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A Bibliography for the Solar Home Builder

by: Don Aitken

Published by:

California Office of Appropriate Technology
1600 Ninth Street
Sacramento, CA 95814 USA

Paper copies are \$ 1.00.

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Sacramento, CA 95814 USA

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**A
BIBLIOGRAPHY
FOR THE
S O L A R
HOME
BUILDER**

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**BY
DR. DONALD W. AITKEN
FOR THE
OFFICE OF APPROPRIATE TECHNOLOGY
STATE OF CALIFORNIA**

BIBLIOGRAPHY FOR THE SOLAR HOME BUILDER

An annotated selection of books generally
focusing on the use of solar energy
in the home

by

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* The Center for Solar Energy Applications is a non-profit organization operating as an affiliate of the San Jose State University Foundation. While some Center work is funded through normal contract channels, activities such as the assembly of this bibliography result from tax-deductible contributions.

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INTRODUCTION

The market is responding to the surging popularity of solar energy with a flood of books and reports, some hundreds of each to date. Some of these are truly excellent, while others are thinly disguised attempts to sell something; some are directed to the reader in plain language with clear examples, while others are show-off attempts to pretend that solar information must all be in high-tech jargon; and some seek to present principles and applications that may be generalized by the reader, while others present only particular cases which often have little general relevance.

The following bibliography summarizes only those books and reports with which I am personally familiar and that I feel to be the most useful, honest, and worth the cost, or which I especially like for a variety of reasons. It is a subjective screening. But since "comprehensive" bibliographies usually offer no particular help to the person wanting some guidance in the most economical assembly of a personal solar energy library, perhaps the assurance that many of the following references have already well served me may be helpful.

I have attempted only the sketchiest of annotations and generally adopted a western regional focus or a specific California focus. I have limited this selection almost exclusively to applications of direct radiant solar energy and to information relevant for solar home design and construction.

Even with these limitations in category and selection, this bibliography is still quite large, listing many of the finest available resources. Accordingly, I have categorized this list as indicated in the outline on the previous pages and included introductory remarks at the head of each section. This should help either to facilitate a reasonable sequencing of the reader's learning or to allow for a rather quick identification of those works that are most appropriate to the reader's experience level or particular interests.

I also indicate book cost, cover (hardback or softback), or format size and number of pages, so that the reader can know what he or she will get for the cost. When I learn of both hardback and softback (paper or cardboard) versions, I always list the lower-cost softback version.

If the reader wishes additional recommendations as to where to start, I have identified with asterisks in the left margin those books that I consider to be the core of a minimally adequate personal library for the serious solar student or beginning solar home designer. I also recommend solar association membership, subscription to at least one of the listed solar journals, and involvement, if possible, in a practical solar course or workshop.

Included is enough information so that books may be

ordered through any bookstore or directly from the publisher. Fortunately, there are also national mail-order houses that can provide most of these books in single-order convenience, as well as regional stores that stock and mail out many of the recommended books. In particular, I recommend the following:

The most complete national mail-order selection of solar books can be found through:

National Solar Energy Campaign, International Compendium, 10762 Tucker Street, Beltsville, Maryland 20705. After receipt of a check for \$4.50 they will send out a 112-page two-color catalog of articles and books on solar energy, divided very descriptively into "Solar Energy General," "Home Owners/Do-It-Yourself," "Business/Professionals," "Alternate Energy," "Conservation," and "Government." It is a very nice layout, including photos of many of the book jackets, and offers an extremely convenient book-ordering service.

The following three stores in the greater San Francisco Bay Area offer direct in-store buying as well as national mail-order services:

The Whole Earth Truckstore, 558 Santa Cruz Avenue, Menlo Park, California 94025, (415) 323-0313. Hours: Monday-Saturday, 9:30-6:00, and Thursday evenings to 9:00. The home of the *Whole Earth Catalog* series, as well as the *Energy Primer*, carries a complete set of books on alternative energy, along with a line of wood-burning stoves and much useful stuff (they stock much of the *Whole Earth Catalog* listing).

Sunway: The Solar Energy Store, 1301 Berkeley Way, Berkeley, California 94702, (415) 843-4019. Hours: Tuesday-Saturday, 10:00-5:00. This little store has in stock more than 70 solar book titles, and is also offering a home-made copper flat-plate collector and miscellaneous solar gadgets. The mail-order list of solar books may be obtained for \$1.00.

Solar Access, 3201 Cedar Street, Santa Cruz, California 95060, (408) 426-3100. This is an assemblage of creative and experienced solar energy people. They distribute several lines of flat-plate collectors, plumbing, hardware, and solar books. They also carry the Zomeworks line, including the Beadwall and the Skylid, and handle greenhouses. Their staff and consultants service or install solar systems, or provide do-it-yourself kits. It is a fascinating store for browsing.

II. AN ENERGY PERSPECTIVE

The successful widespread application of energy conservation, energy-conserving design, and solar energy depends in large measure on the appropriateness of the application to the time: that is, on the readiness of public, commercial, and government opinion to support and encourage the directions represented by these listed resources. The following four references provide an excellent framework for the serious consideration of solar and alternative energy policies:

1. **Energy and Human Welfare: The End Use for Power**

Barry Commoner *et al.*, Volume III in the series "Energy and Human Welfare--A Critical Analysis," Macmillan Information, a Division of Macmillan Publishing Company, 1975. This book describes energy use to promote human welfare, specifically in transportation, architecture and building, agriculture, industry, commerce, and the home. It also discusses the relationship of energy use to the lifestyle in the home, to employment and "true" economic growth, and to the protection of the environment. It certainly explodes the myth that the human welfare value of energy is in any way related to the amount of energy we use, as opposed to the intelligent way in which we use it.

\$14.95 (hardback), 185 pp.

2. **A Time to Choose: America's Energy Future**

Energy Policy Project of the Ford Foundation, Dorothy K. Newman and Dawn Day, Ballinger Publishing Company, 1974. This extraordinary study compares the social, economic, and employment benefits of three alternative energy growth scenarios, discusses reforming electric utility regulation and presents the federal role in protecting the public energy trust, including areas of research and development. The appendices offer very useful, specific numerical energy information in support of the text.

\$7.95 (softback), 528 pp.

3. **Soft Energy Paths: Toward a Durable Peace**

Amory B. Lovins, co-published by Friends of the Earth International and Ballinger Publishing Company,

Cambridge, Massachusetts, 1977. This remarkable book has both stimulated an international debate that we have long needed and focused that debate on the larger issues of the nature of the society and its technology and economy that would be determined by a choice of energy "paths." A careful distinction is made between "hard" and "soft" paths, with solar energy offered as one of the "soft" technologies (although we are learning that even solar energy can be centralized into its highest and most expensive technological form at a time that the "soft" thermal applications go begging for widespread use). Lovins clarifies the choices before us and our responsibility for making them, lest they be taken out of our hands, while offering a wealth of supporting references and numbers.

\$6.95 (softback), 256 pp.

* 4. **Rays of hope. The Transition to a Post-Petroleum World**

Denis Hayes, W. W. Norton and Company, New York, 1977. In this book the author combines the subjects of all three references listed above to take a close look at the differences between a post-petroleum world dominated by centralized, authoritarian, capital-consuming energy technologies (e.g., nuclear) and one driven by sustainable sources in an energy-efficient manner. This is perhaps the best book out on the technological particulars of this distinction, with much useful information on the "alternative" solar energy resources. It offers a promising and possible prospect.

\$3.95 (softback), 240 pp.

III. **A SOLAR ENERGY PERSPECTIVE**

The following three references provide low-cost overviews of the ways in which solar energy can and should be used, with the first offering an illustrated glimpse of our solar past and future; the second providing an overview of the ways in which solar energy can be put to practical use; and the third examining the larger energy and social context of solar energy applications. These can provide a helpful framework for the understanding of solar energy applied to the home.

5. **The Coming Age of Solar Energy**
D. S. Halacy, Avon Books, a Division of the Hearst

Corporation, New York, New York, 1975 (an updated version of the 1963 and 1973 editions by Harper and Row). This very interesting, descriptive, and well-illustrated book places solar energy in perspective of environmental quality, and emphasizes—with one-hundred-year-old examples—that solar energy has been around and technically feasible for a long time. In view of this, it projects to the future large-scale use.

\$1.95 (softback), 248 pp.

