FREE PULL-OUT CATALOG

24 PAGE KAVA REVIEW • HERBS FOR ANXIETY

HERBALGRAM

The Journal of the American Botanical Council and the Herb Research Foundation



KAVA: HERB OF THE PACIFIC PARADISE

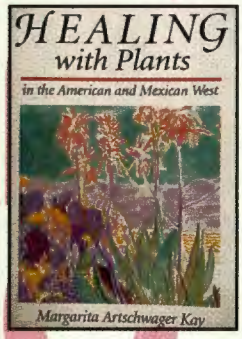
CAN $6.95 USA $5.95

39

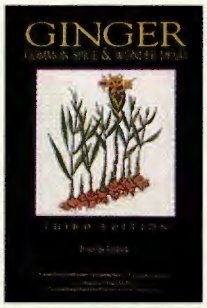
0 74470 81379 8

NUMBER 39

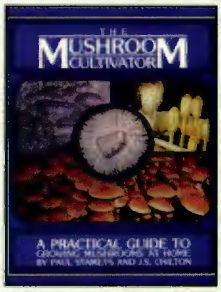
New Additions to ABC's Herbal Education Catalog



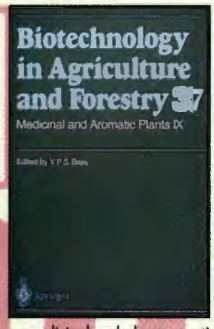
HEALING WITH PLANTS IN THE AMERICAN AND MEXICAN WEST
by Margarita Kay. 1996. Descriptions of 100 plants including botanical and common plant names, history, contemporary uses, a description of how the plant is prepared and administered, and brief phytochemical data. Softcover. 315 pp. $19.95. #B229



GINGER: COMMON SPICE AND WONDER DRUG
by Paul Schulick. 1996. Comprehensive review supported by hundreds of scientific references that links the claims of the ancient herbals to the extensive findings of international scientific research. Softcover. 165 pp. $9.95. #B233



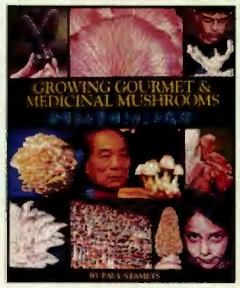
THE MUSHROOM CULTIVATOR
by Paul Stamets and J. S. Chilton. 1983. Detailed growth requirements for 15 mushroom species, sterile culture and mushroom spawn preparation techniques, procedures for strain selection and development, practical preparation methods for compost and bulk substrates, mushroom life cycle and genetics, identification of the major competitor molds, pathogens and pests, and guidelines for the construction of mushroom growing rooms. Softcover. 413 pp. $29.95. #B237



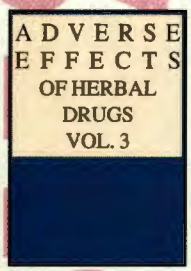
BIOTECHNOLOGY IN AGRICULTURE AND FORESTRY 37: MEDICINAL AND AROMATIC PLANTS IX
Ed. by Y. P. S. Bajaj. 1996. Survey of the recent literature on distribution, importance, conventional propagation, micropropogation, tissue culture studies and the *in vitro* production of important medicinal and pharmaceutical compounds in various species. Hardcover. 414 pp. $339. #B230



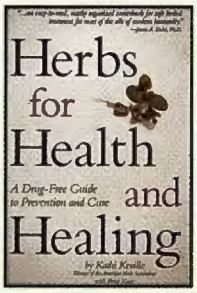
EDIBLE AND MEDICINAL PLANTS OF THE GREAT LAKES REGION
by Thomas Naegele. 1996. Describes over 150 plants commonly found in the Great Lakes area, including detailed drawings, preparation techniques, related medical uses, edible qualities, chemical breakdown, poisonous aspects, and commercial value, if any. Also features over 70 tables, organized by ailment, that list the plants known to cure specific symptoms. Softcover. 423 pp. $18.95. #B234



GROWING GOURMET AND MEDICINAL MUSHROOMS
by Paul Stamets. 1993. Detailed growth parameters for 25 mushroom species, mycological landscaping, state-of-the-art production techniques for home and commercial cultivation, permaculture with mushrooms, trouble-shooting guide, laboratory and growing room construction, and mushroom recipes. Softcover. 552 pp. $39.95. #B238



ADVERSE EFFECTS OF HERBAL DRUGS VOL. 3
by De Smet, Keller, Hansel, and Chandler. 1997. Eighteen comprehensive monographs about specific medicinal herbs and plant constituents important for their prominent place in phytotherapy (e.g., *Valeriana* spp.), clinical expectations about therapeutic potential (e.g., *Tripterygium* spp.), and recent concern about a serious adverse reaction (e.g., *Teucrium chamaedrys*). Softcover. 250 pp. $74.95. #B231



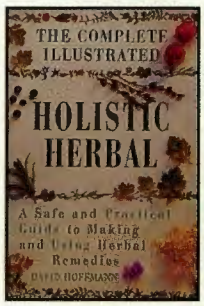
HERBS FOR HEALTH AND HEALING
by Kathi Keville. 1996. Herbal formulas for many health problems arranged by bodily systems, instructions on how to make preparations, discussion of specific herbs for women's, men's, and children's health issues, herbal first aid, cautions and considerations, aromatherapy, skin and hair care, and cooking with herbs. Hardcover. 374 pp. $27.95. #B235



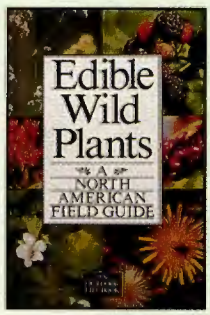
CRC HANDBOOK OF MEDICINAL MINTS (AROMATHEMATICS) PHYTOCHEMICALS AND BIOLOGICAL ACTIVITIES
by Stephen Beckstrom-Sternberg and James A. Duke. 1996. More than 500 references on 10,839 chemicals from 251 assays of 205 unique taxa, combined with 3,324 biological activities, and 256 recommended daily allowances and lethal doses. A valuable resource for assessing the potential medicinal value of a particular species. Hardcover. 458 pp. $129.95. #B239



HERBS FOR YOUR HEALTH
by Steven Foster. 1996. Designed as a quick reference guide to the 50 most commonly used herbs available in the U.S. as dietary supplements. Profiles include common and botanical name, brief history of traditional uses, summary of credible scientific reports, brief descriptions of conditions and symptoms the herb treats, forms in which it is available in the U.S., actions, dosage, cautions or contraindications, and photograph. Softcover. 121 pp. $9.95. #B232



THE COMPLETE ILLUSTRATED HOLISTIC HERBAL
by David Hoffmann. 1996. Covers treatment of a wide range of complaints and diseases, gathering herbs and preparing remedies, alphabetical herbal featuring more than 200 herbs, and over 300 full-color pictures. Softcover. 256 pp. $18.95. #B236



EDIBLE WILD PLANTS: A NORTH AMERICAN FIELD GUIDE
by Thomas Elias and Peter Dykeman. 1990. Comprehensive, precise, and filled with drawings, maps, and nearly 400 photographs, this is a superior guide to identifying, harvesting, and preparing over 200 healthful plants from the wild. Softcover. 286 pp. $14.95. #B240

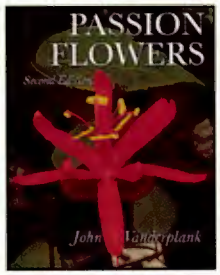
Credit card holders order toll free 800/373-7105 or fax 512/331-1924; for questions call 512/331-8868.



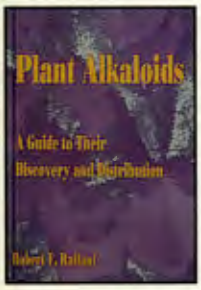
WILD PLANTS OF THE PUEBLO PROVINCE
by William Dunmire and Gail Tierney. 1995. A chronicle of plant uses that encompasses all of the traditional territory of the nineteen modern pueblos of New Mexico, centering in the middle Rio Grande Valley. Documents the prehistoric, historic, and contemporary uses of 300 species of southwestern flora. Softcover. 289 pp. $22.50. #B241



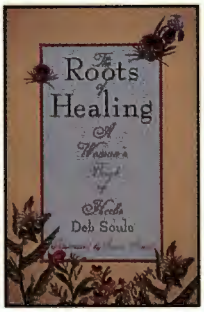
AROMATHERAPY: SCENT AND PSYCHE
by Peter and Kate Damian. 1995. With a thorough exposition of the ancient practice of aromatics in China, India, Persia, and Egypt and a modern scientific understanding of the psychology of scent, and based on research, clinical studies, and the authors' professional experience, this book is a guide to mastering the use of essential oils. Includes profiles for 44 essential oils and specific instructions for creating blends. Softcover. 244 pp. $16.95. #B245



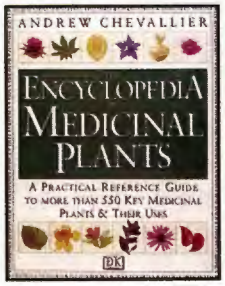
PASSION FLOWERS
by John Vanderplank. 1996. 2nd edition. The most comprehensive and beautifully illustrated guide to this spectacular genus ever published. Documents over 150 species, including important changes to the toxonomy, sections on cultivation and hybridization, an identification key, more than 100 leaf drawings, and 120 color photographs. Hardcover. 224 pp. $40. #B249



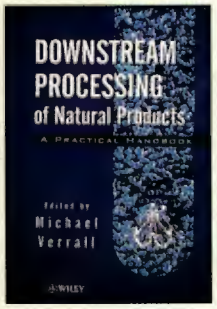
PLANT ALKALOIDS: A GUIDE TO THEIR DISCOVERY AND DISTRIBUTION
by Robert Raffauf. 1996. Positive and negative results obtained in the screening for alkaloids of more than 20,000 plant species (approximately 400 genera of plants found primarily in zones beneath 45º N Latitude) in a 40-year search for new medicinal agents and other pharmacological substances. Hardcover. 298 pp. $69.95. #B242



THE ROOTS OF HEALING
by Deb Soule. 1995. Designed especially for women of all ages, and written from the author's personal perspective as an herbalist and feminist, this book provides herbal remedies passed down over the years in the form of tinctures, tonics, and teas for a large variety of women's health concerns. Simple and practical herbal guidelines along with an extensive resources section make this an invaluable asset for anyone interested in the historical and current use of herbs for women's health issues. Softcover. 306 pp. $12.95. #B246



THE ENCYCLOPEDIA OF MEDICINAL PLANTS
by Andrew Chevallier. 1996. Profiles more than 550 key medicinal plants, systematically detoiling their history, cultivation, key constituents and actions, research, and traditional and current uses. Shows how to make different types of herbal preparations and recommends safe, effective remedies for a wide range of common health problems. Full-color illustrations throughout. Hardcover. 336 pp. $39.95. #B250



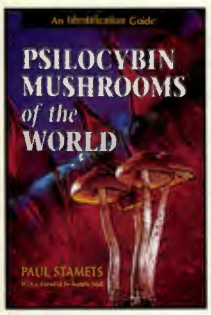
DOWNSTREAM PROCESSING OF NATURAL PRODUCTS: A PRACTICAL HANDBOOK
Ed. By Michael Verrall. 1996. Guides researchers and industrial workers through the potential pitfalls of natural product isolation; presents state-of-the-art techniques and observations; covers the three main stages of natural product purification, namely release, capture, and purification; covers proteins and secondary metabolites; special mention of the Good Manufacturing Practice requirements; provides practical guidance on scale-up procedures and process scale instrumentation. Hardcover. 354 pp. $84.95. #B243



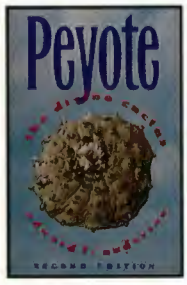
ZULU MEDICINAL PLANTS: AN INVENTORY
Compiled by Hutchings, Scott, Lewis, and Cunningham. 1996. Covers more than 1,000 plants based on a survey of the literature from the late nineteenth century to the present. Includes updated botanical names, synonyms, common English and Afrikaans names, an extensive list of Zulu names, data on the medicinal usage of the plants by the Zulu and other ethnic groups, known physiological effects, chemical compounds, and biological properties. Softcover. 450 pp. $114.95. #B247



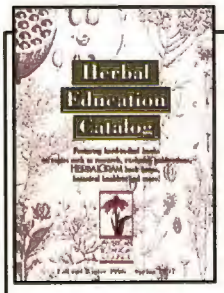
HANDBOOK OF NONPRESCRIPTION DRUGS and NONPRESCRIPTION PRODUCTS: FORMULATIONS AND FEATURES
'96-97 (2 volume set) 11th edition. 1996. Worldwide standard on nonprescription pharmacotherapy, providing pharmacists and pharmacy students with definitive, current information about patient self-care. Now with an extensive chapter on herbs and phytomedicinal products written by Varro Tyler and Steven Foster. Discusses chemical constituents, physiologic activity and therapeutic use, precautions, and dosage of more than 30 of the most commonly used medicinal plants. Hardcover (Vol. 1). 774 pp. Softcover (Vol. 2). 447 pp. $130./set. #B251



PSILOCYBIN MUSHROOMS OF THE WORLD: A GUIDE TO IDENTIFICATION
by Paul Stamets. 1996. Nearly 100 species are described, including close relatives and poisonous look-alikes. Far more than just a field guide, this book will prove useful to mycologists, scholars, physicians, and the curious. Excellent color photographs. Softcover. 243 pp. $24.95. #B244



PEYOTE: THE DIVINE CACTUS
by Edward Anderson. 1996. 2nd edition. Addresses the ceremonial and medicinal uses of peyote in the U.S. and Mexico, along with the legal aspects of this use, as well as the pharmacology, chemistry, and botany of the plant. Softcover. 272 pp. $19.95. #B248



For reviews of certain books on this page, see pages 74-78 of this ***HerbalGram***. For a listing of over 250 other books, publications, videos and software packages, see the Herbal Education Catalog in the center of this issue of ***HerbalGram***. Or send $2.50 for a Catalog with your name and address to American Botanical Council, P.O. Box 201660, Austin, TX 78720.

Credit card holders order toll free 800/373-7105 or fax 512/331-1924; for questions call 512/331-8868.

ADVISORY BOARDS

Each issue of HerbalGram is peer reviewed by various members of our Advisory Boards prior to publication.

American Botanical Council

Dennis V. C. Awang, Ph.D., F.C.I.C., MediPlant Natural Products Consulting Services, Ottawa, Ontario, Canada

Manuel F. Balandrin, R.Ph., Ph.D., Research Scientist, NPS Pharmaceuticals, Salt Lake City, Utah

Michael J. Balick, Ph.D., Director of the Institute of Economic Botany, the New York Botanical Gorden, Bronx, New York

Joseph M. Betz, Ph.D., Reseorch Chemist, Center for Food Safety and Applied Nutrition, Division of Natural Products, Food and Drug Administration, Washington, D.C.

Donald J. Brown, N.D., Director, Natural Products Research Consultants; Faculty, Bastyr University, Seattle, Washington

Thomas J. Carlson, M.S., M.D., Senior Director, Ethnobiomedical Field Research, Shaman Pharmaceuticals, South San Francisco, California

Jean Carper, Author and syndicated columnist, Washington, D.C.

Jerry Cott, Ph.D., Chief of Pharmacological Treatment Research Program, National Institute of Mental Health, Rockville, Maryland

Paul Alan Cox, Ph.D., Professor of Botany and Dean of General Education and Honors, Brigham Young University, Provo, Utah

Lyle E. Craker, Ph.D., Professor, Department of Plant and Soil Sciences, University of Massachusetts, Amherst, Massachusetts

Edward M. Croom, Jr., Ph.D., Coordinator, Phytomedicine Project, National Center for the Development of Natural Products, University of Mississippi, Oxford, Mississippi

Wade Davis, Ph.D., Author, ethnobotanist, Washington, D.C.

Steven Dentali, Ph.D., Natural Products Consultant, Portland, Oregon

Hardy Eshbaugh, Ph.D., Professor of Botany & Assistant Curator, Willard Sherman Turrell Herbarium, Miami University, Oxford, Ohio

Steven Foster, Botanist, photographer, author, Fayetteville, Arkansas

Christopher Hobbs L.Ac., AHG, Herbalist, botanist, licensed acupuncturist, Santa Cruz, California

David Haffmann, B. Sc., M.N.I.M.H., Medical herbalist, Santa Rosa, California

Maurice M. Iwu, Ph.D., Bioresources Development and Conservation Program, Senior Research Associate at the Division of Experimental Therapeutics, Walter Reed Army Institute of Research, Washington, D.C.

Steven King, Ph.D., Senior Vice President of Ethnobotony and Conservation, Shaman Pharmaceuticals, South San Francisco, California

Fredi Kronenberg, Ph.D., Director, Rosenthal Center for Alternative/Complementary Medicine, College of Physicians & Surgeons of Columbia University, New York, New York

Tom Mabry, Ph.D., Professor of Plant Biochemistry, Department of Botany, University of Texas at Austin, Austin, Texas

Gail B. Mahady, Ph.D., Research Assistant Professor, Department of Medical Chemistry & Pharmacognosy, College of Pharmacy, University of Illinois, Chicago, Illinois

Robin J. Marles, Ph.D., Associate Professor of Botany, Brandon University, Brandon, Manitoba, Canada

Dennis J. McKenna, Ph.D., Consulting Ethnopharmacologist, Minneapolis, Minnesota

Daniel E. Moerman, Ph.D., William E. Stirton Professor of Anthropology, University of Michigan/Dearborn, Dearborn, Michigan

Samuel W. Page, Ph.D., Director, Division of Natural Products, Center for Food Safety and Applied Nutrition, Food and Drug Administration, Washington, D.C.

Joseph E. Pizzorno, Jr., N.D., President, Bastyr University, Seattle, Washington

Mark J. Plotkin, Ph.D., Author, Executive Director, Ethnobotany and Conservation Team, Arlington, Virginia

Eloy Rodriguez, Ph.D., James Perkins Professor of Environmental Studies, School of Agriculture & Life Sciences, Cornell University, Ithaca, New York

James E. Simon, Ph.D., Professor of Horticulture and Research Director, Center for New Crops & Plant Products, Purdue University, West Lafayette, Indiana

Beryl Simpson, Ph.D., C. L. Lundell Professor of Botany, Department of Botany, University of Texas at Austin, Austin, Texas

S. H. Sohmer, Ph.D., President and Director, Botanical Research Institute of Texas, Fort Worth, Texas

Barbara N. Timmermann, Ph.D., Professor of Pharmacology & Toxicology, College of Pharmacy, University of Arizona, Tucson, Arizona

G. H. Neil Towers, Ph.D., Professor Emeritus, F. R. S. C., Botany Department, University of British Columbia, Vancouver, British Columbia, Canada

Arthur O. Tucker, Ph.D., Research Professor of Agriculture and Natural Resources, Delaware State University, Dover, Delaware

Nancy Turner, Ph.D., Professor and Ethnobotanist, Environmental Studies Program, University of Victoria, Victoria, British Columbia, Canada

Andrew T. Weil, M.D., Author, Director of the Program in Integrative Medicine and Associate Director of the Division of Social Perspectives in Medicine of the College of Medicine, University of Arizona, Tucson, Arizona

ad hoc advisor:

David M. Eisenberg, M.D., Director, Center for Alternative Medicine Research, Beth Israel Hospital/Harvard Medical School, Boston, Massachusetts

Herb Research Foundation

Rob McCaleb, President

Glenn Appelt, Ph.D., Professor of Pharmacology, University of Colorado, Boulder

John A. Beutler, Ph.D., Natural Products Chemist, National Concer Institute

Robert A. Bye, Jr., Ph.D., Professor of Ethnobotany, National University of Mexico

Subhuti Dharmananda, Ph.D., Director, Institute for Traditional Medicine and Preventive Health Care

James A. Duke, Ph.D., Economic Botanist, (U.S.D.A., ret.), Herbal Vineyard, Fulton, Maryland

Norman R. Farnsworth, Ph.D., Research Professor of Pharmacognasy, Program for Collaborative Research in the Pharmaceutical Sciences, and Senior University Scholar, University of Illinois at Chicago

Richard I. Ford, Ph.D., Professor of Ethnobotany, University of Michigan

Harriet Kuhnlein, Ph.D., Professor of Nutrition, McGill University

Albert Leung, Ph.D., Pharmacognasist, Glen Rock, New Jersey

Walter Lewis, Ph.D., Professor of Biology, Washington University

Ara Der Marderosian, Ph.D., Professor of Pharmacognosy, Philadelphia College of Pharmacy and Science

James D. McChesney, Ph.D., V.P. Natural Products Chemistry, NaPro Bio Therapeutics, Boulder, Colorado

C. Dwayne Ogzewalla, Ph.D., Professor of Pharmacognosy, University of Cincinnati

Robert Rountree, M.D., Physician, Boulder, Colorado

James Ruth, Ph.D., Professor of Medicinal Chemistry, University of Colorado

E. John Staba, Ph.D., Professor of Pharmacognosy, University of Minnesota

Varro E. Tyler, Ph.D., Dean and Distinguished Professor of Pharmacognosy Emeritus, School of Pharmacy and Pharmaceutical Sciences, Purdue University

Phil Weber, M.D., Physician, Boulder, Colorado

Andrew Weil, M.D., Physician and Author, Tucson, Arizona

AMERICAN BOTANICAL COUNCIL

Board of Trustees

Mark Blumenthal, Executive Director

James A. Duke, Ph.D., Economic Botanist/Author, (USDA, ret.), Fulton, Maryland

Norman R. Farnsworth, Ph.D., Research Professor of Pharmacognosy, Program for Collaborative Research in the Pharmaceutical Sciences, University of Illinois at Chicago

Varro E. Tyler, Ph.D., Sc.D., Dean and Distinguished Professor of Pharmacognosy Emeritus, School of Pharmacy and Pharmaceutical Sciences, Purdue University

HERBALGRAM

The Journal of the American Botanical Council and the Herb Research Foundation

Mark Blumenthal **Editor/Publisher**
Barbara Johnston **Managing Editor**
Rob McCaleb **Technical Editor**
Ginger Hudson-Maffei **Art Director**
Steven Foster **Associate Editor**
Ginger Webb **Staff Writer**

Contributing Editors

Dennis V. C. Awang, Ph.D.
Wayne Armstrong
Karen Dean
James A. Duke, Ph.D.
Norman R. Farnsworth, Ph.D.
Christopher Hobbs
Steven R. King, Ph.D.
Peter Landes
Albert Y. Leung, Ph.D.
Ara Der Marderosian, Ph.D.
Varro E. Tyler, Ph.D.
Andrew T. Weil, M.D.

Subscription/Classified Advertising Manager
Margaret Wright

Wali Stopher **Copy Editor**
Karen Newton **Editorial Assistant**

Chief Administrative Officer
Wayne Silverman, Ph.D.

Linda Prudhomme **Receptionist**
Vickie Adams **Administration**
Joni Weismann-McClain **Distribution**
Julie Weismann-McClain **Information Systems**
Cecelia Thompson **Accountant**
Gayle Engels **Sales Coordinator**
George Solis **Shipping**
Dawnelle Malone **Intern**

HERBALGRAM is published quarterly by the American Botanical Council and the Herb Research Foundation as an educational project. Educational and business offices are at the American Botanical Council, P.O. Box 201660, Austin, Texas 78720. 512/331-8868. FAX 512/331-1924. Subscriptions: $25/yr; $45/2 yrs; $60/3 yrs. Foreign subscriptions, please add $10 per year. ©1997 American Botanical Council. ISSN #0899-5648. Printed in the U.S.A.

DEAR READER

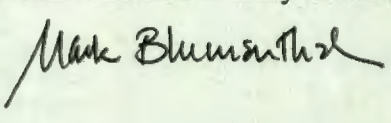
The main story in this issue is the traditional herb kava kava, the peaceful herb of the South Pacific. There is so much interesting ethnobotany and social/cultural importance to this herb that we have devoted an unprecedented 24 pages to kava in a special section. This literature review is based on a major paper by Dr. Y. N. Singh published in 1992 in the *Journal of Ethnopharmacology*. Dr. Singh is a native of Fiji and now a professor of pharmacology in South Dakota. He is also the author of an 800-item bibliography on kava, the most extensive ever compiled. We have condensed his earlier paper somewhat and have added new material to include several of the scientific studies conducted on kava since the article was originally published. The ritual use of kava is an integral part of the culture of numerous Polynesian societies and its relative safety is well established. The German Commission E has approved kava preparations as a safe and effective medicine for anxiety. Based on the available literature it appears that kava has a positive role to play in modern health care and selfcare.

While we were preparing this paper for publication, kava experienced an unfortunate blip in the national news when it was inappropriately associated with a fraudulent product distributed at a New Year's rock concert where numerous attendees were hospitalized after suffering adverse reactions to the bogus product. Early press reports unfairly indicted kava as the probable culprit, but analysis of the product by ABC revealed that despite the label claims, there was no kava in the product. Instead the product contains caffeine and a potentially toxic chemical, neither of which were shown on the label. Our story on this is on page 9.

Also, we offer Holly Bayne's explanation of the Codex Alimentarius, an international effort to develop standards for food products. There has been considerable concern and misunderstanding about the Codex in the U.S. over the past year and we hope to clarify the issue.

Barbara Johnston gives us an interesting profile on Henry Hurd Rusby, one of the great botanists of the past 100 years.

Finally, our regular readers will note a stylistic change in the botanical names in most of the articles in this issue. We are including with the Latin binomial both the botanical authority and the family name of the plant–the preferred method of many scientists.



HERBALGRAM

The Journal of the American Botanical Council and the Herb Research Foundation

Number 39 • Spring 1997

DEPARTMENTS

8 Late-breaking News
Case Mill Homestead new home for ABC; "fX" Does Not Contain Kava

10 ABC News
ABC activities August - December 1996

10 HRF News
HRF Aids in African Medicinal Plant Cultivation Efforts; Natural Healthcare Hotline

12 Herb Blurbs
Clinton-Dole Coat Throats with Herbs; Thyme, Herb of the Year; Insane Veggies

13 Media
Herbalism Thrives in New Mexico; Rare Plants Make Economic Contributions; Renewed Success of Pink Lady's Slipper in New England; Pharmacy Students Study in Belize Rainforest

16 Research Reviews
St. John's Wort for Depression; Bromelain and Musculoskeletal Injuries; Pokeweed Toxicity; Antidiabetic Properties of Bitter Melon; Kava vs. Anxiety; Anti-anxiety Effects of Chamomile Compounds; Grape Seed Extract; Antioxidant/ Antimicrobial Compounds; Licorice Extract and Glycyrrhizin Activity

22 Plant Patents
by Karen Dean
Mistletoe; Tobacco; Ashwagandha, Sallai Guggul, Turmeric, Ginger Combination

23 Research/World News
Professor Tyler Retires; ACS Award to Kinghorn & Balandrin; Herbal Petrol

25 Legal and Regulatory
Ma Huang Update in Ohio; Texas Ephedra Regulations; California Labeling for Laxatives; Commission on Dietary Supplement Labels; Codex Alimentarius Conference

62 Conference Report
American Chemical Society Symposium on Phytomedicines

68 Market Report
Markets with High Share of Phytotherapeutics; Most Frequently Prescribed Phytomedicinals in Germany; Market Report by Peter Landes

70 In Memoriam
A. L. Tommie Bass; Marvin Malone; Arthur E. Schwarting; Robert C. Sohn; Alfred Vogel

73 Book Feature

74 Book Reviews

78 ABC BookStore Top Ten

79 Letters

82 Access

83 Calendar

85 Classified

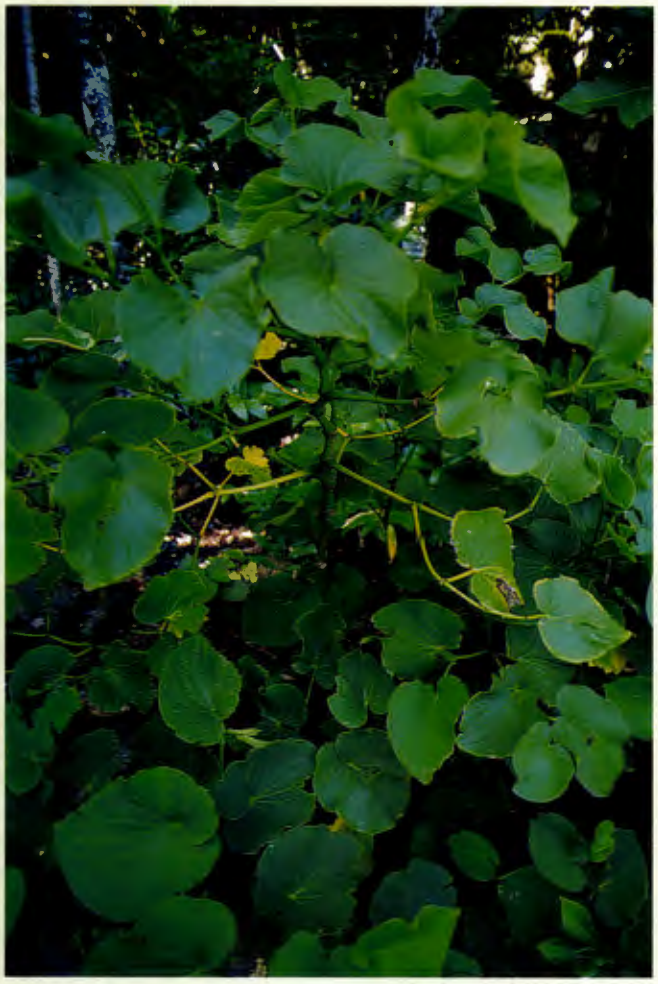
87 Burdock, Edible Wild Weed



Catnip, *Nepeta cataria,* see page 13 for information on herb usage in New Mexico. Photo ©1996 Steven Foster.

FEATURES

33 **KAVA**
A Special Review by Yahdu N. Singh, Ph.D. and Mark Blumenthal



Kava, *Piper methysticum.*
Photo ©1997 Steven Foster

Cover: **Kava,** *Piper methysticum,* now growing in Hawaii. See special kava review beginning on page 33 for geographical dispersal, cultural and scientific information on the species. Photo ©1997 Steven Foster

57 **Profile: Henry Hurd Rusby**
by Barbara Johnston
Great Botanists/Herbalists Series



Coca, *Erythroxylum coca,*
Photo ©1997 Steven Foster

HERBALGRAM is printed on recycled paper.

The Case Mill Homestead

Future Home of The American Botanical Council's Herbal Education and Research Center

ABC is proud to announce the proposed purchase of the Case Mill Homestead to create a new headquarters and herbal education and research center. Located minutes from downtown Austin, Texas, the site offers country tranquillity in an urban environment. ABC envisions the Case Mill Homestead as a dynamic international focal point for botanical education and research, a resource center to enhance the public's knowledge of and appreciation for herbs and medicinal plants, a neighborhood preservation project benefiting its East Austin neighborhood, and a lovingly preserved historic Austin landmark attractive both to residents and to out-of-town visitors.

The Herbal Education and Research Center will include:

- ABC's administrative offices
- An information center open to the public featuring a conference room, lecture auditorium, multi-media resource center, bookstore, and gift shop
- Extensive herb gardens
- Shipping and receiving building

The new site is imperative because ABC is about to move to yet a higher level of activity. In the coming year it will be publishing the long-awaited and much-needed translation of the German government's Commission E Monographs (in which Commission E, the German equivalent of the FDA, assesses and gives therapeutic guidelines for hundreds of herbs). It will also publish the Proceedings of the Office of Alternative Medicine's "Botanicals: A Role in U.S. Healthcare?" conference held in Washington in December 1994, as well as the results of the Ginseng Evaluation Program. These projects will create increased visibility in the national and international media for the projects and roles of ABC, and take it to the forefront of herbal advocacy.

At its inception eight years ago, ABC's five employees could not have dreamed of the agency's current level of success and growth in herb research, education, and advocacy—and it is evident from the explosion of interest in herbs and phytomedicines among healthcare professionals and consumers that ABC's work has just begun.

The current staff of 21 has outgrown ABC's current location. The beautiful and historic Case Mill Homestead in East Austin, a 125-year-old three-story Colonial Revival house, is surrounded by 2.5 acres of established herb gardens and well-maintained grounds.

"We are very excited about this new home," says Mark Blumenthal, ABC's founder and Executive Director. "We must raise $100,000 in the next three months in order to close the deal and begin renovations prior to our summer 1997 move-in date." The project acquisition, renovation, and second phase of expansion will total an estimated $1,000,000.



YOU CAN HELP!

HerbalGram readers can help realize this wonderful project. To send a pledge or contribution, or to request additional information, contact Wayne Silverman, Chief Administrative Officer of ABC, via mail at:
P. O. Box 201660, Austin, Texas, 78720-1660;
phone 512/331-8868;
fax 512/331-1924; or e-mail:
waynes@herbalgram.org

"fX": Chemically Adulterated Product Does Not Contain Kava

The Los Angeles Police Department (LAPD) recently seized samples of a liquid being marketed in Los Angeles under the trade name "fX." The vials were seized at a concert after Biolife Bioproducts of San Diego, a company in business for about six months, gave fX to attendees of a Los Angeles New Year's Eve concert as a promotion. More than 50 people reported symptoms of dizziness, nausea, severe shortness of breath, and respiratory arrest and most required hospitalization. Los Angeles police closed the concert, violence ensued, four people were arrested, and six others were detained on suspicion of distributing the liquid concoction.

Upon hearing that the product listed the herb kava on the label, the American Botanical Council (ABC) obtained samples of fX from a Los Angeles store and sent them to a laboratory for analysis. The laboratory has determined that the vials of liquid being marketed did not contain the herb kava, as was reported by the LAPD. Industrial Laboratories is an FDA-inspected laboratory in Denver,Colorado, specializing in state-of-the-art techniques for analysis of botanical materials.

Subsequent to vigorous testing, two chemicals were found in the samples. "fX" was found to contain both a potentially toxic chemical (1,4 butanediol) and caffeine, although neither substance is listed on the product's label. The human body converts 1,4 butanediol into gammahydroxybutyrate (GBH), a strong central nervous system depressant. ABC immediately made the test results known to LAPD and Food and Drug Administration (FDA) investigators.

The media coverage of this incident began January 1st, the FDA issued a public warning about fX. The following day, a press release from the LAPD speculated that the "problem" ingredient in fX was the herb kava—which was listed on the label as the primary ingredient. The LAPD did not have the capability of testing for kava and was unaware that kava was not actually present in the substance. This flawed information was picked up by print and electronic media and disseminated globally.

On Friday, January 3, Mary Hardy, M.D., a Los Angeles-based physician acting as primary investigator for ABC, appeared on *CNN Headline News*. Dr. Hardy said that the symptoms shown by the hospitalized people were not typical of the known effects of kava.

Contrary to the assertion of the LAPD, the tests conducted by Industrial Labs for ABC did not find even trace amounts of kava. ABC has further learned that results of tests performed by the FDA on fX seized at the concert are fully consistent with the results of ABC's tests. Despite the recent testing, the LAPD has not reversed its erroneous press release, claiming that they cannot release the FDA's test results which are being withheld by the FDA pending criminal investigations.

"As soon as herbs became implicated, we became involved," said Mark Blumenthal, Executive Director of ABC. "The symptoms reported in the press were not consistent with the mildly relaxing effects of kava. We suspected that some unknown ingredient was probably responsible. Our test results confirmed that the product is adulterated and does not contain kava."

ABC distributed a press release giving this information to 2,200 print and electronic media and 450 hard copies to industry and media contacts in hopes of setting the record straight.

Kava (*Piper methysticum* Forst.)—also known as "kava kava" in the U.S.—is a member of the black pepper family (Piperaceae) which grows in the islands of the South Pacific. The herb has been used safely by Polynesian peoples for thousands of years and is finding increased popularity in the U.S. as a dietary supplement. Kava is approved by the Commission E of the German government, the German equivalent of the U.S. FDA, as a safe nonprescription medication for anxiety.

[Press release from ABC (Jan. 17, 1997) and additional information from *HerbalGram* staff.]



Far left: The Case Mill Homestead, Future site of the American Botanical Council headquarters.
Left: a view of the relaxing grounds of the Homestead.

ERRATA:

In the address for Chinese Herbal Market Report (*HerbalGram* No. 38, p. 59) e-mail for information should be: sophie@nat-med.demon.co.uk.

ABC Activities August-December, 1996

HIGHLIGHTS OF PRESENTATIONS AND PAPERS BY ABC EXECUTIVE DIRECTOR MARK BLUMENTHAL

The University of Texas Medical Branch at Galveston, Galveston, TX, "The Use of Herbs in Promoting Health and Healing"; **Southwest Texas State University**, San Marcos, TX, "Herbs: Uses for Promotion of Health and Treatment of Disease"; **Shaklee Corporation,** "Consumer Beha-vior Driving the Herbal Market: Quality Control and Regulatory Issues;" **Austin Whole Life Expo**, Austin, TX, "The Problem wlth Herbal Regulation in the U.S. Today: Toward a New Category of Herbs as Traditional Medicines."

