



Beekeeping

*Beekeeping—the controlled raising of bees in hives to obtain honey—has a very long history. In the industrialized countries, beekeeping is a solid income-generating venture for many people, and a hobby for many others, both in rural and semi-urban areas. The basic piece of equipment in these countries is the rectangular wooden hive with interchangeable parts, including movable frames into which a commercially made wax honeycomb foundation can be inserted to control and accelerate honey production. **The Beekeeper's Handbook** provides a practical summary and guide to the tools and techniques of beekeeping as it is practiced in the industrialized countries.*

One major problem with the practical literature on beekeeping is that most of it was written for developed countries. It is assumed that such specialty items as prepared comb foundations can be purchased (not made) by the beekeeper. These foundations, fitted into frames, assure that there will be a “beespace” of 5/16 of an inch between frames, which bees will leave as a passageway. Comb foundations are important as they reduce the amount of beeswax required for building comb, enable the beekeeper to control where the comb will be constructed, and are usually made of worker-cell bases, which reduce the number of unwanted drone cells.

*Several options are available to prospective beekeepers in areas where the equipment to make the comb foundations is not available. These were recommended to us by Ken's grandfather, an experienced beekeeper who began long before the time of commercially made comb foundations. One approach uses comb cut from a natural hive, tied in place in the frames with string. The bees will extend the comb to fill each frame. The string should be cut within the first few days as soon as it is no longer necessary or the bees will waste considerable effort in cutting it themselves. A technique for making wax honeycomb foundation is described in **Home Honey Production**. This should be of interest in tropical countries where*

distance, cost, and high temperatures make it difficult or impossible to get commercially made wax foundation in good condition.

*Tree trunks, hanging logs, baskets, and jars are among the simpler hives traditionally used by beekeepers in the South. Beekeeping could play a greater role in supplementing rural incomes in these countries. A number of valuable books with a developing country's perspective have appeared in the 1980's. **The Golden Insect and Small Scale Beekeeping** are two welcome new practical manuals. **Beekeeping in Rural Development and Tropical and Sub-Tropical Apiculture** are efforts by apiculturists and rural development agents to share knowledge about many different traditional beekeeping systems. Improved "hybrid" methods should result, some of them "intermediate" between indigenous and manufactured technologies.*

*An excellent example of a promising hybrid is a modification of the Tanzanian top-bar hive. **A Beekeeping Handbook** provides step-by-step instructions for making a low-cost cow dung and cardboard version of this simple hive. Several other simple, low-technology hive designs are presented in **A Beekeeping Guide**.*

Tropical and Sub-Tropical Apiculture, FAO Agricultural Services Bulletin 68, MF 32-773, book, 283 pages, FAO, 1986, \$24.00 from UNIPUB or FAO.

This compilation is intended to provide "an understanding of the problems of apiculture (beekeeping) which are specifically applicable to the developing countries of the tropics and sub-tropics. Many technical matters of considerable importance are hardly touched on, and some are not even mentioned, but these are dealt with in good beekeeping manuals written in and for the developed countries; on the other hand, emphasis is laid on certain points which, while of little concern to beekeepers in temperate zones, create acute problems in the tropics."

"The beginning tropical beekeeper will find in it much of the background material he needs for a thorough understanding of his art. The more experienced worker with bees may find solutions to some of his problems which have been solved elsewhere, and agricultural planners will find some indications of means by which apiculture can become an element in integrated rural development."

The first topics are bee biology, diseases and pests, honey-hunting and traditional beekeeping. The authors regret the lack of progress in beekeeping techniques among most developing country beekeepers, with the result that hive productivity is much lower than it could be, and an opportunity for an export crop is largely unexploited.

The second set of topics concern "modern apiculture", the scientific management of bees to maximize production through the use of improved hives, disease and pest control, and other means. The authors recommend, for example, local production of wax comb foundation, in part because some bee species have cell sizes as much as 25% larger than others.

Also included is a case study of profitable beekeeping from Bangladesh, and recommendations for national programs and technical assistance in any developing country. Appendices cover international standards for honey (important for export programs), bee vulnerability to pesticides, and a listing of information sources of beekeepers in developing countries.

Beekeeping in Rural Development, MF 32-766, large paperback book, 196 pages, Commonwealth Secretariat Publications, out of print.

This collection of twenty papers reviews beekeeping practices and potential in developing countries of the Commonwealth. Unlike many of the other beekeeping manuals reviewed here, this volume deals specifically and extensively with traditional practices and the introduction of adapted or new methods. Indigenous techniques and current development programs are discussed for nine African nations, as well as India, Sri Lanka, the Guianas, Belize, Panama, and the Pacific islands. Photographs of Kenyan log hives and Tanzanian pegged-bark hives are included.