* 6. **Direct Use of the Sun's Energy**

Farrington Daniels, Ballantine Books, a Division of Random House, Inc., New York, New York, 1974 (reprint of the original 1964 Yale University edition). Wisconsin produced Aldo Leopold, John Muir, and Farrington Daniels, all from the same cloth. Daniels' book is still perhaps the best overview of solar energy applications around, especially in view of its emphasis that solar energy should be developed first to aid the poor and developing nations. With today's apparent emphasis on high-priced high technology for the well-to-do, Daniels' book allows us to step back and perceive solar energy as the resource that it is for all mankind. The few obviously dated portions of this book do not detract from Daniels' fine descriptions and timeless message. It is generally easy reading.

\$1.95 (softback), 271 pp.

* 7. **Sun! A Handbook for the Solar Decade**

Stephen Lyons, Editor, Foreword by David R. Brower, Friends of the Earth, San Francisco, 1978 (available through bookstores or directly from Friends of the Earth, 124 Spear Street, San Francisco, California 94105). Prepared as a resource book for the 1978 Sun Day (just as Friends of the Earth prepared the original *Environmental Handbook* as a resource for the 1970 Earth Day) this is a collection of extremely useful and relevant articles by many of the best social and energy commentators around (e.g., Bookchin, Illich, Goodman, Mumford, Lovins, Hayes, Commoner, Odum, Stein, Shurcliff, etc.). The book is divided into sections on "Energy Policy and Social Context;" "The Resources;" "Using the Sun;" and "Steps Toward a Solar Future." Subjects covered include jobs and energy; third world options; net energy from the sun; entropy law and economics; village architecture; untried inventions; Washington's role; and descriptions of alternative energy resources other than direct solar (e.g., wind and biological). These are almost all subjects that are not to be found in solar books, and yet they provide the

framework for the understanding of the elements of the solar transition. This book both complements and supplements #4 very nicely.

\$2.95 (softback), 364 pp.

IV. ALTERNATIVE ENERGY RESOURCES FOR THE HOME

Radiant solar energy (sunlight) is but one of the kinds of alternative solar-derived energy resources available for the home. The others are wind power, water power, and biological activity, with the latter entering into both the production of energy resources (as in fossil fuels and food) and as a mechanism for the release of energy not consumed in primary ways for further primary kinds of use (e.g., in methane production from biological decay). While this bibliography is oriented toward the thermal application of solar energy (heat) in the home, mainly because it is the most readily and economically accessible, it can be very interesting to view this in a framework that encompasses the other alternative energy resources. This becomes necessary, of course, when one wishes to adopt completely integrated or self-sufficient architectural and lifestyle goals. The following five publications, listed approximately according to technical completeness/difficulty, are especially useful.

8. New Low Cost Sources of Energy for the Home

Peter Clegg, Garden Way Publishing, Charlotte, Vermont 05445, 1975. This is certainly the most clearly illustrated, elementary description of the ways in which various energy resources can be used in the home. It also contains very descriptive equipment ads; many are still current.

\$6.95 (softback), 8-1/2 x 11, 252 pp.

9. Energy Primer: Solar, Water, Wind and Biofuels

Richard Merrill and Thomas Cage, Portola Institute, 1978. This up-dated and revised edition of the original 1974 *Primer* continues to present the ways in which various energy resources can be used in the home, but in a somewhat more theoretical setting than resource #8. It is still elementary and descriptive, and contains extensive and up-dated catalog listings for relevant resources and hardware, all offered through the mail-order service of the Whole Earth Truckstore.

\$7.95 (softback), 10 x 13, 256 pp.

10. Other Homes and Garbage—Designs for Self-Sufficient Living

Jim Leckie *et al.*, Sierra Club Books, San Francisco, 1975. Written by four Stanford University Engineering faculty members and about 30 of their students, this is, in short, both a remarkable book and a very useful and practical combined introduction to basic energy-conserving design principles, wind-electric generation, solar heating, waste-handling, water supply, and aquaculture, all applied to the home scale. Each chapter is just about the best introduction to its particular topic that can be found.

\$9.95 (softback), 8-1/2 x 11, 302 pp.

11. Alternative Natural Energy Sources in Building Design

Albert J. Davis and Robert P. Schubert, Passive Energy Systems, P.O. Box 499, Blacksburg, Virginia 24060, 1974. This book supplements *Other Homes and Garbage* very nicely. While not nearly as descriptively complete, it contains many design descriptions and suggestions not found in *Other Homes*, and it goes much further into details of active solar systems.

\$7.35 (softback), 8-1/2 x 11, 252 pp.

12. Sun Power: An Introduction to the Applications of Solar Energy

J. C. McVeigh, Pergamon Press, 1977. McVeigh appears to be one of those solar book authors who never heard of passive applications of solar energy, so this book deals entirely with hardware and techniques appropriate to hardware-centered (active) solar systems. Still, he includes details not to be found in the resources listed above, especially on heat engines, power generation, methods of economic analysis, photovoltaic cells, photochemistry, and biological conversion. There is also material on wind power systems. For the gadget-inclined person, this book is interesting and useful reading.

\$4.95 (softback), 208 pp.

V. SOLAR HOME DESIGN

A. Solar Home Examples and Illustrations

One of the most valuable experiences for the

potential solar home builder is to see some solar homes and to speak with those who have built them and/or who live in them. Short of this opportunity, it is very helpful to see pictures and descriptions of many solar homes and to read about the owners/builders. Solar homes are for everyone and can be suited architecturally to virtually all tastes, climates, and price ranges. The following resources provide hundreds of excellent examples, well illustrated or photographed and described, as well as some very revealing insights into many of the solar home pioneers.

13. Solar Oriented Architecture

Solar Energy Applications Team, Arizona State University, led by John I. Yellot, prepared for the AIA Research Corporation. Available through the mail-order houses previously listed; or from the Architecture Foundation, College of Architecture, Arizona State University, Tempe, Arizona 85281 -- checks should be made out to Architectural Foundation Publications; or through AIA Publications Sales, American Institute of Architects, 1735 New York Avenue, NW, Washington, D.C. 20006. This is an excellent first work for this bibliography section, for it traces, with 68 particular examples, the history of the evolution of solar building design from 1938 through 1975, and sandwiches these between Montezuma's Castle (1100 AD) and the somewhat similar Arcosanti (1975). Each project summary has a very nice line drawing with an outline description of location and building and climate data including the solar climate-control systems. The "Analysis-Design Impact of Basic Principles" portion of the book is an excellent, as well as elementary, illustrated description of the ways in which solar energy is used for home comfort control, with particular homes shown as examples of each of these particular ways. It's a very instructive book with considerable historical value. (Other AIA publications, with description and order forms, are on AIA Publications' price list and order forms, which may be ordered as above, or probably also obtained through the regional AIA offices that provide AIA contracts and forms. They are listed in the telephone book.)

\$12.50 (softback), 8-1/2 x 11, 142 pp.

14. Solar Heated Buildings of North America: 120 Outstanding Examples

William A. Shurcliff, Brick House Publishing Co., Church Hill, Harrisville, New Hampshire 03450, 1978. Bill Shurcliff is the author of the famous series of "Solar Heated Buildings -- A Brief Survey," cataloging

319 solar buildings in the 13th and final edition, 1977. Since then, faced with the impossibility of keeping up with the rapidly expanding numbers, Shurcliff studied the 500 examples he knew about in 1977 and selected 120 of them to represent a complete state-by-state sampling as well as to include houses, office buildings, schools, churches, apartments, and greenhouses. There is not less than one full page on each including a drawing and a photograph, along with a useful description.

\$8.95 (softback), 8-1/2 x 11, 293 pp.

**15. Solar Heating and Cooling Demonstration Program:
A Descriptive Summary of HUD Solar Residential
Demonstrations, Cycle I, 1976**

Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 023-000-00338-4. Many interesting design ideas are presented in this description of homes and buildings now operating as a result of the Cycle I HUD demonstration program. Each is described with a line drawing of the structure as well as the solar system plus a summary of solar parameters. It's quite a lot of material for the money.

\$1.15 (softback), 8-1/2 x 11, 59 pp.

**16. National Program for Solar Heating and Cooling
of Buildings, Project Data Summaries, Vol. 1
Commercial and Residential Demonstrations**

Energy Research and Development Administration, Division of Solar Energy, Washington, D.C. 20545, August 1976. Available from the Superintendent of Documents, Washington, D.C. 20402, Document ERDA 76-127 (UC-59c). This is a low-cost publication with lots of useful data on recent solar projects, including photographs, line drawings of buildings and systems, and descriptions. It's a geographically well-distributed set of projects and includes a number of commercial applications (which are not part of the HUD program).