Drug Information Association 32nd Annual Meeting, "Traditional Medicine Approach to Evaluation of Safety and Efficacy of Herbs"; **3rd International Herb Symposium**, "Medicines & Conservation Efforts In the Rainforest"; **United States Pharmacopeia Open Conference**, Washington, D.C. "New Regulatory Category for Herbs as Traditional Medicines"; **National Nutritional Foods Association, Marketplace '96**, Nashville, TN, "Ma Huang, FDA, DEA, and the Status: Who's Minding the Store?" and "Changes in Global Regulations and Attitudes: Herbs and Supplements"; **National Meeting of the American Chemical Society**, Orlando, FL; "German Commission E Monographs—A Model for Regulatory Reform"; **15th Annual International Aloe Science Council, Scientific Seminar**, Irving, TX, "A New Regulatory Category for Herbs as Traditional Medicines"; **National Conference Gerontological Nurse Practitioners**, "Herbal Medicine"; **Great Earth Annual Conference**, Las Vegas, NV; "Overview of Herbs and Phytomedicines in the U.S."; **Council for Responsible Nutrition Annual Conference**, Amelia Island, FL, "Safety and Efficacy of Herbal Products: Need for a New Regulatory Category"; **New Plant Medicines from Old Cultures**, Atlanta Botanical Garden, Atlanta, GA; "New World Plants:, New World Drugs"; **IBC Conference on Nutraceuticals**: Developing Effective Dietary Supplements and Functional Foods, New Orleans, LA; "The Need for a New Regulatory Category for Herbs as Traditional Medicines."

ABC-SPONSORED CONTINUING EDUCATION ACTIVITIES

Pharmacy Continuing Education presentation, Bergen-Brunswick Annual Trade Show and Conference, Reno, NV; "**Pharmacy from the Rainforest**" workshop leader, International Expeditions, Inc., Peru and Costa Rica; **Continuing Education Courses for Pharmacists** from Brooks pharmacy chain, Boston, MA.

HRF NEWS

by Rob McCaleb and Evelyn Leigh

HRF AIDS IN AFRICAN MEDICINAL PLANT CULTIVATION EFFORTS

Having just returned in early December from a five-week trip to Africa, HRF President Rob McCaleb is pleased to report that HRF's Malian hibiscus-growing project is providing returns that reach far beyond successful cultivation and harvest. Specifically, the project has provided a source of much-needed income and training for more than 1,000 people in this impoverished West African nation. Most of the 280 participating farmers practice subsistence farming on remote farms in the Niger River Valley. Because of training provided by McCaleb and a dedicated team of agriculture specialists and extension agents, the farmers have been able to improve their cultivation and processing methods to meet strict quality and cleanliness standards and greatly improve quality at the farm level.

The project goal of increasing farm income has succeeded dramatically, as farmers are paid more than twice the usual price they would receive from traders. In a departure from traditional methods of crop processing, the project farmers are doing quality grading (sorting) at the farm level. The process entails separating out first-quality hibiscus for export, while second quality material is saved for use during times of shortage. The resulting export crop is of outstanding quality and will bring a better price on the foreign market. Furthermore, because local transport costs are relatively reasonable, sale of the second-quality crop on the local market will also bring a good profit. In the future, the herbs produced on these remote Niger River Valley farms promise to be one of the most important cash crops for hundreds of farming families, as well as a source of high quality, organically grown herbs for the worldwide botanicals market.

Now, HRF is beginning a similar project in South Africa, where a unique set of challenges prevails. Until recently, black South African farmers were not permitted to own land, although many worked as farm laborers on white-owned farms. Now, although black farmers are no longer forbidden to own land, they lack funding and business experience in marketing cash crops.

Currently, South Africa is facing a massive displacement of rural people to urban areas in search of jobs which simply do not exist. Black South Africans have a rich history of traditional herb use, and for those without money or access to modern health care, botanical remedies remain the only option. Many of the plants used in traditional herbal medicine grow wild locally but are not under widespread cultivation, and there is evidence that over-harvesting has placed some wild plant populations at risk. In addition, rural people who have relocated to cities no longer have easy access to their traditional wild plant remedies.

Since the inauguration of Nelson Mandela as president of South Africa, the focus of government organizations has begun to shift toward improving opportunities for those who have traditionally been unable to benefit from the economic growth of the country. With the support of the Africa Bureau of the US Agency for International Development (USAID) and the help of the South African non-profit group The Rural Foundation, HRF will work with disadvantaged farmers on projects which will provide income from herbal cash crops as well as

better access to low cost botanical health care. The challenge is threefold: to help protect wild plant populations by cultivating over-collected species, to foster regional production of traditional herbal remedies, and to develop cash crops for low-income farmers. In light of South Africa's favorable growing climate and recent political changes, the potential to realize all three of these goals seems great.

NATURAL HEALTHCARE HOTLINE NOW AVAILABLE TO PUBLIC

In keeping with its primary goal of public education, HRF is pleased to announce expanded public access to the Natural Healthcare Hotline, a unique telephone service created to provide fast, accurate answers to questions about herbs and health. Hotline Information Specialists are carefully trained to supply reliable information on herbs and other natural product ingredients without diagnosing, prescribing, or recommending any particular brand or product, backed up by a database of solid scientific and/or traditional documentation.

Probably the only herbal hotline service in existence, the Natural Healthcare Hotline was inspired by growing consumer demand for up-to-date facts on the health benefits and safety of herbs. The Hotline is a project of the Natural Healthcare Institute (NHI), a nonprofit subsidiary of HRF founded in 1994 with the specific goal of developing and managing the Hotline database. Since neither the NHI nor HRF are in the business of selling herbs, the Hotline is able to function as an independent source of accurate, unbiased information.

The Natural Healthcare Hotline database currently contains information on more than 200 herbs selected from HRF's extensive library, and is continuously updated with new information. The database utilizes a unique "hypertext" format that allows operators to move quickly between general information, documented benefits, specific scientific citations, dosage information, and safety data, including contraindications.

At the time of its inception in 1994, the Natural Healthcare Hotline was available only as a special subscription service to manufacturers and retailers of herbal products. Hotline subscription provides manufacturers and retailers with a valuable educational resource to which customers can be referred, particularly those with difficult questions. Hotline subscribers are assigned a dedicated toll-free number for customer Hotline access. (Please contact HRF for more information on subscription services and costs.)

Since May 1996, NHI has been able to offer expanded public access to the Hotline, and the response has been overwhelmingly positive. Currently, Hotline Information Specialists answer dozens of ques-tions daily from herb consumers, physicians, complementary healthcare practitioners, pharmacists, and many others. HRF members receive substantial discounts on Hotline usage costs, but the service is available to anyone who needs accurate information on herbs and health. To access the Natural Healthcare Hotline, HRF members and nonmembers alike may call (303) 449-2265 and ask for an Information Specialist. The Hotline database is not available online, and is not for sale. It is accessible only by calling Natural Healthcare Hotline.



Three beneficiaries of the Mali hibiscus project: a Malian hibiscus grower with family. Photo by Rob McCaleb.

Clinton-Dole Coat Throats with Herbs; Cuomo Chooses Chamomile

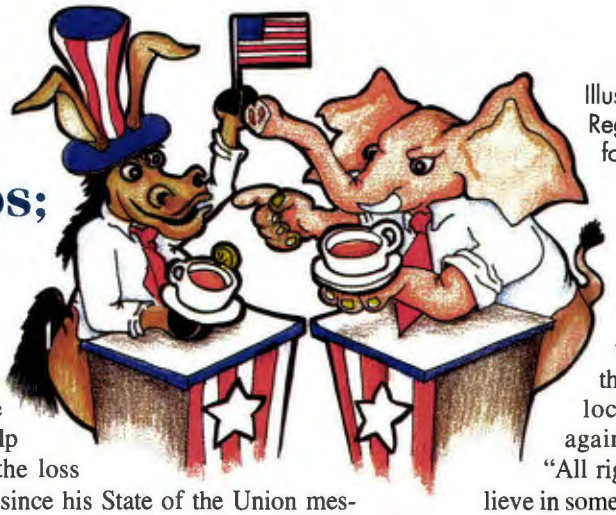


Illustration by Regan Garrett for *HerbalGram*.

Apparently Presidential candidates and some other high-ranking politicians know what the FDA has still not figured out: "Herbs work." Both Democratic and Republican candidates in the 1996 U.S. presidential election were able to get through their grueling speaking schedule with the aid of the soothing herbal tea, "Throat Coat®," a product of Traditional Medicinals, a California-based manufacturer of herbal remedies. According to recent articles in 26 publications including the *New York Times, Los Angeles Times,* and *Newsweek*, President Clinton has been using the tea to help prevent the loss of voice since his State of the Union message in 1994. Bob Dole leaned heavily on the product in the final hours of his 96-hour grind to Election Tuesday.

And, in a story in the *New York Times Magazine* about how recent unsuccessful candidates coped with their losses, former New York Governor Mario Cuomo responded to a question on what was "the perfect meal after a defeat" by saying, "If you don't have something to believe in after your defeat, then the perfect meal is hemlock." When pressed again with the question, "All right, but if you do believe in something, and you're still hungry?," Cuomo answered, "Probably chamomile tea, which would allow you to sleep for a while, rest and come back—re-energized." — *Barbara Johnston*

[*New York Times, Los Angeles Times*, October 4, 1996; *Newsweek* November 18, 1996. Anon. Questions for: Men Who Have Run...And Lost. *New York Times Magazine*, Sunday, Nov. 3, 1996.]

Thyme, Herb of the Year–1997

Thyme (*Thymus vulgaris* L., Lamiaceae) is the 1997 choice for Herb of the Year, an annual designation by the International Herb Association, celebrated every year during the week leading to and culminating with Mother's Day. The purpose of National Herb Week is to focus attention on herbs and to encourage the media, herb businesses, herb and garden organizations, and individuals to educate the public about the uses, history, and lore of herbs.

To qualify for the award, the herb must meet the following criteria: it should be useful in at least two of the categories of culinary, medicinal, or craft; it should be easy to grow from seed, cuttings, or root division, in as many parts of North America as possible, by novice as well as experienced gardeners; it must be a designated genus, rather than a species, and must be adaptable to conditions througout North America; and it should be familiar to the general, "non-herbal" public and offer opportunities for educating the public about its uses.

Thyme has long been a familiar and favorite herb, with use in culinary creations, medicinal preparations, craft work, and aromatherapy. It is also gaining recognition as a valuable ornamental or landscape plant. — *Barbara Johnston*



Thyme, *Thymus vulgaris*. Photo ©1996 Steven Foster

Insane veggies



Eggplant has been a staple in European gardens since around the 12th century, when it was imported from Central Asia. Originally considered a novelty ornamental plant, it was not eaten as a vegetable until much later. Like tomatoes, which were later introduced from the New World, eggplant had an unusual reputation based on myth and misinformation. They were considered unsafe to eat. In the case of eggplant, Europeans thought they produced immediate insanity, despite the fact that they were used as foods for centuries in China and the Middle East. The Italians were the first Europeans brave enough to eat eggplant.

Eggplant was finally listed as an edible plant by the Swedish botanist Linnaeus in 1753, but even then, he gave it the Latin name *Solanum insanum.* Taxonomists later revised the name to the current *Solanum melongena*, meaning black.

[Peterson, C. 1996. Voluptuous Eggplants Love Sunbathing Weather. *New York Times*. June 9.]

Eggplant, *Solanum melongena* var. *esculenta*. Photo ©1996 Steven Foster.

Herbalism Thrives in New Mexico

New Mexico is an excellent resource for those seeking herb shops, herbal schools, or herbalists. Herbal use is part of New Mexico's traditional culture, according to Michael Moore, director of the Southwest School of Botanical Medicine in Albuquerque. An herbalist for some 27 years, Moore has written four books on herbal medicine. One of these, *Los Remedios: Traditional Herbal Remedies of the Southwest*, along with a now defunct line of herbal medicines called Los Remedios de la Gente, is credited with having revitalized the Hispanic herbal medicine traditions of the region. Moore considers oshá (*Ligusticum porteri,* Coult. & Rose, Apiaceae), inmortal (*Asclepias asperula* (Dcne.) Woods., Asclepiadaceae), and yerba mansa (*Anemopsis californica* (Nutt.) Hook. & Arn., Saururaceae) to be the three most important native herbal medicines. Osha is used for colds, as a disinfectant, and as a bitter; inmortal is used for respiratory ailments, for easing the final stages of labor, and to stimulate the production of breast milk; yerba mansa is used for arthritis, throat and mouth sores, and for the sinuses.

There are at least seven herb stores in New Mexico. Bonnie Ochoa, a former nurse, now operates El Vajio Herbs near Mesilla. From the Ground Up is Deborah Brandt's store in Las Cruces. She believes that the use of herbs in New Mexico has remained strong due to the cultural diversity of the people of the state. Brandt is also a registered nurse, and studied with Moore for more than ten years. Yerbas Buenas is an herb-growing business north of Las Cruces. One of its owners, Katia LaMone, is a midwife, and often refers her patients to Brandt's store.

Recently, New Mexico State University received a grant to research ten medicinal crops. This is the first medicinal herb project at the university. Catnip (*Nepeta cataria* L., Lamiaceae), lemon balm (*Melissa officinalis* L., Lamiaceae), marigold (*Calendula officinalis* L., Asteraceae), stinging nettle (*Urtica dioica* L., Urticaceae), scarlet globe mallow (*Sphaeralcea coccinea* (Nutt.) Rydb., Malvaceae), valerian (*Valeriana* spp., Valerianaceae), mullein (*Verbascum thapsus* L., Scrophulariaceae), and three species of echinacea (*Echinacea* spp., Asteraceae) have been planted and are being studied.

Two herbalists, Tieraona Low Dog, M.D., and Amanda McQuade-Crawford, have established a new three-year school of botanical medicine in Albuquerque, the National College of Phytotherapy (See *HerbalGram* #38, p. 22.). Moore's school is planning a move to Bisbee, Arizona. Three of Michael Moore's books are available through the ABC Bookstore: *Medicinal Plants of the Mountain West* (#B112, $12.95), *Medicinal Plants of the Desert and Canyon West* (#B113, $12.95), and *Medicinal Plants of the Pacific West* (#B114, $22.50).—*Ginger Webb*

[Raphael, Kathleen. Herbal essence: The roots of natural healing extend deep in New Mexico. *New Mexico*, May 1996, 28-31.]





Above: **Highbush blueberry,** *Vaccinium corymbosum.* Photo © 1996 Steven Foster.

Left: **Yerba mansa,** *Anemopsis californica.* Photo © 1997 Steven Foster.

Rare Plants Make Economic Contributions

The Center for Plant Conservation (CPC), a non-governmental organization (NGO) housed at the Missouri Botanical Gardens in St. Louis, recently reported on a comprehensive survey of the economic potential of rare plants of the United States. The aim of the survey was to attain a clearer picture of the ramifications of the potential extinction of U.S. plant species in order to develop better strategies of conservation.

The results showed that, as of 1992, 3,214 plant species and 4,277 plant taxa risk extinction in the U.S. These are subsumed under 834 genera. Of the 3,214 rare species, 80 percent are directly useful to humans or have close relatives (i.e., in the same genus) which are useful, many species with significant economic impact, such as cherries, peaches, squash, beans, almonds, sunflowers, walnuts, and roses, have congenerics that are of conservational concern. In fact, two-thirds of the U.S. plant taxa of conservational concern are congenerics (generic relationships) of cultivated species. The better known close relatives clearly have an economical impact in the U.S.

Native Americans once used over 2,000 species of plants for medicinal purposes. Many of which are still in use today. Many formerly wild native North American plants, once wild, are now cultivated extensively in the U.S. Blueberries (*Vaccinium corymbosum*), cranberries (*V. macrocarpon*), pecans (*Carya illinoiensis*), and wild rice (*Zizania palustris*) were all recently domesticated from the wild. Disease-resistant rootstocks of today's commercial walnut were developed from *Juglans hindsii,* a walnut species which is now almost extinct in the wild. Many species of sunflower (*Helianthus* spp.) are in danger of extinction, yet it has been the breeding of domesticated species with the wild species which has enabled the development of disease-resistant, productive hybrids. Disease-resistant rootstocks of North American wild grapes (*Vitis* spp.) prevented the demise of the domesticated European grape about 100 years ago, thereby saving the European grape industry.

continues on next page

The CPC report "illustrates the truly extraordinary economic contributions wild plants make to our lives. Their potential... is arguably much greater even than their current material benefits." — *Ginger Webb.*

[Phillips, O., and B. Meilleur. Survey by CPC Reveals "Extraordinary" Contributions of Wild Plants to U.S. Economy. *Diversity*, Vol. 11, No. 3, 1995,10-11.]

Renewed Success of Pink Lady's Slipper in New England

Once rare, pink lady's slipper (*Cypripedium acaule* L., Orchidaceae) has returned to New England and has become one of the woodlands' most common herbs. Scientists believe the species' recovery is due in part to recovery of its previously disturbed habitat: land that was once cleared for agricultural purposes has gradually returned to forest. Also, pink lady's slipper is dependent on a certain as-yet-unidentified species of soil fungus for the first five years or so of its life. The fungi form filament networks in the soil. These provide water and nutrients for the lady slipper seedlings. It is possible that this fungus was not present again in the habitat until recently.

The reproductive strategy of pink lady's slipper is rather hit-or-miss, and the majority of flowers remain unpollinated; in a typical population, only one or two percent of the flowers develop fruit. When the flowers are artificially pollinated manually, the rate of fruition can increase to 90 percent.

Three populations of pink lady's slipper in Massachusetts were used to test the biological hypothesis that reproduction exacts a cost from individual plants and animals. Groups of volunteers and researchers led by Richard Primack, the author of these articles, carefully hand-pollinated certain marked plants every time they bloomed over an eleven-year period. These plants were compared to groups on non-fruiting specimens. After only two years, the results showed clearly that reproduction exacts a cost: a tremendous difference in size appeared between the experimental and the control plants. Other patterns were noticed as well: of the control plants, which had never been hand-pollinated, only 27 percent ever produced fruit, while every experimental plant had produced at least one fruit. Also, after flowering for several years in a row, the experimental plants would become small, exhausted and cease to flower. This gave the plants a rest, however, and they were able to recover and flower again later.

Primack concludes: "After eleven field seasons, I leave this project with a great sense of satisfaction: my initial love for and curiosity about this beautiful and unique wildflower species had blossomed into a full-scale scientific investigation yielding new insights into the natural history of the species." — *Ginger Webb*

[Primack, Richard. Science and Serendipity: The Pink Lady's Slipper Project. *Arnoldia*, Spring 1996, pp. 8-14. Primack, Richard. Return of a Native. *Natural History*, May 1996, 46-47.]

Pharmacy Students Study in Belize Rainforest

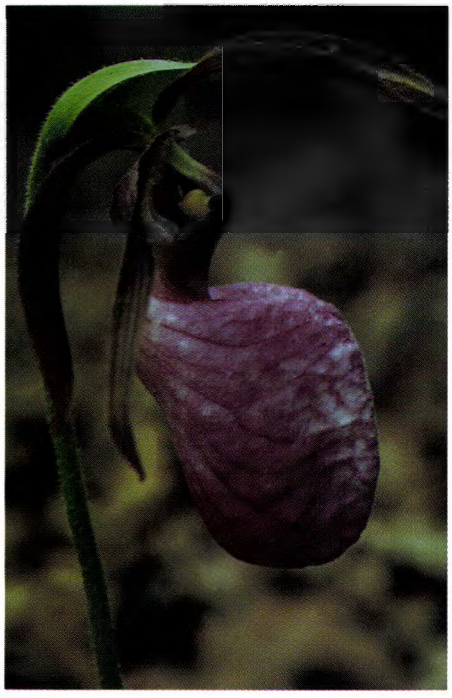
The cover story of the May 1996 issue of *NEWSLine for Pharmacists* recounts the travels of 13 Duquesne University pharmacy students to Belize in March 1995 to work with traditional healers and collect plants for the National Cancer Institute and the New York Botanical Garden at the Ix Chel Tropical Research Centre. The group was headed by Dan Wagner, R.Ph., adjunct professor of pharmacy management and owner of Medi Pharmacy in Allison Park, Pennsylvania, and a seasoned participant of the "Pharmacy From the Rainforest" ethnobotanical trips to Belize, Costa Rica, and the Peruvian Amazon.

The main destination of the week-long trip was the Ix Chel Research Centre in the Cayo District of western Belize. Ix Chel was founded and is directed by Dr. Rosita Arvigo, who spent ten years apprenticing with the late Eligio Panti, a great Belizian traditional healer. The group visited the research laboratory where Ix Chel's brand of herbal products, Rainforest Remedies, is produced. Of special interest, the students were invited to participate in the field collection of plant samples with native healers accompanying them. The students' job was to record everything that the healers said about the plants that were being sampled. Later, these samples would be processed and sent to the National Cancer Institute for screening.

Dan Wagner said that the value of taking pharmacy students on such an expedition "is that when they are practicing, they'll be open to the integration of the two types of medicine, and therefore will have more ways to help their patients." Wagner received the 1996 Pennsylvania Pharmacist of the Year Award from the Pennsylvania Pharmacists Association. According to the award, he "demonstrated dedication to the profession of pharmacy, contributed time and effort to various professional organizations, furthered the profession of pharmacy through community service, and embodied those qualities of attitude and leadership which exemplified the profession."— *Penny King*

[Samsot, Michael. U.S. Students Meet Rain Forest Medicine. *NEWSLine for Pharmacists*, May 1996, 4-7.

Wagner, Dan. Medicine Man. *North Hill News Record* (North Hills, PA), July 21, 1996, D1-2.]



Pink Lady's Slipper,
Cypripedium acaule.
Photo © 1997 Steven Foster.

DID YOU KNOW?

- ❑ Approximately one in 125 plants, thoroughly studied, yields a new medicine.
- ❑ As dozens of plant species are destroyed, we lose countless important medicines–forever.
- ❑ Most of the world relies upon traditional health care systems including the use of native plant medicines to reduce health care costs.

JOIN THOSE WHO CARE

The Herb Research Foundation is working to create programs designed to enhance the responsible use of herbs and phytomedicines in modern health care.

CALL

The HERB RESEARCH FOUNDATION (HRF) at 800/748-2617 to find out how you can support these efforts while having *HerbalGram* and the HRF newsletter delivered to your doorstep!

HERB RESEARCH FOUNDATION

1007 Pearl Street, Suite 200, Boulder, CO 80302
Phone 303/449-2265 Fax 303/449-7849

Meta-analysis of Clinical Trials on St. John's Wort for Depression

A meta-analysis of randomized clinical trials was conducted to investigate whether St. John's wort (*Hypericum perforatum*) is more effective in the treatment of depression than placebo and as effective as conventional antidepressants. Twenty-three randomized trials were found from a literature search which included non-English language publications as well as unpublished sources. In total, 1,757 outpatients with mainly mild or moderately severe depressive states were included in the trials. Fifteen of the trials were placebo-controlled (14 testing single preparations, and one testing St. John's wort in combination with four other plant extracts), and eight trials (6 tested single preparations, 2 tested St. John's wort in combination) compared St. John's wort to other antidepressive drugs. The results of the various trials were pooled and analyzed.

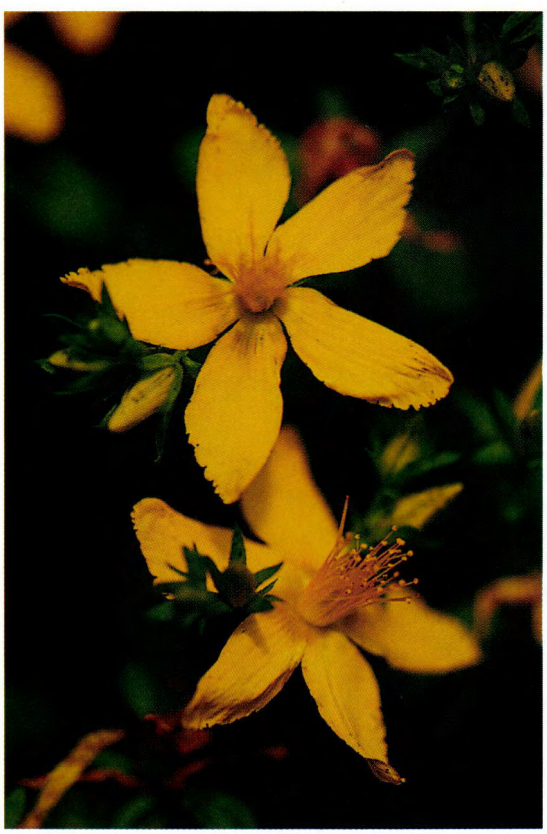
The meta-analysis shows that St. John's wort is significantly superior to placebo. Thirteen of the placebo-controlled trials provided data on "treatment responders": 22.3 percent of those receiving placebo were "responders," compared to 55.1 percent of those receiving St. John's wort treatment. The results of the meta-analysis also show that St. John's wort is as similarly effective as conventional antidepressants. Five of the eight trials provided data on treatment responders: 63.9 percent of those receiving single preparations of St. John's wort were responders compared to 58.5 percent of those receiving conventional antidepressants; 67.7 percent of those receiving St. John's wort in combination were responders, compared to 50 percent of those receiving conventional antidepressants. In the placebo-controlled trials, 4.1 percent of the placebo patients and 4.8 percent of the St. John's wort patients reported side effects; 14.6 percent of the combination St. John's wort patients reported side effects compared to 26.5 percent of those taking conventional antidepressants; and 19.8 percent of single preparation St. John's wort patients reported side effects compared to 35.9 percent of conventional antidepressant patients.

The authors of the meta-analysis conclude that, based on the evidence, St. John's wort appears to be more effective than placebo in treating depression, but that current evidence is inadequate for determining whether it is as effective as other antidepressants and whether it has fewer side effects. They recommend that future trials focus on St. John's wort in comparison to conventional antidepressants. They also recommend that types of depressions be better delineated so that it may be determined whether St. John's wort works better for milder forms or for more severe forms of depression.

In an accompanying editorial, Dr. Peter A.G.M. De Smet, a clinical pharmacologist and Willem A. Nolen, psychiatrist, both from the Netherlands, note that in 1994 MDs in Germany prescribed almost 66 million daily doses of preparations containing St. John's wort. They write that a reason German MDs prescribe so many herbal medicines is because they are so "easily available" and are approved by therapeutic monographs (Commission E). Although the trials on hypericum extract are promising, they are not sufficient to accept use in major depression when judged by the European Union guidelines for assessment of antidepressants. "The herb may offer an advantage, however, in terms of relative safety and tolerability, which might improve patient compliance." They concur that "Longer term studies are needed before it can be recommended in major depression." — *Ginger Webb and Mark Blumenthal*

[Linde, K., G. Ramirez, C. D. Mulrow, A. Pauls, W. Weidenhammer, and D. Melchart. 1996. St. John's wort for depression - an overview and meta-analysis of randomised clinical trials. *British Medical Journal* Vol. 313, pp. 253-258. August 3.

DeSmet, P. A. G. M. and W. A. Nolen. 1996. St. John's wort as an antidepressant. *British Medical Journal*, Vol. 313: 241-242.]



St. John's Wort,
Hypericum perforatum.
Photo © 1996 Steven Foster.

Bromelain and Musculoskeletal Injuries

SUMMARY

In an open clinical trial, 59 patients (39 men and 20 women) with blunt injuries to the musculoskeletal system (e.g. contusions, muscle strains, ligament tears) were given 500 mg of bromelain three times daily 30 minutes before meals with some water for a period of one to three weeks. The patients were evaluated on four categories of symptoms including swelling, pain at rest and during motion, plus tenderness on palpation, utilizing a self report scale ranging from one (no symptoms) to ten (strongest symptoms) every five days. For each pain criterion a subjective reversal of symptoms was noted in each case. Pain during motion and tenderness on palpation, according to the authors, exhibited the steepest curves and hence the most rapid symptom decline. The preparation was generally well tolerated with only two individuals reporting such reversible symptoms as gas and nausea.

COMMENTS

Nonsteroidal anti-inflammatory drugs (NSAIDs) are one of the most prescribed pharmaceutical agents in the U.S., accounting for well over 99 million prescriptions per annum. NSAIDs are considered the cornerstone for the treatment of pain secondary to in-flammatory disorders ranging from arthritis to migraine. Despite the fact that these medications are inexpensive and readily available, long-term use, especially in the elderly patient, is associated with hepatic, renal, and gastrointestinal side effects. This has prompted research on such alternative anti-inflammatory medications as bromelain.

Bromelain is a protease-containing extract derived from pineapple *(Ananas comosus* (L.) Merr., Bromeliaceae*)*. Although NSAIDs work exclusively through the inhibition of prostaglandin synthesis, bromelain has the advantage of decreasing fibrin by enhancing fibrinolytic action. While fibrin is an essential component of the clotting cascade, preventing excessive bleeding from occurring, this same protein also contributes to stasis in tissues. By decreasing fibrin, bromelain helps promote circulation and post-traumatic resorption of inflammatory by-products, thus allowing for a speedier recovery time from injuries.

While bromelain has always been found to reduce swelling and inflammation, it came as a surprise to me that subjects reported reduced pain symptoms. Although bromelain does inhibit prostaglandin E, the recorded reduction in pain may be due to the high dose (1500 mg/day) employed by the investigator. For those individuals without inflammatory gastric lesions, high-dose bromelain may provide the clinician with another anti-inflammatory as powerful as NSAID medication but with fewer concerns with regard to side effects. — *R. Reichert*

[Masson, M. 1995. Bromelain in the treatment of blunt injuries to the musculoskeletal system. A case observation study by an orthopedic surgeon in private practice. *Fortschritte Der Medizin* 113(19):30346.]

Case Report of Pokeweed Toxicity: Severe Gastrointestinal Upset May Affect Cardiac Activity

Poisonings due to ingestion of pokeweed (*Phytolacca americana* L., Phytolaccaceae) are not uncommon in the United States, where many people enjoy the young leaves of this plant as part of their diet. Symptoms usually include "self-limited but severe gastroenteritis characterized by intense vomiting and frothy diarrhea." Although no cardiotoxin has been identified in pokeweed, three case reports of cardiotoxicity due to pokeweed poisoning exist. The following case report may provide further insight into the question of pokeweed's cardiotoxicity.

Case report 4 involves a 46-year-old male who, together with his wife, experienced nausea, vomiting, and diarrhea after eating a few uncooked pokeweed leaves and then some twice-boiled pokeweed greens. His mother-in-law, who had eaten only the cooked greens, experienced no symptoms of poisoning. The male, who denied a prior history of cardiac disease, was found, upon further examination in the hospital, to have suffered a Type I Mobitz heart block, a temporary condition requiring no treatment, which may occur after a mild heart attack. He was discharged from the hospital symptom-free after 36 hours.

It is possible that "the intense nausea, vomiting and intestinal colic that resulted from the pokeweed ingestion may have had a prolonged parasympathetic effect" on the male patient's heart. Once the gastrointestinal symptoms were alleviated with medication, the heart block resolved itself. It is therefore unlikely that a cardiotoxin was responsible for the toxicity.— *Ginger Webb*

[Hamilton, R. J., R. D. Shih, and R. S. Hoffman. Mobitz Type I Heart Block. Pokeweed Ingestion. *Veterinary and Human Toxicology*, February 1995, 37(1):66-67.]





Left: **Pineapple,** *Ananas comosus*. Right: **Pokeweed,** *Phytolacca americana*. Photos © 1997 Steven Foster.

Antidiabetic Properties of Bitter Melon

The unripe fruit of *Momordica charantia*, also known as karela or bitter melon, enjoys widespread use as a vegetable and a traditional medicine. Its use in the treatment of diabetes mellitus is of special interest. Cultivated throughout the tropical regions of the world, karela is used as an anti-diabetic remedy in China, India, Sri Lanka, and the West Indies.

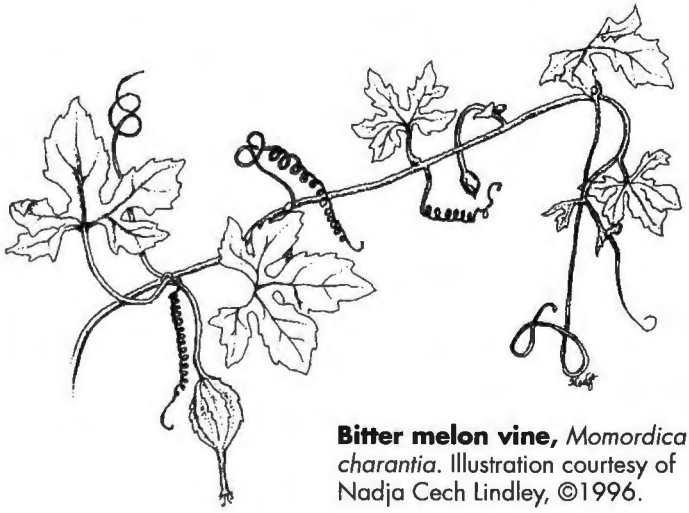
Small clinical studies of the therapeutic effects of karela on diabetic patients have been conducted. Karela preparations have been shown to significantly improve glucose tolerance without increasing blood insulin levels, and to improve fasting blood glucose levels. Blood and urine sugar levels and post-prandial (after eating) blood glucose levels also fell. Reports of poor response to karela can be attributed to inter-patient variation.

In vivo studies in laboratory animals and *in vitro* studies of enzymes, tissues, and cells have yielded further information about the actions and mode of action of karela. *In vitro* studies have shown that karela acts to inhibit glucose absorption, acts as an insulin secretagogue, and exerts insulinomimetic effects. Not all of these actions have been supported by *in vivo* data.

Steroidal glycosides, insulinomimetic lectins, and alkaloids are believed to be responsible for karela's hypoglycemic and antihyperglycemic effects.

Anti-fertility side effects and hepatotoxicity have been reported in animals receiving karela, with pregnant animals being especially susceptible. Fortunately, such adverse effects in humans do not seem to have been reported, despite widespread use of the fruits. — *Ginger Webb.*

[Raman, A., and C. Lau. 1996. Anti-diabetic properties and phytochemistry of *Momordica charantia* L. (Cucurbitaceae). *Phytomedicine*, Vol. 2 (4), 349-362.]



Bitter melon vine, *Momordica charantia*. Illustration courtesy of Nadja Cech Lindley, ©1996.

Efficacy And Tolerability Of Kava In Anxiety

Concern about the long-term safety and addiction potential of synthetic psychopharmaceuticals has led to increasing scientific interest in botanical approaches to the treatment of anxiety. To investigate the anxiolytic (anti-anxiety) effects and tolerability of kava (*Piper methysticum* Forst., Piperaceae), a group of German researchers performed a double-blind, placebo-controlled clinical trial in 58 patients with anxiety syndromes not caused by mental disorders. Patients were randomized to receive either placebo or 100 mg kava extract (standardized to 70 mg kavalactones) three times daily for 4 weeks. Treatment outcomes were evaluated through standard psychometric assessments, including the Hamilton Anxiety Scale (HAMA), HAMA subscales, a 60-item Adjectives Check List self-assessment scale, and the Clinical Global Impression scale (CGI). Assessments were made at baseline and at three intervals during the study: 7, 14, and 28 days.

After only one week of treatment, HAMA scores demonstrated a significant reduction in anxiety symptoms in patients taking kava as compared to placebo, and this improvement continued to increase throughout the course of the study. The differences between the HAMA scores of the two groups were statistically significant at all three assessment intervals. Similar statistically significant improvements were observed for the kava group in many categories of the other outcome measures, including mental anxiety and somatic anxiety as rated by the HAMA subscales, self-assessed performance-oriented activation as measured by the Adjectives Check List, and severity of disease as rated by the CGI.

No adverse reactions were observed in the kava group during the course of the study. The investigators concluded that the positive risk/benefit profile demonstrated by the kava extract makes it suitable for the general practitioner in treating states of anxiety, tension, and excitedness. These findings support the results of previous kava studies. — *Evelyn Leigh*

[Lehmann, E., E. Kinzler, J. Friedemann. 1996. Efficacy of a special kava extract (*Piper methysticum*) in patients with states of anxiety, tension and excitedness of non-mental origin—A double-blind placebo-controlled study of four weeks treatment. *Phytomedicine* 3: 113-119.]



Kava root, *Piper methysticum*. Photo © 1996 Steven Foster.

Anti-anxiety Effects of Chamomile Compounds

Although its use has been traditionally recommended in mild sleep disorders in children, the use of chamomile as a mild sedative has not been substantiated in authoritative references, including the German Commission E monographs. A study using an aqueous extract of the dried flower heads of German chamomile (*Matricaria recutita* L., Asteraceae) investigated the affinity of several fractions of the plant for central benzodiazepine receptors in mice. Apigenin, one of the predominant flavonoids in chamomile, was found to competitively inhibit the binding of the drug flunitrazepam, benzodiazepine derivative. At doses up to 30 mg/kg, apigenin was shown to have a clear anxiolytic (anti-anxiety) activity without the sedation or muscle relaxing effects noted for benzodiazepine drugs (e.g., Valium®) and without noticeable anticonvulsant effects. Dosages of 30 mg/kg and 100 mg/kg produced dose-dependent sedation characterized as mild. The results demonstrate that the flavonoid apigenin in chamomile produces an anti-anxiety effect without producing marked CNS depression. According to the authors of this study, chamomile from Argentina and neighboring countries is higher in free apigenin than species from other parts of the world.