An introductory article presents a valuable summary of geographical distribution of colony-forming honeybee species, honey production and trade, and traditional vs. modern equipment and methods. "Traditional hives are simple containers made of whatever material is used locally for other containers; hollowed logs, bark, woven twigs or reeds, coiled straw, baked or unbaked clay, plant stems and leaves, or fruits such as gourds. In the tropics and subtropics almost all these hives lie or hang horizontally. In the most primitive form of beekeeping the bees are killed or driven out once or twice a year when the honey and wax are taken, the colony being destroyed in the process At the other end of the scale are the movable frame hives used in modern apiaries throughout the world, which consist of a tier of accurately manufactured wooden boxes Between these two extremes—each irreplaceable in its appropriate context—there are various 'intermediate' hives that provide some of the benefits of moveable frame beekeeping with a much reduced need for precision In movable-comb frameless hives, used successfully in development programs in East Africa ... the rectangular frame fitted with foundation wax is replaced by a top-bar only, rounded on the under side and smeared with wax (or perhaps supplied with a narrow strip of wax). The top-bars must be at the correct distance apart to give the bees' natural intercomb distance (beespace) but that is the only precision measurement."

A useful overview of beekeeping's potential as a low-cost, appropriate technology for supplementing rural incomes in many parts of the developing world.

The Beekeeper's Handbook, MF 32-764, large paperback, 131 pages, by Diana Sammataro and Alphonse Avitabile, 1978, \$17.95 from MacMillan, Front and Brown Streets, Riverside, New Jersey 08075, USA.

"There are hundreds of beekeeping books, but there is an almost universal complaint that beginners' books are not sufficiently explicit ... (this book) will not only give you good understanding of the life history and behavior of bees, but it will also tell you how to manage bees, how to control their diseases, how to remove and process honey, and many other 'how-to-do-it' aspects." Especially useful for its simple, clear discussions of bee behavior and various methods of locating, starting, feeding and maintaining hives. The authors assume that beekeepers will buy commercial hive parts, but line drawings and text may provide enough information to improvise some equipment.

A clear, comprehensive introduction to beekeeping.

A Beekeeping Handbook, MF 32-763, 65 pages, by B. Clauss and L. Tiernan Ministry of Agriculture, Botswana, 1982, Dfl. 10.50 (order code BKH-45) from TOOL.

Here is an excellent combination: a primer on honeybees and a manual for setting up and keeping colonies using simple low-cost equipment. "On a small scale, the prospects of beekeeping in Botswana are good (It) can be completely home based; the hives are made in Kanye and Molepolole or the individual can try constructing his own from a cardboard box and cowdung." Both the simple manufactured hive and the cowdung hive (a cardboard box strengthened and protected with a plaster of cowdung and sand) are of the top-bar type, and do not require frames or commercial comb foundation. A smoker made from a tin can and a feather (for brushing bees off combs) are the key accessories. The handbook gives detailed instructions on starting a colony from a swarm or capturing an existing wild colony. Appendices discuss problems and pests, costs of hives and materials, and honey production as a source of income.

Photographs show children doing all of the handling operations. Clear, convincing; a welcome document on low-cost beekeeping methods. Highly recommended.

The Golden Insect: A Handbook on Beekeeping for Beginners, MF 32-772, book, 112 pages, by Stephen Adjare, 1984, £5.95 from ITDG.

Written as a training manual for beekeepers in Ghana, this is a basic introduction to tropical beekeeping by a man with several years of practical experience. "The aim is to put into the hands of the Ghanaian and African beekeeper information that he can readily understand and put to immediate use." Very readable, with numerous photographs.

"After the first bee sting you must run away. The bee may chase you but do not be afraid of it because it cannot sting a second time. You may catch and crush it because once it has stung it will die later. Killing it may save you as it will have no chance to go back to the hive and inform others to chase you."

Small Scale Beekeeping, Peace Corps A.T. for Development Series Manual M-17, MF 32-771, book, 211 pages, by Curtis Gentry, 1982, available to Peace Corps volunteers and development workers from Peace Corps; also available from ERIC (order no. ED 241775) and NTIS (accession no. PB85 247278/AS).

The basics of beekeeping are covered with the author advocating an "intermediate" level of technology in this manual written for Peace Corps volunteers. More advanced techniques are also discussed. Information is offered on project planning, characteristics and needs of honeybees, hive products, diseases and pest control. Includes plans for building most of the needed equipment.

Home Honey Production, MF 32-767, book, 72 pages, by W.B. Bielby, 1977, EP Publishing Ltd., East Ardsley, Wakefield, West Yorkshire WF3 2JN, United Kingdom, out of print.

A "do-it-yourself" manual for the beginning beekeeper, less complete than **The Beekeeper's Handbook** (see review). This book, however, includes drawings and instructions for making hives, plaster molds for wax foundations (the patterned surface on which bees build honeycombs), a solar wax extractor, and candles.

Dimensional drawings and a list of materials are included for the catenary hive, which is shaped so that bees will build their combs on a homemade foundation hanging from a single strip of wood. This design eliminates the rectangular frames and beespaces of a conventional hive.