\$2.35 (softback), 8-1/2 x 11, 163 pp.

*** 17. 30 Energy-Efficient Houses . . . You Can Build**

Alex Wade and Neal Ewenstein, Rodale Press, Emmaus, Pennsylvania, 1977. This is a stunning book! It could equally well be put into Section VI, Parts C or D, of this bibliography, but we include it here on the strength of Part I of the book, "30 Houses and the Stories Behind Them." This section, with fine

black-and-white photographs of many house details and sketched floor plans and elevations, along with interesting technical and historical descriptions, includes the following examples: "Family Houses -- How to Build to Suit Your Needs;" "Small Houses and Studio Living Spaces;" "South-Facing Hillside Houses." It's irrelevant that the houses are not all explicitly solar. The distinction between an energy-efficient house and a passive solar house essentially can't be made in most cases. Part II of the book, "Design and Construction Principles," is an excellent practical review, ranging from post and beam framing through how-to-do-its in all portions of the house interior, including natural heating, ventilation and lighting, and discussion of restorations, remodeling to save energy, and cost estimation.

\$8.95 (softback), 8-1/2 x 11, 316 pp.

18. Living with Energy: Alternative Sources in Your Home

Ronald Alves and Charles Milligan, preface by Ralph Nader, Penguin Books, New York, 1978. Using both color and black-and-white photographs and an excellent eye for both composition and detail, the authors trace 55 projects, mostly homes, but also including wind generators and some solar gadgets. The book is purely descriptive but makes entertaining reading. A special touch is the inclusion of personal views of the owners/builders, helping to reveal what sort of people go about solar home building.

\$7.95 (softback), 8-1/2 x 9-1/2, 128 pp.

B. Introductory Solar Design Primers

The distinction between Part A of this bibliography section (V) and this part is very fine. The following recommended resources also include reviews of solar homes and buildings, but the following resources contain more design detail and theory for the reader who wishes to delve more deeply into the how-to of solar home design.

19. Solar Energy and Housing: An Introduction

AIA Research Corporation, 1735 New York Avenue, NW, Washington, D.C. 20006, Second Edition, June 1975 (AIA/RC S-1). Available through AIA Publications Sales, or the International Compendium (see p. 2). This is a very well illustrated and clearly descriptive

introduction to the application of solar energy to housing. It leans on several of the AIA publications, but most strongly on the early chapters of resource #13. The architectural principles are developed step-by-step, including south-wall greenhouses in combination with active systems.

\$5.00 (softback), 8-1/2 x 11, 32 pp.

20. Solar Dwelling Design Concepts

AIA Research Corporation, for the U.S. Department of Housing and Urban Development, May 1976. Purchase from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 023-000-00334-1. I think this is the most for the least dollars available in the field! It opens with a fine look back in history to early solar energy applications, and then presents solar heating/cooling and domestic hot water systems, solar dwelling design, influencing factors, site planning for solar energy utilization, impact of solar energy utilization on traditional dwelling design, and solar dwelling design concepts. It is extremely well illustrated with some photographs (black and white) and excellent line drawings and perspectives, and includes climate and comfort factors in design. It is a well balanced collection.

\$2.30 (softback), 8-1/2 x 11, 146 pp.

*** 21. Sunset Homeowner's Guide to Solar Heating**

The editors of Sunset Books, Lane Publishing Co., Menlo Park, California, 1978. This is a non-typical Sunset book done in Sunset's typically thorough and beautifully illustrated style, offered at a very low cost. The non-typical nature of it is that it is not so much the usual Sunset nuts-and-bolts do-it-yourself style as an overview of principles with examples and references to nuts-and-bolts follow-ups that the reader can pursue. It does offer some practical kinds of detail not found in other solar books in many, many useful drawings (e.g., what thermal storage containers look like). Theoretical principles are thoroughly reviewed and presented in a non-technical, non-mathematical format. The colored photographs and black-and-white drawings then carry these principles first through passive architectural applications, then to active systems, and finally to retrofit circumstances. This is a uniquely useful book.

\$2.95 (softback), 8-1/2 x 11, 96 pp.

* 22. **The Solar Home Book: Heating, Cooling and Designing with the Sun**

Bruce Anderson with Michael Riordan, Cheshire Books, Church Hill, Harrisville, New Hampshire 03450, September 1976. This book is now probably the definitive introductory work in the field. (I use it as the primary resource in my solar home design class.) Beautifully illustrated and perfectly organized, it introduces the reader to solar energy in homes with a descriptive cataloging of those classic examples that have been around for many years, demonstrating diverse approaches and the fact that solar energy has been a practical resource for a long time. The rest of the book is a set of tools to do something. The fundamentals of solar energy, solar architecture, and direct (passive) solar heating are exhaustively developed before any discussion of solar hardware. But principles of active solar energy heating are then developed, first with soft technology (e.g., thermosiphoning air and water systems), and then with pumped systems. There is also a nice do-it-yourself section with very clear illustrations. The book has enough theory without being overwhelming. The appendices are thorough and helpful. The reader can learn enough to calculate solar home design parameters.

\$8.50 (softback), 8-1/2 x 11, 297 pp.

23. **Designing and Building a Solar Home: Your Place in the Sun**

Donald Watson, AIA, Garden Way Publishing, Charlotte, Vermont 05445, 1977. This fine book by a respected solar architect has the same aim as Resource #22 but leans more to the practical side because it includes photographs of its examples, do-it-yourself calculation tables, lists of homes by state in the U.S., lists of workers in the field, and lists of available periodicals. It suffers a bit in comparison with Resource #22 by not providing as carefully systematized a development of theory and by relying more on examples than on general design principles, but the differences between the books in these regards are slight. I use it as an excellent companion book to Resource #22 in my solar home design class. The two together provide a more thorough introduction than either does alone.

\$8.95 (softback), 8-1/2 x 11, 281 pp.

* 24. **SUN/EARTH — How to Apply Free Energy Sources to Our Homes and Buildings**

Richard L. Crowther and the Crowther/Solar Group,

P.O. Box 6539, Denver, Colorado 80206. Add \$1.00 for postage and handling of one copy, or 50¢ each for two or more copies. This attractively organized and illustrated book by one of the most creative solar architectural groups in the country adds many ideas to those presented in *The Solar Home Book*, especially in the area of natural climate control. But its unique value for this bibliography is the excellent Chapter II, "Energy Optimized Buildings," which describes a number of Mr. Crowther's beautiful solar homes and building designs in detail in view of the natural climate control design elements that were integrated into them. This chapter alone makes this a valuable book for the solar home designer, while the rest adds considerably to the information that the solar homebuilder will want to have at fingertip convenience.

\$12.95 (softback), 8-1/2 x 14, 232 pp.

25. Solar Energy and Housing — Design Concepts

Giffels Associates, Inc., for the AIA Research Corporation, 1975. This may be purchased through AIA Publications Sales, as described for Resource #13, by specifying Code No. RC 203. This document extrapolates the procedures for solar design to multi-family solar design in four climates, demonstrating ways in which the orientation and integration of multiple dwelling units may enhance the thermal performance of each individual unit. In addition, a very interesting matrix approach is presented for delineating those aspects of design which contribute through active solar energy systems, passive solar energy devices, and passive energy conservation devices. This certainly facilitates the calculation, once the basic design goals have been derived. The (very conservative) numerical data adopted for the four-climate examples (cool, temperate, hot-humid and hot-arid) are presented in an appendix. There is also a very nicely illustrated section describing how various kinds of solar heat collection and storage devices look and work, which by now should be old-hat to the user of this bibliography.

\$15.00 (softback), 8-1/2 x 11, 145 pp.

C. Passive Solar Design Primers

Again, this would seem to be drawing a pretty fine distinction between closely related books, but those that dwell exclusively on solar architectural concepts (passive approaches) and not at all on pumped (active) approaches to capturing solar heat for space comfort probably should be featured as specialized references.

Certainly much of the material in the following resources has appeared in previously listed resources, but the following do provide very useful expansions on passive design ideas and many practical details. Furthermore, additional books and reports are soon to come out with a passive design specialty, and will add to this particular list of solar design resources. These will include both a passive design pamphlet and a passive design manual, commissioned by the California State Energy Commission, and a national passive design manual, commissioned by the Department of Energy and now (July 1978) being prepared by Dr. Douglas Balcomb and Bruce Anderson.