This study adds chamomile to the growing list of herbal anxiolytics which includes valerian, kava, and passion flower. The anxiolytic actions of chamomile most closely compare to passion flower. Previous research identified chrysin (5,7 dihydroflavone) as the primary component in passion flower exhibiting benzodiazepine-receptor activity.[1] Valerian has potent GABA-A (gamma-aminobutyric acid, a neurotransmitter) binding activity, although the particular fraction of the plant's root having greatest activity has not been identified as is the case with chamomile and passion flower.

It is unlikely that chamomile products will be standardized on apigenin content in the next few years. In this respect and because chamomile use has been reduced to commercial tea formulations that claim to be "calming" and useful for sleep, the herb will continue to be underutilized.

Traditional and modern phytomedicine preparations of chamomile use the flower heads just prior to blooming. In Germany alone, there are more than 90 licensed preparations of chamomile. European creams and ointments for topical application are made with a 3-10 percent chamomile concentration. Chamomile is a useful herb for small children because of its rather pleasant taste. Allergic reactions attributed to chamomile ingestion are uncommon,[2] but users should be careful of contact with the eyes. Persons with a history of allergies to the daisy family should likewise be cautioned about its use. The Commission E monographs[3] list no known contraindications for the use of chamomile, even during pregnancy and lactation. — *Donald Brown, N.D.*

1. Wolfman, C., H. Viola, A. Paladini, *et al.* 1994. Possible anxiolytic effects of chrysin, a central benzodiazepine receptor ligand isolated from *Passiflora coerulea. Pharmacology Biochemical Behavior*; 47:1-4.

2. Mann, C., E. J. Staba. 1986. The chemistry, pharmacology, and commercial formulations of chamomile. In: *Herbs, Spices, and Medicinal Plants: Recent Advances in Botany, Horticulture, and Pharmacology* (Craker, L. E. , Simon, J. E., eds.). Phoenix, AZ: Oryx Press; 1:23980.

3. Blumenthal, M., J. Gruenwald, T. Hall, C. W. Riggins, R. S. Rister (Eds.), S. Klein and R. S. Rister (trans.) 1997. *German Commission E Monographs*. Austin, Texas. American Botanical Council (in press).



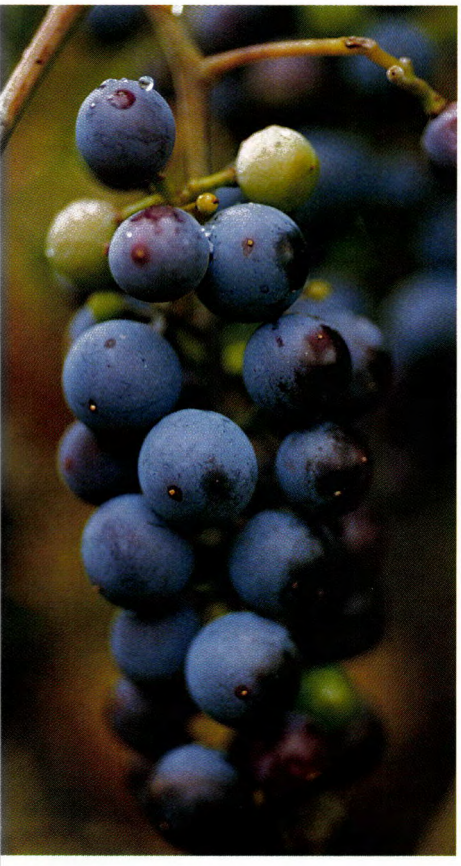
German chamomile,
Matricaria recutita.
Photo © 1994 Steven Foster.

Benefits of Grape Seed Extract

Use of the common grape (*Vitis vinifera* L., Vitaceae) dates back to very ancient times. For sustenance, the fruits are eaten fresh, in dried form (raisins), or processed to make wine; the leaves are also sometimes eaten. Folk medicine throughout the world makes use of the common grape, as does traditional Chinese medicine and the Ayurvedic medical tradition.

Found in abundance (less than 1 percent by weight) in grape seeds, a group of polyphenols called procyanidins have received particular attention for their pharmacological properties. The rapeutically, procyanidins are of value in treating microcirculatory disorders, and are the active principle in a proprietary pharmaceutical product sold in France for this purpose (PBE, Endothelon) and in the U.S. as well, not as proprietary pharmaceuticals but as dietary supplements. Procyanidins are strong antioxidants, lipid peroxidation inhibitors, and free radical scavengers. These properties seem to be the basis for the other therapeutic properties of the procyanidins. For instance, procyanidins exert an antimutagenic effect that could be due, at least in part, to the antioxidant effect of the compounds. Chronic degenerative diseases are believed to be a result of environmental mutagens, whose effects may be countered by polyphenols such as the procyanidins.

Clinical trials conducted on the therapeutic effects of procyanidins have yielded positive results. At least two clinical studies have been conducted on procyanidins' effects on peripheral venous insufficiency. In a double-blind study of 50 patients, 25 were treated for one month with procyanidins (150 mg/day) and 25 with the semi-synthetic diosmin (450 mg/day). Both therapies were shown to be effective in alleviating symptoms, but procyanidins worked more quickly and their effects lasted longer. In a double-blind, placebo-controlled study of 92 patients, procyanidins were shown to improve venous functionality and to reduce pain, cramps, edema, and paresthesia (tingling, "pins and needles").



Grapes, *Vitis vinifera.* Photo © 1996 Steven Foster.

Procyanidins are also proving to be useful in the field of ophthalmology. The effects of procyanidins on light vision were examined in a controlled clinical study of 100 subjects with no ophthalmological pathologies. Two groups were formed: the experimental group received procyanidins (200 mg/day for five weeks); the other group was a control. The procyanidins' effect on the resistance to glare in the experimental group was significant in comparison to the control group. Researchers believe that procyanidins allow for better retinal nutrition due to their effects on microcirculation. In another study, patients with ocular stress from prolonged activity at a display unit (type not specified) were treated with procyanidins (300 mg/day for 60 days). Contrast sensitivity was significantly improved by procyanidins treatment as compared to placebo. Two studies conducted on the effects of procyanidins on retinal function and sensitivity in myopia also showed positive results.

Procyanidins have shown both anti-inflammatory and radioprotective activity at the dermatological level. Here again, their therapeutic use in cosmetics is connected to their antioxidant and free radical scavenging properties. Procyanidins in cosmetics help protect against the damage caused by free radicals and lipid peroxidation.

The toxicity of procyanidins has been tested in laboratory animals. The compounds appear to be well-tolerated with no toxic, mutagenic, or teratogenic (causing physical defects in embryo) effects.

Information in this article was taken fronm an extensive review on grapes and grape seed extract was written by research scientists at Indena Spa, a leading manufacturer of botanical extracts in Italy. — *Ginger Webb.*

[Bombardelli, E., and P. Morazzoni. 1995. *Vitis vinifera* L. *Fitoterapia*, Vol. LXVI, No. 4, 291-317.]

Herbs and Spices with Antioxidant and/or Antimicrobial Compounds

Many herbs and spices are known to exert antioxidant activity and are useful for preventing lipid oxidation in living organisms as well as in foods. Of 78 common spices tested, 32 showed antioxidant activity in lard. Rosemary (*Rosmarinus officinalis*) and sage (*Salvia officinalis*) were "remarkably effective" and by far the strongest antioxidants, with oregano (*Origanum heracleoticum*), thyme (*Thymus vulgaris*), nutmeg and mace (*Myristica fragrans*), and turmeric (*Curcuma longa*) next in line. When the spices were tested in an oil-in-water emulsion, clove (*Syzygium aromaticum*) was found to exert the strongest antioxidant activity, followed by turmeric, allspice (*Pimenta officinalis*), rosemary, ginger (*Zingiber officinale*), cassia and cinnamon (*Cinnamomum aromaticum*), oregano, savory

(*Satureja* spp.), and sage. Aniseed (*Pimpinella anisum*), basil (*Ocimum basilicum*), cardamom (*Elettaria cardamomum*), marjoram (*Origanum vulgare*), and black and white pepper (*Piper nigrum*) have also been reported to have some antioxidant activity. These results have prompted studies of various constituents of some of these spices to determine whether the isolated compounds produce antioxidant effects.

Herbs and spices have been used for their antimicrobial properties in preventing food deterioration and pathogenic diseases. Ground mustard (*Brassica nigra*), clove, and cinnamon as well as their oils are known to be useful in slowing down microbial spoilage of food. In a study of 27 spices, garlic (*Allium sativum*) was shown to exert antimicrobial activity against all eight microbials, including *Escherichia coli*, *Salmonella typhosa*, and *Shigella parasysenteria*. Onion (*Allium cepa*), clove, and nutmeg were effective against all except *Bacillus subtilis*. Mace and achiote (*Bixa orellana*) have been shown to be especially effective against *Clostridium botulinum*. Also effective as antimicrobials are oregano, marjoram, thyme, sage, rosemary, caraway (*Carum carvi*), wasabi (*Wasabia japonica*), allspice, pepper, and ginger. Isolated constituents of antimicrobial spices have also been studied for their antimicrobial activity. — *Ginger Webb*

[Nakatani, Nobuji. 1994. Antioxidative and Antimicrobial Constituents of Herbs and Spices. *Spices, Herbs and Edible Fungi*. Elsevier Science B.V., 251-271.]

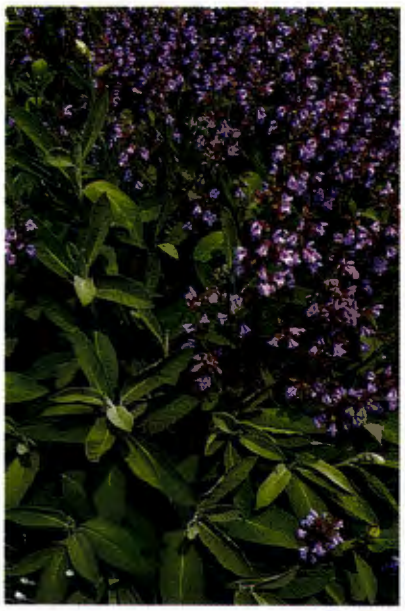
[Ed. note — This paper should be required reading at the U.S. Food and Drug Administration which proposed new regulations under the dietary Supplement Health and Education Act of 1994 (DSHEA) that, if implemented in the proposed form, would limit anti-oxidant nutrient content claims for dietary supplements to vitamins A, C, and E only. This would significantly limit herbal products from describing their well-docmented antioxidant properties. Based on the data reported in this paper, there appears to be a strong scientific basis to support the anti-oxidant activity of a number of popular herbs. — *M. Blumenthal*]

Licorice Extract and Glycyrrhizin Activity

Glycyrrhizin, a saponin-like glycoside, is found in licorice root (*Glycyrrhiza glabra* L., Fabaceae) and aqueous licorice root extract. Glycyrrhizin is fifty times sweeter than sugar, and is used to sweeten such items as licorice candies, chocolates, beers, liquors, and chewing gum. Licorice root extract is sometimes used therapeutically to treat gastric ulcers and inflammation of the skin, and has been studied for its anti-allergic, anti-arthritic, anti-cholinergic, anti-estrogenic, anti-hepatotoxic, and anti-leukemogenic properties. However, serious side effects are associated with glycyrrhizin ingestion. To investigate the behavior and toxicity of glycyrrhizin, a study was conducted "to compare the bioavailability of glycyrrhizin after oral administration of glycyrrhizin alone or glycyrrhizin in licorice root extract in rats and humans."

The experimental procedure for rats and humans was similar: in the human study, glycyrrhizin or licorice root extract in water solution (in doses of either 800 or 1600 mg as glycyrrhizin) was administered to eight volunteers of both sexes. Blood and urine samples were collected at intervals up to 36 hours after treatment, and were analyzed for glycyrrhizin and glycyrrhetic acid concentrations. The results of the experiments showed that the bioavailability of glycyrrhizin in both the animal and human models is lower when consumed as a component of licorice root extract than it is when consumed alone. This is caused by some interaction during intestianl absorption between glycyrrhizin and other component(s) of licorice root extract. The lower bioavailability (i.e., intestinal absorption) of glycyrrhizin in licorice root extract means a reduced incidence of side effects, and suggests that the consumption of licorice root extract is safer than that of glycyrrhizin, either alone or in food products. Unfortunately, the small size of this study (eight people) is of questionable statistical significance; a larger study is needed to confirm the results. — *Ginger Webb*

[Cantelli-Forti, G., F. Maffei, P. Hrelia, F. Bugamelli, M. Bernardi, P. D'Intino, M. Maranesi, and M. A. Raggi. Interaction of Licorice on Glycyrrhizin Pharmacokinetics. *Environmental Health Perspectives*, Vol. 102, Supplement 9, November 1994, 65-68.]





Far left: **Sage,** *Salvia officinalis*. Photo © 1993 Steven Foster

Left: **Licorice,** *Glycyrrhiza glabra*. Photo © 1995 Steven Foster

PLANT PATENTS

By Karen Dean

MISTLETOE

Pharmaceutical preparations derived from European mistletoe, and pharmaceu-tical preparations derived from Korean mistletoe. Invented by Tasneem A. Khwaja (Newport Beach, CA), and assigned to University of Southern California (Los Angeles, Aug. 20, 1996, and 5,565,200, issued Oct. 15, 1996.

A simple description of these patents cannot do justice to the potential impact they could have. Each patent protects an aqueous mistletoe (*Viscum album* L., Viscaceae) extract useful in the treatment of AIDS, cancers, and other diseases of immunosuppression. Conventional mistletoe extracts have been used in Europe to treat cancer patients for more than 50 years, and AIDS patients are finding them helpful. Each pharmaceutical grade mistletoe extract can be characterized by its unique lectin, viscotoxin, and alkaloid composition, which provides the observed pharmacological activity. What makes these natural products patentable is the use of "pharmaprint" analysis to create a precise profile of the molecular components, identifying the components and quantifying their bioactivities. Such a precise characterization of natural multicomponent mixtures not only makes it possible for an herbal company to offer natural products of guaranteed content and potency, but raises the possibility of establishing content and potency standards that could lead eventually to an FDA-approved and regulated herbal and natural medicine industry.

The University of Southern California has licensed the plant extract fingerprinting technology to PharmaPrint, Inc., a company established by the university to develop, manufacture, test, gain FDA approval for, and sell or license pharmaceutical versions of natural medicines. The company plans to use the technology to develop pharmaceuticals, and to make the "pharmaprinting technology" available to other companies. PharmaPrint's long-term goal is to establish its technology as the gold standard protocol that enables natural product companies to achieve patent protection on their products, and enables regulatory agencies to ensure the contents and potency of multicomponent natural medicinal compositions. The company is looking for development and marketing partners to speed the commercialization process.



Tobacco, *Nicotiana tabacum.* Photo © 1997 Steven Foster.

TOBACCO

Tobacco extract composition and method, invented by Joseph A. von Fraunhofer (Baltimore, MD), and assigned to University of Louisville (Louisville, KY). U.S. Patent 5,435,941, issued July 25, 1995.

Chemical metallurgist Joseph von Fraunhofer has discovered and patented an unexpected property of minimally processed by-products of the tobacco processing industry. He found that soaking and filtering tobacco sticks (*Nicotiana* spp., Solanaceae), stems, seeds, and other agricultural waste from tobacco, under certain extraction conditions, yields a potent natural corrosion inhibitor. The renewable, environmentally friendly aqueous solution can be blended into paints, coolants, waters, and antifreeze liquids that are used in such harsh oxidative environments as automotive engines, high-rise building cooling systems, industrial cooling towers, and the like. Many of the last generation of commercial corrosion inhibitors—chromates, nitrites, benzoates, and phosphates, for example—have been classified and banned as environmentally unfriendly toxins. The anticorrosive tobacco extract comes from a renewable resource and can replace such conventional, toxic corrosion inhibitors. The tobacco extract reacts with exposed metal, forming a new, protected, nonreactive surface. Von Fraunhofer observes that corrosion control costs the United States billions of dollars every year, some 4.5 percent of the U.S. gross national product. Describing the tobacco extract coating as "a low-tech response to a major problem," von Fraunhofer has formed a company called Inhibitex, Inc., to commercialize the discovery through strategic partnerships with major paint manufacturers, water treatment companies, and corrosion control companies. Several nationally known companies have requested evaluation samples of the anticorrosive material.

The actual processing of tobacco into anticorrosive extracts is very easy —it can be done in the warehouse or on the harvesting field. The most enthusiastic interest in the technology has come from tobacco growers and manufacturers of coating systems, and the least interest has come from cigarette manufacturers.

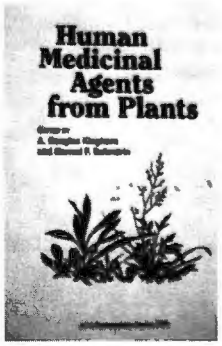
ASHWAGANDHA, SALLAI GUGGUL, TURMERIC, GINGER COMBINATION

Method of treating musculoskeletal disease and a novel composition therefor, invented by Bhushan Patwardhan (1471 Shukarwar Peth, Bhaumaharaj Bol, Poona 411 002, IN), no assignee. U.S. Patent 5,494,668, issued February 27, 1996.

Protects a combination of plant extracts that have been produced via a novel process and formed into a therapeutically effective, convenient dosage form to treat such degenerative musculoskeletal diseases as rheumatoid arthritis and osteoarthritis. Composition contains plant extracts in predetermined proportions relative to one another, including ashwagandha (*Withania somnifera* Dunal., Solanaceae), Sallai guggul (*Boswellia serrata*, Roxb. *ex* Colebr., Burseraceae), turmeric (*Curcuma longa* L., Zingiberaceae), and ginger (*Zingiber officinale* Roscoe, Zingiberaecae). These are all important anti-inflammatory plants in Ayurvedic medical practice.

American Chemical Society Gives Platinum Award to Kinghorn & Balandrin

Human Medicinal Agents from Plants, a book edited by A. Douglas Kinghorn, Ph.D., and Manuel F. Balandrin, R.Ph., Ph.D., has been awarded a Platinum Award at the American Chemical Society (ACS) meeting, August 1996. The award is given on two levels, the 700 Club for volumes which have sold 700 copies and the Platinum Award for those selling over 1,100 copies. The book is the proceedings of a symposium held at the National Meeting of the ACS in San Francisco, April, 1992. The articles included represent the field of plant-derived drugs at the time and reflect the high quality of the symposium participants. The editors received support from the Division of Agricultural and Food Chemistry of the ACS, the division presenting the award plaque. The book was published in 1993 and reprinted in 1995 and was reviewed in *HerbalGram* #32, p. 65. *Human Medicinal Agents from Plants* is available in the ABC BookStore. #B020. Hardcover, 356 pages. $89.95.



Herbal Petrol: a Hot Item

Scientists at the Indian Institute of Technology (IIT) in New Delhi, India, were recently baffled by a high school dropout from Tamil who turned water into a petro-like fuel by mixing it with an herb he discovered in the hills. The compound burnt with a sooty flame, smelled like kerosene, and, on distillation, yielded a pure hydrocarbon fraction with a boiling point of 170 degrees centigrade.

IIT chemist N. K. Jaha organized the experiment at the request of the Department of Science and Technology (DST). "It is incredible, but true," said Jha. For the past seven years, 30-year-old Ramar Pillai has been converting tap water into a fuel that can drive a car.

Pillai first realized the value of the plant during a picnic in a forest when a flying spark from the cooking stove set a leaf of a nearby plant on fire. He almost forgot about it, but ten years later, he tracked it down and started experimenting. In a process which takes less than 30 minutes, the leaves and barks are cooked for a few minutes in hot water, the mixture cooled and stirred after addition of small amounts of salt, citric acid, and traces of a few, so far unknown, chemicals. Allowed to settle, the liquid fuel, which is lighter than water, floats to the top and is separated by filtering. The herbal petrol would cost one rupee per liter (the equivalent of $.12) per gallon in the U.S.

Pillai was invited to come from his village to New Delhi by the DST. Laboratory tests conducted with early samples show conclusively that the herbal fuel is a pure hydrocarbon similar to kerosene and diesel.

All Pillai wants from the DST is money to build a plant in his native area and his own personal protection. He has had one attempt on his life for refusing to part with his secret.

Some of the best scientists in the country reportedly are being assembled to understand the chemical process in detail before settiup a plant with production capabilities of one million liters (approximately 24,000 gallons) per day. The economic implication of Pillai's discovery for the coun-try are enormous. DST secretary Valangiman Ramamurti says, "We have no doubt that we are sitting on something very big, but we must proceed carefully and systematically." DST has assigned highest priority to the patenting of Ramar's invention. — *Barbara Johnston*

[*The Times of India*, September 6, 1996.]

Distinguished Professor Tyler Retires

Dr. Varro E. Tyler, Lilly Distinguished Professor of Pharmacognosy at Purdue University, officially retired from that institution on December 31, 1996, after more than 30 years of service. During that time, he served 20 years as Dean of the School of Pharmacy and Pharmacal Sciences and five years as Executive Vice President of Academic Affairs of the entire Purdue system. Tyler has indicated that in addition to serving with some frequency as a guest lecturer at the University, he will continue a very active speaking and writing schedule as well as continuing to consult for numerous herb producers and marketers. He also plans to continue as an active member of the American Botanical Council's Board of Trustees.

He was the senior author of four editions of *Pharmacognosy*, the leading textbook in the field, as well as being author of several popular books; including *The New Honest Herbal*, and *Herbs of Choice–The Therapeutic Use of Phytomedicinals.*



Consider it Done!

Herb Research Foundation's
Herb Information Packet Series Has What You Need

When you have an herb question, do you have time to locate and buy half a dozen books, or devote hours to research in your local library? Now there's a quick and easy solution — turn to the Herb Research Foundation for highly informative herb information packets on over 150 subjects!

Each packet contains 15-30 pages of concise and informative articles, book excerpts and comments, providing you with a thorough introduction to many common herbs, health conditions and other herb-related topics.

Here are a few samples of the subjects we cover:

Allergies	Echinacea	Pregnancy
Asthma	Garlic	Psoriasis
Bilberry	Ginger	Reishi
Caffeine	Ginkgo	Senna
Cancer	Insomnia	Stevia
Chamomile	Kudzu	Stimulants
Colds/Flu	Milk thistle	Valerian
Dandelion	Pau d'arco	Women's herbs



HRF Members receive special discounts and one *free* packet upon joining.
Nonmembers may purchase a packet for just $7.00

To order your herb information packet, have your Visa or MasterCard ready and call our 800 order line: 800-307-6267.

To request a complete listing of herb information packets phone HRF at 303-449-2265. Or write us at:

HERB RESEARCH FOUNDATION

1007 Pearl Street, Suite 200 Boulder, CO 80302

Ma Huang Update: Ohio Amends Ephedrine Ban

Herb Products Allowed with Limited Alkaloid Levels

by Mark Blumenthal

The State of Ohio has cleared the way for natural food stores to sell dietary supplements containing the herb ma huang. On December 30 Ohio Governor George V. Voinovich signed legislation passed by the Ohio Senate which amends the state's Schedule V controlled substances list to exempt foods or dietary supplements containing a maximum of 25 mg ephedrine alkaloids (in an herbal product) per dosage unit or serving.

Ohio was the first state to initiate a total ban on the sale by anyone other than pharmacists of products containing the herb ma huang, also known as ephedra (*Ephedra sinica* Stapf., Ephedraceae). The original action was promoted for the drug ephedrine by the Ohio State Board of Pharmacy and passed by the state legislature in 1994. In response to the death of a male high school football player who consumed pills containing the drug form of ephedrine hydrochloride, the Ohio Board then expanded the law to include herbal ephedra.

The exempted products must contain "prominent" labeling showing the amount of ephedrine equivalents per serving or dosage unit. Additionally, the bill states that "the maximum recommended dosage of ephedrine for a healthy adult human is the lesser of 100 mg. in a 24-hour period for not more than 12 weeks or the maximum recommended dosage or period provided in applicable regulations adopted by FDA." It is anticipated that FDA's proposed dosage and labelling rules will be stricter than those of the Ohio legislature. It also warns that "improper use of the product may be hazardous to a person's health."

The bill prohibits the dispensing or distribution of any herbal ephedrine-containing product to anyone under 18 years of age unless the dispenser is a physician, pharmacist, parent or guardian. In an attempt to address recent concerns about the marketing of ephedrine alkaloid-containing products as substitutes for illicit street drugs ("herbal highs"), a provision of the bill prohibits manufacturers from representing that a product "causes euphoria, ecstasy, a 'buzz' or 'high,' or an altered mental state; heightens sexual performance; or, because it contains ephedrine alkaloids, increases muscle mass."

The new law resulted from a grass roots lobbying campaign by National Nutritional Foods Association (NNFA) President-elect Joe Bassett, who also owns two retail health food stores in Toledo. The bill was also supported by various multi-level marketing companies. In support of the bill, the American Herbal Products Association (AHPA) sent Mary Mulry, Ph.D., a member of the AHPA standards committee, to testify before the House legislative committee. Dr. Mulry is a food technologist and industry consultant in Boulder, Colorado. The new law will go into effect on March 31.

For more on the safety and regulatory issues surrounding ma huang, please see articles in previous issues of *HerbalGram* (nos. 34-38).

SOURCES

Anonymous. 1996. NNFA Efforts a Success!: Ohio Governor Signs Ephedra Bill. *NNFA Fax Update*, Dec. 31.

Anonymous. 1996. Ohio Ephedrine Ban Repeal Passes Legislature. *The Tan Sheet*. Chevy Chase, MD: F-D-C Reports. Dec. 9: 12-13.

Young, A.L. 1996. Personal communication, Dec. 31.

Ohio Bill HB523. 1996.

Texas Pulls Back Proposed Regulations Banning Ephedra

On Jan. 16 the six-member Texas Board of Health unanimously agreed to table regulations proposed last July, 1996 that would have required that all products containing the herb ephedra (aka ma huang, *Ephedra sinica*) be classified as prescription drugs. The proposed regulations would have removed ephedra-containing dietary supplements from the market.

Although the Board was concerned about potential abuse and misuse of ephedra products (including "euphoria-inducing" usage), members agreed that there is a need to ensure the availability of ephedra-containing products for consumers and practitioners who are not abusing them. Dr. Walter Wilkerson, chairman of the Board, urged the Texas Department of Health and the dietary supplement industry to work together to develop reasonable regulations with respect to the sale and appropriate use of products containing ephedra. A meeting is expected to be scheduled between Texas Department of Health officials and interested parties possibly within three or four months.

In comments filed late last year, the National Nutritional Foods Association (NNFA) urged the Texas Dept. of Health not to go forward with the proposed regulations but to allow the federal Food and Drug Administration to take the lead on this issue. To date, no official FDA policy has been proposed. — *Mark Blumenthal*

Source

Anonymous. 1997. Texas Ephedra Regs Tabled By State Board of Health. *The Tan Sheet*. Chevy Chase, MD: F-D-C Reports, Jan. 20: 14-15.

California Requires Warning Labels for Products Containing Stimulant Laxative Herbs

GNC Requiring Laxative Warning Labels in all Stores

by Mark Blumenthal

The California Department of Health Services Food and Drug Branch (FDB) issued an emergency regulation November 1, 1996, requiring that all herb teas and dietary supplements containing herbs with stimulant laxative activity carry a warning label. The herbs included in this regulation include aloe (*Aloe ferox* and other related species), buckthorn bark and berry (*Rhamnus cathaticus*), cascara sagrada bark (*Rhamnus purshiana)*, rhubarb root (*Rheum palmatum*), and senna leaf and pod (*Cassia acutifolia*, *C. angustifolia*, *C. senna*). The ruling exempts herb products made from aloe leaf gel which normally does not contain significant natural levels of anthraquinones, compounds which produce a laxative action. The new ruling went into effect January 1, 1997.



Senna, *Cassia angustifolia.*
Photo ©1996 Steven Foster.

The California label warning must be similar to the following sample:

> "Notice: This product contains (name of substance(s) and common name if different). Read and follow directions carefully. Do not use if you have or develop diarrhea, loose stools, or abdominal pain. Consult your physician if you have frequent diarrhea. If you are pregnant, nursing, taking medication, or have a medical condition, consult your physician before using this product."

FDB has held several meetings with the herb industry and others to collect industry and scientific input in formulating a policy on laxative ingredients in herbal teas and dietary supplements, according to American Herbal Products Association President Michael McGuffin, President of McZand Herbals in Santa Monica, California. McGuffin told *HerbalGram*, "The Dietary Supplement Health and Education Act of 1994 (DSHEA) clarified the legitimacy of warning labels for non-drug products. The development of this cautionary label statement has provided a real opportunity to work with the state regulatory agency in implementing, for the first time, this important feature of DSHEA. Stimulant laxative herbs are subject to some misuse. The labeling regulation developed by FDB will inform the public of the potential health concerns associated with misuse, at the same time protecting these herbs for their appropriate historical use."

According to the notice, FDB has reports of 67 illnesses in first-time and regular users of so-called "dieter's teas" and up to 10 deaths in regular consumers. The notice acknowledges that "While it has not been proven that these foods caused the illnesses and deaths, use and abuse of stimulant laxatives can cause illnesses and deaths similar to those experienced by individuals consuming these foods."

Most of the adverse events were associated with teas containing senna leaf; however, FDB notes that all of the substances noted above can produce stimulant laxative actions and thus some of the same potential risks, which include abdominal pain and diarrhea in first-time users. Frequent use and episodes of diarrhea canproduce serious illness, characterized by electrolyte imbalance and hypokalemia (abnormally low potassium levels), leading to permanent kidney damage and life-threatening cardiac arrhythmias.

Some of these substances have been marketed as approved safe and effective ingredients in over-the-counter (OTC) stimulant laxatives. However, according to a survey by FDB of leading "dieter's teas," they contained higher levels of senna than FDA-approved OTC senna-containing laxatives.

In July 1995 the U.S. Food and Drug Administration's (FDA) Food Advisory Committee recommended that herbal diet teas contain a warning that some of the herbal ingredients can act as stimulant laxatives. Also in July 1995 AHPA issued a policy statement to its members recommending

warning labels on dried aloe latex (laxative aloe from the leaf; not the aloe vera gel and juice), buckthorn, frangula, cascara sagrada, Chinese rhubarb, and senna.

The AHPA warning reads:

> "Do not use this product if you have abdominal pain or diarrhea. Consult a health care provider prior to use if you are pregnant or nursing a baby. Discontinue use in the event of diarrhea or watery stools. Do not exceed recommended dose. Not for long-term use."

The Pittsburgh-based General Nutrition Corporation (GNC) has announced that it will require all stimulant laxative-containing herb teas and dietary supplements to carry warning labels in all of its stores nationwide. The move by GNC will no doubt influence many herb manufacturers to conform to the California regulation, thereby creating a national impact, according to Rob McCaleb, President of HRF and a member of the Presidential Commission on Dietary Supplement Labels.

California is the first state to require a laxative warning on teas and dietary supplements.

SOURCES

American Herbal Products Association. 1996. Comments on Proposed Label Requirements for Foods and Dietary Supplements Containing Aloe, Cascara, Frangula, Rhubarb Root and/or Senna, Regulation Control Number R-38-95E. Dec. 10.

American Herbal Products Association. 1995. Herbal Laxative Policy Statement. July 21.

Anonymous. 1996. California Deadline Nears for Labels on Laxative-Containing Products. National Nutritional Foods Association Fax Update. Dec. 27.

Anonymous. 1996. GNC Selling Stimulant Laxative Products With Label Warnings. *The Tan Sheet.* Chevy Chase MD: F-D-C Reports. Dec. 9: 13-15.

California Department of Health Services. 1996. Notice of Emergency rulemaking: Label Requirements for Foods (R-38-95E) California Regulatory Notice Register. October 1.

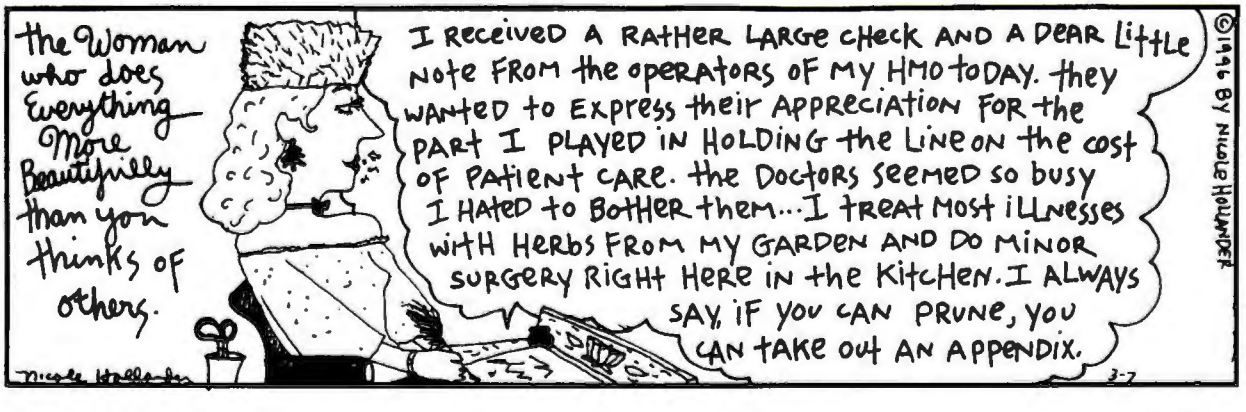
McCaleb, R. 1997. Personal communication, Jan 6.

McGuffin, M. 1997. Personal communication, Jan. 7.

Commission on Dietary Supplement Labels Debates Health Benefit Claims

The Commission on Dietary Supplement Labels (CDSL) appointed by the President as a result of the Dietary Supplement Health and Education Act of 1994 (DSHEA) is now in the process of compiling its recommendations to President Clinton, Congress, and the Secretary of Health and Human Services on ways to make dietary supplement labels more accurate and informative. According to HRF President Rob McCaleb, a Commission member, the CDSL is wrestling with the same questions that have plagued the FDA, Congress, and the dietary supplement industry for decades. "There are no easy answers to questions about the fuzzy dividing line between health promotion and disease prevention, supplement claims and drug claims, and ultimately, foods and drugs," said McCaleb.

The idea of creating an expert panel to review evidence on proposed health benefit claims has gained support among Commission members, although ironing out the details is likely to pose a challenge. The concept known as the Botanical Ingredient Review (BIR), initially proposed by HRF and the American Herbal Products Association (AHPA) in 1991, has now also been adopted by the National Nutritional Foods Association (NNFA). The suggested Traditional Remedies category proposed by ABC, AHPA and others, and favored by some CDSL and industry members would allow broader claims on dietary supplement labels, but this concept remains controversial. The fundamental issues are well known. Many herbs and other supplements are used in a manner that might be considered "drug like." The evidence supporting the use of these products often focuses on disease treatment. Yet, under guidelines currently allowed for "structure and function" claims under DSHEA, claims made for such products must be worded in a way that does not adequately describe either the research or the benefits. Most Commissioners agree that if research indicates a benefit of a supplement in treating or preventing disease, there should be a way of informing the public of that benefit without resorting to elaborate word games. As the issues are debated more openly by the CDSL, the positions of individual Commission members are becoming clearer. A complete report on the Commission's deliberations and progress will appear in a future issue of *HerbalGram*. — *Rob McCaleb*



SYLVIA by Nicole Hollander reprinted by permission

Report on the Conference of the Codex Alimentarius
Regulators Meet to Establish International Standards for Foods

by Holly Bayne

The Codex conference was largely devoted to a discussion of vitamins and minerals, i.e., essential nutrients. These issues have stirred controversy and concern in the U.S. over fears that protections gained by the Dietary Supplement Health and Education Act of 1994 (DSHEA) may be overturned by an international body. This raises important issues of national sovereignty and self-determination with regard to U.S. health care policies. Reports of the nutrients discussions have received wide media coverage; however, the separate and important discussion of the safety of herbs as foods has gone largely unreported.

*The following article provides a detailed summary of the background initiatives which led to the Codex's discussion and decisions on future consideration of botanical safety issues.**

The Twentieth Session of the Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU) was held in Bonn, Germany from October 7-11, 1996. The U.S. was represented by Dr. Elizabeth Yetley, Director of the Office of Special Nutritionals within the Food and Drug Administration (FDA), and Dr. Robert Moore, Senior Regulatory Specialist, Office of Special Nutritionals, as the designated delegates. The CCNFSDU addressed the possibility of developing international regulatory guidelines for herbs and botanical preparations sold as foods. A background paper, prepared by the Canadian delegation, provided the impetus for this timely issue to reach the Committee's agenda. The Canadian position advocates the development of a "negative list" of herbs and botanical preparations in order to restrict the sale and international trade of potentially toxic herbs for use as foods. Ultimately, the CCNFSDU concluded that it is the responsibility of national regulatory authorities to develop any lists of potentially toxic plants and recommended that the issue be considered by an expert panel under the auspices and funding of the Food and Agriculture Organization (FAO) of the United Nations and the World Health Organization (WHO) (Moore, 1996).

As a separate item on the agenda, the CCNFSDU also addressed highly controversial proposed guidelines for dietary supplements, first considered by the Committee in 1993. The proposed guidelines will only apply to dietary supplements containing essential vitamins and minerals, either alone or in combination. The U.S. does not support the development of guidelines for dietary supplements at the present time. The almost unanimous consensus of the Committee, however, is that the elaboration of Codex guidelines for dietary supplements is necessary in light of the increased trade in these "supplementary foods" in many countries. As a result of the Bonn meeting, the dietary supplements proposal moved from a "Step 3" document, a *Proposed Draft Guideline*, to a "Step 5" document, a *Draft Guideline*, in the intricate eight-step procedure for the elaboration of Codex Standards. Notwithstanding the procedural advance of the document, much of the text remains in controversy and has not yet achieved the Committee's consensus.

