarat were making variations of the toolbar, each producing 30 to 1000 units per year. "Field tests indicate that, compared to its traditional substitutes, the tool bar is lighter, requires less draft, and is more efficient and superior in terms of seed-rate, plant spacing, and quality of work. Not all farmers and artisans, however, are convinced about the higher efficiency of the tool bar, though most of them agree that it requires less effort. The major factor contributing to the popularity of the tool bar is its cost advantage. All respondents interviewed by us agreed that it is less costly both in terms of the initial investment, and repair and maintenance costs.

The equipment is multipurpose, and, if adopted fully, can replace 10 traditional and three improved implements. The cost advantages become even more significant when the farmer is eligible for subsidy While the subsidy adds to the advantage of the tool bar over traditional implements, it is almost impossible to isolate the impact of the government subsidy on the diffusion/adaptation process. However, it is certain that the subsidy scheme has contributed to" the toolbar's popularity.

"The story of the tool bar brings into sharper focus the issue of centralized and decentralized innovation-diffusion systems. The centralized (classical) diffusion model has dominated the thinking of scholars and policy makers. Classical diffusion theory fails to capture the complexity of relatively decentralized diffusion systems in which innovations originate from numerous sources and evolve as they diffuse."

Appropriate Engineering Technology for Developing Countries, book, 259 pages, by A.J. Francis and D.S. Mansell, 1988, available from Research Publications Pty. Ltd., 12 Terra Cotta Drive, Blackburn, Victoria, Australia 3130.

This book is intended to provide a broad overview of the conditions, options, and likely priorities for technologists working in developing countries. The early chapters are devoted to a discussion of the circumstances and basic economics that underlie the need for appropriate technologies. Next are chapters on food and agriculture, small-scale manufacturing, energy, public health, building and construction, and transport and communications, all sprinkled with interesting examples from Asia.

Last is a chapter on technical education in less developed countries. The authors "hope that the book will be of use as a text supporting courses on the subject of appropriate technology in universities in the Third World." The book emerged from the materials used in a masters program in development technologies at the University of Melbourne, which is a program that has attracted students from a variety of developing countries

Bibliography of Appropriate Technology Information for Developing Countries: Selected Abstracts from the NTIS Data File, Disk 1, File 02-22, 452 pages, edited by Paul Bundick, 1983, accession no. PB83-113 852, paper edition \$7.50 domestic, \$15.00 foreign; microfiche \$8.00 domestic, \$16.00 foreign; from NTIS.

This bibliography contains 2000 annotated entries, chosen from the materials held by the National Technical Information Service (NTIS). The editor hopes that this information can be adapted for "direct benefits which foster self-reliance and a sense of dignity among the poor." This publication came out of a collaborative effort between NTIS, the U.S. Agency for International Development, and VITA.

Unfortunately, few of the reports included were originally written with any sensitivity to the concept of appropriate technology. These are mostly reports on research projects; there are virtually no practical publications with information that can be directly applied. Recommended only for those willing to work their way through a lot of extraneous information in search of a few valuable items. To label this collection of government (mostly AID) research papers

"appropriate technology" is to ignore the dramatic shift of development strategy represented by the appropriate technology movement.

An awkward dilemma facing A.T. supporters is the question of how to extract the valuable technical information from past research efforts which neglected social factors, and which were based on now discredited assumptions (e.g. about acceptable levels of investment per job created). Because this bibliography does not help the reader to identify the relevant portions of these research papers, we recommend that you handle it with great caution.

Guide to Convivial Tools, Library Journal Special Report #13, **Disk 3, File 02-83**, 112 pages, by Valentina Borremans, 1979, R.R. Bowker Company, New York, out of print.

This annotated bibliography was produced by Valentina Borremans, director of the Centro Intercultural de Documentación (CIDOC) in Cuernavaca, and a close associate of Ivan Illich. (It was Illich who coined the term "convivial tool" see review of **Tools for Conviviality**). The bibliography "lists and describes 858 volumes and articles that, in their turn, list books on alternatives to industrial society or people who write on that subject."

"This new discipline deals with the cultural, social and political conditions under which use-value oriented modern tools can and will be widely used, and with the renewal of ethics, politics, and aesthetics which is made possible by the democratically decided limitation of the industrial mode of production."

There are three kinds of people in the intended audience: 1) the librarian attempting to create a specialized research library away from the large general libraries; 2) the librarian in the industrialized countries who wishes to expand the reference section on this topic; and 3) the individual researcher without access to a library at all.

Non-Agricultural Choice of Technology: An Annotated Bibliography of Empirical Studies, **Disk 2, File 02-49**, book, 84 pages, by Gareth Jenkins with an introduction by Frances Stewart, Institute of Commonwealth Studies, 1975, Oxford University, out of print.

Provides access to a fascinating list of studies on technology choice, with implications for many of the debated economic aspects of appropriate technology theory. The annotations make very interesting and valuable reading even without going to the original articles.