26. The Passive Solar Story

Pacific Gas and Electric Company, 1978, Energy Conservation and Services Department, 77 Beale Street, San Francisco, California 94106. This little pamphlet provides a nice introduction to the basic principles of passive solar home design for the reader with absolutely no prior solar experience. It does not substitute for any of the recommended books in this bibliography, but it does provide a simple starting reference for those first thinking about solar.

Free (pamphlet)

27. Natural Solar Architecture: A Passive Primer

David Wright, AIA, Van Nostrand Reinhold Company, 1978. This long-needed book by perhaps the most creative architect of passive solar homes in the country is divided into sections dealing with "Energy Ethics;" "Microclimate Design;" "Nature's Design Tools;" "Applying the Tools;" and "Looking Ahead," with useful appendices on passive nomenclature, metric conversion, references to read, a reading "matrix" and an index. Wright's aim, as he states in his Introduction, is to "help fulfill the need for prerequisite knowledge of passive concepts for students, architects, builders, home planners and survivalists prior to the undertaking of the ultimate logical process of designing a climatically oriented structure. This is not a how-to book; it is meant to illustrate some of the concerns of passive solar design and at the same time to tickle the imagination." Wright is not quite correct, for I do consider the book to be a how-to for the designer of passive structures, aided by his inclusion of useful numbers and calculation examples where appropriate. He supplements his handwritten text with numerous (and humorous) diagrams. In response to the criticism that his handwritten text is difficult to read, Wright remarked that he wanted to slow the reader down, so

that he couldn't skim-read concepts that needed to be digested. This is by far the most thorough and integrated treatise of the subject.

\$7.95 (softback), 8-1/2 x 11, 256 pp.

28. Passive Solar Buildings: A Compilation of Data and Results

R. P. Stromberg and S. O. Woodall, Solar Technical Liaison Division 5714, Sandia Laboratories, Albuquerque, New Mexico 87115, August 1977. This can be ordered from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161 -- specify Report SAND 77-1204. This report documents federally funded measurements of four well known passive solar homes and one passively heated warehouse. If one does not wish to accept that those who live in passively heated homes remain comfortable without any (or substantial) technical assist, perhaps these convincing measurements of some remarkable designs will help. The appended article and "Rules of Thumb" by Dr. Douglas Balcomb adds to the value of this reference.

\$5.25 (softback), 8-1/2 x 11, 71 pp.

* **29. The Food and Heat Producing Solar Greenhouse: Design, Construction, Operation**

Rick Fisher and Bill Yanda, John Muir Publications, P.O. Box 613, Santa Fe, New Mexico 87501, 1976. If ordering from them, add 50¢ for postage and handling. Wholesale orders: through Bookpeople, 2940 Seventh Street, Berkeley, California 94719. This book is the definitive original work on solar greenhouses as used for space heating as well as for growing food. It answers all questions on what solar greenhouses are, and then shows in clearly illustrated, step-by-step fashion, how to design, construct, and use them. This includes illustrated descriptions of actual solar greenhouses, a listing of commercial manufacturers, and useful numerical and bibliographical appendices. A superb book! Watch for their up-dated revised edition, soon to come out.

\$6.00 (softback), 8-1/2 x 11, 161 pp.

D. Solar for Your Present Home

Obviously, many of the solar design principles discussed in resources listed up to this point have relevance to the conversion (retrofitting) of existing homes to solar comfort control. This is not always

obvious to the homeowner, though, for the architectural constraints caused by having to work with a home or building that is already up and oriented may seem to be severely limiting. Fortunately, in most cases, one of the roof elements, a southward-facing wall, or even a garage or nearby field may be converted to solar heating resources for the home, while the energy demand of the home may be reduced through conservation to the point where solar conversion to meet the remaining energy demand begins to make economic sense. It is helpful to the homeowner to isolate here those pamphlets and books that address the specific issues of energy conservation and solar energy conversion for existing homes.

30. Insulate. Save Energy.

Prepared by the Energy Conservation Division of the Electric and Gas Industries Association. Also *Save Energy - Cut Your Heating and Cooling Losses with Door and Window Weatherstrip*, prepared by the Home Economics Department of Pacific Gas and Electric Co. These are clearly and cleverly illustrated, very useful little pamphlets. They may be obtained from the local office of PG&E or by writing to the Energy Conservation and Services Department, Pacific Gas and Electric Company, 77 Beale Street, San Francisco, California 94106.

Free (pamphlets)

31. 350 Ways to Save Energy and Money in Your Home and Car

Henry R. Spies, Seichi Konzon, Jean Calvin, and Wayne Thoms, Crown Publishers, New York, 1974 (available through International Compendium -- see page 2). This is a marvelously descriptive book on all ways in which energy is used in the home and car. It is both instructive and helpful, approaching home energy use from the standpoint of human metabolism and comfort and humidity control.

\$3.95 (softback), 5-1/2 x 8, 198 pp.

32. Making the Most of Your Energy Dollars in Home Heating and Cooling

U.S. Department of Commerce, National Bureau of Standards, 1975. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 003-003-01446-0. This is a very simple but nicely laid out little document providing basic information on energy

conservation activities relevant to your specific home. Also included is a nice list of other inexpensive federal documents on energy conservation in the home.

\$.70 (softback), 8-1/2 x 11, 16 pp.

33. In the Bank . . . Or Up the Chimney? A Dollar and Cents Guide to Energy-Saving Home Improvements

Order from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 023-000-00297-3. This is a nicely descriptive, illustrated approach to home energy saving.

\$1.70 (softback), 8-1/2 x 11, 72 pp.

34. Keeping Warm for Half the Cost: The Complete Guide to Home Insulation

Phil Townsend and John Colesby, Prism Press, Stable Court, Chalmington, Dorchester, Dorset DT2 0HB, England, 1975 (available through American booksellers). This is a fine and extremely practical little book. Although it is written for homeowners in England, the techniques and solutions are completely applicable to the United States. It is well illustrated and nicely written.

\$3.95 (softback), 91 pp.

35. Homeowner's Energy Guide

John A. Murphy, Brockston Publishing Company, 1976. This is a more complete approach to home energy savings than the prior recommendations in that the principles of heat loss and the relationship of heat loss to local climate variables are explained and the reader is shown how to understand things like "R" and "U" values and how to calculate energy savings. The step-by-step analysis for the homeowner is extremely well done, in a chatty style, with many practical illustrations and photographs. Both solar systems and heat pumps are analyzed, and both come out looking economically bad in comparison with merely plugging the heat leaks of the home.

\$6.95 (softback), 8-1/2 x 11, 215 pp.

36. Your Home's Solar Potential

Irwin Spetgang and Malcolm Wells, Edmund Scientific Company, 7877 Edscorp Building, Barrington, New Jersey 08007, 1976. This is a very useful, step-by-step approach to the determination of the solar

potential of the home, but in view of the cost of *Solar for Your Present Home*, this seems to be expensive. For non-California users of this bibliography, obtaining both this and *Solar for Your Present Home* might be warranted with the latter carrying the home energy calculations much further and then specifically addressing the task of determining just what kind of solar retrofit might work best for the home.

\$9.95 (softback), 8-1/2 x 11, 60 pp.

*** 37. Solar for Your Present Home (San Francisco Bay Area Edition)**

Charles S. Barnaby, Philip Caesar, Bruce Wilcox, Lynn Nelson, 1977, published and distributed by the California State Energy Commission, Alternatives Implementation Division, 1111 Howe Avenue, Sacramento, California 95825. This is just an excellent book, with step-by-step practical information on estimating energy use and conservation potential in the home, on solar "prospecting" the home, on determining the most suitable solar retrofit approach (considering both active and passive possibilities), and then on estimating the performance and cost of the homeowner's decisions. This does not give the actual design details for the homeowner -- it is meant to be a decision-making manual -- but it does usefully lead the homeowner to those resources and/or persons who can convert the decisions into real projects, and it provides a great deal of very practical information. The geographic focus of this book limits the numerical analysis to the San Francisco Bay Area, but the "prospecting" techniques are certainly not local. For the time being, at least, this is probably the most useful solar retrofit document in the United States, and certainly worth the fairly small cost.

\$4.00 (softback), 8-1/2 x 11, 163 pp.