The most contentious of the substantive issues under consideration concerns the establishment of maximum upper limits for single essential nutrients, and the methodology by which the maximum limits will be established (CCNFSDU, Proposed Draft Guidelines for Dietary Supplements, 1995). In Bonn, a direct safety-based approach for formulating the maximum upper limits was added as an alternative to calculations based on Recommended Daily Allowances (RDA's) or Recommended Daily Intakes (RDI's). The RDA's (or RDI's) are founded upon outdated assumptions and are generally discredited by contemporary standards of nutritional science as invalid measures of safety. The safety-based approach to setting upper limits was introduced by the U.K. and Canadian delegations, and rests on appropriate risk assessment methodology, taking into account all sources of nutrients in the diet. The FDA's position is that maximum upper limits for vitamins and minerals could be supported if the limits were established through sound science according to some type of risk/

Overview of Codex Procedures

The Codex Alimentarius Commission was established in 1962 by the Food and Agriculture Organization (FAO) of the United Nations and the World Health Organization (WHO) for the purpose of developing uniform standards and definitions for foods, in order to protect the health of consumers and facilitate international trade. The headquarters of the Commission is Rome. As of July 1995, there were 151 Member Countries in the Codex Alimentarius Commission (CAC), as part of the Joint FAO/WHO Food Standards Programme. An Executive Committee acts as the governing arm of the Commission, making proposals regarding the overall orientation of the Standards Programme to the Commission and guiding the implementation of the Programme once approved by the Commission *(CAC Procedural Manual, 1995).*

The work of the Commission has resulted in the publication of the Codex Alimentarius, the name derived from the Latin meaning food law or code. This comprehensive publication is a set of standards, guidelines and principles, containing standards for all the principal foods, (whether processed, semi-processed or raw), hygienic and technological practice codes, commodity codes and guidelines for chemical contaminants, including maximum limits on pesticides and veterinary drug residues. The Commission has set up a total of 28 general subject, commodity and regional codex committees, or subsidiary bodies, in order to draft food standards within the relevant terms of reference for each committee, as well as to act in an advisory capacity. The regional coordinating committees are responsible for ensuring that the work of the committees is responsive to both developing countries and regional interests. Various Member Governments, appointed by the Commission, serve as the host countries for each of these working groups.

The Codex Committee on Nutrition and Foods for Special Dietary Use (CCNFSDU) is one of the Worldwide Commodity Codex Committees. The next meeting will be held in September of 1998 in Germany, which is the host country. In matters voted upon by the Committee, Member Countries have one vote, regardless of the size of the country. Meetings of the Codex Committees are held in public.

The process of formulating Codex Standards is a complex eight-step procedure, designed to allow input from governments and interested organizations. The standard-setting process may take anywhere from 2 to 15 years or longer to complete, depending upon the particular circumstances. The initial step begins with the Commission's decision to elaborate a standard and the subsequent delegation of the work to the appropriate Codex Committee for preparation of a "proposed draft standard." The proposed draft is then circulated to governments and international organizations for comments, including economic impact statements. A proposed draft standard is considered to be at "Step 3." The Committee considers the comments, and revises the draft, if appropriate. The "proposed draft standard" is then submitted to the Commission in anticipation of its being adopted as a "draft standard." This is Step 5 of the procedure. The Commission may either release the document at Step 5, or drop it back to Step 3. The process repeats itself; the "draft standard" is once again sent to Member Governments and interested organizations for comments, and is re-considered by the Committee. At Step 8, the final step, the draft standard is sent back to the Commission, along with any comments received, for adoption as a Codex standard *(CAC Procedure Manual, 1995).*

In short, the quickest way to ascertain the status of an issue under consideration by a Codex Committee is to determine which stage it is at in the elaboration procedure. Language within proposed drafts and draft standards which are italicized or bracketed indicates that the matter is currently under discussion. For example, within the "Draft Guidelines on Vitamins and Minerals in Dietary Supplements," officially a Step 5 document, some of the text is at Step 3. The Commission or the relevant subsidiary body may return a draft for additional work at any previous step in the procedure, and the Commission may hold a draft at Step 8. Generally, when the Commission considers a proposed or draft standard, only those issues in controversy will be discussed.

There is also an accelerated procedure for the elaboration of Codex standards, commonly known as the "fast track" procedure, which essentially provides for the adoption of a Codex standard directly from the draft standard. The fast track procedure may be recommended by the relevant Codex Committee upon consideration of the need for urgency, and the likelihood of new scientific information becoming available in the immediate future *(CAC Procedure Manual, 1995). — Holly Bayne*

benefit analysis (Moore, 1996). The direct safety approach is strongly favored by the Council for Responsible Nutrition (CRN), a public interest group based in Washington, D.C., and the European Health Food Manufacturers Association (EHPM) (Hathcock, 1996).

The approved document, "Draft Guidelines on Vitamins and Minerals in Dietary Supplements," will be considered by the next meeting of the Codex Alimentarius Commission (CAC), to be held in Geneva, Switzerland during June 23-27, 1997. The Commission can either accept the recommendations in the draft and release the document at Step 5, as a "Draft Standard," or drop it down to Step 3, a "Proposed Draft Standard." In either case, the draft will be sent to governments and interested organizations for comment, prior to re-consideration of the guidelines at the next meeting of the CCNFSDU, scheduled to be held in either Bonn or Berlin from September 21-25, 1998 (Moore, 1996).

Canada's paper, *Sale of Potentially Harmful Herbs and Botanical Preparations as Foods,* was first submitted to the Codex Coordinating Committee for North America and the South-West Pacific (CCNASWP) in early June of 1994. Principally, the paper considers the regulatory dilemma presented by herbs which are commonly sold as both foods and medicines, depending upon the nature of the products' labeling and advertising claims. Canada believes that the drug regulatory systems of many countries cannot be readily adapted to deal with herbs, due to the difficulty in establishing the safety and efficacy of herbs according to the same cri-

teria applied to conventional medicines. The result is that herbal products which are sold without therapeutic claims in labeling or advertising "default" into the legal category of "foods" (Canada, 1994).

In countries with well developed drug regulatory systems, manufacturers must generally submit extensive documentation of the drug's safety and efficacy in order to obtain the requisite pre-market approval of the medicine.

Due to the difficulty in establishing the safety and efficacy of herbal medicines according to the strict clinical protocols that are required for conventional drugs, coupled with the lack of patent protection for herbs, manufacturers of herbal medicines are generally dissuaded from seeking registered drug status. Within this regulatory dilemma, the Canadian paper comments briefly on some aspects of thenational regulatory and administrative procedures for health-risk evaluations of health food products in the Nordic countries, and touches upon the regulations regarding herbs and botanical preparations in Australia, Canada and the U.S. (Canada, 1994).

"the FDA did not see the compelling need to develop international guidelines for these commodities which have a variety of national uses..."

In 1994, Canada asked the CCNASWP to recommend to the Codex Commission that "an advisory list of toxic or adulterating substances be established and that such substances be prohibited for sale as foods within the jurisdictions of the member nations of the Codex Alimentarius Commission" (Canada, 1994). The Canadian view is that the development of an internationally recognized "negative list" of herbs is important to protect consumers from potentially toxic herbal substances sold as foods, and is more feasible than the creation of a "positive list." In addition, Canada advanced the proposition that a Codex Code of Hygienic Practice specifically applicable to "health-foods" would be a valuable first step toward the introduction of international processing standards for these types of herbal products, representing a rapidly growing sector of the food industry.

The CCNASWP referred Canada's paper to the 43rd Session of the Executive Committee of the Codex Alimentarius Commission (CCEXEC), held in Geneva during June 4-7, 1996. In its referral, the CCNASWP noted the need to clarify the interface between foods and medicines and the potential for the development of a Code of Hygienic Practice in this area. Insofar as the Executive Committee was unable to provide additional clarification, the CCEXEC requested the Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU) to consider the matter and report its findings to the next Executive Committee meeting, which will be held in June, 1997. A Circular Letter was sent to Member Countries (and interested international organizations) soliciting input regarding the national regulatory approach for these types of herbal products, particularly with regard to safety and their legal classification as either "foods" or "drugs" (CL 1996/20-NFSDU). Member Governments were also asked to comment on any action the Committee should take in light of the CCNFSDU's ongoing work with respect to dietary supplements, since the Committee could have considered incorporating herbs and botanical preparations sold as foods into the Proposed Guidelines (Codex Alimentarius Commission, 1996).

The FDA held a public hearing in Washington, D.C. on August 16, 1996, for the purpose of presenting to interested parties the entire provisional agenda of the upcoming meeting in Bonn. The meeting was facilitated by Drs. Yetley and Moore. Dr. Yetley articulated the FDA's position, stating that, "the FDA did not see the compelling need to develop international guidelines for these commodities which have a variety of national uses; the FDA would be more than happy to see the issue not considered by the Committee" (Yetley, 1996). Dr. Yetley also noted that the purview of the CCNFSDU does not extend beyond food, therefore, the Committee could only address the development of guidelines for herbs used as foods, and not medicines.

The FDA also released the text of a draft policy statement, reflecting the agency's commitment to uphold the legal mandate of the Dietary Supplement Health and Education Act (DSHEA) of 1994, as follows:

> The United States does not support the development of guidelines or standards for herbal products marketed as dietary supplements. First, the United States recognizes that there are diverse opinions on the use of these types of substances throughout the world. The United States believes that it is not appropriate or necessary to develop a uniform set of standards for ingredients, formulations, and claims because of the diverse citizen and government attitudes towards the use of dietary supplements that exists in different countries and cultures. We believe that national authorities are in the best position to develop appropriate regulations for theses types of products,because of the need to consider national needs for supplementation with specific nutrients, the consideration of historical and cultural factors, and the diverse regulatory philosophies in place in different countries regarding whether such products are drugs or foods by definition. Furthermore, while the United States concedes that risks may be associated with the use of some botanical preparations, the risk to individual consumers varies, to a

degree, on the pattern of use. For botanicals in this category, we believe that national authorities are in the best position to determine the risk/benefitratio most appropriate to provide for the safe use of a substance by their citizens. For these reasons, we do not believe that widely applicable guidelines should be developed for these products at this time (United States Draft Comments to the Codex Committee on Nutrition and Foods for Special Dietary Uses, 1996).

In Bonn, Australia introduced the proposal contained in the Canadian paper, recommending that the CCNFSDU consider the establishment of international guidelines for botanicals in the form of a negative list. The Australian position was supported by Canada, France, Kuwait and the United Kingdom. In opposition, on behalf of the United States, Dr. Yetley read the FDA's draft text. Several countries voiced their opposition to the U.S. position: Australia, Canada, Germany, Greece, France, Spain and the United Kingdom (Schauss, 1996).

Finally, the proposal failed to win the Committee's support and the matter was closed. The CCNFSDU concluded that the issue was outside the purview of the Committee, particularly in light of the fact that the toxicity of herbs is not an issue with nutritional implications. Notwithstanding, the Committee recognized that the subject deserves attention. Thus, the CCNFSDU will formally recommend to the Codex Commission that an independent body of experts be formed under the auspices of the FAO/WHO for the purpose of studying the potential toxicity of herbs and botanical preparations used as foods.

The Commission will consider the request at the next meeting of its Executive Committee in June of 1997, and is expected to follow the CCNFSDU's recommendation and ask the FAO/WHO to convene the working group. Depending upon resources and other priorities within the FAO/WHO, the expert committee could be established within one to five years. If the proposal is implemented, the FDA will submit names of U.S. experts in the botanical field to the FAO/WHO, and ask that one or more of the named individuals serve on the committee. If convened, the work of the expert committee will result in the publication of a FAO/WHO document (Moore, 1996).

Worthy of mention is that the European Federation of Health Products Manufacturers (EHPM) supported the establishment of a negative list of botanicals at the Bonn meeting. The EHPM distributed a statement which endorsed the principle of a negative list, noting the difficulties that the Federation had encountered during the past two years in attempting to establish a positive list of herbs, based on lists in existence within Europe (Schauss, 1996).

* (For a complete report on the nutritional issues, contact the National Nutritional Foods Association (NNFA) 1/800/966-6632 or the Council for Responsible Nutrition (CRN) 202/872-1488.)

REFERENCES

Bayne, H., Blumenthal, M. and Israelsen, L. D. A Survey of Regulations of Herbal Medicines in Six Industrialized Nations, Executive Summary of Traditional Medicines Research Project, Austin, TX: American Botanical Council, August, 1996.

Canada. Sale of Potentially Harmful Herbs and Botanical Preparations as Foods, Prepared for Codex Coordinating Committee for North America and the South-West Pacific, 1994.

Codex Alimentarius Commission. Joint FAO/WHO Food Standards Programme, Procedural Manual, (9th ed. 1995).

Codex Committee on Nutrition and Foods for Special Dietary Uses. Matters Referred by the Codex Alimentarius Commission and other Committees, 1996.

Codex Committee on Nutrition and Foods for Special Dietary Uses. Proposed Draft Guidelines for Dietary Supplements, 1995.

Codex Committee on Nutrition and Foods for Special Dietary Uses. Report of the Nineteenth Session of the CCNFSDU, 1995.

Commission of the European Communities. Guidelines on the Quality, Safety andEfficacy of Medicinal Products for Human Use. 1989. (Note for guidance relating toPart 1 of the Annex to Directive 75/318/EEC, as amended).

Hathcock, John. Director, Nutritional & Regulatory Science, Council for ResponsibleNutrition. Personal communication (telephone conversation), December 16, 1996.

Moore, Robert. U.S. Delegate. Codex Committee on Nutrition and Foods for SpecialDietary Uses. Personal communication (telephone conversation), December 4, 1996.

Schauss, Alexander, G. Codex: A Special Report. Report on the 20th Codex Committee Meeting on Nutrition and Foods for Special Dietary Uses, October 11, 1996.

Yetley, Elizabeth. U.S. Delegate, Codex Committee on Nutrition and Foods for Special Dietary Uses. Comments at public meeting of the Codex Committee on Nutrition and Foods for Special Dietary Uses, Washington, D.C., August 16, 1996.

B.C. **By Johnny Hart**



By permission of Johnny Hart and Creators Syndicate, Inc.

Structure/Function Claims?
You Need The Facts



Manufacturers! Make sure you are covered!

The Dietary Supplement Health and Education Act allows herbal product manufacturers to make "structure/function" claims about the effects their products have on the structure or function of the human body. These claims may be made under the following four conditions:

- Claims must be truthful and not misleading.
- They cannot be drug claims (for the cure, treatment, mitigation or prevention of disease).
- They must carry a disclaimer that the claim has not been evaluated by FDA.
- The claims must be based on scientific evidence in your files.

Rapid reliable research from HRF, the "herb specialists"

Drawing on a library of over 100,000 scientific articles and an international network of contacts the Herb Research Foundation offers custom research on any aspect of herbs, spices, medicinal plants and essential oils:

- Health benefits of herbs
- Herb horticulture
- Regulatory information
- Herb safety research

From a few pages to comprehensive background literature, we provide online database searching, complete scientific articles and references, access to experts, consultants and more. Get the facts!

For fee schedules and member discounts, phone HRF at (303) 449-2265 or write us at:

HERB RESEARCH FOUNDATION

1007 Pearl Street, Suite 200 · Boulder, CO 80302
Phone 303/449-2265 · Fax 303/449-7849

KAVA
AN OVERVIEW

by Yadhu N. Singh, Ph. D.
College of Pharmacy,
South Dakota State University,
Brookings, SD (USA)
and
Mark Blumenthal
American Botanical Council,
Austin, TX (USA)



DISTRIBUTION, MYTHOLOGY, BOTANY, CULTURE, CHEMISTRY, AND PHARMACOLOGY OF THE SOUTH PACIFIC'S MOST REVERED HERB



SPECIAL REVIEW
HERBALGRAM NO. 39



This article is a condensed version of a previous review by the primary author in a 1992 issue of the Journal of Ethnopharmacology.[1] *The co-authors have added new material.*

INTRODUCTION

Since first significant contact with Europeans in the 18th century, the Oceanic plant, *Piper methysticum* Forst. (Fam. Piperaceae), and the beverage prepared from it, both called kava, have become familiar to much of the outside world through written and visual media. The ceremonial preparation and consumption of the beverage are probably its most conspicuous and spectacular features. Kava continues to occupy a central place in everyday life in the islands concerned, although its role has been somewhat diminished by time and outside influences.

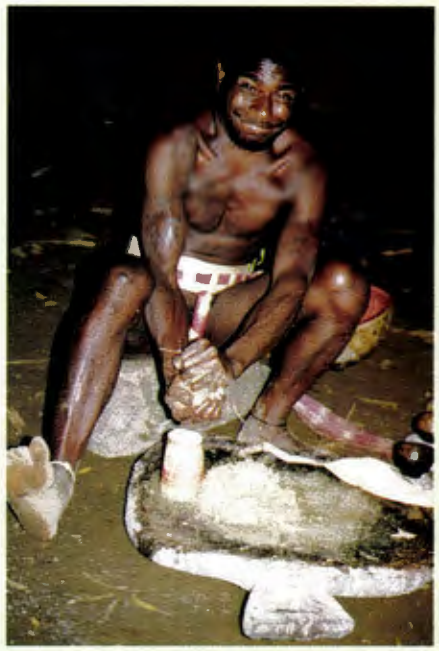
Despite the large body of literature on kava—about 850 entries are listed in a recent bibliography by Singh[2]—there has been no comprehensive review on the subject. Earlier contributions by Keller and Klohs[3] and Shulgin[4] were selective in treatment and dealt primarily with chemical and pharmacological aspects. The monograph by Steinmetz[5] remains a standard reference but some of the information in it has become dated. There are three excellent additions to the recent kava literature, by Lebot and Cabalion,[6] Brunton,[7] and Lebot *et al.*,[8] which are significant contributions to the subject. A recent popular publication has been written by Kilham.[9]

This review provides an updated and a multidisciplinary overview of kava. It was prepared on the basis of the author's personal experience—he is a native of Fiji and lived in that country for about 30 years—as well as the relevant literature listed in the Singh[2] bibliography and some more recent publications.

Oceania is the term for the island communities of the Pacific Ocean encompassed by Polynesia, Melanesia, and Micronesia (see map on page 41). According to some authorities, Oceania is one of the few culture areas (another being most of North America) not to have had alcoholic beverages by the time of the first significant contact with Europeans in the 18th century. However, since the beginning of recorded history for this geographic region, most of the islands did possess the drink kava. Like alcohol, it had acquired important symbolic meanings; associated with it were a large number of rules and procedures for its preparation, distribution among participants, and consumption.

Previous page: Illustration of **Kava,** *Piper methysticum*, Forst. from the third volume of Delessert's *Icones selectae plantarum*, Paris 1837. Courtesy of Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA.
Kava decorated for exchange, celebrating a boy's circumcision. Iakwurakau village, Tanna, Vanuatu, 1982.
Courtesy of Lamont Lindstrom
Above: Photo of *Nakamal* (kava bar) signboard, Port Vila, Vanuatu, 1988. Courtesy of Lamont Lindstrom.

THE KAVA CEREMONY



The method of preparation, distribution, and all other attendant details have been described in great detail in various places,[16,23,84,50,13,42,25,17,11] thus only an overview and descriptions of a few typical ceremonies are presented here.

Three major types of kava ceremonies can be identified: the full ceremonial as enacted on very formal occasions, such as welcoming of royalty or highly honored guests; that performed at the meeting of village elders, chiefs and nobles, and for visiting chiefs and dignitaries; and the less formal kava circle common to social occasions.

Preparation of Beverage

The main requirements for beverage preparation are the kava stock, bowl, cup, strainer, and water. Depending on the nature of the occasion, the kava would be in the form of fine roots, or roots and stems, which are then reduced to fine particles, or commercially prepared powder.

The task of preparation and distribution of the drink is normally entrusted to specific members of the community. In Samoa, these individuals are young, untitled, and unmarried men, called *aumanga*; in Manua, kava could be made by either girls or boys, although in the "high kava" ceremony only boys were permitted to officiate.[13] In Tonga the activities have been performed by young boys under the direction of a herald (*matabule*) to the chief. After the kava stock had been scraped clean, it was cut or broken into smaller pieces before being macerated into fine particles using a mortar and pestle. At present, commercially available kava, especially in the bigger cities, is mechanically ground. However, there is overwhelming evidence in the literature that in all communities where the beverage was used, kava was at one time or another chewed as a prelude to preparation of the infusion*.

Chewing and Pounding

The chewing was normally done by young men or women[42] although there appears to be some controversy among sources as to the degree of involvement of women. Pritchard and Churchward say it was done by young girls[85,21], while Erskine found that it was the responsibility of boys.[86] According to Churchward, a man in the security of his own home might sometimes avail himself of the services of his wife, if no girls were available, but this would not be considered proper in front of strangers.[21] Even a strange girl passing by could be pressed into service.

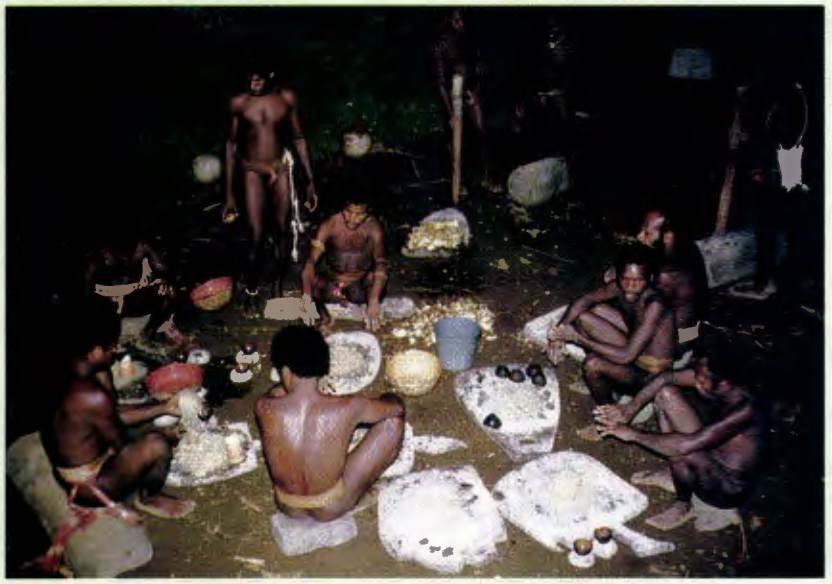
To be selected for the task, the chewers had to have good, strong teeth and jaws, clean mouths, and be free of ailments—e.g., coughs, colds, and sores. Before commencing their work, they rinsed their mouths, and sometimes their hands and fingers, with clean water.[85] Brown says they were supposed to chew kava without wetting it with saliva, but doubts whether they could succeed in this.[87] A test made by a Dr. Macgregor of Fiji, showed that six

continues on next page

...CEREMONIAL KAVA DRINKING HAS INVARIABLY BEEN THE FIRST ACT OF MOST IMPORTANT COMMUNITY FUNCTIONS



Above right and right: Ni-Vanuatu (Vanuatu native villagers) preparing kava root in a traditional manner for ceremonial drinking. Photo courtesy of Kava Kompani, Vanuatu.



Left: Photo courtesy of Kava Kompani, Vanuatu.

Below left: A leader of the Samoan community on O'ahu, Hawaii presenting kava to Hillary Rodham Clinton during 1992 presidential campaign visit. Photo by Carl Viti/The Honolulu Advertiser.
Below right: Pope John Paul II drinks kava, Fiji's national drink, during Fijian Ceremonies of Welcome at Albert Park November 21, 1986. Photo: Reuters/Corbis-Bettmann.





ounces of kava, when chewed, increased in weight to seventeen.[88] However, Mariner found it "astonishing how remarkably dry they preserve the root, while it is undergoing this process of mastication."[16] A European man, resident in Tonga long enough to have seen kava chewed, said that remarkably little saliva was mixed with the kava, and that he himself felt no difficulty in drinking kava prepared in this way.[84]

Although it was inevitable that the chewers would swallow some of the juice, they and the youths who assisted in the making were never allowed to drink the beverage after it had been prepared.[89] Undoubtedly, the chewing activity was exceedingly taxing for the mouth and jaws of the individuals concerned, so much so that "the older women who were chewers in their youth speak feelingly of the tiresome labor and great weariness of jaw incident to the older method of preparation. A desire to escape from this fatiguing duty is a traditional explanation of the old time elopement of chief's daughters."[13]

Although chewing was the prevalent method (sometimes called the "Tongan method"), there is evidence to indicate that in Fiji it was preceded by pounding or grating, called the "Fijian method."[22] According to Williams, "some old men assert that the true Fijian method of preparing the root is by grating, ... but in this degenerate age the Tongan custom is almost universal (i.e., chewing)."[90] Later, Brewster wrote that in "the beginning and middle of the past century Fiji was nearly conquered by Tongan adventurers.[67] They succeeded in introducing many of their customs, and amongst them their fashion of preparing kava. The ancient Fijian way was to pound up the roots with

The importance of kava in Oceania should perhaps be considered in the context that every culture has had its own intoxicants, narcotics, or stimulants, or both, and, in spite of their great diversity, they have had the same kind of social status and significance.[10] The kava custom so widespread throughout Oceania might be considered the one item in their material culture that linked together most of the peoples of Oceania. Besides being the social beverage for chiefs and noblemen, it was also used to welcome distinguished visitors at formal gatherings,[11] at initiation and completion of work,[12,13] in preparing for a journey or an ocean voyage, installation in office,[14] validation of titles, ratification of agreements, celebration of important births, marriages, and deaths,[13] as a libation to the gods,[15] to cure illnesses and to remove curses,[16] as a prelude to tribal wars—in fact, in almost all phases of life in the islands.[17]

The Swedish botanist Daniel Scholander and Sydney Parkinson, the artist charged with the task of making drawings of newly discovered plants, both of whom accompanied Captain James Cook on his first voyage in the *Endeavour* (1768-1771), probably were the first Europeans who saw and recorded the kava plant. However, the credit for the first detailed description of the plant is usually given to Johann Georg Forster.[18] Forster named the kava plant "*Piper methysticum*" or "intoxicating pepper," *methysticum* being the Latin transcription of the Greek *methustikos,* and derived from *methu,* which, according to Steinmetz[5] means "intoxicating drink." Since these early accounts, a large body of both scientific and ethnographic accounts on kava has accumulated. Reference to this literature may be found in three extensive bibliographies.[2, 19, 20] Additional references are included in Lebot and Cabalion,[6] Brunton,[7] and Lebot *et al.*[8]

Although kava drinking was important on ceremonial occasions, it was not confined to such gatherings. Old men often had a cup first thing in the morning and senior members of the family had a cup before (but not after) a meal.[12] A visitor often took a root of kava as a present for the person being called upon,[21] and this custom persists today.

stones." After Fiji became a British colony (in 1874), the medical officers objected to the chewing on sanitary grounds and subsequently the colonial government forbade the practice.[67,50,91] Elsewhere, similar pressures by colonizing governments and missionary influence led to the abandonment of the chewing technique in favor of pounding.[13]

Ceremonial Welcome

The most dignified of the kava ceremonies of welcome, called "high kava" in Fiji, is reserved for highly honored guests. These include visiting heads of state like presidents and prime ministers, the Queen of Great Britain and members of her family, and monarchs of other countries like Tonga. The following description is of a ceremony typical of Fiji.

All preparations of the site of welcome are done ahead of time. On arrival the honored guests are led to a raised platform with chairs for the guests, the main host, and his party. Visitors of exalted rank are often accompanied by a spokesperson or herald who sits on the floor next to him or her. Kava will be prepared in an area about 15-20 meters from the edge of the platform. Large mats made mainly from leaves of the screw pine or pandanus (*Pandanus tectorius* Sol., Fam. Pandanaceae) have been spread on the platform, in the kava preparation area, and on the path connecting the two.

The ceremony begins with the arrival of a group of young men dressed in ceremonial attire and carrying the kava bowl, the kava, and other accessories. The bowl is placed between the kava preparers and the visitors, with the suspen-

continues on next page



Above: Kava ceremony for local political leaders. Courtesy of Sarah Wolf.

KAVA IS THE ONLY WAY TO WELCOME AN IMPORTANT VISITOR





Far left: Mrs. Lyndon Johnson accepts kava. October 1966. Photo by Y. R. Okamoto. Left: President Lyndon Johnson taking kava at same ceremony. Photo by Frank Wolfe. Photos courtesy of the LBJ Library Collection.

ETYMOLOGY OF THE TERM KAVA

The term *kava* and the variant *kawa* are used for both the plant and the beverage made from it. However, some other names or variants are also encountered. In Hawaii, Tahiti, the Marquesas, and some other Polynesian areas, the initial *k* of the word is often dropped and it may become *ava* or *awa*. The Maoris, on migration to New Zealand, did not find the kava plant in their new environment, so they applied the names *kava* and *kawakawa* to a related plant (*Piper excelsum*) much used in religious ceremonies. However, this plant was not made into a beverage.[22]

The term *kava* or its equivalent may be used in Polynesia to designate various properties of food and drink. In Hawaii, it means "bitter," "sour," "sharp," or "pungent." In the Marquesas it signifies "bitter," "sour," or "sharp." In Tahiti, the range is broad, including "bitter," "sour," "acid," "acrid," "salty," "sharp," and "pungent".[23]

A commonly held view is that kava was introduced into Melanesia from Polynesia. In some parts of Melanesia, it is probable that the use of kava has been so introduced, and that recent Polynesian influence has greatly modified an earlier method of using this substance.[22] Thus, in various members of the Vanuatu group (formerly New Hebrides), the name is the same as in Polynesia.[22] In the Banks Islands it is called *gea*, and in the Torres Islands *gi*, both of which are perhaps related to the Polynesian word.[22] Another view holds that kava may have originated in either northern Vanuatu or Papua New Guinea.[6]

In Fiji, there is a wholly different term, *yaqona*. In Fijian orthography, the letter *q* stands for the sound *ng* and hence *yaqona* is pronounced *yangona*. Lester reports that the word *qona* is used on the northwest coast of the main Fijian island of Viti Levu to denote both "beverage" and "bitter."[25] He suggests that it was to this part of Fiji that kava was first introduced and that local people supplied the name *yaqona* now used throughout the Fijian archipelago.

GEOGRAPHIC DISTRIBUTION OF KAVA USAGE

Although identified mainly with Western Polynesia, kava has been found and historically used in nearly all the Pacific islands, except

sory lug laid out in a line pointing towards the chief guest of honor. The kava is placed in the bowl and water is poured in from a special container. Very often the ceremony is accompanied by the chanting of special kava songs. The kava maker kneads the kava; when it is considered to be ready the cup bearer picks up a cup and approaches the bowl. He squats down before the bowl with knees well apart, turns his back to the guests and holds the cup over the bowl. The kava maker soaks some of the infusion in the strainer and squeezes it into the cup. The server who is holding the cup with both hands slowly turns around on bent knees to face the visitor, walks in this mode for a few steps, then walks upright for the rest of the way. The beverage is poured into a cup reserved for the chief guest, who holds it with both hands and drinks from it. If the whole cup is drained without stopping, everyone says *a maca* (pronounced "a matha" meaning "it is empty") and clap three times with cupped hands. The cup bearer now returns to the bowl and proceeds to serve the person next in rank or importance, but without the same ceremony. At such occasions the distinguished visitor may also be presented with gifts of the whale's tooth (*tabua*), large kava roots, tapa cloth, fine mats, dead pigs, yams, and other crops.



The Yaqona Ceremony (Kava Ceremony). Photo © and courtesy of the Fiji Visitors Bureau.

Kava Ceremony in Villages

The ceremony performed in the villages has invariably been the initial act of almost all important community activities. Although less formal than that encountered at ceremonial welcomes, strict protocol still needs to be followed with the preparation and distribution of the beverages. The following describes a typical Samoan ceremony at a village council meeting to discuss the reconstruction of the village guest house which had recently been blown down by a hurricane. This account is derived from a description by Holmes.[92]

After the Chiefs and Talking Chiefs are seated on the periphery of the circular council house (such structures traditionally do not have walls) and the *aumanga* (the society of untitled men) has taken its position outside in tight rows, the council members are welcomed by the orator who presides over the gathering. The kava ceremony begins with the orator selecting a kava root from the many presented to him. A member of the *aumanga* cuts it into small pieces and pounds it into pulp using a stone mortar and pestle reserved for this purpose. Meanwhile, other *aumanga* members wash a multi-legged wooden kava bowl and bring clusters of cups filled with cool, fresh water.

An air of reverence prevails while the preparations are being made. Chiefs speak in whispers and no one smokes. At a location near the back of the council house, some *aumanga* members position the kava bowl and sit behind it, with a kava maker in the center. The kava powder is placed at the bottom of the bowl, which is then half filled with water. The fibrous strainer made of hibiscus bark is laid over the kava, which is then collected into it. The strainer with the kava in it is raised above the bowl and wrung dry of the infusion three times. The entire process is repeated two more times. The pulp-filled strainer is now thrown out of the house to a waiting strainer cleaner who removes the kava pulp by several snaps of the strainer. It

for New Zealand, New Caledonia, and most of the Solomon Islands, although it is now being used in some of these areas. A survey of the available literature establishes the presence of kava in nearly all the island groups of Oceania. The map on page 41 shows the location of most of the islands in the Pacific Ocean on which kava has been found or used.

The Hawaiians placed great importance on kava drinking as late as the end of the last century.[26] Titcomb states that the kava custom was highly esteemed in Hawaii because it was a sacred drink of great significance in many phases of Hawaiian life.[27] Outside of water and coconut milk, no other drink was known. Its effect was to relax the mind and body, and it was used by farmers and fishermen alike for this purpose. Medical *kahunas* (or learned men) had many uses for it. It was customary for chiefs to drink it before meals, commoners also if it was obtainable. At one time, commoners were subject to penalty of death if caught drinking kava. Kava drinking was essential on occasions of hospitality and feasting, and was the drink of pleasure of the chiefs. However, the sale and use of kava rapidly decreased from the beginning of this century.[153] Titcomb notes that in 1903 "no Hawaiian went home from the Saturday market without an 'awa' root tied to his saddle."[27] In 1930 *awa* was still to be purchased in the market. Missionaries discouraged drinking of kava and were responsible for discontinuation of its use by Hawaiians. By 1948 the practice had completely disappeared, although the plant continues to grow in the wild.

The resurgence of kava drinking on the Vanuatu island of Tanna in the early 1940s may be related to the ritual of the John Frum cargo cult, that arose partly as a repudiation of the teachings of the Christian missionaries.[28] Kava in Vanuatu is drunk socially and ceremonially, and the plant is recognized as a remedy for a number of physical ailments. Previously kava was not use in ceremonies.

Historically, the most important centers of kava usage were Fiji, Samoa, and Tonga. In these countries it was consumed not merely as a beverage but as the focus of an elaborate system of social ceremonials and rituals, and also had certain important magico-religious aspects. In the last few decades kava has begun to resume

is then thrown back into the house and the steeping process is repeated until most of the kava residue has been removed. A generous stream of kava is now showered down from the strainer into the bowl to allow the chiefs to judge if the kava requires more water. If not, then it is announced that the kava is ready and the assembled chiefs clap their hands, not as applause, but for protocol.

The order in which the kava is served is of vital social significance. The Chief of highest traditional rank drinks first, then the highest ranking Talking Chief. The cup is then passed to the second ranking Chief, the second ranking Talking Chief, and so on down the elite hierarchy.[92]

Informal Kava Drinking

By its very nature, informal or secular kava sessions have no set procedures or rituals to be followed, and depend on the circumstances of the occasion and the whim of the group participating. However, some factors always play a prominent role. For instance, the sacred nature of the beverage warrants that its preparation and use are always done with respect and its distribution is more often than not preceded by the pouring of a libation. Traditionally, *tanoas* (ceremonial kava bowls) have been used as mixing bowls. Recently, however, basins and even plastic buckets started replacing them, and this led to a sharp rebuke from some chiefs in Fiji.[93]

Although kava parties may be used to resolve less amicable situations, such as conflict and enmity, their major role undoubtedly is to serve as a social "mixer." Typically participants gather at a house or outside, sitting cross-legged in a circle around a kava bowl, with the kava maker at the head of the circle. Someone pounds the kava, which is then mixed with water in the bowl according to traditional procedures but without much ceremony. Often a bark strainer is used to separate out the debris. When a piece of cloth is used as a strainer, it is spread out and the dry kava powder placed in it before immersion into the water. When ready, the kava is served in a coconut cup, proceeding clockwise or counterclockwise around the circle. No precedence is followed unless someone of importance is present. Serving is anticipated for each individual by clapping of hands of the others in the circle. The server then waits patiently in front of each drinker until he has finished. Drinkers usually utter some stylized salutation, then down the contents in one draught.[51] Such kava parties may be held in the afternoon, or even in the morning, but most frequently they begin in the early evening and continue until late at night or even the next morning.