The ABC and XYZ of Bee Culture, MF 32-762, book, 726 pages, 1983, revised 1990 edition \$25.00 from A.I. Root and Co., P.O. Box 706, Medina, Ohio 44256, USA.

This is a complete encyclopedia on the art and science of beekeeping, arranged alphabetically and well-illustrated. A.I. Root and Company are pioneers in beekeeping enterprises in the United States and have enjoyed an international reputation since the first edition of this volume was published in 1877. They cover the innovations in the U.S. up to the present, and an extensive glossary helps the reader to understand the more technical portions of the book. Recommended to those interested in large-scale bee cultivation.

"Some cover of boards or other shade material (trees, bushes) should be provide to protect the hives from the severe heat of the summer sun. In very hot climates, sheds are built to shelter the hives. It is not uncommon in hot climates for the combs to melt from excessive heat." (Under such circumstances the bees do their own air conditioning of the hive They gather small droplets of water to be evaporated inside the hive, cooling it down. The beekeeper can cooperate by placing nearby a pan of water filled with pebbles, so that the bees can land without falling in and drowning—Editors.)

The Hive and the Honey Bee, book, 740 pages, Dadant & Sons, Inc., 1975, \$15.60 plus shipping from Dadant & Sons, Inc., Hamilton, Illinois 62341, USA.

"Twenty-two chapters cover all the aspects of beekeeping from history of beekeeping through equipment, management, anatomy and behavior, pollination, disease, honey and honey processing, honey plants, beeswax and pesticide poisoning."

Those willing to make the major investment in this expensive text will not be disappointed. The format is more readable than **The ABC and XYZ of Bee Culture**, although the content is essentially the same.

A Beekeeping Guide, Technical Bulletin No. 9, MF 32-765, booklet, 45 pages, by Harlan Attfield, illustrated by Marina Maspero, 1989, \$7.25 (overseas orders add \$3.00 for surface mail, \$5.00 for airmail) from VITA; also available in French.

This booklet presents construction details for beehives made of wood, tree trunks, clay jars, woven bamboo/reeds/straw, and empty kerosene tins. A honey extractor and several smokers are also included, along with guidelines for selecting sites, caring for hives, and choosing proper clothing. This booklet was originally published in Bangladesh by the Appropriate Agricultural Technology Cell.

A Homemade Honey Extractor, MF 32-768, plans, 3 pages, by Larry McWilliams, 1974, in **Countryside Journal**, out of print in 1985.

This is a simple unit, made mostly of wood, which holds honeycombs in wire baskets and spins them with the use of a hand crank. This motion forces the honey out of the comb, and it flows down to a drain at the bottom of the barrel or wooden

box in which the spinning unit is housed. You get clear honey with a minimum of effort. The empty wax honeycombs can be reused by the bees, who will concentrate on filling them with honey rather than having to build them again.

Plans for a Complete Beekeeping System, MF 32-770, dimensional drawings, 20 pages, 1975, Garden Way Publishing, out of print in 1981.

This is a full set of plans for small-scale honey production. Included are the beehive with all components, honey extractor, smoker, gloves, and protective veil. The equipment can be easily made of locally available materials in most places.

Directory of Important World Honey Sources, book, 384 pages, by Eva Crane et. al., 1984, £29.50 or US \$50.00 from International Bee Research Association, 18 North Road, Cardiff CF1 3D4, United Kingdom.

A list with data on each of 467 plants that are reported to be major honey sources somewhere in the world. Special lists of drought-tolerant and salt-tolerant entries are included.

"Each entry contains information (as available) on the plant and its economic uses, its flowering period, its nectar or honeydew flow, its honey and pollen production, and the chemical composition and physical properties of its honey (including flavor, aroma and granulation)."

The Impact of Pest Management on Bees and Pollination, book, 207 pages, by Eva Crane and Penelope Walker, International Bee Research Association, 1983, £18.50 or US \$31.50 from the International Bee Research Association, 18 North Road, Cardiff CF1 3DY, United Kingdom.

The authors explore the pesticide killing of bees in developing countries—which crops and poisons it tends to be associated with, and how to determine whether poisoning is in fact taking place. Three bibliographies are appended: 1) pesticides and bees, 2) bee pollination of crops in the tropics and subtropics, and 3) laws and regulations to prevent bee poisoning.

Making and Using a Solar Wax Melter, MF 32-769, leaflet no. 2788, plans, 3 pages, 1975, send a check for \$1.00 payable to "U.C. Regents" to Publications, University of California, Division of Agricultural Sciences, 6701 San Pablo Avenue, Oakland, California 94608, USA.

This glass-covered box uses solar heat, collected in a black metal pan, to melt and recover beeswax from old combs and hive scrapings. Drawings showing construction details are very clear. A metal pan measuring 24 inches by 36 inches can recover wax from up to 60 hives. The size can be varied. This melter can be closed during operation, protecting the wax from robber bees.