**VI. HELPFUL INFORMATION FOR THE BEGINNING
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While much of the information presented in the previous resources can certainly qualify as being practical and helpful for the beginning solar home builder, there are numerous books available that present more detailed analyses or that dwell on certain specific aspects of low-cost and/or energy-efficient shelter design and construction. There are also books available that describe solar system design in considerably more detail than the general overview approaches, as well as

books that help the homeowner select and purchase equipment. It is useful to group these separately in the following sections, so that the reader can see information of a specific nature.

A. Solar and Climate Data

The serious solar home designer or retrofitter or the serious solar student must certainly have access to local solar and climate data and know how these data influence solar home design. The responsibility for taking and tabulating such data falls on the National Oceanic and Atmospheric Administration (NOAA). State-by-state records are prepared on temperature, cloud cover, rain, snow, wind, and other weather data, and also often on solar radiation. These state tabulations may be obtained by sending 15¢ (for each state) to:

National Climatic Center
Federal Building
Asheville, North Carolina 28011

Recent recognition of the importance of certain kinds of weather data (e.g., monthly heating and cooling "degree days") and usefully tabulated solar data (e.g., measured insolation, including both direct and diffuse components, and tabulations for various collector tilts and orientations) has led to the publication of some extremely pertinent and helpful documents in easy-to-read and useful format. The following three recent documents are very good examples.

38. Climatic Atlas of the United States

U.S. Department of Commerce, Environmental Data Service, June 1978. This may be ordered from the National Climatic Center, Federal Building, Asheville, North Carolina 28011, Attention: Publications. This is a very nicely laid out, very large format collection of maps showing precipitation, average temperatures, average humidity, average winds, and other data for the entire United States, with tables of heating degree days, cloudiness, and solar insolation. While not as locally useful as Resources #39 and #40, this is a national document, and can be interpolated to provide at least a good guess as to the important design climate and solar variables in all U.S. climates.

\$6.00 (softback), 16 x 22, 80 pp.

39. California Sunshine — Solar Radiation Data

State of California, the Resources Agency, Department of Water Resources, Bulletin 187, May 1978. In a way, this useful document has been upstaged by Resource #40, but the price is certainly right(!) and this does contain information not to be found in #40. Published as a companion to Water Resources Bulletin 185, "Wind in California," this document first offers a summary of types of solar measurements, with an excellent bibliography, and then presents tables of average measured daily solar radiation (by months) for many stations in California. Rather than merely averaging the measurements, they are presented for each year as taken, and then often represented in corrected form to allow for instrumental variations. There are also tables of mean sky-cover, and of sunrise and sunset times for many California stations. It concludes with an excellent "Glossary of Solar Radiation Terms."

Free (softback), 8-1/2 x 11, 110 pp.

40. California Solar Data Manual

Paul Berdahl, Donald Grether, Marlo Martin, and Michael Wahlig, Solar Energy Group, Energy and Environment Division, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720, March 1978. This can be obtained from the project sponsor, the California Energy Commission, 1111 Howe Avenue, Sacramento, California 95825. This is a wonderfully useful book. Beginning with a fine, elementary explanation and guide to the solar zones and to solar radiation, the book then offers a guide to the data, along with a fine how-to description of determining local shadowing with sky charts. Solar data are presented for 19 stations, fewer than in Resource #38, but in a completely different manner. Of particular importance to the solar home designer are the month-by-month measurements of solar radiation (along with percent of possible sunshine and mean cloud cover), accompanied by calculations of solar radiation on tilted surfaces for various tilts and various orientations. A section on climate data for 36 stations in California is followed by separate tabulations for heating and cooling degree days, and by several useful appendices. This is an indispensable reference work for the California solar designer.

\$4.72 (softback), 8-1/2 x 11, 318 pp.

B. Principles of Energy-Efficient Home Design

It is assumed that the user of this bibliography now

understands solar energy, is familiar with basic solar design concepts, and has a good feeling for the ways in which these design concepts are being integrated into actual solar homes. If one wants to proceed to develop an actual solar home plan, it is important to understand very well the principles of energy-efficient shelter design, so that the maximum possible climate and comfort control can be achieved from the siting and structural elements of the buildings, and so that the design of the building itself can promote as much of the comfort control as possible. Of course, this is just a restatement of the principles of passive solar home design. But the following three references go into practical details of energy-efficient and earth-integrated design to a greater extent than the previously-listed resources. Included are considerations of making maximum use of locally available or recycled resources for the building of the home.

41. Your Energy-Efficient House: Building and Remodeling Ideas

Anthony Adams, Garden Way Publishing, Charlotte, Vermont 05445, 1975. This is another book of the same quality and clear, descriptively illustrated format as Resource #8. It takes the potential home builder on a step-by-step decision-making journey through site selection, climate awareness, siting for natural climate control, selecting space needs and configurations, and then determining appropriate styles for foundations, roofs, walls, windows (for both illumination and ventilation), and selecting appropriate vegetation to aid the climate control. This is presented in an extremely elementary format, but it is in no way insulting to the reader. It is an excellent primer to the conceptual development of the shelter.

\$4.95 (softback), 8-1/2 x 10, 118 pp.

42. Low-Cost Energy-Efficient Shelter for the Owner and Builder

Eugene Eccli, Ed., Rodale Press, Emmaus, Pennsylvania 18049, 1976. This is a remarkably fine extension of Resource #41 above, but of course this also stands alone. It duplicates much of Resource #41, but in more detail, while adding an emphasis on reducing costs and financing the construction, designing smaller houses that utilize space and materials more efficiently, recycling old buildings or using recycled materials, and balancing energy and aesthetic needs. Specific how-to-do-it construction details are given, again in a framework of cost-saving. The material then moves into the design of the "Solar-Tempered

speaking the same language. This is a must for the amateur, or inexperienced, builder.

\$15.00 (softback), 5-1/2 x 8-1/2, 599 pp.

45. Energy Design Manual for Residential Buildings

State of California Department of Housing and Community Development, Division of Codes and Standards, 1807 13th Street, Room 119, Sacramento, California 95814. The cost covers first-class postage, tax and handling, but be sure to include two self-addressed stick-on mailing labels with the order. This provides the specific California climatic and insulation standards, tabulated data, and step-by-step calculation examples for designing in conformance with the energy insulation standards adopted for residential building in the state, effective February 22, 1975. This is the required design input for California and a how-to-do-it manual of great worth.

\$3.43 (softback), 8-1/2 x 11, only \$2 with fourth-class mailing

*** 46. From the Ground Up: The Shelter Institute Guide to Building Your Own House**

John N. Cole and Charles Wing, in collaboration with the Shelter Institute, Bath, Maine; Atlantic Monthly Press Book, Little Brown and Company, Boston and Toronto, 1976. This is a marvelous book! I consider this necessary reading for the person seriously considering the design and construction of a home. While there is a little duplication with some of the climate and solar books listed earlier, this is important for the manner in which designing for climate and people are integrated. The section headings are "The Idea;" "The Land;" "The Materials;" "The Building." Subheadings include such tantalizers as "With Your Own Two Hands;" "Wonderful Wood;" "Nails;" "Foundations;" "Framing;" "Heating With Wood;" "Wiring;" "Plumbing;" "Light;" "Sound;" "Ventilation," etc. This book not only provides those practical details that are so mysterious for the beginning home designer (e.g., wiring for electrical code, plumbing to code) in an elementary and yet thorough fashion, it also provides the framework necessary for good design decision-making.

\$7.95 (softback), 8-1/2 x 11

47. The Owner-Built Home

Ken Kern, Charles Scribners Sons, New York, 1975. Written by a California architect and builder,

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this marvelous book perfectly supplements Resource #42 with an emphasis on inexpensive and/or earth-related materials and good, sound design and construction techniques.

\$6.95 (softback), 6 x 9, 374 pp.

48. Build Your Own Low-Cost Home

L. O. Anderson and Harold F. Zornig, Dover Publications, Inc., New York, 1972. Prepared under the auspices of the Department of Agriculture, this large format book contains "complete working drawings and specifications for eleven homes . . . with step-by-step construction information." In short, here are eleven examples of low-cost dwellings designed for living convenience, showing how to convert the designs into working drawings. The 55-page "Construction Manual" at the end is the clearest and most useful I have seen.

\$5.95 (softback), 11 x 19, 203 pp.

49. The Owner-Builder and the Code

Ken Kern, Ted Kogon, Rob Thallon, Owner-Builder Publications, P.O. Box 550, Oakhurst, California 93664, 1976. This is a highly readable account of many case histories of owner-built homes, documenting what it took to make them both livable and legal. It offers handy tidbits on how to scrounge inexpensive materials (including an appended "Demolition Agreement" with an appropriately legal liability disclaimer). Included is an account of the legal trials of United Stand, the group of Mendocino homeowners who were to be evicted from their owner-built homes in mid-winter. I suppose this is more of a "how to evade the uniform code" book than it is a "how to conform to the uniform code" book.