Kava plant, *Piper methysticum*. Photo by Yadhu N. Singh

*For details, see Samoa,[85,21,23] Tonga,[84,42] Marquesas,[94] Rotuma,[42] Tahiti,[61,95] Wallis,[35] Fiji,[25,50] and Hawaii.[25]

some of its earlier importance. This may be closely linked to the gaining of political independence and the subsequent reassertion of ethnic values and customs which were somewhat suppressed or discouraged during the colonial era.

Kava was drunk in the Solomons on the islands of Vanikoro and Utupua,[21] but it was unknown in the Santa Cruz islands.[20,29] Men drank kava at burial ceremonies but not on other occasions. The only island in the Solomons group reported to have contemporary knowledge of kava and its uses is Choiseul, where some islanders claim it is used medicinally.[31]

During the last century, kava was grown on all the islands of the Cooks group, but the infusion, prepared from the root of the plant, did not have the same ceremonial significance as it had in Western Polynesia.[32] However, it is now impossible to locate the plant on these islands, and all practices related to it have completely disappeared.

Scarcity is the reason sometimes given for the fact that in Tahiti kava drinking was only indulged in by the chiefs.[33,34] Although the kava root was scarce and little used in Tahiti, in the other Society Islands (or French Polynesia) there were great plantations of it.[18] This suggests that it was probably a lack of desire rather than of supply which limited kava drinking by the natives of Tahiti, as they could presumably have obtained supplies from the other nearby islands if they wished.

On Wallis Island the position of the kava ceremony was as highly esteemed as anywhere else in the Pacific.[35] All official decisions concerning the community's administration, such as promotions, official takings of possessions, and proclaiming of laws and codes of conduct were made at such ceremonies. The kava root was often used in reconciling with enemies or in preserving the goodwill of kings and chiefs. Indeed, guilty persons often owed their pardons and sometimes even their lives to it. In the neighboring island of Futuna kava was used to express friendship and to allay fear. Mangeret notes that once, on the arrival of a French ship, the native people, fearing vengeance for the murder of a missionary a few months earlier, presented the captain with an enormous kava root.[35]

BOTANICAL CHARACTERISTICS OF KAVA

The kava plant is a robust, fairly succulent, well-branching and erect perennial shrub belonging to the family *Piperaceae*. It thrives at altitudes 150 to 300 meters (m) above sea level and grows well in stony ground, both cultivated and in the wild.

Plant Description

When cultivated, the plant is usually harvested when it is about 2 to 2.5 m tall, but in warm humid conditions and with much sunlight, the plant grows densely to heights of up to about 6 m. The leaves are heart-shaped, pointed, and smooth and green on both sides, being about 15 cm in length (see photo page 39 and Figure 1 below). The spaces between the stem joints (the internodes) are sometimes used as a basis for the native names of the species, with the intensity of leaf color, the color of the stems, and the quality of the root also serving this function.[78,27] For about 60 cm or so just below the ground the root may become 5 to 8 cm thick at maturity, which occurs 3-5 years after planting. The roots may eventually become a heavy knotted mass (see photo page 45), highly prized in the past, because the root is said to gather strength and flavor with age.[27]

Cultivation

In the past, when only the root was used, the whole plant was dug up and the tops removed, leaving part of the stem attached to the root. The mass of roots was then split up into convenient portions. Two internodes of the stem were left attached to large pieces of roots to form the *tungase*, used as a handle during a presentation of the root to visitors of rank.[48]

Varieties

The various characteristics of the kava plant, such as the intensity of the green leaf color, the color of the stems, etc., are by no means constant. It is on the basis of such differences that the varieties of Kava were classified by the native people. Handy lists 14 different varieties previously described in Hawaii: *apu, liwa, ke'oke'o, kumakua, kuaea* or *nene, makea, mamaka, mamienie, mo'i, mokilana, papa, papa ele'ele, papa kea* and *kau la'au*. Handy's descriptions of some of these varieties might help to illustrate the bases for the subdivisions:

apu, long joints and dark green stalk.

makea, long internodes and lighter green than *apu*.

liwa, short joints and green stalk.

mo'i, short and dark green internodes; the nodes are somewhat whitish.

papa, short internodes and spotted stalk.[78]

There is evidence that in Hawaii and elsewhere varieties of kava differed enough to make some preferred for one purpose, some for another. For instance: Only the most common variety could be used by the commoner, the rarer kinds being reserved for the chiefs. For the gods and on ceremonial occasions the *mo'i, liwa*, and *papa* were used, the *papa*, from which the *mo'i* was often an offshoot, being especially offered to female deities.[79]

Brown lists 21 varieties from the Marquesas and includes short descriptions for some of them.[80] Parham lists and describes five Fijian varieties, three white and two black types.[81] All five varieties are still available and used at the present time.

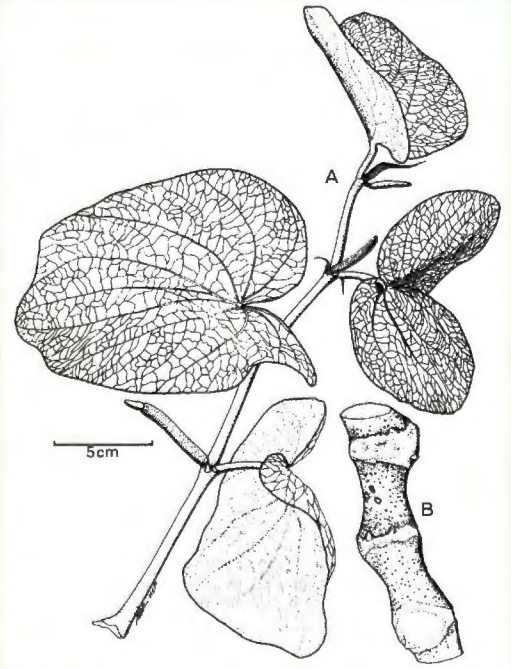
white varieties - *kasa leka, kasa balavu* (*yalu*) and *qolobi*

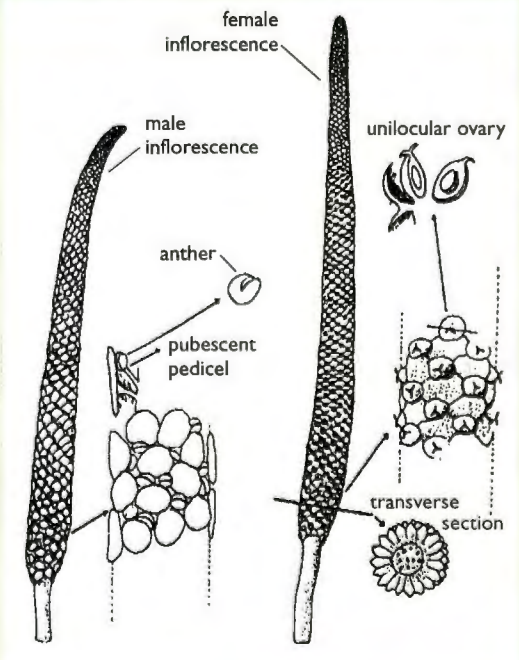
black varieties - *kasa leka* and *kasa balavu*.

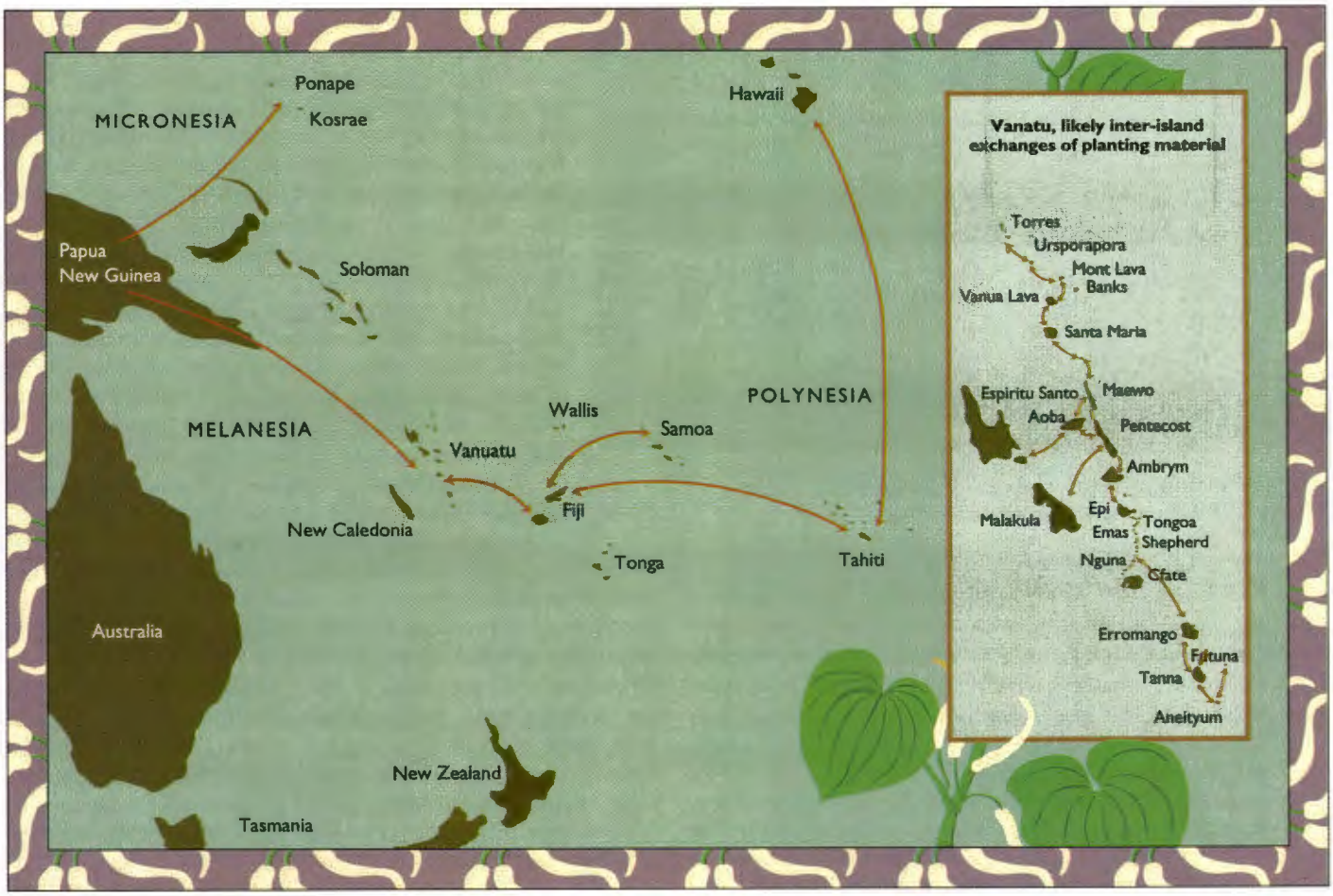
The white varieties are considered best, but they take longer (at least four years) than the black varieties (2 1/2 to 3 years) to attain maturity. Consequently, the black varieties are being cultivated commercially at present.

Nine separate varieties of kava have been recognized in Samoa.[45] VanVeen has described at least two varieties in Western New Guinea, and he maintains that a "small green variety had much stronger narcotic [*i.e.*, sleep-inducing] action than the tall red variety."[82] The green variety was chemically analyzed and found to contain more dihydrokawain (one of the main active ingredients) than the red variety. Serpenti reports that on the island of Kolepom in New Guinea, where kava is known as *wati*, five varieties are known: *kuraka, dikoje, namuru, kwadarre*, and *ikawati*, but the intoxicating effect of each is different.[10] On Ponape, two kinds of kava have been recognized—a "spotted branch" and a "smooth branch," the former being better liked because of the stronger drink made from it.[83] More recently, 72 different varieties, each known to traditional growers by vernacular names and said to have different properties, have been reported from Vanuatu.[66]

Right: Figure 1.
Far right: Figure 2.







Geographical distribution and likely dispersal of the species, *Piper methysticum*. Inset shows likely inter-island exchanges within Vanuatu of planting material. Compiled from information from *Kavas of Vanuatu* by Lebot and Cabalion, 1988.
Map by Jan Milstead for *HerbalGram*.

Tikopia is perhaps the most famous of the Polynesian outliers (i.e., islands which lie in Melanesia but whose people are Polynesian in origin), mainly because of the extensive work done there by the renowned anthropologist Sir Raymond Firth. In Tikopia the use of kava differs radically from its use in other areas of the Western Pacific. Firth contends that "historically there is little doubt that the kava rites of Tikopia belonged to the same general series as those of Tonga, Samoa and Fiji and may well have been imported from that area."[15] In Tikopia kava was and still is very rarely drunk. Most of the liquid is poured away in libations, and the remainder usually emptied out on the ground before the bowl is wiped clean.

IN MANY PARTS OF THE PACIFIC, IT WAS GENERALLY THOUGHT THAT KAVA, TAKEN JUDICIOUSLY, HAD A BENEFICIAL EFFECT ON HEALTH.

The Australian Aborigines had no contact with kava until the early 1980s when they learned about it from missionaries who came to their communities from Fiji, Tonga, and other kava-growing societies of the South Pacific.[36] At about the same time Aboriginal leaders visiting Fiji and Polynesia were impressed with the kava ceremony and advocated kava use in their own communities as an alcohol substitute.[37] Soon thereafter kava was introduced from Fiji to Aboriginal communities in Northern Australia and rapidly became a substance of abuse,[36, 38] probably because of a lack of ceremonial or traditional restraints controlling its use. Estimates for individual consumption have ranged as high as 50 times the amount habitually consumed in the Pacific Islands. Some reports contend that kava abuse has become a serious social and health problem in regions of Northern Australia[39, 40†] but these reports have been largely discredited.[153]

BOTANIC ORIGINS OF KAVA

The origins of kava usage in Oceania are not known. Kava drinking itself is much older than any written history of this part of the world,



Men bring in kava at a marriage exchange ceremony, Tanna, Vanuatu, 1979. Courtesy of Lamont Lindstrom.

and oral traditions do not seem to have brought forward relevant reliable accounts. It should be noted that at first contact none of the island communities had an alphabet, and therefore a written language of their own. Some of the hypotheses concerning the botanic origins of kava are worth considering.

According to Newell, the origin of the kava plant appears to have been in the New Guinea-Indonesia area or further north.[17] He discusses three possible ways in which the plant could have spread to Tonga and the eastern Pacific, namely: (a) by the islands being attached to a main land mass on which kava evolved and developed; (b) by drifting or being otherwise transported from island to island; and (c) by being transported by people in canoes.

THE KAVA ROOT WAS OFTEN USED IN RECONCILING WITH ENEMIES OR IN PRESERVING THE GOODWILL OF KINGS AND CHIEFS.

The first of these proposals may be discounted, as most of the islands of Oceania are of comparatively recent geological origin and consist of coral limestones or volcanic cones. The possibility that the plant or its root drifted to the various islands on which it is now found seems equally remote because of the great distances and the large number of islands involved. Thus, without completely dismissing the first two possibilities, Newell concludes that the kava root or plant was brought by early Polynesian explorers in much the same way as they brought other plants in their canoes.

The second hypothesis places the origins of the kava custom on the Asian subcontinent. In his works on the cultural origins of Polynesians, Handy proposes an alternative to the theory that the different cultures of the Polynesian area are the products of evolution within Polynesia itself, that is, of a single culture which the original Polynesians brought with them. He compares various cultural traits of Polynesians with those found in Southern China and connects the drinking of kava in Polynesia with the ancient Chinese tea ceremony.[41]

Williamson, on the other hand, thinks that the Polynesians might have originated slightly further west, in the southern parts of India.[42] In a detailed and carefully documented treatise, he argues that the kava ceremony might equally well be compared with the ceremonials, rituals, and beliefs connected with the drinking of *soma* in the ancient Vedic religion, a ceremony to which it bears considerable resemblance. He discusses many points of similarity between the kava ceremonial and the Vedic ritual.

Another theory, proposed by Rivers, holds that the kava custom was related to, or developed out of, an earlier established practice of betel nut chewing.[22] In fact, Rivers has suggested the presence of two quite distinct cultural traditions in Oceania: the betel nut culture and the kava culture. Betel nut chewing involves three separate ingredients—crushed nut of the areca palm (*Areca catechu* L. Palmae), leaves of *Piper betle* L. Piperaceae, and slaked lime—while kava requires only one ingredient. Rivers believes that partly because of this, kava drinking succeeded betel nut chewing as migrants were unable to acquire all the necessary components for the earlier habit. Rivers also thinks that kava drinking arose in part as a result of the needs encountered by the immigrants under alien conditions who found the kava root more satisfying than the betel nut. This latter suggestion is queried by Williamson on two counts.[42] First, both the betel nut and the kava plant grow in the same areas of New Guinea and Samoa, and yet, in New Guinea, kava is of little importance, whereas in Samoa betel nut chewing is virtually unknown. Second, the fact that kava is less potent than the betel nut may invalidate Rivers's reason for the immigrants' preference for kava over the betel nut.

Churchill also proposes the presence of two cultures based on the distribution of kava and betel in Oceania.[43] He suggests that these two cultures belonged to two immigrant peoples whom he calls the kava people and the betel people. The kava people settled in Southern Melanesia, Fiji, and Polynesia while the betel people did not extend in their southeasterly movement beyond the Solomon and Santa Cruz islands. However, elements of the culture of the betel people may have carried directly or indirectly to Southern Melanesia, Fiji, and Polynesia, in a minimal way, and any that does exist is probably of recent origin.[7]

LEGENDS OF THE ORIGIN OF KAVA

Kava enters into many myths and legends, many relating to the origin of the plant and the beverage. Different versions have been recorded from all parts of Oceania, e.g., Hawaii,[427, 44] Samoa,[21, 42, 45] Marquesas and Rotuma,[46] Tonga,[47] Futuna,[25] Vanuatua,[22], Fiji [25] and Tikopia[15] to name a few.



Kava plant, *Piper methysticum*, showing characteristic inflorescence. Photo courtesy Kava Kompani, Vanuatu.

In Fiji, three legends regarding kava and its origins are remembered.[25] The first refers to a root which was found growing on the grave of a Tongan leper. The second legend, which comes from the eastern Fijian islands of Lau, implies that kava was introduced into Tonga from Lau—or vice versa—because of the close proximity between the islands. The third, and probably the most important, comes from the northeast coast of Viti Levu, not far from a traditional settlement. One group of settlers, led by Degei, journeyed inland and settled near Nakauvadra. The legend is that two of the settlers killed a rooster which had awakened Degei by its crowing every morning. This action angered Degei and they fled from his wrath, taking with them samples of all of the material culture of the community with the sole exception of kava, which they left behind for Degei's use. This legend might also explain why kava was originally used only at religious rites, with its consumption limited to the chief (who was considered the mortal representative of the ancestor god) and his priests.

According to a Samoan tale from Manu'a, an island studied by Margaret Mead,[13†] Tangaloa came down from heaven with two assistants who went fishing for him. In those days there were no hooks, lines, or nets, so they had to fish with their hands. They caught a fish and brought it to Tangaloa, but he wished to have kava to drink with it. As there was none on earth, he sent them back to heaven to bring down a root of it. They, however, pulled up the whole plant and brought it down with them, and as Tangaloa scattered the superfluous parts all over the earth, they grew up luxuriantly. He wanted some water in which to infuse the kava and this was supplied by a downpour of rain. The two attendants also brought down from heaven the necessary bowl (*tanoa*), strainer (*tau'anga*), and cup (*ipu*) for preparing and drinking the kava. That is how, according to the tale, this drink of the gods was introduced to earth.[42]

In the Marquesas, the original kava was the child of their great god Atea, the provider of good seasons and rain, and patron deity of farmers. In Rotuma, in the Fiji group, the original kava was believed to have floated to the island from Samoa.[46] And on Pentecost[ΔΔ] in Vanuatu, the story is told that a man once saw a rat nibbling a root of kava, and watched it fall down and presently come back to life again. He saw this happen several times and then tried the root himself.[22]

In his monograph, *Tongan Myths and Tales,* Gifford describes four variants of a Tongan legend, one of which is outlined below.[47] The great chief Loau, who lived in Ha'amea, on the island of Tongatapu, one day sailed to the small island of Euaiki to visit his faithful servant Feva'anga. Feva'anga wished to honor his chief with



Yaqona bowl used in the kava ceremony, Fiji. Photo © and courtesy of the Fiji Visitor's Bureau

a great feast but it was during the time of a great famine. In desperation he and his wife killed and cooked their only daughter to be served to the chief. However, Loau recognized the human flesh in the food when it was served. He instructed Feva'anga to plant the food in the ground and to bring him the plant when it matured. On receiving the mature plant, Loau instructed that a drink be prepared from it and consumed with due ceremony.

EFFECTS OF KAVA DRINKING

There is some disagreement as to the taste of the kava drink. In 1903, Emerson wrote: "While tramping in the woods I have often moistened my tongue with a piece of *awa* chipped from some root, and experienced relief from thirst by its pleasant, cooling, aromatic, numbing effect in the mucous membrane of the tongue."[26]

According to Sir Peter Buck—or to use his given name, Te Rangi Hiroa—a Polynesian physician from New Zealand who often drank kava, "It is cooling, refreshing, and stimulating without being intoxicating.... Used in moderation, it is probably the best drink for a tropical climate."[48]

SHARING A BOWL OF KAVA TENDS TO FOSTER SOCIALIZING AND FRIENDSHIP

On the other hand, other reports talk of great bitterness and a burning taste in the mouth. For instance, Ellis wrote: "If an opinion of its taste might be formed by a distortion of their countenance after taking it, it must be a most nauseous doser,"[49] while Churchill observed that "Polynesians do not praise kava for its taste, it is the odor which appeals to their sense of pleasure."[23]

It is generally agreed that the first effect of drinking kava is a numbing and astringent effect on the tongue and, to a lesser extent, the inner lining of the mouth. Titcomb quotes two Hawaiians, one of whom reported, "there is a peculiar bitterness with a feeling of thickness in the mouth, so that one does not taste the deliciousness of food after chewing or drinking *awa*," and the other, "If you chew a piece in your mouth, it is sour, and very bitter. The mouth will not taste food that is eaten after."[27]

A little while after drinking, kava is found to reduce fatigue, to allay anxiety, and to produce a generally pleasant, cheerful and sociable attitude, although some other quite different physiological effects—some bordering on intoxication—have been noted in various parts of Oceania. For instance, consider the following typical accounts from Melanesia and Western Polynesia:

> It gives a pleasant, warm and cheerful, but lazy feeling, sociable, though not hilarious or loquacious; the reason is not obscured.[50]
>
> The head is affected pleasantly; you feel friendly, not beer sentimental; you cannot hate with kava in you. Kava quiets the mind; the world gains no new color or rose tint; it fits in its place and in one easily understandable whole.[51]

Thomson, in a highly prejudiced and exaggerated account, describes slightly more severe effects in this passage on "confirmed topers":

> The body becomes emaciated. The skin becomes dry and covered with scales, especially the palms of the hands, the soles of the feet, and the forearms and shins. Appetite is lost. Sleep is disordered. Eye becomes bloodshot. There are pains in the pit of the stomach. The drinker sinks into unwholesome lethargy.[30]

Compare these reports with other accounts from various locations in Eastern Polynesia. Morrison, who visited Tahiti between 1788 and 1791, wrote:

> (Kava) almost immediately deprives them of the use of their limbs and speech, but does not touch the mental faculty, and they appear in a thoughtful mood and frequently fall backwards before they have finished eating. Some of their attendants then attend to chafe their limbs all over till they fall asleep, and the rest retire and no noise is suffered to be made near them. After a few hours they are as fresh as if nothing had happened, and are ready for another dose.[52]

continues on page 46

Facing page: Villagers on the island of Tanna in the South Pacific nation of Vanuatu exchange pigs and the decorated roots of a much-prized shrub, kava, during a ritual dance festival. Photo courtesy of Lamont Lindstrom.



CHEMISTRY OF KAVA

The reported pharmacological effects of kava drinking have prompted numerous chemical investigations over the past 130 years in the search for the biologically active constituents. These investigations have resulted in the isolation of two series of closely related compounds which are either substituted alpha-pyrones or substituted 5,6-dihydro-alpha-pyrones, and some other miscellaneous compounds.

Gobley[126] and Cuzent[127] almost simultaneously reported the isolation of the first of these compounds, now called methysticin, (previously known as kavakin, kawakin, kavatin, and kanakin). In 1874, Nölting and Kopp[128] reported a crystalline material whose isolation was later repeated by Lewin[96] and who named this compound yangonin. The isolation of dihydromethysticin (DHM) was achieved by Winzheimer in 1908.[129]

Lewin's work in 1886 was followed by the most extensive chemical investigation ever undertaken on kava with the publication of 14 papers by Borsche and his co-workers during 1914-33. This work covered two new constituents, kawain and dihydrokawain (DHK) and their structural elucidation together with those of the three known components, methysticin, yangonin, and dihydromethysticin (DHM). However, Borsche and Bodenstein[130] incorrectly formulated yangonin as the 2-methoxy-4-pyrone structure. It was not until 1950 that the error was corrected by Macierewicz,[131] and independently confirmed.[132] It was finally unambiguously synthesized in 1960.[133]

Four new compounds were added to the alpha-pyrone series: 5,6-dehydromethysticin, 11-methoxyyangonin and 11-methoxynoryangonin[134], and desmethoxy-yangonin[135], together with the isolation of two pigment materials, flavokawin A and flavokawin B. These pigments have been established by synthesis to be substituted chalcones.[136] According to Shulgin[4] these otherwise biologically inactive pigments might explain the skin discoloration observed with chronic use of kava extracts.

Depending on the separation procedures employed, early attempts to establish the relative amounts of the components present in kava have yielded uncertain results. Young *et al.*[137] used spectrophotometric analytical techniques while Klohs *et al.*[135] assayed the fractions from column chromatographic separations. Based on the available data,[136,137,138,139,140] Shulgin[4] has classified the proportion of each component present as being major (DHK, kawain and methysticin), minor (5,6-dehydromethysticin, desmethoxyyangonin, DHM, flavokawin A, and yangonin), or trace (flavokawin B, 11-methoxynoryangonin, and 11-methoxyyangonin).

Renewed interest in kava has prompted chemists to develop more rapid and reproducible detection techniques for the active kava components and their metabolites. Duve and co-workers[141,142,143,144] have used a gas-liquid chromatographic technique to identify the major active constituents, to assay the effectiveness of various extraction procedures during beverage preparation, and to determine the stability of the constituents in long-term storage of dried pow-

...THESE COMPOUNDS MIGHT REPRESENT A NEW GROUP OF POTENT SKELETAL MUSCLE RELAXANTS.

Titcomb quotes a report by a Hawaiian, Kaualilinoe, written in the last century:

> There is no admiration for the body and face of an *awa* drinker whose eyes are sticky, and whose skin cracks like the bark of the *kukui* trees of Lilikoi in unsightliness. If you are drunk with *awa*, you will find your muscles and cords limp, the head feels weighted and the whole body too.[27]

Consider also Torrey's description of kava drinking in the Marquesas:

> Copious draughts cause a dizziness and a horribly distorted countenance. They lose the use of their limbs, and and fall and roll about on the ground, until the stupefication wears away.[53]

All the above observations are based on infusions, not water-alcohol extracts or other dosage forms becoming popular in the West. There are obvious and well-documented differences in the pharmacological effects observed in Eastern Polynesian societies on the one hand, and in a large group of Western Polynesian and Melanesian societies on the other. Some reasons that may be advanced to explain the differential effects are:

(a) Different varieties of *Piper methysticum* were used in different societies. Some indication has already been given of the large number of varieties available and of the differences in the strengths of kava prepared from them. For instance, the Samoan varieties are considered much less potent than those cultivated elsewhere in Polynesia.[54]

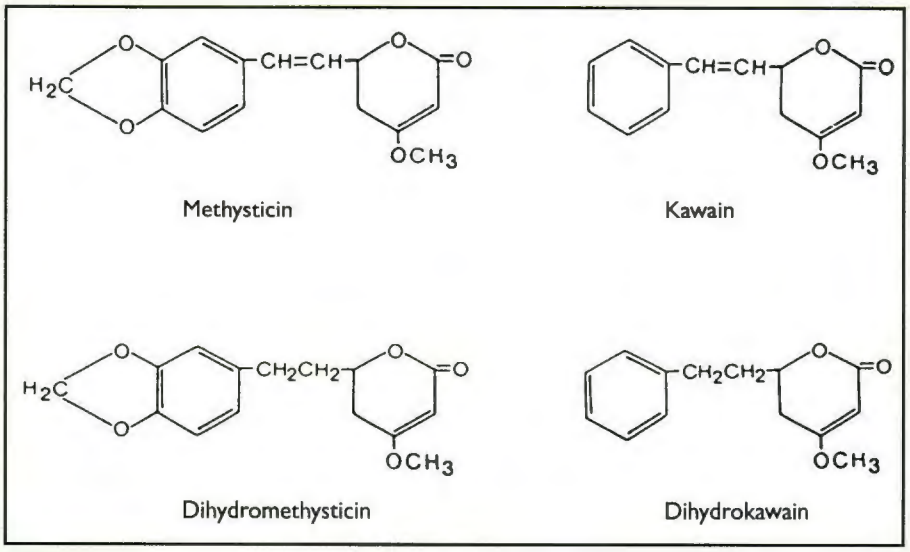
(b) There could also be differences in soil and climatic variations. Titcomb notes that certain localities in Hawaii were famous for the potent kava. She quotes the native historian Kamakau who stated that: "From of old, there were places made famous by the intoxicating qualities of their awa, for example, Ko'uko'u on Kauai, Hena on Oahu, Lanakila on Maui, and Puna on Hawaii."[27]

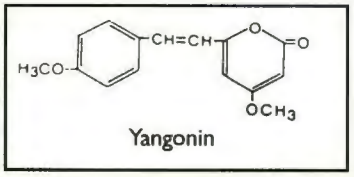
(c) The plant may be used in different states of freshness or maturity. Furthermore, the green root or stem provides the much stronger drink. Gadjusek found that islanders in Tanna and Tongariki in Vanuatu showed a distinct preference for freshly harvested roots for this reason, as do people in the Sigatoka River valley in Fiji.[55]

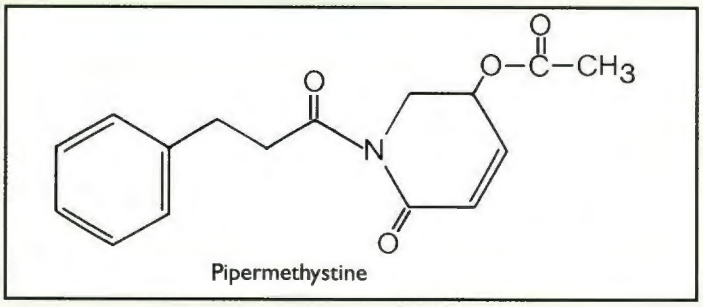
dered roots and basal stems of the plant. On the other hand, Duffield and his group employed methane chemical ionization gas chromatography/mass spectroscopy in their studies by which they were able to confirm earlier studies and identify human urinary metabolites and previously unknown trace compounds of kava.[144-147]

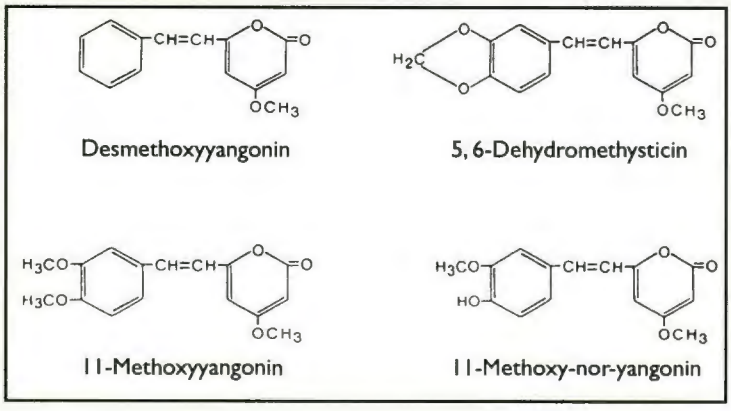
Despite earlier claims[129,149,150] that alkaloids were present in the roots, all attempts at their isolation were unsuccessful until 1971 when two amides in trace amounts were reported.[151] Recently, the isolation and structural determination of a novel alkaloid, pipermethystine, a major constituent of the leaves, has been achieved by Smith.[152] It is also present in small amounts in stems and roots of the plant, but due to its instability it had not previously been reported.

In an effort to assign biological activity to one or the other portion of the molecule, several structural modifications of the active constituents have been carried out. Pharmacological assays of the analogues in various test systems suggest certain structure-activity relationships.[153] For more detailed accounts of the chemistry and structure-activity relationships, the reader should consult reviews by Keller and Klohs[3] and Shulgin[4] and the more recent papers of Duve's and Duffield's groups[140-147].









(d) There are differences in the methods of preparing kava. The "Tonga method" and the "Fiji method" are described under the section on "Chewing and Pounding." A third method is sometimes used with the malicious intention of quickly intoxicating the drinker. For this, hot water is used to extract the kava from dry or green stock and the drink allowed to cool before serving. The effect far exceeds that of the other two methods of preparation. Obviously, the method of preparation would increase the amount of the active constituents extracted from the kava stock and hence the strength of the drink.

(e) Effects may vary according to whether or not drinkers combine kava consumption with eating. Imbibers often assume that the combination of feasting with kava ingestion may result in less debilitating effects. In earlier times, Tongans always took food with kava to prevent nausea, and Mead speaks of an invariable association of food with kava in Samoa.[13] Morrison, writing of Tahiti, says that "a gill of this juice is a sufficient dose, but if they eat anything



Nakamal (kava bar) signboard written in Bislama (Pidgin English), Port Vila, Vanuatu, 1988. Courtesy of Lamont Lindstrom



Nakutan breaks a branch from a kava plant at a dispute-settlement exchange, Samaria village, Tanna, Vanuatu, 1979. Courtesy of Lamont Lindstrom

immediately before it, it has no effect,"[52] while Holmes found that in legends describing the origins of the kava ceremony in Samoa, the *fono o le 'ava* (food for the kava) went hand in hand with the beverage.[56]

(f) The accounts of missionaries and explorers exaggerated the deleterious effects of kava drinking. This possibility should be seen in the context of the role of missions in helping shape Oceanic attitudes towards alcohol and kava. O'Brien, for instance, discusses the efforts to ban the drinking of kava and alcohol on Ponape as part of a program by the missions to gain and assert political power. He notes:

The attack on kava was much more than the general missionary dislike of alcohol. The missionaries were far less concerned with prohibiting coconut toddy or rum. Kava was singled out for special attention because of the important position it held (in the system of political tribute) in native society.[57]

(g) Different psychological attitudes towards kava drinking affected the response to ingestion of the drink. Those who expected or desired intoxicating effects were more likely to experience them, in very much the same way as with marijuana and other hallucinogens.

(h) Additives, which might have been mixed with the drink, could have produced some of the more extreme effects. The practice of adding extracts of *yaqoyaqona* (*Piper puberulum*) or the daturas (*Datura* spp.), often with a malicious intent, is still practised in some places in Fiji.

SOCIOLOGICAL ASPECTS

SOCIAL CEREMONIAL

The most significant role of kava continues to be social ceremonial. As Ford states, it is "the only way to welcome an important visitor. Sharing a bowl of kava tends to foster socializing and friendship and it is unthinkable that kava should not be a part of commemorating any important event. The practice is solidly embedded in social and political context."[11] Holmes, writing on the position of kava in modern Samoa, found that "kava drinking is without doubt the most important element of the *aiava*, the ceremony of greeting for visiting parties (*malaga*), and therefore carries much of the burden of Samoan hospitality."[56]

Present-day ceremonies of welcome in Tonga, Samoa, and Fiji invariably include the kava ceremony. President and Mrs. Lyndon Johnson were offered the kava drink on their visit to Samoa in October, 1966. (See photo on page 37) On that occasion, "Samoans who had turned out from every corner of the island to welcome the Johnsons, applauded delightedly.[87] Queen Elizabeth of Great Britain and members of her family are always offered kava on their visits to Fiji and they always drink the beverage! On other occasions, Pope John Paul II has consumed the beverage as have First Lady Hillary Rodham Clinton, former First Lady Lady Bird Johnson and President Lyndon Johnson.

However, kava is not always in the form of a drink when used in welcoming ceremonies. It appears from Friedlander's account that it was the custom in Samoa for each of the parties, both guest and host, to make a present of kava root to the other—which was accompanied by polite speeches of welcome.[59] La Pérouse reports the appearance, on the arrival of the French in Samoa, of an old man with a branch of kava in his hand, and also the throwing into the sea of several branches of kava by some natives in another part of Samoa, as a sign of peace.[60] Cook says that in Tonga it was brought out in canoes to the English ships as a sign of peace and friendship,[62] and Mariner reports an incident where a chief, visiting the island of Vavau to quell an insurrection, was met by one of the rebellious men who removed his turban, gave the chief a piece of kava root, and kissed his feet as a mark of respect.[16]

This practice of exchanging kava is still prevalent and is performed even where no chiefs or dignitaries are involved. Waqavonovono, in her study of Fijian medicinal plants, reports that she first "presented a *sevusevu*[¥] to the leader of the Y.W.C.A. group who returned the same procedure with another *sevusevu* of welcome. After several bowls of yaqona, I described to the group the purpose of my visit."[62]

In the past, ceremonial kava drinking has invariably been the first act of most important community functions. Other important ceremonial uses of kava occur at meetings for divination, pacts of revenge, before the confinement of a woman when prayers are said so that the child may be a son,[14] the naming of a child at one year of age, after seeing the shark god Sekatoa in the water, settling dis-

putes, pigeon snaring,[17] consecrating a boy child, and ceremonial initiation of girls trained in the sacred hula dancing and chanting.[63] In Tikopia, kava serves as a medium for the reaffirmation of the value of sacred symbols. Since it is used as a religious libation and not as a beverage, it is ceremonially poured out, not drunk.[15]

In less peaceful times kava was consumed by chiefs and warriors prior to battle. For example, the first king of Tonga, Taufa'ahau, incited his troops to battle by a kava ceremony,[14] and Mariner[16] describes how the head chief of a village anointed his war leader by symbolically offering the first cup of honor to him.