\$5.00 (paperback), 182 pp.

D. Some Solar System Nuts and Bolts

There are a number of publications available that provide very important design tips, valuable construction techniques and illustrations, and/or detailed solar system specifics. In addition, catalogs and indexes supplement the solar journals in providing where-to-buy-it information, while some commercial manuals offer very helpful information. A selection of these kinds of catalogs, manuals, and books follows.

50. Catalogs

- (a) **Solar Age Catalog: A Guide to Solar Energy Knowledge and Materials**
Editors of *Solar Age* magazine, Solar-Vision, Inc., 200 East Main Street, Port Jarvis, New York 12771, 1977. This is a very useful document, containing a large number of short, original essays on solar design particulars by the best in the field, interspersed with advertisements for hardware appropriate to the section topic. The main headings are: "Proper Building Design;" "Passive Solar Heat;" "Greenhouses;" "Components (Insulation, Glazing, Absorber Plates, Heat Exchangers and Heat Transfer Fluids);" "Subsystems (Storage, Flat Plate Collectors, Controls, Concentrating Collectors, Heat Pipes and Heat Pumps);" "Complete Systems;" "Photoconversion;" "Measurement and Data Collection;" "Comparative Data Tables;" "Performance Curves;" "Directory of Manufacturers;" "Resources Listings;" and "Directories of Wind and Wood Use Resources."
\$8.50 (softback), 8-1/2 x 11, 232 pp.
- (b) **Energy Primer: Solar, Water, Wind and Biofuels**
See Resource #9, this bibliography, for details. Published by the home of the *Whole Earth Catalog*, this book has many, many current ads for all of the subject areas of the title.
- (c) **A-Z Solar Products: Solar Energy Catalog**
A-Z Solar Products, 200 East 26th Street, Minneapolis, Minnesota 55404. Ask to go on their mailing list, for they claim that "A more comprehensive catalog will follow."
Free (softback), 8-1/2 x 11, 19 pp.
- (d) **Solar Research: Components for Solar Energy Systems, 1976**
Order from Refrigeration Research, Inc., 525 North Fifth Street, Brighton, Michigan 48116. This valuable catalog exploits the relationship of solar to refrigeration engineering by including heat pumps, chillers, condensers, and heat exchangers, along with complete solar-assisted hot water system kits.
Free (paper), 8-1/2 x 11, 21 pp.

Some commercial component manufacturers are also taking steps to stock related hardware, and/or to orient their sales manuals toward useful general design criteria. Two of these from manufacturers of solar system electronic controls are:
- (e) **Delta-T**
Order their advertising literature of July 1976 from Heliotope General, 3733 Kenora Drive, Spring Valley,

California 92077. They include heat-exchanger tanks, transformers, relays, pumps, valves, and a multi-channel electronic thermometer in summary form.

Free (one sheet, both sides), 8-1/2 x 11

— (f) **Rho Sigma Solar Energy Engineering and Product Catalog**

Order from Rho Sigma, Inc., 15150 Raymer Street, Van Nuys, California 91405. They'll send you a four-page description of their electronic controls and meters for free, or you can pay \$1.00 for a nicer version of the same, along with some useful engineering and system diagrams and discussions.

\$1.00 (softback), 8-1/2 x 11

51. **Industry Indexes**

— (a) **Solar Industry Index**

Solar Energy Industries Association, 1977. To order, send payment plus a self-addressed mailing label to *Solar Industry Index*, 1001 Connecticut Avenue, NW, Suite 632, Washington, D.C. 20036. Their literature on the *Index* includes the following: "A comprehensive guide to 237 manufacturers and service companies in the solar industry. Other sections cover passive, photovoltaic, wind, bioconversions and solar thermal energy systems. The *Index* also includes basic 'how-it-works' descriptions, discussions of life cycle costs and marketing projections, sources of public information and an SEIA member directory."

\$8.00

— (b) **Survey of the Emerging Solar Energy Industries**

Justin Bereny, Solar Energy Information Services, P.O. Box 204, San Mateo, California 94401, 1977. To order, add \$3.00 for postage and handling. California residents must also add \$3.60 tax. A brochure will be sent on request, describing the publication in detail. This is certainly an expensive book to include in the bibliography, but since it is the most comprehensive overview of solar energy activity in the United States, institutions, libraries, and businesses should certainly consider it. Six solar categories are indexed: heating, cooling, wind, biomass, ocean thermal, solar thermal electric, and photovoltaics. Also included are a company directory and a heating and cooling product and resource directory, plus a list of nationally contracted products.

\$60.00 (softback), 8-1/2 x 11, 405 pp.

52. ERDA's Pacific Regional Solar Heating Handbook

San Francisco Operations Office, in conjunction with Los Alamos Scientific Laboratory, March 1976. Order from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (or from Superintendent of Documents, Government Printing Office, Federal Office Building, 450 Golden Gate Avenue, San Francisco, California 94102, Stock No. 060-000-00247). It offers graphed results of computer calculations, very clearly presenting the dependence of solar system performance on variables such as tilt, orientation, flow rate, storage capacity and climate, to facilitate estimation of solar system size and performance under both optimal and non-optimal conditions. Although the book generally concentrates on the Pacific Region, the inclusion of data for Seattle, Washington, and Bismark, North Dakota, helps to make the conclusions broadly representative of most climates in the United States.

\$3.25 (softback), 8-1/2 x 11, 108 pp.

53. Solar Homes and Sun Heating

George Daniels, Harper and Row, 1976. Written by an author with many handyman and how-to-do-it books to his credit, this book lands right on the mark in meeting an obvious need. It is filled with step-by-step photographs following a very clear and simple theoretical description of home heating and insulation, getting energy from the sun, and building flat-plate collectors and heating systems.

\$8.95 (hardback), 178 pp.

54. Solar Heating System Design Manual

Prepared by Bell and Gossett Division, ITT Fluid Handling Division. I recommend that anyone considering the construction and installation of a hydronic (fluid) solar system for residential space heating get this document. It contains the most complete and useful discussions and diagrams I have seen of fluid flow systems and logic, pumps and controls, and general fluid system theory, on a technical, but not overly advanced, level. Order through ITT Fluid Handling Division, 4711 Golf Road, Skokie, Illinois 60076, or through their Training and Education Department, 8200 North Austin Avenue, Morton Grove, Illinois 60053.

\$2.50 (softback), 8-1/2 x 11

55. Solaron Corporation Application Engineering Manual

Solaron Corporation, 4850 Olive Street, Denver,

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Colorado 80022, 1976. I offer this here so that an air system can be represented in the form of a commercial manual, as a complement to the Bell and Gassett solar hydronic system manual of Resource #54. This is actually quite general, but also aids in the calculation of the numbers for air systems and rock-bed storage. The "Solaron Installation Procedures" supplement provides the real nuts-and-bolts end of this and should be requested at the same time.

\$15.00 (looseleaf notebook), 8-1/2 x 11, 45 pp.

56. How to Build a Solar Heater

Ted Lucas, Ward Ritchie Press, Pasadena, California, 1975. Available from the International Compendium (see page 2). This book is full of handy design and construction specifics, including: solar heaters, solar heating systems for houses, trailers, and pools; backyard barbecues; and even a very interesting presentation of solar-driven, thermal-electric plants on the residential scale. A mixed bag, broadly representative of the range of technological approaches.

\$4.95 (softback), 5 x 8-1/2, 236 pp.

57. An Inexpensive Economical Solar Heating System for Homes

Johnny W. Allred, Joseph M. Shinn, Jr., Cecil E. Kirby, and Sheridan R. Barringer, Langley Research Center, Report No. NASA TM X-3294, July 1976. Available through the National Technical Information Service, Springfield, Virginia 22161. This is a very simple but complete discussion of the basics, and then a complete design, including drawings and bill of materials, for a do-it-yourself collector construction (tube-on-sheet), including installation details. Even if you choose not to build precisely this system, it is an invaluable resource on the steps you should go through in developing your own design.

\$4.25 (softback), 8-1/2 x 11, 56 pp.