MEDICINAL

In many parts of the Pacific, it was generally thought that kava, taken judiciously, had a beneficial effect on health. The Hawaiians used it for many purposes—to soothe the nerves, to induce relaxation and sleep, to counteract fatigue,[27] for congestion in the urinary tract, for asthma and rheumatism, and to reduce weight.[63] They considered the leaf good as a poultice for headache or for placing under a patient to make him or her perspire to break a cold or fever. Treatment by kava for excessive fat brought the body back to normal fitness. According to Diehl, "it is a spinal rather than a cerebral depressant; it steadies the pulse, does not raise the temperature, and acts as a diuretic and a stomachic tonic. Its chief medical use is in the cure of chronic cystitis and gleet and, amongst those South Sea Islanders affected with syphilis, its stimulating and diaphoretic action was highly appreciated."[54] Harrisson found that it was formerly used extensively as "a curative in cases of gonorrhoea.[63] Kava-drinkers



Joel Iau cleans kava for chewing, Samaria village, Tanna, Vanuatu, 1992. Courtesy of Lamont Lindstrom

Australian political cartoon lampooning reports of purported kava abuse by Aboriginals. Courtesy of the *Northern Territory News*.



PHARMACOLOGY OF KAVA AND ITS CONSTITUENTS

The first pharmacological evaluation of the kava pyrones was published in Lewin's admirable monograph but because limited quantities of pure compounds—methysticin and yangonin—were at his disposal, his data now is deemed of only historical significance.[96] At any rate, they are worth noting. Methysticin was found to be inactive when injected intraperitoneally (i.p.) in doses of up to two grams in both warm- and cold-blooded animals. Yangonin, being available in even smaller quantities, could be tested only in two frogs in oral doses of 0.05 g with no observable effects.



Kava root, *Piper methysticum*. Photo ©1997, Steven Foster.

The bulk of Lewin's experiment was carried out on resin remaining after the crystallization of methysticin and yangonin. It produced paralysis in frogs and showed a local anaesthetic action. In experiments with a bat, a sparrow and a pigeon, it caused the loss of use of the wings, the animals appearing to be deeply sedated. Subcutaneous injection of the resin in cats resulted in deep sleep with obvious local anesthetic activity, but when given orally, only salivation and vomiting were noted.

Borsche and Blount came to the conclusion that none of the kava pyrones known at that time (i.e., methysticin, dihydromethysticin [DHM]), yangonin, dihydrokawain [DHK], and kawain), possessed the biological activities reputed to be present in the crude preparation.[97] The possibility that the active principle might be present in the unsaponifiable fraction could not be substantiated, as the solubility characteristics of the fraction did not allow for biological testing. In a pharmacological investigation carried out about this time, Schübel found the kava resin to have a weak sleep-inducing action, to paralyze sensory nerves and to first stimulate, then paralyze smooth muscles.[98] The hydrolysis products of this resin also showed similar actions. The local anesthetic action was attributed to compounds containing benzoic and cinnamic acid residues. In experiments in the isolated frog heart, Schübel showed that incubation of the kava root with human saliva increased the potency of kava extract. He attributed the increase in activity to the enzymatic breakdown of starch in the root, which in turn led to a more efficient extraction of the active materials. However, Schübel was unable to demonstrate any pharmacological activity when the pure compounds yangonin and methysticin were administered to rabbits, pigeons, or frogs.

Van Veen employed pigeons, monkeys, and rice birds to follow the active principles of kava in his isolation procedures.[99] Preliminary results indicated that rice birds were overly sensitive to the crude extracts, and monkeys too resistant. Pigeons were thereafter used for routine assays. Eight to fifteen minutes after administration of the extract, the pigeons became sleepy and atactic—unable to coordinate movements. A deep sleep then set in lasting from two to ten hours. The birds appeared to be fully recovered upon awakening. Monkeys

very seldom get gonorrhoea. If they do, the kava itself cures it in time, always keeps it under control."

According to Titcomb, Hawaiian medical men (*kahunas*) made extensive use of kava for the cure or alleviation of such ailments as "general debility, especially in children," "weary muscles...a great restorer of strength," for "chills and head colds," "difficulty in passing urine," "sharp blinding headache," and for children having a "disorderly stomach and... thick, white coating on the tongue."[27] Other disorders for which kava was recommended and used included "lung and kindred troubles," "weaknesses arising from certain conditions during virginity," "displacement of the womb," and as "a poultice for boils." Jarret notes that "it was extensively used in Germany previous to the World War, in the manufacture of certain drugs and medicines,"[65] and Emerson mentions kava as an article of export, noting that its "value as a drug is in the preparation of remedies for urinary troubles."[26] In Tanna, where custom ascribes to women a mysterious power which may destroy the potency of kava, Tannese women drink it medicinally, and give it to their children (a one-teaspoon dose is considered to cure whooping cough); its power then seems unimpaired.[66]

MAGICO-RELIGIOUS

In addition to its social ceremonial uses, kava has been employed for a number of magico-religious purposes. One of the most important of these was the pouring out of libations of the beverage to the gods, although in some cases the symbolic offering of kava root was substituted. Turner notes that in Samoa the head of a household, at the beginning of the evening meal, would pour a little kava onto the ground or around the edge of the mat as an offering to the gods.[12] In pre-Christian days in Fiji, the first cupful was poured out at the foot of the main kingpost of the *bure* or tribal hall.[67] At formal kava parties, the first cup was always proclaimed by the priest as being for the gods.[22, 68, 69] Often the names of ancestors were also invoked at this time. Mariner also refers to a Tongan custom whereby a small piece of kava root was left before a consecrated house or grave, out of respect either to a god (or gods), or to the departed spirit of a

required three to five times the dose used in pigeons. An effective dose caused initial loss of limb control, followed by sleep within fifteen to thirty minutes which lasted for 15 hours or longer. Purified fractions gave a maximal effect when administered in an oil or lecithin-water emulsion, suggesting that chewing the root and admixing saliva produced emulsification and thus promoted activity.

Van Veen succeeded in isolating an active fraction from which he reported a crystalline material that he called *marindinin*. He subsequently demonstrated that marindinin was a slightly impure form of DHK, a compound found by Borsche to be physiologically inactive. Van Veen also tested the purified DHK and showed that the physiological activity he had earlier demonstrated was indeed due to this refined material and not to the impurity.

More recent work has confirmed the activities of the kava pyrones. Hansel and Beiersdorff showed that DHK and DHM both appeared to be active in causing sleep in white mice and white rats when administered orally by a stomach tube as an emulsion.[100] Meyer, Oberdorf, and Seifen reported that DHK and DHM had sedative activity when administered i.p. or orally to mice, rats, rabbits, and cats.[101] Higher doses led to a marked ataxic phase followed by loss of the righting reflex (an animal's ability to regain normal posture on all four limbs when artificially forced onto its back). When administered to mice as peanut oil solutions, both DHK and DHM produced sedation, hypothermia, and a corresponding reduction in total oxygen consumption. Recently, Jussogie and coworkers have suggested that the sedative action of kava pyrones might be mediated through their effects on GABA, receptor binding site.[102] However, Davies *et al.* detected no significant interaction between kava pyrones and GABA or benzodiazepine binding sites.[103]

In unanesthetized rabbits, blood pressure was only slightly reduced.[104] These findings, however, could not be duplicated by Keller and Klohs[3] and are reminiscent of the contradictory evidence of Borsche and Van Veen mentioned earlier.[97,99]

Later, Meyer demonstrated that the most characteristic central nervous action of all kava pyrones was their ability to produce a muscular relaxation in all species of laboratory animals.[103] The pyrones have also proved to be considerably more effective than mephenesin in protecting mice from convulsions and death caused by toxic doses of strychnine. Thus, these compounds might represent a new group of potent skeletal muscle relaxants. Larger doses produced ataxia and an ascending paralysis without loss of consciousness, followed by complete recovery. In doses causing muscular relaxation, the pyrones did not possess a curare-like action on the neuromuscular function.[106] Death after large oral or i.p. doses was the result of respiratory failure. In addition, the pyrones reduced experimentally produced edema. Experimentally induced contractions of isolated ileum or uterus were inhibited by the pyrones.[105]

Klohs *et al.* studied the effects of the ground root of kava, a chloroform extract obtained therefrom, and several of its crystalline constituents on the central nervous system as determined by their ability to antagonize clonic strychnine convulsions and death in mice,

continues on next page

THE ACCOUNTS OF MISSIONARIES AND EXPLORERS EXAGGERATED THE DELETERIOUS EFFECTS OF KAVA DRINKING.

relation or chief.[16] On some of the outlying Tongan islands a piece of scraped kava was thrown into the sea when invoking the shark god Sekatoa.[42]

Reference was made earlier to the presumed absence of kava drinking by Niueans, probably because of its scarcity; whatever material was available was reserved for the inspiration of their priests.[69]

In Hawaii, a major function of the *kahunas* was to establish communication with the gods. These priests were experts of religious practice, with knowledge of what to offer, what prayers to use, and what interpretations to place on portents.[27] Of the offerings made, kava was thought to be the most important to propitiate the favor of the gods. Root, beverage, and leaves were all suitable, while one exceedingly powerful offering was a "complete" kava—that is, a plant with one root, one stem, and one leaf.

Among the orders of priesthood in Hawaii, there were three which were particularly dreaded—those who prayed victims to death, sorcerers, and those who sent evil spirits on errands of death.[27] Of these, the last named used kava exclusively. In Fiji, kava has also been used both in sorcery and witchcraft.[25] If an individual desired the death of his neighbor, he recruited the services of a sorcerer who prepared kava and poured a libation on the grave site of an ancestor of the intended victim. The ceremony was repeated after the victim was dead. In many parts of Fiji kava is considered to have the gift of healing. If a child is sick, a piece of the kava plant is suspended from the roof of the house in full view of the patient. It is claimed that after two or three days normal health would be fully restored.

CLINICAL STUDIES

Mathews and coworkers have assessed the effect of kava usage on the physical health status of a group of Australian Aborigines.[40] (Subsequently, this research was discredited as being politically motivated by commercial alcohol interests to pressure a government ban of kava.[153]) The study found a correlation between the extent of kava usage and a number of abnormal medical symptoms in these individuals, including scaly skin rash, increased patellar reflexes,

cause fall-out in roller cage experiments, and potentiate sodium pentobarbital-induced sleeping time.[107] The crude extract, methysticin, and DHM were particularly effective in affording protection against the lethal effects of strychnine, while yangonin and dihydroyangonin (DHY) were practically without effect. Kawain and DHK were only moderately effective. All of the compounds increased pentobarbital-induced sleeping time with DHM being the most potent agent. Using "fall-out" from revolving (roller) cages as an index, none of the crystalline compounds had significant activity. This was in sharp contrast to the ground root and the crude extract. On the basis of these results, Klohs *et al.* proposed the presence of a synergistic action for the individual compounds when administered in combination.[107] An indication of a synergistic effect was also found by testing a mixture of kawain, DHK, methysticin, DHM, yangonin and DHY against strychnine convulsions and death. The amounts of the compounds tested were in the ratio in which they were isolated from the crude extract. The mixture showed a potency similar to that of DHM. Since this agent represented only about 5 percent of the mixture and since the other constituents were less potent or inactive, a synergistic effect of the mixture or increased absorption of individual components are likely explanations. In agreement with Klohs *et al.*, Meyer reported that the activity of yangonin and desmethoxyyangonin (given i.p.) in preventing mice from maximal electroshock seizure was markedly increased when given in combination with the other kava constituents.[107,105] An interesting observation was recently made by Backhauss who found that kava extract, methysticin, and DHM, but not the other pyrones, protected against tissue damage in experimentally induced ischemia in rat and mouse brains.[108]

Recently Keledjian *et al.* have measured the rate of uptake into mouse brain tissue of kawain, DHK, yangonin, and desmethoxyyangonin,[109] all of which are reported to be active as anticonvulsants against maximal electroshock seizures when tested in mice.[105,110] They found that maximal brain concentrations of kawain and DHK occurred five minutes after their i.p. injection. Previously, Meyer showed that the peak effect of the two compounds in protecting mice from maximal electroshock seizure occurred after 10 minutes.[105] Therefore, the brain concentrations correlated well with the centrally mediated pharmacological actions.

Duffield's group showed that both pyrone-free and lipid soluble kava resin fractions reduced amphetamine-induced hypermotility and conditioned avoidance responses in rats and mice.[111] However, the kava effects were slight compared to that of the standard antipsychotic drugs chlorpromazine and haloperidol. This group also found that the anticonvulsant effect of the aqueous extract againt strychnine was very slight.[112] The kava resin produced hypnosis, analgesia, and a local anesthetic action. Overall, the pharmacological effects of kava appeared to be mainly due to the activity of the compounds present in the lipid soluble resin fraction. In the cat, the preferential site of action of the kava extract and the pure compound d,l-kawain appears to be the amygdala complex.[113] According to them, the participation of these structures in modulating emotional processes may explain the promotion of sleep by kava.

Frater also observed the effects of kava on the nervous system of human subjects.[72] Following the consumption of six pints of an infusion (no defined concentrations were mentioned in the studies) over a two-hour period, the subjects looked sleepy, their eyes were slightly bloodshot and definitely watery, with the pupils enlarged and reacting only slowly to light. Speech was only slightly affected. The subjects were able to walk in a straight line and could still run up the stairs two at a time. In an effort to assess the effects on alertness, and on speed of access of information in long-term memory, Russell, Bakker, and Singh showed that kava has no effect on the reaction times or errors in two groups of native drinkers who consumed doses thought usual or greater than those associated with social functions.[114] In a study on the visual effects produced by kava, Garner and Klinger noted a reduced near point of accommodation and convergence, an increase in pupil diameter and disturbance to the oculomotor balance.[114] However, no changes were recorded in visual or stereoacuity, or in ocular refractive error.

The local anaesthetic action of the pyrones originally observed by Lewin, Schübel, and others early this century has been re-investigated.[96,98] Frater showed that a thin paste of kava powder, when applied to the mucous membrane of the lip, produced a slightly burning sensation and a feeling of numbness.[72] With a pin-prick test there was a



Talmweren chews kava for his father, Samaria village, Tanna, Vanuatu, 1979. Courtesy of Lamont Lindstrom.

underweight, reduced levels of albumin, plasma protein, urea and bilirubin, decreased platelet and lymphocyte count, shortness of breath and pulmonary hypertension. On the basis of the above observations, these workers recommended urgent social action to improve the health in Aboriginal communities by reducing kava consumption and improving the nutritional status of kava users.

Although the effect of chronic drinking of traditionally prepared kava beverages (as distinct from water-alcohol extracts) on the skin has been mentioned in many reports,[27,30,44,71] there have been only two reported attempts, those of Frater and Ruze, to understand the pharmacological basis for it and to search for a cure.[72,73] The lesion in question, called *kani* in Fijian, requires regular, almost daily, consumption of kava before it appears, and takes from a few months to a year or more to develop. The skin becomes dry and covered with scales, especially the palms of the hand, the soles of the feet, and the forearms, back, and shins. Frater, working with Fijian subjects, came to the tentative conclusion that *kani* was caused by an interference by kava with the normal uptake and assimilation of some of the B group vitamins. The condition could be reversed, even in the most serious cases, by a reduction in kava consumption and a balanced diet.

In her study, Ruze selected 29 male Tongan kava drinkers, all of whom showed the characteristic skin lesions. Fifteen of these individuals were randomized to receive a dose of niacin (or nicotinamide) vitamin, while the remaining 14 received a placebo containing no active ingredient. After three weeks, clinical

slight impairment of feeling as compared with the rest of the lip. When some root was chewed for 15 minutes, however, the degree of anesthesia was greater, leading him to conclude that there was a definite local anesthetic effect. In another study most of the kava pyrones inhibited frog heart contraction.[116] These actions were compared with those of cocaine which showed a similar protection against ventricular fibrillation through its local anesthetic effectiveness. More recently, Singh examined the effects of whole kava extract on muscle contractility and neuromuscular transmission, using twitch tension and electrophysiological techniques[115]. He found that the extract caused muscle paralysis by mechanisms similar to local anesthetics like lidocaine. These observations are supported by the recent finding that kawain, like the common local anesthetics, blocked voltage-dependent sodium ion channels.[118]

The antimycotic (antifungal) properties of some of the pyrones have been investigated.[119,120] A large number of Gram-positive, Gram-negative, pathogenic and non-pathogenic bacteria were found to grow uninhibited in nutrients containing the pyrones, indicating they are not bacteriostatic in nature. However, some of the pyrones showed remarkable fungistatic properties against a wide genera of fungi, including some which are pathogenic to humans.

Since the bulk of the pharmacological work has concentrated on the water-soluble pyrones, Buckley, Furgiuele, and O'Hara investigated the biological activity of the water-soluble fractions of kava obtained by steam distillation.[121] They found that the two fractions so obtained contained biologically active materials which were relatively free of any pyrones. These materials suppressed spontaneous activity in test animals and at higher doses led to muscular relaxation previously seen with the pyrones. In addition, one of the two fractions exhibited an anti-serotonin activity similar to that of DHM.

Recent investigations by Lebot *et el.* into the relative proportions of the various pyrones in kava has shed a tremendous amount of light on the origin of kava and its chemistry which has been modified through native selection of individual plants. Lebot found that the chemical makeup of kava, and not its outward appearance, correlated with ethnobotanical use. Pharmacologically driven selection appears to have created chemical variations of kava far removed from its wild ancestor.[8]



Kava leaf, *Piper methysticum.*
Photo ©1997, Steven Foster

improvement was observed in five members from each group. These findings led Ruze to conclude that niacin vitamin deficiency was not responsible for the skin condition associated with excessive kava consumption since treatment with the vitamin did not produce an effect significantly different from control.

In a 1996 randomized placebo-controlled double-blind study two groups of 29 patients were treated with a standardized special extract made from kava rhizome or placebo. The dose was 100 mg. of dry extract standardized to 70 mg. kava lactones three times daily for four weeks. The study concluded that the kava was clinically

THE KAVA CUSTOM HAS BEEN SO WIDESPREAD THROUGHOUT OCEANIA THAT IT MIGHT BE CONSIDERED THE ONE ITEM IN THEIR MATERIAL CULTURE THAT LINKED TOGETHER MOST OF THE PEOPLES...

effective in reduction of states of anxiety, tension, and excitedness of non-mental origin. No adverse reactions were noted.[154]

CONCLUSIONS

Kava continues to occupy a central place in South Pacific communities, and its importance there recently has increased with the surge of interest in the ethnic culture and customs of the native people. Kava products are sold in the U.S. in many health food stores, Polynesian grocery stores, by mail order, and now in mass market outlets. Because of its reputed lack of addictive properties, legal availability, and claims by various authors (it induces "deep restful sleep and clear, epic-length dreams,"[74] "enhances psychic powers and visions,"[75] and "relieves insomnia and nervousness")[76] and because it has been recognized by European health authorities as a relatively safe remedy for anxiety,[77] kava is rapidly gaining popularity.❑

Correspondence to: Prof. Y. N. Singh, Ph. D., College of Pharmacy, South Dakota State University, Box 2202-C, Brookings, SD, 57007
Fax: 605/ 688-6232.

† For a detailed account of the impact of kava in Australia, see Prescott and McCall (1988).

†† Manu'a is one of the Samoan islands studied by the famous anthropologist Margaret Mead (1930).

Δ The island of Pentecost is famous for its "land divers," whereby young men tie one end of jungle vines to their ankles, the other end being secured to the top of a platform 15-25 meters high, and leap to the ground from the top of the platform. The flexibility and the length of the vines are such that the fall almost always is broken just before the divers reach the ground, thus usually preventing any serious injury from occurring to the young men (see Johnson and Johnson, 1955; Muller, 1970). The recently introduced sport of "bungee" jumping from bridges and other high structures using large elastic bands (*Time*, April 15, 1991) has its origins in this custom of "land divers".

ΔΔ Fijian word for exchange of gifts, often as a prelude to a request for a favor.

REFERENCES

1. Singh, Y. N. 1992. Kava, an overview. *Journal of Ethnopharmacology*, 37, 13-45.
2. Singh, Y. N. 1986. *Kava: a bibliography*, Pacific Information Centre, University of the South Pacific, Suva.
3. Keller, F. and M. W. Klohs. 1963. A review of the chemistry and pharmacology of the constituents of *Piper methysticum. Lloydia*, 26, 1-15.
4. Shulgin, A. T. 1973. The narcotic pepper: the chemistry and pharmacology of *Piper methysticum* and related species. *Bulletin on Narcotics*, 25, 59-74.
5. Steinmetz, E. F. 1960. *Piper methysticum (kava)*. Published by the author, Amsterdam.
6. Lebot, V. and P. Cabalion. 1988. *Kavas of Vanuatu. Cultivars of Piper Methysticum* Forst. Technical Paper No. 195, South Pacific Commission, Noumea.
7. Brunton, R. 1989. *The Abandoned Narcotic. Kava and Cultural Instability in Melanesia.* Cambridge University Press, Cambridge.
8. Lebot, V., M. Merlin, and L. Lindstrom. 1992. *Kava, the Pacific Drug.* Yale University Press, New Haven.
9. Kilham, C. 1996. Kava Medicine — *Hunting in Paradise.* Inner Traditions International, Rochester, N.Y.
10. Serpenti, L. M. 1969. On the social significance of an intoxicant. *Tropical Man*, 2, 31-44.
11. Ford, C. S. 1967. *Ethnographical aspects of kava.* In: D. H. Efron, B. Holmstedt and N. S. Kline (Eds.), *Ethnopharmacologic Search for Psychoactive Drugs*, U. S. Department of Health, Education and Welfare, Publ. No. 1645, Government Printing Office, Washington, D.C. 162-173.
12. Turner, G. 1861. *Nineteen years in Polynesia*, J. Snow, London, 122-123.
13. Mead, M. 1930. *Social Organization of Manu'a*, Bishop Museum Bulletin, No. 76, Honolulu, 102-112.
14. Gifford, E. W. 1929. *Tongan Society*, Bishop Museum Bulletin, No. 61, Honolulu, 156-170.
15. Firth, R. 1970. *Rank and Religion in Tikopia*, George Allen and Unwin, London, 199-232.
16. Mariner, W. 1827. *An Account of the Natives of the Tonga Islands in the South Pacific Ocean*, John Martin, Edinburgh, Vol. 2, 150-189.
17. Newell, W. H. 1947. The kava ceremony in Tonga, *Journal of the Polynesian Society*, 56, 364-417.
18. Forster, J. G. 1777. *A Voyage round the World in his Britannic Majesty's Sloop, Resolution*, J. White, London, Vol, 2, 406-408.
19. Marshall, M. 1974. Research bibliography of alcohol and kava studies in Oceania, *Micronesica*, 10, 299-306.
20. Freund, P. and M. Marshall. 1977. Research bibliography of alcohol and kava studies in Oceania: update and additional items, *Micronesica*, 13, 313-317.
21. Churchward, N. B. 1887. *My Consulate in Samoa*, W. Bentley, London, 47-59.
22. Rivers, W. H. R. 1914. *The History of Melanesian Society*, Cambridge University Press, Cambridge, Vol. 1, 82-86; Vol. 2, 243-257.
23. Churchill, W. 1916b. Samoan kava custom, In: *Holmes Anniversary Volume: Anthropological Essays Presented to William Henry Holmes*, J. W. Bryan Press, Washington, D.C., 56-58.
24. Ray, W. 1894. quoted in W. H. R. Rivers (1914), Vol. 2, 244.
25. Lester, R. H. 1941. Kava drinking in Vitilevu, Fiji, *Oceania*, 12, 97-121, 226-254.
26. Emerson, O. P. 1903. The awa habit of the Hawaiians, *Hawaiian Annual*, 130-140.
27. Titcomb, M. 1948. Kava in Hawaii, *Journal of the Polynesian Society*, 57, 105-171.
28. Guiart, J. 1956. *Un Siecle et demi de Contacts Culturels a Tanna, Nouvelles Hebrides*, Publication de la Societe des Oceanistes, No. 5, Musee de l'Homme, Paris, 246-254.
29. Codrington, R. H. 1891. *The Melanesians*, Clarendon Press, Oxford.
30. Thomson, B. 1908. *The Fijians: a study in the decay of custom.* Heinemann, London, 341-351.
31. Fox, C. E. 1924. *The Threshold of the Pacific*, Oxford.
32. Buck, P. H. 1944. *Arts and Crafts of the Cook Islands*, Bishop Museum Bulletin, No. 179, Honolulu, 18-20.
33. Parkinson, S. 1784. *A Journal of a Voyage to the South Seas in His Majesty's Ship, the Endeavour.* S. Parkinson, London, 37.
34. Wilson, J. 1799. *A Missionary Voyage to the Southern Pacific Ocean, 1796-1798, in the Ship "Duff"*, London.
35. Mangeret, R. P. 1884. *Monsigneur Bataillon et les Missions de l'Oceanie Centrale*, Vitte et Perrussel, Lyons, Vol. 1, 119-126.
36. Cawte, J. 1985. Psychoactive substances of the South Seas: betel, kava and pituri. *Australian and New Zealand Journal of Psychiatry*, 19, 83-87.
37. Moyles, W. 1983. Aboriginal community use of kava as alcohol substitute. *Aboriginal Training and Cultural Institute.* Balmain, Sydney, quoted in Carote (1985).
38. Smiles, S. 1987. Kava, the alcohol alternative (and why it's stronger in Vanuatu). *Islands Business.* May 1987, 32-33.
39. Cawte, J. 1986. Parameters of kava used as a challenge to alcohol. *Australian and New Zealand Journal of Psychiatry*, 20, 70-76.
40. Mathews, J. D., M.D. Riley, L. Fejo, E. Munoz, N. R. Milns, I. D. Gardner, J. R. Powers, E. Ganygulpa, and B. J. Gununuwawuy. 1988. Effects of the heavy usage of kava on physical health: summary of a pilot survey in an Aboriginal community. *Medical Journal of Australia*, 148, 548-55.
41. Handy, E. S. C. 1927. *Polynesian Religion*, Bishop Museum Bulletin, No. 34, Honolulu.
42. Williamson, R. W. 1939. *Essays in Polynesian Ethnology*, Cambridge University Press, Cambridge, 51-112, 274-275.
43. Churchill, W. 1916a. *Sissano: Movements of Migration within and through Melanesia*, Carnegie Institution, Washington, D.C.,124-144.
44. Fornander, A. 1916-20. *Fornander Collection of Hawaiian Antiquities and Folklore*, T.G. Thrum (Ed.), Bishop Museum Press, Honolulu.
45. Kramer, A. 1902. *Die Samoa-Inseln*, Stuttgart. Reprinted by McMillan, Papakura, 1983.
46. Christian, F. W. 1899. *The Caroline Islands*, Methuen, London, 188-193.
47. Gifford, E. W. 1924. *Tongan Myths and Tales*, Bishop Museum Bulletin, No. 8, Honolulu, 71-75.
48. Buck, P. H. 1930. *Samoan Material Culture*, Bishop Museum Bulletin, No. 75, Honolulu, 147-164.
49. Ellis, W. 1828. *Polynesian Researches*, Fisher, Son and Jackson, London, Vol. 1, 229-231.
50. Hocart, A. M. 1929. *Lau Islands, Fiji*, Bishop Museum Bulletin, No. 62, Honolulu, 59-70.
51. Lemert, E. M. 1967. Secular use of kava in Tonga, *Quarterly Journal of Studies on Alcohol*, 28, 328-341.
52. Morrison, J. 1935. *The Journal of James Morrison*, Golden Cockerel Press, London, 151.
53. Torrey, W. 1848. *Torrey's Narrative, or the Life and Adventures of William Torrey*, A.J. Wright, Boston, 117-118.
54. Deihl, J. R. 1932. Kava and kava-drinking, *Primitive Man*, 5(4), 61-68.
55. Gajdusek, D. C. 1967. Recent observations on the use of kava in New Hebrides. In: D. H. Efron, B. Holmstedt and N. S. Kline (Eds.), 1967. *Ethnopharmacologic Search for Psychoactive Drugs*, U. S. Department of Health, Education and Welfare, Publ. No. 1645, Government Printing Office, Washington, D.C. 119-125.
56. Holmes, L. D. 1967. The function of kava in modern Samoan culture. In: D.H. Efron, B. Holmstedt and N.S. Kline (Eds.) 1967. 107-118.
57. O'Brien, I. E. 1971. Missionaries on Ponape: induced social and political change, *Australian National University Historical Journal*, 8, 53-64.
58. Pfeiffer, C. C., H. B. Murphree, and L. Goldstein. 1967. Effect of kava in normal subjects and patients. In: D. H. Efron, B. Holmstedt and N. S. Kline (Eds.) 1967, *Ethnopharmacologic Search for Psychoactive Drugs*, U. S. Department of Health, Education and Welfare, Publ. No. 1645, Government Printing Office, Washington, D.C. 155.
59. Friedlander, J. 1899. *Zeitschrift für Ethnologie*, 31, 50.
60. La Perouse, J. F. G. de 1798. *Voyage de La Perouse autour du Monde*, Paris. Vol. 3, 225, 256.
61. Cook, J. 1813. *The Voyages of Captain James Cook Round the World.* Printed verbatim from the original editions, London. Vol. 3, 180, 222.
62. Waqavonovono, M. 1980. *Traditional Medicine and Practices: an Alternative Health Care System for Women*, Centre for Applied Studies in Development, University of the South Pacific, Suva.
63. Handy, E. S. C. and E. G. Handy. 1972. *Native Planters in Old Hawaii: Their Life, Love and Environment*, Bishop Museum Bulletin, No. 233, 190.
64. Harrisson, T.H. 1937. *Savage Civilization*, Gollancz, London, 275-280.
65. Jarrett, L. H. 1933. *Hawaii and its People*, Honolulu, 127-128.
66. Ellis, J. A. 1984. Looking at kava as an export crop. *Pacific Islands Monthly*, 55 (2), 27-28.
67. Brewster, A. B. 1922. *Hill Tribes of Fiji*, Seeley and Service, London, 17-22.
68. Young, R. 1855. *The Southern World: Journal of a Deputation from the Wesleyan Conference to*
69. Pritchard, W. T. 1863-4. Notes on certain anthropological matters respecting the South Sea Islanders. *Memoirs of the Anthropological Society of London*, 1, 122.
70. Thomson, B. 1902. *Savage Island: an Account of a Sojourn in Niue and Tonga*, J. Murray, London, 95-97.
71. Beechey, F.W. 1831. *Narrative of a Voyage to the Pacific and Bering's Strait.* Colburn and Bentley, London. Reprinted by N. Israel, Amsterdam, 1968, 120-122.
72. Frater, A. S. 1958. Medical aspects of kava. *Transactions and Proceedings of the Fiji Society*, 5(2), 31-39.
73. Ruze, P. 1990. Kava-induced dermopathy: A niacin deficiency? *Lancet* (North American edition), 335(8703), 1442-1445.
74. Tierra, M. 1990. *The Way of Herbs.* Pocket Books, New York, 177-8.
75. Cunningham, S. 1991. *Encyclopedia of Magical Herbs.* Lewellyn Publications, St. Paul, 133.

76. Santillos, H. 1991. *Natural Healing with Herbs*. Hohn Press, Prescott, Arizona.
77. Blumenthal, M., J. Gruenwald, T. Hall, C. W. Riggins, R. S. Rister, eds. Klein and R. S. Rister, trans. 1997. *German Commission E Monographs*. American Botanical Council, Austin, TX. (in press)
78. Handy, E. S. C. 1940. *The Hawaiian Planter. Volume I: His Plants, Methods and Areas of Cultivation*, Bishop Museum Bulletin, No. 161, Honolulu, 201-205.
79. Beckwith, M.W. 1940. *Hawaiian Mythology*. Reprinted by University of Hawaii Press, Honolulu, 94.
80. Brown, F. B. H. 1935. *Flora of Southeast Polynesia. III. Dicotyledons*, Bishop Museum Bulletin, No. 22, Honolulu, 18-19.
81. Parham, B. E. V. 1935. Wilt disease of yangona. *Fiji Agricultural Journal*, 8, 2-8.
82. Van Veen, A. G. 1939. Isolation and constitution of the narcotic substance from kawakawa. *Recueil des Travaux Chimiques des Pays-Bas*, 58, 521-527.
83. Bascom, W. R. 1965. *Ponape, a Pacific Economy in Transition*, University of California Press, Berkeley, 41-42.
84. Collocott, E. E. V. 1927. Kava ceremonial in Tonga, *Journal of the Polynesian Society*, 36, 21-47.
85. Pritchard, W. T. 1866. *Polynesian Reminiscences or Life in the South Pacific Islands*, Chapman and Hall, London, 121-24.
86. Erskine, J. E. 1853. *Journal of a Cruise among the Islands of the Western Pacific, including the Feejees and others Inhabited by the Polynesian Negro Races, in Her Majesty's Ship Havannah*. J. Murray, London, 48-49.
87. Brown, G. 1910. *Melanesians and Polynesians*. Macmillan, London, p. 137.
88. Cumming, C. F. G. 1881. *At Home in Fiji*, Blackwood, Edinburgh, P. 305.
89. Humphreys, C. B. 1926. *The Southern New Hebrides: an Ethnological Record*. Cambridge University Press, Cambridge, 81-83.
90. Williams, T. 1858. *Fiji and the Fijians*, Heylin, London, Vol. 1, 141-146.
91. Degener, O. 1949. *Naturalist's South Pacific Expedition: Fiji*. Paradise of the Pacific, Honolulu, 234-245.
92. Holmes, L. D. 1974. *Samoan Village*, Holt, Rinehart and Winston, New York, 35-38.
93. Wendt, S. 1969. , We want real kava ceremonies or nothing, says Fiji. *Pacific Islands Monthly*, 40(12), 40-41.
94. Porter, D. 1823. *A Voyage to the South Seas in the Years 1812, 1813 and 1814 with Particular Details of the Gallipagos and Washington Islands*. R. Phillips, London, 94-95.
95. Henry, T. 1928. *Ancient Tahiti*, The Museum, Honolulu. Printed verbatim by Kraus Reprint, New York, 1971.
96. Lewin, L. 1886. *Über Piper Methysticum (Kawa)*, A. Hirschwald, Berlin.
97. Borsche, W. and B. K. Blount. 1933. Untersuchungen über die Bestandteile der Kawawurzel. XIII. Mitteil, Über einige neue Stoffe aus technischem, *Chemische Berichte*, 66, 803-806.
98. Schübel, K. 1924. Zur Chemie und Pharmakologie der Kawa-Kawa (*Piper methysticum*, Rauschpfeffer, *Naunyn-Schmiedebergs Archiv fur experimentelle Pathologie und Pharmakologie*, 102, 250-282.
99. Van Veen, A. G. 1938. (Over the bedwelmende stof vit de kawakawa of wati-plant) (*Piper methystium*), *Geneeskundig tijdschrift voor Nederlandsch-Indie*, 78, 194-195.
100. Hansel, R. and H. U. Beiersdorff. 1959. Zur Kenttnis der Sedativen Prinzipien des Kava-Rhizoms, *Arzneimittel-Forschung*, 9, 581-585.
101. Meyer, H. J., A. Oberdorf, and E. Seifen. 1960. Pharmakologische Untersuchungen über die Wirkstoffe van Kawa-Kawa (*Piper Methysticum,) Naunyn-Schmiedebergs Archiv für experimentelle Pathologie und Pharmakologie*, 238, 124-125.
102. Jussogie, A., A. Scmiz, and C. Heimke. 1994. Kavapyrone extract enriched from *Piper methysticum* as modulator of the GABA binding site in different regions of the rat brain. *Psychopharmacology* (Berlin), 116, 469-74.
103. Davies, L. P., C. A. Drew, P. H. Duffield, P. H. Johnston, and D. D. Jameison. Kava pyrones and resin: studies on $GABA_A$, $GABA_B$, and benzodiazepine binding sites in rodent brain. *Pharmacology and Toxicology*, 71(2), 120-6.
104. Meyer, H. J. 1962. Pharmakologie der Wirksamen Prinzipien de Kawa-rhizoms (*Piper methysticum* Forst.), *Archives Internationale de Pharmacodynamie et de Therapie*, 138, 505-536.
105. Meyer, J. J. 1967. Pharmacology of kava. In: D. H. Efron, B. Holmstedt and N. S. Kline (Eds.), *Ethnopharmacologic Search for Psychoactive Drugs*, U. S. Department of Health, Education and Welfare, Publ. No. 1645, Government Printing Office, Washington, D.C. 133-140.
106. Meyer, H. J. 1966. *Pharmakologie der Kawa-Droge-Zugleich ein Beitrage zum Problem des Kawa-Trinkens*, Habilit and Schrift, Freiburg.
107. Klohs, M. W., F. Keller, R. E. Williams, M. I. Toekes, and E. G. Cronheim. 1959b. A chemical and pharmacological investigation of *Piper methysticum* Forst. *Journal of Medicinal and Pharmaceutical Chemistry*, 1, 95-99.
108. Backhauss, C. and J. Kriegelstein. 1992. Extract of kava (*Piper methysticum*) and its methysticin constituents protect brain tissue against ischemic damage in rodents. *European Journal of Pharmacology*, 215, 265-9.
109. Keledjian, J., P. H. Duffield, R. O. Lidgard, and A. M. Duffield. 1988. Uptake into mouse brain of four compounds present in the psychoactive beverage kava. *Journal of Pharmaceutical Sciences*, 77, 1003-1006.
110 Kretzschmar, R. and H. J. Meyer. 1969. Vergleichende untersuchunger uber die antikonvulsive Wirksamkeit der Pyronverbindungen aus *Piper methysticum* Forst. *Archives internationales de pharmacodynamie et de therapie*, 177, 261-277.
111. Duffield, P. H., D. D. Jamieson, and A. M.Duffield. 1989. Effect of aqueous and lipid-soluble extracts of kava on the conditioned avoidance response in rats. *Archives Internationales de Pharmacodynamie et de Therapie*, 301, 81-90.
112. Jamieson, D. D., P. H. Duffield, D. Cheng, and A. M. Duffield. 1989. Comparison of the central nervous system activity of the aqueous and lipid extracts of kava (*Piper methysticum). Archives Internationales de Pharmacodynamie et de Therapie*, 301, 66-80.
113. Holm, E., U. Staedt, J. Heep, C. Kortsik, F. Behne, A. Kaske, and I. Mennicke. 1991. Untersuchungen zum Wirkungsprofil von D,L-Kavain. *Arzneimittel Forschung*, 41, 673-683. (English abstract).
114. Russell, P. N., D. Bakker, and N. N. Singh. 1987. The effects of kava on alterting and speed of access of information from long-term memory. *Bulletin of the Psychonomic Society*, 25(4): 236-237.
115. Garner, L. F. and J. D. Klinger. 1985. Some visual effects caused by the beverage kava. *Journal of Ethnopharmacology*, 13, 307-311.
116. Meyer, H. J. and H. U. May. 1964. Lokalanaesthetische Eigenschaften natürlicher Kawa-Pyrone, *Klinische Wochenschrift*, 42, 407.
117. Singh, Y. N. 1983. Effects of kava on neuromuscular transmission and muscle contractility, *Journal of Ethnopharmacology*, 7, 267-276.
118. Glietz, J., A. Beile, and T. Peters. 1995. Kawain inhibits veratradine-activated voltage-dependent Na+ channels in syunaptosomes prepared from rat cerebral cortes. *Neutopharmacology*, 24, 1133-8.
119. Hansel, R., D. Weiss, and B. Schmidt. 1966. Fungistatische Wirkung der Kawadroge und ihrer Inhalfsstoffe, *Planta Medica*, 14, 1-9.
120. Hansel, R. 1968. Characterization and physiological activity of some Kawa constituents, *Pacific Science*, 22, 293-313.
121. Buckley, J. P., A. R. Furgiuele and M. J. O'Hara. 1967. *Pharmacology of Kava*, In: D. H. Efron, B. Holmstedt and N. S. Kline (Eds.), *Ethnopharmacologic Search for Psychoactive Drugs*, U. S. Department of Health, Education and Welfare, Publ. No. 1645, Government Printing Office, Washington, D.C. 141-151.
122. Krause, B. 1981. *Native Plants Used as Medicine in Hawaii*. University of Hawaii, Manoa.
123. Smith, R. M. 1983. Kava lactones in *Piper methysticum* from Fiji. *Phytochemistry*, 22, 1055-56.
124. Lebot, V., M. Aradhya, and R. M. Manshardt. 1991. Geographical survey of genetic variation in kava. *Pacific Science*, 45, 169-185.
125. Hansel, R. 1994. *Spectrum Kava Kava*. Aesophus, Basel. *Australia and Polynesia*, Hamilton Adams, London, 2nd Ed., 249-151.7665
126. Gobley, M. 1860. Recherches chimiques sur la racine de kava, *Journal de Pharmacie et de Chimie*, 37, 19-23.
127. Cuzent, M. 1861. Composition chimique de la kavahine, *Comptes Rendus Hebdomadaires des Seances de L'Academie des Sciences*, 52, 205-206.
128. Nölting, E. and A. Ko 1874. Sur la racine de kava, *Moniteur Scientific du Chimiste et du Manufacturier*, 920-923.
129. Winzheimer, E. 1908. Uber die Identität von Methysticol und Piperonylenaceton, *Chemische Berichte*, 41, 2377-2383.
130. Borsche, W. and C. K. Bodenstein. 1929. Untersuchungen über die Bestandteile der Kawawurzel. IX, Die Synthese der Yangonins, *Chemische Berichte*, 62, 2515-2523.
131. Macierewicz, Z. 1950. Synthesis of the lactone of the mother substance of yangonin. *Roczniki Chem.* 24, 144-166.
132. Herbst, D., W. G. Mors, O. R. Gottlieb, and C. Djerassi. 1959. Naturally occurring oxygen heterocyclics. IV. The methylation of pyrononeS. *Journal of the American Chemical Society*, 81, 2427-2430.
133. Bu'Lock, J. D. and H. G. Smith. 1960. Pyrones. Part 1, Methyl esters of tautomeric hydroxypyrones and the structure and yangonin. *Journal of the Chemical Society*, Pt 1, 502-506.
134. Mors, W. B., M. T. Magalhaes, and O. R. Gottlieb. 1962. Naturally occurring aromatic derivatives of monocyclic t-pyrones, *Fortschritte der Chemie Organischer Naturstoffe*, 20, 131-164.
135. Klohs, M. W., F. Keller, and R. E. Williams. 1959a. *Piper methysticum* Forst. The synthesis of dl-methysticin and dl-dihydromethysticin. *Journal of Organic Chemistry*, 24, 1829-1830.
136. Hansel, R., G. Ranft, and P. Bahr. 1963. Zwei Chalkonpigmente aus *Piper methysticum* Forst. Zur Frage der Biosynthese der Kawalaktone, *Zeitschrift für Naturforschung*, 18(b. , 370-373.
137. Young, R. L., J. W. Hylin, D. L. Plucknett, Y. Kawano, and R. T. Nakayama. 1966. Analysis for kawa pyrones in extracts of *Piper methysticum*, *Phytochemistry*, 5, 795-798.
138. Hansel, R. and L. Kaproth. 1966. Isolierung von ll-methoxy-yangonin aus der Kawawurzel, *Archiv der Pharmazie*, 299, 503-506.
139. Hansel, R., H. Sauer, and H. Rimpler. 1966. ll-methoxy-yangonin aus einer botanisch nicht beschriebenen Piperart Neu-Guineas, *Archiv der Pharmazie*, 299, 507-512.
140. Duve, R. N. 1981. Gas-liquid chromatographic determination of major constituents of *Piper methysticum. Analyst*, 106, 160-165.
141. Duve, R. N. and J. Prasad. 1983. Changes in chemical composition of yaqona (*Piper methysticum*) with time. *Fiji Agriculture Journal*, 45, 45-50.
142. Duve, R. N. and J. Prasad. 1984a. Efficacy of extraction of constituents in the preparation of yaqona beverage. Part 1: General constituents. *Fiji Agriculture Journal*, 46, 5-9.
143. Duve, R. N. and J. Prasad. 1984b. Efficacy of extraction of constituents in the preparation of yaqona beverage. Part 2: Major active constituents. *Fiji Agriculture Journal*, 46, 11-16.
144. Duffield, A. M. and R. O. Lidgard. 1986. Analysis of kava resin by gas chromatography and electron impact and methane negative ion chemical ionization mass spectroscopy. *Biomedical and Environmental Mass Spectroscopy*, 13, 621-626.
145. Duffield, A. M., R. O. Lidgard, and G. K. C. Low. 1986. Analysis of the constituents of *Piper methysticum* by gas chromatography methane chemical ionization mass spectroscopy. *Biomedical and Environmental Mass Spectroscopy*, 13, 305-313.
146. Cheng, D., R.O. Lidgard, P. H. Duffield, A. M. Duffield, and J. J. Brophy. 1988. Identification of methane chemical ionization gas chromatography/mass spectroscopy of the products obtained by steam distillation and aqueous acid extraction of commercial *Piper methysticum. Biomedical and Environmental Mass Spectroscopy*, 17(5), 371-376.
147. Duffield, P. H., D. D. Jamieson, and A. M.Duffield. 1989. Effect of aqueous and lipid-soluble extracts of kava on the conditioned avoidance response in rats. *Archives Internationales de Pharmacodynamie et de Therapie*, 301, 81-90.
148. Lavialle, M. 1889. La kavaine, *L'Union Pharmaceutique*, 30, 5.
149. Scheuer, P. J. and T. J. Horigan. 1959. A new carbonyl compound from *Piper methysticum* Forst., *Nature*, 184, 979-980.
150. Achenbach, H. and W. Karl. 1971. Inhaltsstoffe des Rauschpfeffers. III. Untersuchung der Sauren des Rauschpfeffers (*Piper methysticum* Forst.), *Chemische Berichte*, 104, 1468-1477.
151. Smith, R. M. 1979. Pipermethystine: a novel pyridone alkaloid from *Piper methysticum*, *Tetrahedron Letters*, 35, 437-439.
152. Klohs, M. W. 1967. Chemistry of kava. In: D. J. Efron, B. Holmstedt and N. S. Kline (Eds.), *Ethnopharmacologic Search for Psychoactive Drugs*, U. S. Department of Health, Education and Welfare, Publ. No. 1645, Government Printing Office, Washington, D.C. 126-132.
153. Friedman, G. 1997. Personal communication to Mark Blumenthal. February 6.
154. Lehmann, E., E. Kinzler, J. Friedemann. 1996. Efficacy of a special Kava extract (Piper methysticum) in patients with states of anxiety, tension and excitedness of non-mental origin—A double-blind placebo-controlled study of four weeks treatment. *Phytomedicine* Vol. III(2), 113-119.

GERMAN COMMISSION E MONOGRAPH

KAVA-KAVA RHIZOME

Piperis methystici rhizoma
Kava-Kava-Wurzelstock
Published June 1, 1990

Description of Drug
Piperis methystici rhizoma, kava-kava rhizome (root).

Constituents of Drug
Kava-kava rhizome consists of the dried rhizomes of *Piper methysticum* G. Forster [Fam. Piperaceae], as well as their preparations in effective dosage.
The drug contains kava-pyrones (kawain).

Uses
Conditions of nervous anxiety, stress, and restlessness.

Contraindications
Pregnancy, nursing, endogenous depression.

Side Effects
None known.
Note: Extended continuous intake can cause a temporary yellow discoloration of skin, hair, and nails. In this case, further application of this drug must be discontinued. In rare cases, allergic skin reactions can occur. Also, accommodative disturbances, such as enlargement of the pupils and disturbances of the oculomotor equilibrium, have been described.

Interactions with Other Drugs
Potentiation of effectiveness is possible for substances acting on the central nervous system, such as alcohol, barbiturates, and psychopharmacological agents.

Dosage
Unless otherwise prescribed:
Daily dosage:
Herb and preparations equivalent to 60 - 120 mg kava pyrones.

Mode of Administration
Comminuted rhizome and other galenic preparations for oral use.

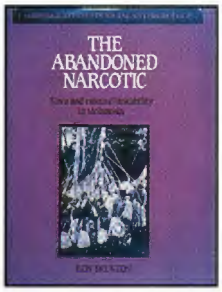
Duration of Application
Not more than 3 months without medical advice.
Note: Even when administered within its prescribed dosages, this herb may adversely affect motor reflexes and judgment for driving and/or operating heavy machinery.

Action
Anti-anxiety.
In animal experiments a potentiation of narcosis (sedation), anticonvulsive, antispasmodic, and central muscular relaxant effects were described.

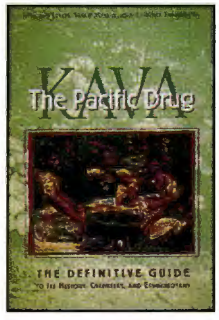
SOURCE

Blumenthal, M., J. Gruenwald, T. Hall, C. W. Riggins, R. S. Rister (Eds.), S. Klein and R. S. Rister, (trans.) 1997. *German Commission E Monographs*. Austin, Texas: American Botanical Council (in press).

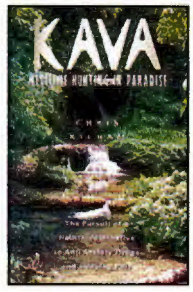
Further Reading on Kava



THE ABANDONED NARCOTIC: KAVA AND CULTURAL INSTABILITY IN MELANESIA
by Ron Brunton. 1989. Taking the varying fortunes of kava on the island of Tanna, Vanautua, as his starting point, the author suggests that kava's abandonment can best be explained in terms of its association with unstable religious cults and is part of a broader problem of why many traditional Melanesian societies were characteristically highly unstable. Hardcover, 219 pp. $49.95. #B134



KAVA
by Vincent Lebot, Mark Merlin and Lamont Lindstrom. 1992. Research on botany, chemistry, ethnobotany, pharmacology, social usage, distribution, and economic potential. B/W photos, illus. Softcover, 255 pp. $19.95. #B032



KAVA: MEDICINE HUNTING IN PARADISE
by Chris Kilham. 1996. A journey through the mystical legends, outlandish history, and exciting science surrounding kava. With a thorough analysis of kava research and information on where to find the best kava, a must-read for those interested in adventure, plant medicines, or the cultures of Oceania. Softcover. 166 pp. $12.95. #B202

AMERICAN BOTANICAL COUNCIL

These books are available through the ABC BookStore.
Credit card holders order toll free 800/373-7105. Or call 512/331-8868, fax 512/331-1924.

To order copies of this 24-page Kava review, call the above numbers. For a copy of the American Botanical Council's Herbal Education Catalog, with more than 250 books, as well as videos, audio tapes, computer software and much more, send $2.50 to: ABC, P.O. Box 201660, Austin, TX 78720-1660. Visa or MasterCard holders call our automated system 24hrs/day: 800/373-7105, or our sales department: 512/331-8868, or fax: 512/331-1924, or email: custserv@herbalgram.org.
ABC is a nonprofit education and research organization under IRS Code 501(c)3.



Profile: Great Botanists/Herbalists Series

Henry Hurd Rusby — 1855-1940

by Barbara Johnston



"Wrestling the Jungle's Secrets" ©1957 by Robert A. Thom for Parke-Davis. Courtesy of Warner-Lambert. Special thanks to Hal W. Goff.

Tenacity and dedication of purpose are without a doubt two qualities necessary for success in almost any field. Henry Hurd Rusby had both to spare. Though nearly blind from birth from congenital cataracts, Rusby led a life of adventure, exploration, discovery, and contribution centered around the fields of botany, medicine, and pharmacy.

Rusby's Commercial Ventures

Rusby's association with Chief Chemist Harvey Wiley of the Bureau of Chemistry, U.S. Department of Agriculture (USDA), brought him under fire from Wiley's enemies. This culminated in a number of allegations published in 1930 in the *Journal of the American Medical Association* (*JAMA*) concerning his implication in a number of "questionable commercial associations."

The first is the Wine of Cardui suit. Rusby was called as technical witness to the prosecution and was accused by the AMA of not always appearing "to make articulate and well-informed statements." His testimony was focused by the defense, not on the area of his expertise, but on that of his co-author of *The National Standard Dispensary* (1909).

In the second instance, the Slends Weight-Reducing Gum suit, Rusby was called as a pharmacognosy expert by the defense and was accused by the AMA of testifying with "unscientific character;" again, seemingly unjustified.

The third occurrence was a result of a 1929 ad campaign. Fleischmann's Yeast, in an effort to boost lagging sales of its product, published advertisements with Rusby's photograph (as they did with 26 physicians from six countries) and an alleged quotation endorsing the product for healthy purposes. Rusby denied the endorsement.

Author Rossi-Wilcox feels that there are three factors supporting Rusby's denial. The nature of the bulk of his work, his participation in the writing of *The Properties and Uses of Drugs*—from which Fleischmann's advertising agency, J. Walter Thompson, took the misused quote—was confined only to the botanically related sections, and the fact that the writing style used was not consistent with that of Rusby, especially for reference works.

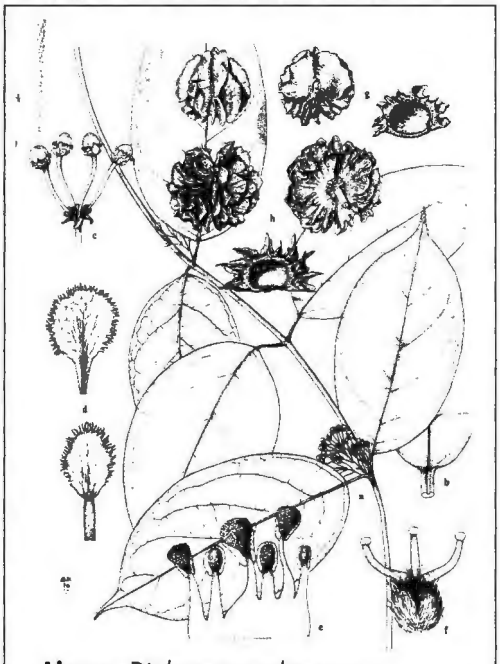
The fourth involved allegations concerning his tie with Howard Ambruster, an importer of Spanish ergot (*Claviceps purpurea*) used at the time in cases of obstetrically managed birth. Rusby had publicly offered to examine lots of crude ergot for manufacturers and only the Meyers Brothers Company of St. Louis took the offer. The Senate committee hearing the case ultimately recognized Rusby's commitment to reliability of market products. He insisted on a standardized, reliable approach in a time when recognition of the complex chemistry of determining physical characteristics to ensure insect and mold-free crude ergot was not yet understood.— *Barbara Johnston*

[Source: Rossi-Wilcox, Susan M. Henry Hurd Rusby's Alleged "Commercial Ventures." 1995. *Pharmacy in History*, Vol. 37, No. 2. 85-93.]

Broadened and toughened by years of plowing when older men were away fighting the Civil War, Rusby's interest in flowers and ferns might have waned had it not been for the influence of an inspired schoolteacher. Rusby took to the fields, swamps, and woods in his home county in New Jersey, collecting and identifying almost every kind of plant.

Educators of today would probably catch and deflect the behavior of this uncontrollable bad-boy early on, recognizing the frustration of a first-rate mind trapped in the body of a bright and eager youth potentially hindered with poor eyesight. That the influence was successful is not in doubt, for, at 21, he was awarded a prize at the Centennial Exposition of 1876 for the herbarium he had started as a youngster. From then on it was full speed ahead for the youth.

He sold the prize-winning herbarium to Parke, Davis & Co. for enough money to pay for his medical education. His field experience continued as he conducted botanical expeditions for the Smithsonian Institution to the then-frontier areas of New Mexico and Arizona, areas not the least bit peaceable but the scene of horrific conflicts between the indigenous people and settlers. "Just how," he said, "I made the Apaches recognize us as non-combatants and leave us alone I don't know. But they did, although they didn't fail to give us indications every now and then of what it would cost us to grow forgetful."



Liana, *Diplopterys cabrerana [Banisteriopsis rusbayna]*. Courtesy of the Botanical Research Institute of Texas, Fort Worth, TX.

Rusby, practicing botany even though coping with the robbers and Apaches, found time to translate Goethe into English. He received his medical diploma a year later, in 1884, and, with only three days' notice, Parke, Davis & Co. sent him to South America to search for a reputed new discovery of possible importance to medicine—*Erythroxylon coca*, the "divine" coca plant of the Incas, source of the alkaloid cocaine. In terms of discovery, the expedition was a resounding success for Rusby collected 20,000 pounds of the leaf, then surveyed the extensive quinine-producing cinchona (*Cinchona* spp.) plantations in Brazil.

However, the commercial profit vanished when the shipment disappeared during a political revolution. The pharmaceutical company ordered his return but Rusby's pugnacious personality and botanical soul wouldn't allow him to give up the opportunity to be one of the first American explorers to study the then-unexplored richness of South American flora. He set out to cross the continent by

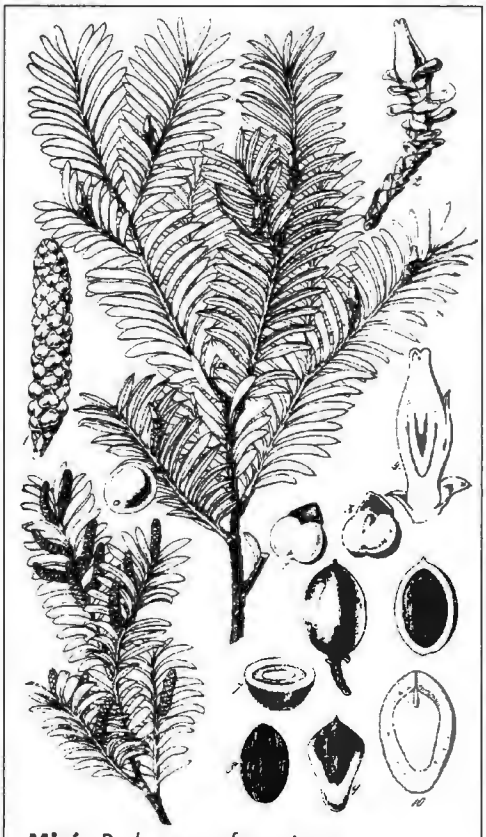


Henry Hurd Rusby in Amazon on cabin of boat. Date unknown.
Photo from the Library of the New York Botanical Garden, Bronx, New York.

foot and boat, trusting in his ability to survive on whatever medical fees he could command from the sparsely located settlers and Indians. He and his crew of adventurous soldiers of fortune embarked on a two-year trek of incredible hardship. He was stricken with a tropical fever, became unconscious, was placed in a shallow grave by his Indian guides, and given up for dead. As his companions sat around the grave, waiting for him to die so they could fill in the earth, Rusby regained consciousness, climbed out of the grave, and went back to work, much to the dismay of his mourners.

When, at the end of his journey, he staggered onto the grounds occupied by an orchid specialist on the coast of Brazil and presented himself as Rusby, he was so emaciated as to be unrecognizable. It took a great deal of effort to convince the man of his veracity. "Think of a better one," said the man. "Rusby's dead. He was killed by Indians. I sent out an expedition after him, and I've got all the proof."

The orchid grower was not the only one skeptical of his identity. Rusby's telegram to Parke, Davis & Co., reporting his survival, had been disregarded and his family never informed. On his return home, his own father, not recognizing the emaciated person as his son, ordered him off the premises and took an iron poker to him to reinforce the order.



Miré, *Podocarpus ferrugineus [Prumnopitys ferruginea]* Courtesy of the Botanical Research Insitute of Texas, Fort Worth, TX.

The results of this expedition, recorded by Rusby in his book, *Jungle Memories*, were 45,000 botanical specimens, 4,000 species being brought back, 20 percent of which were new to science. About 6,000 of these specimens were deposited in the herbarium of the New York Botanical Garden. These included some important new drugs—cocaine (*Erythroxylum coca*), cocillana (*Guarea rusbyi*), cascara sagrada (*Rhamnus purshiana*) , miro (*Prumnopitys ferruginea*), and pichi (*Fabiana imbricata*).

Following his appointment as Professor of Botany, Pharmacy, and Physiology at Columbia University a year later, he terminated an arrangement with Parke, Davis to receive royalties on the sale of drugs introduced by him. He observed that it seemed wrong that one man should profit rather than serve the good of all, an altruistic attitude seldom encountered in the pharmaceutical field.

Explorations of Henry Hurd Rusby

1885 - 1887: Colombia, Ecuador, Peru, Chile, and across the continent through Bolivia and Brazil, in search of cocaine for Parke, Davis & Company of Detroit.
1893: General botanical survey of various parts of Venezuela south of the Orinoco River.
1908 - 1910: Mexican rubber forests.
1917: Colombia, searching for cinchona for war-time (WWI) use
1919- 1921: Bolivia and Brazil in search of caapi (*Banisteriopsis caapi*), the "fear" drug.
[*Chronica Botanica* VII, 5(1942) 230-231.]

Rusby was an active member of a group of foresighted botanists who succeeded in establishing the New York Botanical Garden after over a decade of effort. As Curator of Economic Botany, he insisted on developing a comprehensive collection reflecting the wealth of plants important in every aspect of life. The collection was recently returned to the NYBG after a stay at Harvard University.

Anthropologist and Rusby biographer Frank Lipp, after studying the collection of some 10,000 plants amassed by Dr. Rusby, concluded, "An obvious, but seldom-thought-of truth emerges—that plant life is the foundation of a vast extent of human activity, the basis of every culture that humankind, since the beginning, has drawn not only its vital sustenance but its deepest aesthetic feelings and highest moral and intellectual absorption, from the natural order of the plant world."



Coca, *Erythroxylum coca,* from the *American Journal of Pharmacy,* 1885. Courtesy of the Lloyd Library and Museum, Cincinnati, OH.

Rusby's importance to the development of economic botany and ethnobotany cannot be overemphasized. According to Lipp, aside from J. W. Harshberger in the 1890s and W. E. Safford in the 1920s, Rusby was one of the few botanists concerned with research and exploration in this area—1890-1940. Says Lipp, "The H. H. Rusby Economic Botany Collection is one of the few thorough quantitative indicators and compendiums of the profound influence of plants on the course of history and civilization, and man's dependence on plants for the essentials of his existence.

"Rusby spent much of his life in the construction of this collection; as he states, 'laborious and expensive operation,' a work which carried him 'into many remote regions, often destitute of roads.' Rusby endeavored to develop a compendium of economic plants from all areas, countries, plant families, genera or economic groups, such as those producing resins, gums, drugs, spices, and so



Rusby (leaning against the door frame) with natives who helped him on his Amazon trip. Date unknown. Photo courtesy of the American Institute of the History of Pharmacy.

on. A considerable number of species are of ethnological interest in that they furnish food, medicine, and other commodities of value in the daily life of non-European peoples. Included was a large collection of the final end products, in terms of ethnological artifacts, as well as a presentation of the processes by which the crude materials were converted into their usable forms."

A strong belief in the fact that the person who held life and death in a bottle of pills should be educated—at that time there were no entrance requirements for applicants to any medical school—led Rusby to wage a three-year struggle to enact a requirement of one year of high school. Twenty-five years of campaigning later, graduation from high school became mandatory.

Still a scrapper, he, along with Dr. Harvey Wiley, fought a battle resulting in the passage of the first Pure Food and Drug Act to protect the public from adulterated drugs and unethical medical practices. The struggle continued when he worked as pharmacist for the Port of New York where he established controls over nearly all plant imports. Over the years, continuing his interest in South American medical flora, he made numerous expeditions to the Southern continent, bringing back more than 17,000 specimens from the lower Orinoco River, in search of new rubber-yielding trees and quinine. During this period he conducted research into the influence of radioactivity on plant growth and plant reproduction.

At 64, just recovering from pneumonia, he embarked on a two-year ordeal in Bolivia and Brazil in search of the tropical vine, caapi (*Banisteriopsis caapi,* aka *ayahuasca*) which he hoped would help treat human anxieties. Unable to withstand the rigors of the trip, he returned early, confounding those who didn't expect him to survive the journey. He lived and worked for another 20 years.

Dr. Rusby received many honors during his life and his name forms part of the title of numerous species and genera, such as *Banisteriopsis rusbyana* (aka *ayahuasca* Fam. Malpighaceae), *Rusbya taxifolia* (Ericaceae), *Guarea rusbyi* (cocillana of the Solanaceae) and the Rusbyantheae.

Certainly many pages could be filled with testimonials to Henry Hurd Rusby's accomplishments. Perhaps the best evaluation comes in his own words taken from a letter to C. W. Ballard, College of Pharmacy, Columbia University, and quoted in Rusby's obituary published in *Science*.

"I cannot say too strongly that, in my opinion, the first and most important consideration is absolute loyalty in adhering to principle. This does not mean stubbornness in having your own way when the decision is against you. It may be necessary to yield in practice but you are not compelled to admit a wrong principle.

"Unfortunately honesty frequently does not yield results which are sufficiently immediate to warrant the old adage. Perhaps the dishonest people do win at the expense of the others, yet I would adhere to the honest course to the very end as the ultimate good of humanity depends on that sacrifice and the one object of life is the improvement of human character."

SOURCES

Anon. 1942. *Chronica Botanica* VII, 5 (1942) 230-231.
Ballard, C. W., 1941. *Science*, Vol., 93, No. 2403.
Lipp, Frank. 1974. "One of the Giants," *Garden Journal*, June.
Lipp, Frank. 1996. Personal communication to Penny King. November 17.
Rossi-Wilcox, Susan. 1995. "Henry Hurd Rusby's Alleged "Commercial Ventures."' *Pharmacy in History*, Vol. 37, No. 2. 85-93.
Williams, David E. and S. Fraser. 1992. *Brittonia*, 44(3), 273-279.

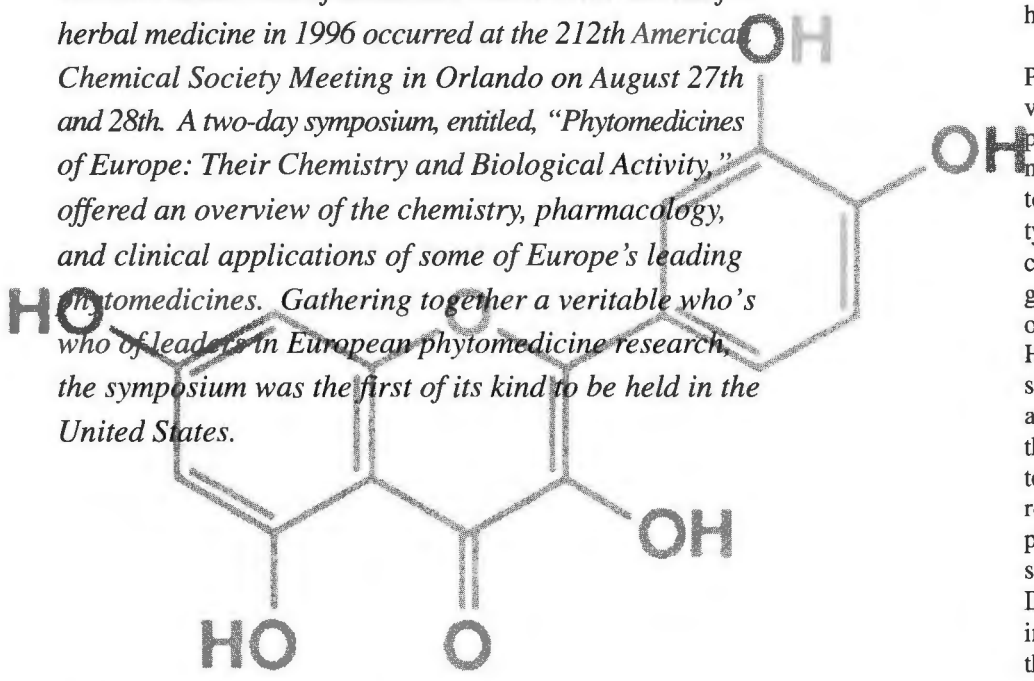
European Phytomedicines: Research Updates on Chemistry, Pharmacology, and Clinical Applications

Selected Highlights of the Two-Day Symposium on Phytomedicines at the 212th American Chemical Society Meeting, Orlando, Florida, August 27–28, 1996

by Donald J. Brown, N.D.

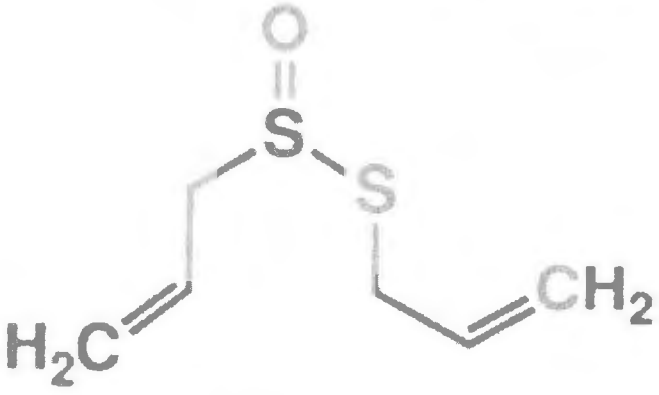
Last year was a significant time for the presentation of scientific and clinical data validating the use of alternative and complementary therapies. A key area of focus has been the impressive body of information on plant medicines in Europe. Commonly referred to as phytomedicines, these plant-based pharmaceuticals have made a significant impact on European health care. Growing interest in scientifically validated alternative and complementary therapies has led the scientific and medical community in this country full-circle back to herbal medicine and its current evolution in Europe.

Another in a series of landmark educational events for herbal medicine in 1996 occurred at the 212th American Chemical Society Meeting in Orlando on August 27th and 28th. A two-day symposium, entitled, "Phytomedicines of Europe: Their Chemistry and Biological Activity," offered an overview of the chemistry, pharmacology, and clinical applications of some of Europe's leading phytomedicines. Gathering together a veritable who's who of leaders in European phytomedicine research, the symposium was the first of its kind to be held in the United States.



The symposium was introduced by co-organizer Dr. Larry Lawson, director of research at Murdock-Madaus-Schwabe in Springville, Utah. Dr. Lawson paid homage to the impact European phytomedicines and phytopharmaceutical research have had on the U.S. herbal dietary supplement market over the past decade. He pointed out that most of the significant research on the clinical use of herbal medicines has largely come out of Europe because of favorable regulation that supports scientific and clinical research. This research has made well studied phytomedicines from Europe tailor-made for the 1994 Dietary Supplement and Health Education Act—a law that requires research validation for structure/function claims on any dietary supplement, including herbal products.

Dr. Varro E. Tyler, Lilly Distinguished Professor of Pharmacognosy at Purdue University, gave an eloquent overview of the role phytomedicines play in Europe—both economically and medically. Dr. Tyler pointed to the fact that while herbal medicines are typically limited to health food stores in this country, they have been successfully integrated into the health care delivery systems of countries like Germany, France, and Italy. He pointed to the more than 300 Commission E monographs published in Germany as perhaps the best single resource on the therapeutic use of herbal medicines. It is interesting to note that the research in these reports was either conducted by German phytopharmaceutical companies or sponsored by them through German universities. Dr. Tyler's comments were complemented in the next presentation by Mark Blumenthal, the Executive Director of the American



Botanical Council (ABC), who informed the audience of the organization's near completion of translating the Commission E monographs to English. ABC hopes to make these available for purchase in early 1997.

Dr. Tyler then covered the ten top-selling herbs in the United States—echinacea, garlic, goldenseal, ginseng, ginkgo, saw palmetto, aloe gel, ephedra, eleuthero, and cranberry—and pointed out that six have become popular in the past few years because of European research and clinical use. Dr. Tyler gave a less-than-favorable overview of goldenseal, pointing out that the current use of the herb for its antimicrobial actions has no scientific merit, as there have been no clinical studies carried out on the herb or its extracts.

The other co-organizer of the symposium, Dr. Rudolf Bauer, professor at the Institute of Pharmaceutical Biology at the University of Düsseldorf, next gave a fascinating presentation on echinacea and its potential active constituents. Dr. Bauer's work with echinacea points out the difficulty of standardizing some phytomedicines on specific active constituents. In the case of echinacea, three major categories of chemical compounds appear to contribute to its immunostimulating actions.

The first category of constituents are the polysaccharides and glycoproteins. Found primarily in the water-soluble portion of the extract, these include such well-known immunomodulating polysaccharides as arabinogalactan. Studies have shown these constituents increase phagocytosis and promote cytokine production, e.g., tumor necrosis factor and interferon. Dr. Bauer noted that glycoproteins and polysaccharides are particularly high in the roots of *Echinacea purpurea* and *E. angustifolia*. He also addressed the issue of precipitation of these constituents by alcohol. While products extracted with high alcohol content (greater than 20 percent) will have significant precipitation of glycoproteins and polysaccharides, products initially extracted with water and then preserved with a low concentration of alcohol are unlikely to have significant precipitation of these constituents.

The second category is the caffeic acid derivatives. The most commonly measured is cichoric acid. This compound has also shown the ability to increase phagocytosis. Present in alcohol extracts, cichoric acid is highest in products prepared from the aboveground (aerial) portion of *E. purpurea*—particularly the flower heads. Degradation of cichoric acid commences with maceration and becomes significant at about six days. Dr. Bauer points to cichoric acid as a marker for quality and/or standardization of *E. purpurea* juice products.

The fractions with strongest effect on phagocytosis are the alkamides. Ironically, even though isobutylmide is the one we hear the most about, it has a very weak effect on phagocytosis when measured *in vitro*. Which of the alkamides has the strongest action has yet to be discovered. The alkamides in *E. purpurea* root are the most active, followed by those in *E. angustifolia*.

Dr. Bauer concluded his talk with a brief overview of clinical trials. Notable is a retrospective study with 1,280 children treated for acute bronchitis with the expressed juice of *E. purpurea*.[1] Children receiving echinacea recovered far faster than those using antibiotics. Dr. Bauer also reviewed the Coeugniet study[2] showing a significant drop in the recurrence rate of vulvovaginal candidiasis by adding *E. purpurea* to standard anti-fungal therapy.