58. Build Your Own Solar Water Heater

Florida Conservation Foundation, Inc., 1976. Available from The International Compendium (see page 2). Detailed instructions and drawings on how to build a thermosyphon or pumped-water solar hot water system, including the construction of a serpentine flat-plate collector. Many useful illustrations of soldering, glazing, construction, and mounting particulars, making this a fine techniques manual.

\$4.00 (softback), 8-1/2 x 11, 25 pp.

E. Some Solar Greenhouse Nuts and Bolts

The concept of using greenhouses for home climate control was introduced in several of the Resources already presented (e.g., #21, 22, and 27, and particularly in #29). The following two books present more detailed information on the solar greenhouse, with a particular emphasis on the use of the greenhouse for growing food.

59. The Solar Greenhouse Book

James C. McCullagh, Editor, Rodale Press, Emmaus, Pennsylvania, 1978. This probably is the definitive book on solar greenhouses, including design, construction, and use. If this appears to duplicate my review of Resource #29 (Fisher and Yanda), one should note here that the specialty of this Rodale book is the greenhouse itself, including free-standing as well as attached designs, and with considerable emphasis on the use of the greenhouse for crop production. The solar home designer will find a chapter on using the greenhouse for space heating, "The Attached Greenhouse," along with useful appendices on automatic vent openers, solar greenhouse heat gain and loss calculations, and a fine "Assessment of Commercial Glazing Materials." This book is done in the clear and easy-to-read style we are accustomed to seeing from Rodale Press, with excellent line illustrations and a lot of black-and-white photos. The book is thorough and instructive. As such, this supplements very nicely the Fisher-Yanda book (Resource #29), so I recommend the pair to serious solar greenhouse designers.

\$10.95 (hardback), 328 pp.

60. How to Build Your Own Greenhouse

Elvin McDonald, Popular Library, New York, 1976. (Part of the Popular Library Gardening Series, Popular Library, P.O. Box 5755, Terre Haute, Indiana 47805.) The first five chapters deal with the construction of the greenhouse (and cold frames, hotbeds, and cutting boxes), while the remaining nine chapters cover greenhouse plants, including flowers, trees, shrubs, and ground covers, as well as food crops. This marvelously illustrated and detailed book provides a lot for the money.

\$1.50 (paperback, standard format), 318 pp.

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VII. ADVANCED BOOKS FOR THE SERIOUS SOLAR STUDENT

There are surprisingly few books presenting advanced engineering or architectural concepts regarding the use of solar energy for home and building thermal comfort. This indicates a fortunate aspect for the homeowner: it is generally sufficient to understand the application of solar energy at a fairly elementary level for the purpose of designing or retrofitting a solar home. The serious solar student may nevertheless be stimulated by his/her own interest to look further into the subject. The following resources are useful (and generally expensive) next steps for that person, either toward the engineering or toward the architectural aspects of solar thermal design.

A. Advanced Solar Energy Theory, Applications and Engineering

61. Energy — An Introduction to Physics

Robert H. Romer, W. H. Freeman and Company, San Francisco, 1976. This is actually not "advanced," as the section heading would suggest. But a brush-up on physics can certainly be helpful. This book takes an energy theme throughout, including explicit treatments of energy use and resources, environmental implications, and a good final chapter on "Solar Energy." In addition to the usual fingertip tables of units and conversion factors, there are appendices on U.S. energy use and fuels, solar energy, and many other useful but usually hard-to-find tables.

\$14.95 (hardback), 628 pp.

62. Efficient Use of Energy: A Physics Perspective

The APS Studies on the Technical Aspects of the More Efficient Use of Energy, AIP Conference Proceedings No. 25, American Institute of Physics, 1975 (available through International Compendium — see p. 2). This is included here for the technical- or physical-science-inclined person who would like a better handle on the physics perspective of energy use and conservation. It is a very useful theoretical treatise, with particular value in such areas as "Second-Law Efficiency: The Role of the Second Law of

Thermodynamics in Assessing the Efficiency of Energy Use," "Window Systems and Climate Control Performance," and "Infrared-Reflecting Selective Surface Materials Which Can Be Useful for Architectural and/or Solar Heat Collector Windows." There is also a major section on "The Role of Physics in Combustion," which makes this book a nice technical companion to Resource #31.

\$20.00 (hardback), 304 pp.

63. Elementary Heat Transfer Analysis

Stephen Witaker, Pergamon Unified Engineering Series, Pergamon Press, Inc., New York, 1976. This book can be purchased from International Compendium (see p. 2). This is not a solar book as such, but a physics text so specific and useful for the serious solar system thermal designer that I should like to list it. This is mathematical stuff, but it involves everything one might want to know about heat transfer in static and flowing-fluid circumstances. Even if much of the mathematics is beyond the reader, the conclusions and illustrations are accessible.

\$22.50 (softback), 8-1/2 x 11, 369 pp.

64. Solar Energy Utilization for Heating and Cooling

John I. Yellot, Chapter 59 of the 1974 edition, Applications Volume, of the ASHRAE Guide and Data Book Series. Reproduced by the National Technical Information Service for separate distribution, PB-245 592 (National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22151). This is a very instructive reprint, sufficiently technical to be interesting, yet not at all too technical for the average reader. Each section is a brief and concise description and short analysis, including solar radiation, the technology of solar radiation collectors, cooling by nocturnal radiation and evaporation, and solar heating and cooling systems. In many ways this is the best short introduction that I have encountered.

\$4.00 (paper cover), 8-1/2 x 11, 20 pp.

65. Solar Energy: Fundamentals in Building Design

Bruce Anderson, McGraw-Hill Book Company, 1977. Written by the principal author of Resource #22, this book follows the same logical development of principles from passive through active applications of solar energy to the home. Where this differs is in a lesser emphasis on architectural and "doing" aspects of the subject, for a greater emphasis on easily

comprehended technical descriptions. It goes into considerably greater detail regarding the theory of flat-plate collectors, for example, than does Resource #22. While this is perhaps more of the typical textbook format that one might expect college students to use for an introduction to the subject (and it is indeed very suitable for that purpose), I find that Resource #22 accomplishes just about as much technically while giving the student a much firmer intuitive grasp of what the theory is really all about. Still, in the interest of this section of this bibliography, Anderson's textbook provides more thorough coverage of sufficient aspects to make it worthwhile reading for the student who has already read Resource #22.

\$22.50 (hardback), 374 pp.

66. **Solar Heating and Cooling Systems: Engineering, Practical Design, and Economics**

Jan F. Kreider and Frank Kreith, McGraw-Hill Book Company, 1975. This is the most widely used -- and, I suspect, also the most vigorously marketed -- book focusing quantitatively on solar heating and cooling of buildings. The first part contains the usual fundamentals of heat transfer and solar energy collection, while the rest applies these principles to buildings and hardware. Written so that much can be learned by the person with little technical background.

\$22.50 (hardback), 386 pp.

67. **Solar Energy Thermal Processes**

John A. Duffie and William A. Beckman, Wiley Interscience Publishing Company, 1974. Written for professionals and engineers, this book supplements the others (especially Resource #66) by going into considerably greater mathematical detail. This is already beyond the intended scope of this bibliography section (i.e., to reveal the next step for the interested solar student, but it is a very interesting book and demonstrates the theoretical level toward which the serious solar engineer should aspire. It is well beyond the necessary scope for the home or building designer.

\$19.00 (hardback), 386 pp.

68. **Solar Heating Design: By the F-Chart Method**

William A. Beckman, Sanford A. Klein, and John A. Duffie, John Wiley & Sons, 1977. This is a very nicely done mid-college-level approach to mathematical methods for designing active solar systems. The f-chart method yields many of the benefits of computer

simulations without requiring more than exponential functions, easily evaluated with the aid of small calculators. "The result," as the book says, "is a simple method requiring only monthly average meteorological data which can be used to estimate the long-term thermal performance of solar heating systems as a function of the major system design parameters. Combined with costs and meteorological data for the location in question, the f-charts provide a method by which architects and heating engineers can easily determine the thermal performance of solar heating systems, and thus optimize solar heating system designs in the light of costs."

\$14.95 (hardback), 200 pp.

B. Advanced Architectural Concepts

69. Architecture and Energy (Conserving Energy Through Rational Design)

Richard G. Stein, Anchor Press/Doubleday, Garden City, New York, 1977. This is a sensitive treatise of the major relationships between energy and building design, thoroughly professional in its particulars, and yet broadly philosophic in its intent.

\$12.95 (hardback), 322 pp.

70. Solar Control and Shading Devices

Aladar Olgyay and Victor Olgyay, Princeton University Press, Princeton, New Jersey, 1976. This is one of those books that is not only thoroughly instructive in its subject (in this case I believe it to be the definitive working treatise on shading devices for buildings), but is also a marvelous experience for the reader. Graphical methods (as opposed to computer methods) for calculating sun paths and shading are carefully developed, following their introductory "bioclimatic" approach to design. These methods are then applied to many examples, with a concluding section of over one hundred photographed examples of solar-control devices.

\$7.50 (softback), 8-1/2 x 11, 201 pp.

71. Design with Climate: Bioclimatic Approach to Architectural Regionalism

Victor Olgyay, Princeton University Press, Princeton, New Jersey, 1963 (available through the International Compendium -- see page 2). This is an expensive but outstanding book with beautiful

ADVANCED BOOKS FOR THE SERIOUS STUDENT

illustrations and layout. It carries the reader step by step, both intuitively and analytically, through a basic climatic approach to design, through interpretation of the design using architectural principles, and finally to application. It begins with animal and insect architecture along with human comfort and shelter, evolves through site and form, and discusses "heliothermic planning." There are calculations of temperature distributions over light and dark surfaces with respect to their orientation toward the sun, and photographs of air flow around models of buildings. Fascinating and instructive.

\$28.50 (hardback), 8-1/2 x 11, 190 pp.

VIII. KEEPING UP WITH SOLAR DEVELOPMENTS

It is important that those wishing to employ solar energy in their own lives keep abreast of developments in the field and in their locale, as well as of evolving policy, codes, and standards. This is best accomplished by joining the local solar energy society and subscribing to the best journals. Some suggestions follow:

A. Solar Energy Societies and Organizations

(a) American Section of the International Solar Energy Society

Solar energy professionals have organized on a worldwide scale, with each member nation serving as a section. The parent organization is the International Solar Energy Society (ISES). Full membership is \$20, student is \$12. To belong to the American Section (AS/ISES), one must pay \$25, for a full membership, or \$12 for students. One can belong to either, but membership in both is the usual route, with a full combined membership (ISES and AS/ISES) amounting to \$40, or \$21 for students. Membership in ISES (or combined membership) entitles the member to the quarterly issues of the professional journal, *Solar Energy—The Journal of Solar Energy Science and Technology*, along with the more popular-level *Sun World*. Members of the American Section also receive the U.S.-oriented *Solar News and Views*, along with the very interesting and informative magazine, *Solar Age*. Furthermore, membership in both organizations (ISES and AS/ISES) leads to very low-cost opportunities to purchase the proceedings of the national and international conferences, an excellent way to keep up

with the field. Membership applications are to be addressed to American Section, ISES, American Technological University, P.O. Box 1416, Killeen, Texas 76541 -- phone (817) 526-1300.

— **(b) The Northern California Solar Energy Association**

Inquiries and membership applications should be addressed to the Office of the Secretary, NCSEA, P.O. Box 1056, Mountain View, California 94042. Regular Member, \$10/year; Student Member, \$5/year; Corporate Member, \$50/year.

— **(c) The Southern California Solar Energy Association**

Inquiries and membership applications should be addressed to Secretary, SCSEA, San Diego City Administration Building, 202 "C" Street, Room 511B, San Diego, California 92101. Regular Member, \$15/year; Student Member, \$7/year; Corporate Member, \$50/year; Associate Member, \$10/year.

— **(d) Other Regional Solar Energy Associations
(and Newsletters)**

A listing of all regional Solar Energy Associations is offered in a one-page handout by the International Solar Energy Society. Request it from the American Section, ISES, American Technological University, P.O. Box 1416, Killeen, Texas 76541 -- phone (817) 526-1300.

— **(e) Solar Energy Advocates**

This is the organization that lobbies on behalf of solar energy legislation in California. With an office (shared with SUNRAE) in Sacramento, they provide a very important service to the solar community. For information and/or membership, write to Solar Energy Advocates, P.O. Box 876, Sacramento, California 95814 -- Telephone (916) 446-2012. Membership fees: business, \$240.00; individual, \$100.00.

— **(f) SUNRAE**

San Francisco Bay Area: 5628-A Locksley, Oakland, California 94618 (they also have a Sacramento area representative at 2317 Elendil Lane, Davis, California 95616, as well as Santa Barbara area and Los Angeles/San Diego area representatives). This group promotes solar energy applications and legislation, provides solar-supporting turn-outs at public meetings, and develops and distributes informative lists, such as their "List of California Solar Manufacturers."

KEEPING UP WITH SOLAR DEVELOPMENTS

B. Solar Journals

— **(a) Solar Energy — The Journal of Solar Energy Science and Technology**

The international professional magazine of solar energy research, available with a membership in the International Solar Energy Society (see part A of this section for details, or write to the American Section, ISES, American Technological University, P.O. Box 1416, Killeen, Texas 76541).

— **(b) Sun World**

A popular-level, well-illustrated journal reviewing various solar activities and subjects on the international scene, available with a membership in the International Solar Energy Society (see above for address).

— **(c) Solar Age**

The journal of the American Section of the International Solar Energy Society available with a membership in AS/ISES, but also available by separate subscription from Solar-Vision, Inc., 200 East Main Street, Port Jarvis, New York 12771. This offers very interesting and current reading in all areas of solar energy applications, research, marketing, legislation, and policy. \$20 a year (monthly).

— **(d) Solar Engineering**

This publication is perhaps the most useful journal available, with concise, up-to-date news, pictures and descriptions, and also carries probably the most complete advertising of any solar journal. It is available with a membership in the Solar Energy Industries Association, but it is also separately available by subscription to Solar Engineering Publishers, Inc., 8435 N. Stemmons Freeway, Suite 880, Dallas, Texas 75247. \$15 a year (monthly).

— **(e) Solar Heating and Cooling**

This journal contains summary articles on solar heating and cooling. It is primarily aimed at manufacturers and builders, but has much interest for the average solar person. Gordon Publications, P.O. Box 2126-R, Morristown, New Hampshire 07960. \$6 a year (bimonthly).

— **(f) Solar Energy Digest**

P.O. Box 17776, San Diego, California 92117. This is a chatty, informative (and expensive) newsletter, aimed at a broad readership. It includes a calendar of solar events. \$28 a year (monthly).

(g) Solar Utilization News

Published quarterly by the Alternate Energy Institute, P.O. Box 3100, Estes Park, Colorado 80517 (begun with Spring/Summer 1976 issue). This is full of interesting news notes, patent descriptions, and references. \$8 a year (monthly).

(h) Solar Energy Update

U.S. Department of Energy monthly bulletin, abstracting and indexing current publications on solar science and technology, including development and demonstration. Available through the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. \$27.50 a year (monthly).

(i) State Energy Commission Newsletter

Published by the Office of Information and Education, 1111 Howe Avenue, Sacramento, California 95825. This is the best way to keep up with the Energy Commission and with Commission R & D activities, including solar. Free.

C. Solar Codes and Standards

It is not possible to include a section on solar codes and standards just at the time that they are being promulgated and adopted on a state-wide basis. (The need to implement California's new 55-percent solar tax credit will require that solar standards be adopted during 1978). The solar home builder needs to be aware of the potential impact that such standards may have on solar home design flexibility, especially if the current trend toward proscriptive standards remains (particularly regarding glazing) rather than the more sensible performance standards. The potential solar home builder is urged to read Resource #49 (*The Owner-Builder and the Code*) to be forewarned. Some approaches toward technical solar energy codes have been adopted by professional trade associations. One example is listed below for the interested user of this bibliography:

72. Heating and Air Conditioning Systems Installation Standards for One and Two Family Dwellings and Multifamily Housing Including Solar

The Better Heating and Cooling Bureau, Sheet Metal and Air Conditioning Contractors' National Association, Inc., 8224 Old Courthouse Road, Tysons Corner, Vienna, Virginia 22180. Their code description

covers basic architectural considerations for energy equipment selection and construction, followed by standards for equipment installation, controls and control systems, duct construction and installation, insulation, thermal storage, chimneys and venting systems, air cleaning devices, sound considerations, and electric wiring. Included also are recommended standards for corrosion treatment, swimming pool heating with solar, domestic water heating with solar, plus useful worksheets and appendices.

\$10.00 (paperback), 8-1/2 x 11, 102 pp.

KEEPING UP WITH SOLAR DEVELOPMENTS



Reprinted from *Solar Control and Shading Devices* by Aladar and Victor Olgyay.