Dr. J. Kreiglstein, professor of pharmacology and toxicology at the University of Marburg in Germany, provided an overview of his work demonstrating the neuroprotective properties of *Ginkgo biloba* extract (GBE). Dr. Krieglstein's studies have utilized animal models of cerebral ischemia as well as primary cultures of neurons. The most notable neuroprotective effect was for the terpene lactones (the flavone glycosides had no effect on neuroprotection). Ginkgolides A and B reduced infarct size and the percentage of damaged neurons following ischemia. Bilobalide was even more effective in reducing infarct size and was better at protecting neurons against injury. He points to the PAF-antagonistic actions (reduces tendency for clotting) of the ginkgolides as a possible explanation for their efficacy. The reason for bilobalide's (another terpene lactone in ginkgo) neuroprotection remains unknown.

Dr. Kreiglstein concluded his talk with the theory that the terpene lactones in GBE may cause an induction of neuronal growth factors. Pharmacological induction of these factors has resulted in neuroprotection during ischemic states *in vitro*. He added that while the standardized extract of GBE does exert neuroprotective actions, it is unlikely that the PAF-antagonism achieved with oral use of the extracts is significant.

The next presenter, Dr. Adolf Nahrstedt of the Institute of Pharmaceutical Biology and Phytochemistry at the University of Münster, gave a very thorough overview of quality control with phytomedicines. He pointed out that while the pharmacologically active constituents in plants are the basis of therapeutic quality, the content of these constituents varies in crude plant drugs and is only clearly known for a limited number of plants. Dr. Nahrstedt then presented three levels of quality:

Level 1 – The main active constituents are known and standardized in the finished product (e.g., ginkgo, milk thistle).

Level 2 – Active constituents are not clearly known but "typical" constituents are known and act as markers for quality control (e.g., valerian, hops, turmeric).

Level 3 – Sufficient information on active constituents is lacking to create a standardized product (nettle roots, saw palmetto, vitex, echinacea).

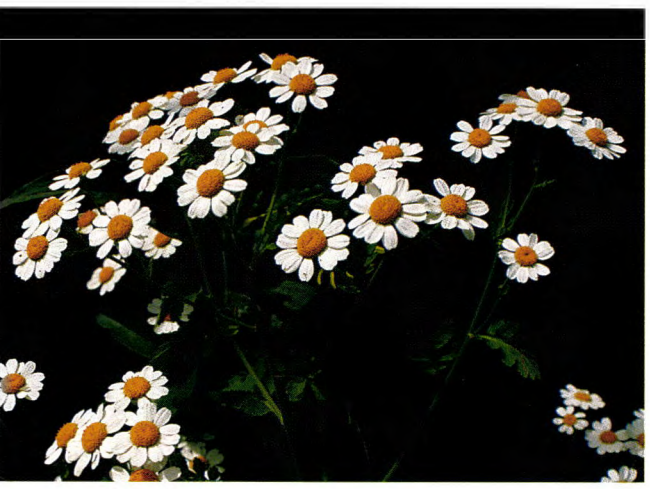
Several issues were presented that may affect quality. These include proper identification of the crude drug; suitable cultivation procedures; processing technique including stabilization, extraction (type of solvent), and separation of fractions. As an example, Dr. Nahrstedt compared the standardized gingko extract EGb 761 to the crude drug Z (i.e., dried ginkgo leaf). EGb 761 has 2.9 percent bilobalide to 0.04 to 0.2 percent for the crude drug. Ginkgolide content for EGb 761 is 3.1 percent versus 0.06 to 0.23 percent for the crude drug while flavone glycoside content is 24 percent versus only 0.5 to 1.8 percent respectively. Ginkgolic acid, a potential allergen and gastrointestinal irritant (which is greatly reduced in the preparation of the standardized extract), is less than 6 ppm in EGb 761 compared to one to two percent in the crude drug.

One of the great men of European phytochemistry, Dr. Hildebert Wagner of the University of Munich, gave an overview of his work screening plants for anti-hypertensive and anti-asthmatic constituents. Dr. Wagner pointed out that while we have over 2,000 drugs, only 40 percent are actually curative. Side effects and increasing resistance of pathogenic microorganisms have prompted science to began looking for new medications. He points to the increased morbidity associated with prophylactic use of beta-sympathomimetic drugs in asthma patients as one specific example.

Dr. Wagner's work on screening for anti-asthmatic constituents in plants has led to three promising candidates. The first is onion (*Allium cepa*) which is high in newly discovered sulfur-containing compounds including thiosulfinate. The other two are the plant *Galphinia glauca* and the ayurvedic herb *Picrorhiza kurrooa* Royle *ex* Benth.[3]

One of the highlights of the first day was an overview of feverfew as migraine prophylaxis by Dr. Stan Heptinstall, professor at the Queen's Medical Center in Nottingham, England, and editor of the journal *Platelet*. After a rather humorous introduction which found Dr. Heptinstall reading the actions of feverfew from a lay publication and complimenting its accuracy, Dr. Hepstinstall gave an overview of a decade of research on feverfew. He reviewed the placebo-controlled trials showing feverfew's efficacy in reducing the frequency and severity of migraine attacks, including a decrease in vomiting. He added that while little benefit has been shown for rheumatoid arthritis, that the negative results shown in the English study may be partly explained by the severity of the disease in the subjects studied.

While many publications point to inhibition of serotonin release by platelets as one explanation for feverfew's efficacy with migraine sufferers, Dr. Heptinstall says that this finding is not conclusive. Feverfew has been shown to inhibit platelet aggregation and inhibit histamine release. While four active sesquiterpene lactones have been identified, parthenolide continues to be of the greatest importance as the key constituent in the treatment of migraine headache. Dr. Heptinstall, however, pointed to the fact that parthenolide is very unstable and that feverfew extracts must stabilize parthenolide to insure efficacy.



Feverfew, *Tanacetum parthenium*. Photo © 1996 Steven Foster.

Dr. Wolfgang Kubelka of the University of Vienna next gave a presentation on the biological activity and active compounds in horse chestnut (*Aesculus hippocastanum*). The active constituent found in the seeds of the plant is aescin, a complex mixture of triterpenoid saponins. Horse chestnut extracts standardized on aescin content are used both internally and topically in Europe to treat chronic venous insufficiency and venous edema, leg ulcers, hematoma, and sports injuries. Aescin works primarily by decreasing capillary permeability, increasing venous tone, and stabilizing the capillary endothelium. Products containing aescin include liquids (0.7 to 3.5 percent aescin), tablets/capsules (10 to 50 mg aescin), injectibles (5 mg/ml aescin), and ointments/gels (1 to 2 percent aescin).

Other presentations on the first day included an overview of plant polysaccharides for cancer adjuvant therapy by Dr. Gerhard Franz of the University of Regensburg and the use of mistletoe lectins for cancer therapy by Dr. Hans Gabius of the Institute for Physiological Chemistry at the University of Munich. While Dr. Franz's presentation made a compelling argument for the use of higher plant polysaccharides as immunomodulators for cancer patients, Dr. Gabius gave a rather unfavorable review of the research on mistletoe lectins as a primary therapy for cancer patients.

Day two of the symposium began with a thorough overview of the role phytomedicines play in the management of mild to moderate symptoms of benign prostatic hyperplasia (BPH) in Europe. Dr. H. Schilcher, professor in the Department of Pharmaceutical Biology at the Free University of Berlin, introduced his lecture with an overview of the pathogenesis of BPH, including the role of the enzymes 5-alpha-reductase and aromatase. He then covered the standard prescription drugs used in the U.S. It's amazing to note that over 90 percent of the prescriptions in Germany and Austria written for BPH are phytomedicines!

Currently in Germany, saw palmetto (*Serenoa repens*) liposterolic extracts and a beta-sitosterol product are the most commonly prescribed phytomedicines for BPH, accounting for 64 percent of the phytomedicines prescriptions for BPH. They are followed by nettle (*Urtica dioica*) root which

accounts for 20 percent. Other phytomedicines include pumpkin (*Curcubita peponis*) seed as well as a rye pollen all have been approved. Following the re-registration of phytomedicines in Germany, saw palmetto, nettle root, pumpkin seed oil and rye pollen extract, all have new monographs. Interestingly, the very popular beta-sitosterol extract has yet to be approved. *Pygeum africanum* extract has not been reviewed.

Dr. Schilcher then provided an overview of the various products, including chemistry and mechanism of action. Pumpkin seed oil has been difficult to standardize because of different species being used for extracts. The active constituents are thought to largely reside in the sterol portion of the oil. Dr. Schilcher pointed to delta-7-sterols as possible active constituents. Although there is a double-blind study underway, there is a paucity of quality clinical studies on this product also.

Pollen extracts have a somewhat more impressive record of modern clinical research. The lipophilic extract of rye pollen has been shown to inhibit 5-alpha-reductase while the hydrophilic portion of the extract inhibits prostaglandin and leukotriene synthesis. It should be noted that this extract has shown good results in the management of chronic, non-bacterial prostatitis.

Dr. Schilcher concluded his talk with a general overview of the most successful and best-researched phytomedicine for BPH, the liposterolic extract of saw palmetto berries. The extract has been shown to inhibit 5-alpha-reductase and aromatase and block the binding of dihydrotestosterone in the prostate. It also possesses anti-inflammatory and anti-edema actions to complement the above actions.

While numerous clinical trials have demonstrated the efficacy of saw palmetto extract for BPH, Dr. Schilcher shared the exciting results of a recently published, three year, open-label study in Germany examining the effects of 320 mg of saw palmetto extract daily in 315 patients with mild or moderate symptoms of BPH.[4] Nocturia decreased in 73 percent of the patients and daytime urination in 54 percent. The residual urine volume decreased significantly from a mean of 64 ml to 32 ml. The peak urinary flow rate improved by a mean of 6.1 ml/s. Significant changes were observed at the six-month evaluation and only 14.7 percent of the patients had a deterioration of symptoms over the three-year study. These results compare favorably to finasteride (Proscar®) and terazosin (Hytrin®).

Dr. R. Della Loggia, professor of pharmacognosy at the University of Trieste in Italy, next gave a presentation of the anti-inflammatory drugs of herbal origin. While herbal drugs are often somewhat weaker in action when compared to prescription anti-inflammatory drugs, Dr. Della Loggia argues that many have a more complete spectrum of action with far fewer side effects. He gave an overview of chamomile (*Matricaria recutita*) as an example. It is fascinating to note that the most potent anti-inflammatory agent in chamomile is the flavonoid apigenin. In fact, *in vitro* tests have actually shown apigenin to be a more active anti-inflammatory agent than indomethicin. It was also interesting to note that quercetin compares relatively well to apigenin in strength. According to Dr. Della Loggia, the essential oils in chamomile are primarily responsible for its spasmolytic effect. Dr. Della Loggia also talked about studies with St. John's Wort (*Hypericum perforatum*) and marigold (*Calendula officinalis*).

Dr. Larry Lawson followed with a remarkably thorough overview of the chemistry, biological activity, and clinical research with garlic (*Allium sativum*). Dr. Lawson, one of the world's experts on garlic and co-author of the book, *Garlic: The Science and Therapeutic Application of Allium sativum L. and Related Species* (Williams and Wilkins, 1996), offered insights into the active sulfur compounds in garlic. Several studies have pointed to allicin as the primary constituent responsible for antimicrobial, hypolipidemic, antithrombotic, antioxidant and hypoglycemic effects of garlic. Allicin is also thought to partly contribute to garlic's anticancer actions. Dr. Lawson points out that more research is needed to clearly understand the metabolism and mechanism of action for allicin and garlic's other sulfur compounds.

Dr. Lawson then covered scientific publications on garlic. To date, 1,300 research publications covering the medicinal effects of garlic have been published. Studies on chemistry and analysis of active compounds have totaled 1,100. The largest number of clinical trials have focused on the use of garlic powder extracts for hyperlipidemia. In addition to causing a modest drop in serum cholesterol and triglycerides, garlic has also shown additional benefits for the cardiovascular system, including mild antihypertensive actions, inhibition of platelet aggregation, and fibrinolytic actions. Epidemiological and animal studies also point to the anticancer actions of garlic. Finally, the intestinal and antimicrobial actions of garlic have opened the door to research looking at the potential use of garlic for a variety of pathogenic organisms.

If you are interested in garlic, then Dr. Lawson's book is essential reading. The only thing missing is a good recipe for pesto. (The book is available from ABC's BookStore.)

One of the highlights of the ASP Conference was a field trip to observe the harvest, drying, and processing of **saw palmetto berries,** *(Serenoa repens)* in South Florida at Plantation Medicinals, Inc.



The next presentation, "Hawthorn (Crataegus): Biological Activity and New Strategies for Quality Control," was delivered by Dr. Otto Sticher, professor of pharmacognosy and phytochemistry at the Swiss Federal Institute of Technology in Zurich, Switzerland. Dr. Sticher presented an overview of the common hawthorn species used in phytomedicine extracts (*Crataegus monogyna* and *C. laevigata*) in Europe. Hawthorn extracts are largely made from the leaves and flowers and are standardized on either total flavonoids (usually calculated as vitexin) or procyanidins. Dr. Sticher broke the bioactive compounds into three groups:

- Flavonol and flavone-o-glycosides (e.g,. hyperoside)
- Flavone-C-glycosides (e.g,. vitexin-2'-rhamnoside, vitexin)
- Procyanidins (e.g,. oligomeric procyanidins)

Dr. Sticher then presented clinical data demonstrating the efficacy of hawthorn leaf and flower extracts for the treatment of New York Heart Association (NYHA) class II congestive heart failure. Hawthorn extracts improve coronary blood flow, increase left ventricular ejection fraction, and reduce peripheral resistance to blood flow. Dr. Sticher ended his presentation with an overview of extraction techniques and quality standards.

Dr. Hans Reuter, vice-president of the German Society of Phytotherapy and one of the leading figures in phytomedicine research in Europe, next gave an overview of the chemistry and biology of St. John's Wort (*Hypericum perforatum*). Dr. Reuter pointed out that St. John's Wort (SJW) extracts are far more commonly recommended for mild to moderate depression in Germany than are the standard prescription antidepressants used in the U.S. Over 23 clinical studies with over 1,500 patients have been published demonstrating the efficacy of SJW extracts for the treatment of mild to moderate depression. Three trials have actually compared SJW extract favorably to tricyclic antidepressants.

While the conventional wisdom has been that SJW's actions are primarily due to hypericin, Dr. Reuter clearly showed that a specific constituent has not been identified as solely responsible for SJW's antidepressant actions. He also dispelled the amine theory as SJW's mechanism of action. While the common belief has been that SJW inhibits its monoamine oxidase, current research by Dr. Reuter and colleagues is pointing to the possibility that SJW may actually be acting as a serotonin re-uptake inhibitor. He also noted that SJW has been shown to inhibit the action of interleukin-6, a cytokine that may contribute to the increased cortisol production noted in major depression. Dr. Reuter also pointed to a possible dopaminergic effect to partly explain SJW's actions.

Dr. Johann Sonnenbichler, professor and department head of the Max Planck Institute of Biochemistry in Munich, Germany, gave a presentation entitled "Biochemistry and Pharmacology of Silibinin." Dr. Sonnenbichler, whose work with milk thistle seeds in the late 1960s led to the discovery of silymarin and its active flavonolignan, silibinin, has largely been responsible for demonstrating the actions of silibinin in the liver. Silbinin has been used orally in standardized milk thistle extracts as well as in i.v. preparations to treat a number of toxic liver conditions, including alcohol-related liver disease. Silibinin not only exerts a hepatoprotective effect but also leads to faster regeneration of normal hepatocyte function. This action has largely been attributed to silibinin's ability to stimulate the enzyme activity of the DNA-dependent RNA-polymerase I, thus causing an increase in rRNA (ribosomal RNA synthesis and an accelerated formation of intact ribosomes). This results in an increased rate of synthesis of all cellular proteins.

Dr. Sonnenbichler surprised some of us in attendance when he postulated that silibinin's actions may possibly be explained by a possible anabolic effect (the constructive phase of metabolism by which a cell takes from the blood the substance required for repair and growth). He also added that silibinin's regenerative actions also extend to both human and monkey kidney cells.

Other presentations of note the second day were a presentation on the search for secondary metabolites from plants as antiretroviral agents by Dr. Eckart Eich of the Free University of Berlin. Dr. Max Wichtl, the author of the wonderful textbook *Herbal Drugs and Phytopharmaceuticals* (CRC Press, 1994), gave a presentation on the biological activity and active compounds in turmeric (*Curcuma longa*). Also presented were an overview on ginseng by Dr. Sticher as well as pharmacological and clinical data on *Vitex agnus-castus* by Dr. Winterhoff of the University of Münster.

The two-day symposium drew over 100 attendees. Special thanks go out to Drs. Lawson and Bauer for organizing this landmark event which will hopefully be the first of many more to come. The proceedings of the symposium will be published at a yet-to-be-determined date by the American Chemical Society as part of their ACS Symposium Series and will be available from the American Botanical Council BookStore.❑



Onion, *Allium cepa*. Photo ©1996, Steven Foster

SOURCES AND NOTES

1. Baetgen, D. Treatment of acute bronchitis in children: A practice study with an immunostimulant from *Echinacea purpurea*. *T W Pädiatrie*. 1988. 1:66–70
2. Coeugniet, E., R. Kühnast. Recurrent candidiases: Adjuvant immunotherapy with different formulations of Echinacin®. *Therapiewoche*. 1986; 36:3352–8
3. Dorsch, W., A. Müller, V. Christoffel, *et al*. Antiasthmatic acetophenones—an *in vivo* study on structure activity relationship. *Phytomedicine* 1994; 1:47–54.
4. Bach, D., L. Ebeling. Long-term drug treatment of benign prostatic hyperplasia—results of a prospective three-year multicenter study using Sabal extract IDS 89. *Urologe* [B] 1995; 35:178–83.

German medicine market segments with a high share of phytotherapeutics

	Total DPM* Sales in millions of $US	Total Phytomedicine sales in millions of $US	Percent of Market
Total market	13,750		
- Over-the-counter	4,566		33
Total phytopharmaceutical drugs		1,357	10
- Sold in pharmacies only		1,238	9
- Over-the-counter (available outside pharmacies)		119	1
Other cardiac preparations: Hawthorn preparations	25	23	92
Universal products (e.g., essences, etc.)	46	40	87
Anti-arteriosclerotics of natural origin (garlic)	61	56	92
Immune stimulant preparations of herbal origin (Echinacea)	77	65	84
Urologics, incl. prostate preparations	185	142	77
Other gynecologicals (e.g., black cohosh)	27	20	74
Percutaneous inhalants (e.g., menthol)	46	33	72
Other cold and cough preparations	37	23	62
Choleretics, cholecinetics (increase bile production)	46	28	61
Other rheumatics	53	31	58
Hepatic prophylactics and lipotropic preparations	54	31	57
Vein preparations	158	78	49
Cerebral/peripheral vasotherapeutics (Ginkgo)	429	196	46
Hypnotics and sedatives	173	75	43
Adjuvants and herbal remedies in cancer therapy	30	13	43
Laxatives	104	44	42
Expectorants without anti-infectious agents	283	86	30
Wound healing preparations	105	27	26
Flu remedies	66	17	26
Rheumatic liniments	217	48	22
Cardiac glycosides	59	12	20
Antidepressants	177	30	17
Tonics	65	11	17
Other dermatologicals	68	11	16
Sore throat remedies	102	15	15
Tranquilizers	77	9	12
Anti-emetics, anti-nausea preparations	77	8	10

* Deutscher Pharma Markt (DPM) = German market of pharmaceuticals, a statistical summary of all sales in pharmacies in Germany.
All sales are based on a conversion rate of 0.6158 DM (German Marks). All figures are rounded to the nearest whole number.
Source: IMS, courtesy of Joerg Gruenwald, Ph. D., Phytopharm Consulting, Berlin.

Most frequently prescribed herbal monopreparations in Germany, listed according to active ingredient and sales

Active ingredient	Therapeutic category (retail prices)	Sales in million $US
Ginkgo biloba	circulatory preparations	284
Horsechestnut	vein preparations	70
Hawthorn	cardiac preparations	40
Yeast	antidiarrhetic, acne	36
St. John's wort	antidepressant	36
Myrtle (*Myrtus communis*)	cough remedy	22
Stinging nettle	urologic	22
Echinacea	immunostimulant	21
Saw palmetto	urologic	19
Milk thistle	urologic	18
Ivy	cough remedy	16
Mistletoe	cancer treatment	14
Soy beans	dermatological	9
Chamomile	dermatological	9
Comfrey	dermatological	8.6
Kava-kava	tranquilizer	8
Greater Celandine	gastrointestinal agent	7
Cineole (essential oil fraction)	cold remedy	6.7
Bromelain (pineapple enzyme)	anti-inflammatory	6.8
Black snakeroot (Black cohosh)	gynecological	6

Source: Schwabe/Pfaffrath, *Arzneiverordnungsreport* (Drug Prescribing Report) 1995.
Courtesy of Joerg Gruenwald, Ph.D., Phytopharm Consulting, Berlin.
All sales are based on a conversion rate of 0.6158 DM (German Marks). All figures are rounded to the nearest whole number.

ERRATA

The figures shown in the above table which first appeared in *HerbalGram* #38, page 59, were converted from German Marks to US$ incorrectly. This revised table has the correct US$ figures. *HerbalGram* apologizes for any inaccuracies and inconvenience this error has caused.

Market Report

by Peter Landes

SPICES: We've seen lots of action in **Spices** during this period, following several dull, featureless quarters of relative inactivity in these usually volatile markets. Faithful readers will recall our discussion some time ago of the governing principle ruling these unsophisticated markets throughout their modern history: a commodity that is too cheap for too long inevitably will become short in supply and rise enough in price to make production once again worthwhile. It will then rise too far leading to overproduction and the whole cycle will start again. This is precisely demonstrated once again by huge price increases in many spices, due only to shortages in supply and not increased demand, which still remains fairly stable. We have seen White Pepper increase about 80 percent in price this year and **Black Pepper** has moved up very sharply recently.

Coriander is tight and relatively expensive this year, too, and makes a good example to demonstrate our thesis. Coriander is a fairly easy crop to grow and is a worldwide crop. The U.S. imports Coriander from Canada, Morocco, Bulgaria, Romania, Russia, India, and Egypt—widely diverse locations with vastly different climates, both physical and economic—yet this commodity is in short supply from everywhere this year. The main factor leading to this shortage is the "too cheap for too long" syndrome. Farmers this year, almost universally, decided that Coriander had become unprofitable and were tired of losing money cultivating it. Moreover, **Wheat**, a crop that can be grown in the same climatic conditions as Coriander, ran up in price quite nicely during the past year and so, apparently, almost every farmer decided to plant Wheat instead. One doesn't need an economics degree to calculate the consequences of this action: Coriander rises in price due to shortage;Wheat sinks in price due to increased supply. One further effect: as buyers of Coriander (a relatively cheap but necessary ingredient in various prepared foods, tobacco, and liquor flavorings) get word of an imminent shortage, they rush to cover their annual requirements. The worst thing that can happen to a purchasing agent for a manufacturing concern is to go to his/her boss with the news that he/she cannot obtain an ingredient necessary for manufacturing a (theoretically lucrative) product. Probably the second worst is to overpay for that ingredient, but that evil certainly pales in comparison to not being able to manufacture a product at all for lack of a simple ingredient. Therefore, buyers bid up prices for diminishingly available supplies, prices rise to unheard-of heights, farmers once again plant too much of the crop and the cycle begins once again. And these are in markets with relatively inelastic demand—people tend not to use less Coriander when prices are high, nor do they use more when prices are cheap. One need only follow the supply situation to predict price fluctuations.

BOTANICALS: In these markets both supply and demand play important roles in price and availability calculations and one must also throw considerations of vastly differing quality into the equation. Spices, at least, are more-or-less commodity items, i.e., one 15-ton lot of **Malabar Black Pepper** is fairly interchangeable with another. This is certainly not true of **Echinacea**, **Goldenseal**, **Cat's Claw,** or **Burdock Root**.

Prices for almost all botanicals are rising due to increased demand and decreased availability of decent quality product. As botanical buyers in the U.S. become more sophisticated in their quality control and as botanical medicine becomes more available, more popular, and, inevitably, more scrutinized in this country, quality considerations must become paramount or this new groundswell in demand will grind to a halt as consumers (and FDA) become disillusioned with both the inactivity of their products and the lack of ability of the industry to police itself. We are presented with a new climate and vast new opportunities to finally put botanical medicine on the health-care map but quality of product must be paramount. Given these parameters it must be stated that quality botanicals are scarce and likely to remain so for the foreseeable future. Supply lines are tenuous since the collapse of the Communist botanical infrastructure in the Eastern European countries and cases of bad, dirty, and sometimes wrong material being shipped or outright defaults on contracts by shippers are increasing. This situation will improve but vigilance as to identification, activity, cleanliness, origin, timely harvesting, proper drying, appropriate storage, etc., is important.

An illustrative (and, to me, fascinating) story: a 10-year-old investigation of a particular plant native to a tropical country which has shown ability to kill the hepatitis-B virus continues. This plant in native form conclusively demonstrated this activity but was thought by a large American corporation to be too uncontrolled in its native habitat to deal with; consequently a supply of seed was brought to an area of South Florida with a comparable climate and the plant was carefully cultivated under controlled conditions. It was monitored throughout its growth and lovingly harvested for pharmaceutical use, whereupon it showed absolutely no activity whatever. It is now postulated that the plant in its native tropical environment is subjected to some natural stress (i.e., insect attack, trauma from a plant disease) that causes it, in self defense, to produce some compound with the desired activity, that is, the ability to kill the hepatitis-B virus. No such affront to the plant existed in South Florida and consequently the plant as produced under such horticulturally controlled conditions was completely useless. Every plant is an extremely complex living organism, as integral to and as much a product of its environment as any other organism, maybe more so. So origin may be as important as any other quality consideration.

This is also an infant industry in many respects—"hot" botanicals come and go with rapidity. It is important to provide consumers with good material, especially in the early stages of an upswing in demand, to demonstrate the industry's ability to bring responsible, safe, and efficacious product to market.

POTPOURRI INGREDIENTS: Very dull markets. Lots of good material available at very advantageous prices. Will the "too cheap for too long" rule prevail here? Let's wait and see!❑

A. L. Tommie Bass 1908 -1996

"I try to give ease."

"Folks have called me a backwoodsman, or a mountain man, and I tell folks I'm a hillbilly without a guitar." Tommie Bass introduced himself in this way to hundreds upon hundreds of people who sought his help and advice. Another Bass trademark statement was "Same address since 1925." He was born in Jackson County, Alabama, at a time when his father was constantly on the move looking for congenial business locations as he bought and sold furs and herbs and "anything else." However, in 1925 the family homesteaded in the area of Leesburg, Alabama. Hard times when young Tommie Bass was growing up fostered ingenuity, entrepreneurial spirit, and the ability to work with the seasons.

"I've actually been working ever since I was eight years old. I've done everything. On the farm, picking cotton, cutting cordwood, making crossties, trapping, taking care of the stock." All this honed his skills with the broadaxe, bucksaw, mattock, sickle, hoe, carpenter saw, and steel trap.

Bass's interest in herbs started early as, like his father, he followed a long Appalachian tradition of herb gathering and trading. A retentive memory and an eye for income fostered his growing knowledge, garnered from the oral and printed traditions.

One of his early advertisements (*Alabama Farmers' Bulletin*, March 1, 1945) is typical of those he used for the next 30 years or so: "Wanted: Star of Grub root, Star grass root, lady Slipper, Snake root, Black Haw bark or root, Calamus and Bloodroot, etc. Write for prices—A. L. Bass, Leesburg (Cherokee Co.)." Although Bass's local reputation grew, it was only from the 1970s that he began to be widely sought after as an herbalist.

The "ease" that Bass gave to many often rested on more than his extensive knowledge of herbs, though he never wanted to admit that. A meeting with him generally took place in his yard—which he aptly described as a junkyard—or inside his shack or on its porch. In the winter a coffee pot of warm sassafras tea standing on a stove greeted the visitor to a roomful of clutter with walls decorated with countless old calendars, photographs of friends, and pictures of President and Mrs. Reagan and Senator Jesse Helms—testimony to a wide circle of acquaintances and to a spirit of Republican independence.



A visit was often marked less by a discussion on herbal medications than by conversation ranging over local events, births, marriages, and deaths, Alabama politics, and general chats on herbs, all laced by Bass's charisma, stories, and jokes. When visitors left, Bass's last comment was generally, "I'm sure glad you came." Bass's advice for, say, such common problems as ulcers and rheumatism, was that he could provide relief ("ease") rather than a cure, and that the visitor would be a "guinea pig to see if the medicine works." Often no charge was made for the "trial" of medicine ("I'm going to make a present of that. Don't tell on me."). If the medicine "worked," a repeat of the herbs or tea commonly cost one to two dollars.

Tommie Bass often said, "I can't quit jabbering." While we can no longer hear directly his wonderful story-telling, his own words and wisdom have been captured many times in the media (film, print, radio, and television) as well in *Herbal Medicine, Past and Present* by J. K. Crellin and J. Philpott (Durham: Duke University Press, 1990, 2 vols.) and *Plain Southern Eating,* ed. J. K. Crellin (Durham: Duke University Press, 1988). — *J. K. Crellin, Ph.D., University of Newfoundland*

Marvin H. Malone 1930 -1996

Marvin H. Malone, 66, of Stockton, California, died December 1996, in a Stockton hospital. A native of Fairbury, Nebraska, Dr. Malone was a pharmacologist, educator, researcher and editor. He retired in 1990 as professor of pharmacology at University of the Pacific, (UOP) where he served on the faculty for 21 years. Previously, he held teaching positions at the University of Connecticut and the University of New Mexico. Dr. Malone wrote more than 200 published scientific articles and was past editor of the *American Journal of Pharmaceutical Education* and the *Journal of Ethnopharmacology*. He was affiliated with more than 20 professional and honorary societies and received, among other honors, the Outstanding Educator of America Award, the UOP distinguished faculty award, and the Order of the Pacific. His work included research on natural products, drug absorption, anti-inflammation, and fertility regulation. He was also editor and publisher of the *Wormwood Review*, a journal of contemporary poetry.



continues on next page

A TRIBUTE FROM COWORKERS AT THE HERB RESEARCH FOUNDATION

Dr. Marvin Malone was a key participant from the start in the Herb Research Foundation's eight-year-old herb safety review program. He was the foundation's principal peer reviewer of the 35 herb safety reviews performed during that time. As a distinguished scientist in the field of pharmacology, Dr. Malone brought to the task an immense body of knowledge and understanding. His reputation at the foundation was legendary as the single reviewer who could offer the most obscure references and details, in addition to providing exhaustive comments, which greatly served to improve the integrity of the reviews overall. It was clear that the effort he put into each report came from a love of the discipline and his passing represents the loss of an impressive talent in the field. — *Rob McCaleb*

Memorials to the Marvin H. Malone Scholarship Fund, University of the Pacific Central Records, 3601 Pacific Ave., Stockton, CA 95211.

Arthur E. Schwarting 1917 - 1996

Arthur E. Schwarting was born June 8, 1917, in Waubay, South Dakota. Dr. Arthur E. Schwarting revolutionized the teaching of pharmacognosy in the United States by classifying drugs according to the chemistry of the drug's active constituents. Dr. Schwarting received his Ph.D. at South Dakota State College in 1943 and moved on to his first faculty position at the University of Nebraska. For almost five decades now, his approach to the teaching of pharmacognosy has been accepted throughout the U.S. and, indeed, the entire world.

Dr. Schwarting introduced, and carried through in his teaching and research, the new, revolutionary concept of the biochemical classification of plants for instruction in pharmacognosy, a distinct deviation from the traditional teacher's version of the subject. Dr. Schwarting had a tremendous influence on the teaching of the science and is primarily responsible for its conversion from one dealing exclusively with taxonomy, morphology, and histology, to one concerned with the biochemistry and chemistry of plant drug constituents. Most of the modern pharmacognostical theory and practice in this country is directly attributable to him. Arthur Schwarting's great service consisted in showing how pharmacognosy should be studied and how it should be taught.

When Dr. Schwarting joined the faculty of the University of Connecticut School of Pharmacy in 1949, I accompanied him and became the first student to receive a Ph.D. degree under Dr. Schwarting's direction.

For 17 years, from 1960-1976, Dr. Schwarting was editor of *Lloydia* (to become the *Journal of Natural Products* in 1979). In this capacity, too, he initiated changes, both quantitative and qualitative, to turn the journal into an outstanding research publication.

In 1970, Professor Schwarting became dean of the School of Pharmacy at the University of Connecticut. He was president of the American Association of Colleges of Pharmacy in 1971-72, during which time he instigated the idea of a study by an outside commission to determine the state of practice and the education which would best serve future pharmacy professionals. The idea was adopted by the AACP in 1972; past-president Schwarting raised the money for such a study, and thus, the Study Commission of Pharmacy was organized. Its report appeared in 1975.

In 1968-69, Dr. Schwarting spent a sabbatical leave in Munich, Germany, where he worked in the institute of Prof. Ludwig Hörhammer. He was one of the authors of *Introduction to Chromatography*, 2nd edition, in 1968. He was on the Board of Directors of the American Foundation for Pharmaceutical Education from 1974-1980. Some of his awards are American Pharmaceutical Association Foundation Research Achievement Award, 1964; University of Connecticut Alumni Association Award for faculty excellence, 1965; and the Centennial Achievement Award from Ohio State University, 1970.

In 1980, Dean Schwarting retired; in 1981 the title of Professor Emeritus was conferred upon him by the University of Connecticut.

The preceding remarks are accurate only in part. Art Schwarting was also a very human individual behind his professional facade. I know of no one more even-tempered, more generous, more willing to help a friend or loathe to condemn an enemy than he. Above all, he was a patient teacher, and I have benefited from his fascinating lectures not only in the classroom, but while scrutinizing alpine flora on top of the Kehlstein and while testing the palatability of malt and hops extracts in Freising. — *Varro E. Tyler, Ph.D.*



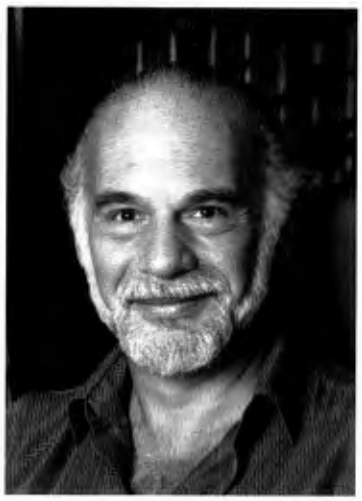
Dr. Arthur Schwarting has more academic descendants than anyone in the field of pharmacognosy in the United States. His Ph.D. students include American Botanical Council Trustee Varro E. Tyler, Ph.D., and Herb Research Foundation Professional Advisory Board member John Staba, Ph.D.

Robert C. Sohn
1939 - 1997

Dr. Robert Sohn, founder and CEO of Sunsource International, Inc., who died in January, is best known throughout the herbal industry as the man who did what everyone else at the time said couldn't be done—he successfully launched an herbal product into the mass market, transforming the industry and opening the doors for other natural product companies to follow. The first product he marketed, the Swiss-made Ginsana® ginseng extract, grew to become the largest-selling ginseng product in the U.S., as Sunsource continued to grow and expand with other natural health products. His vision and commitment to the health and well-being of people and the planet was reflected through his founding and continued leadership in the New Center College for Wholistic Health Education and Research in Syosset, New York, and Sustainable Technologies, Inc., in Maui, Hawaii. Synchromic Studios, Inc., is an award-winning video production facility, also founded by Dr. Sohn to creatively communicate solutions to environmental problems. He was a founding member and past-president of the American Association for Acupuncture and Oriental Medicine as well as a key supporter of other organizations involved with Oriental and alternative medicine, body work, and holistic health.

Dr. Sohn also created the nonprofit Sohn Foundation which was responsible for providing the initial funding for ABC's Ginseng Evaluation Program, an unprecedented evaluation of commercial ginseng products sold in North America. According to ABC Executive Director, Mark Blumenthal, "Dr. Sohn was truly a unique individual. His vision and pioneering efforts in bringing quality herbal products to the mainstream will have an irreversible beneficial impact on the long-term health of all Americans."

He is survived by his wife, Tina, author of a book on Ammay, a traditional healing system of Korea. — *Lorri Rosenthal and Barbara Johnston*



Alfred Vogel
1902 - 1996

Naturopath, herbalist, lecturer, author, and businessman, Alfred Vogel lived long and productively for the benefit of humankind. His first book, *Small Guide to Healthy Living*, was published in 1923. Among his other books, his most famous, the 800-plus-page *The Nature Doctor*, was translated from German into 12 other languages. By the time of publication of the 50th English edition, sales had surpassed two million.

Alfred Vogel was born in Aesch, Switzerland, in 1902. As a child, he was introduced to the benefits of herbalism by his grandmother and his father, both knowledgeable herbalists.

As a young man in 1920, with the help of his father, he set up shop in Basel, Switzerland. The 18-year-old entrepreneur was soon busy selling herbs and lecturing on the benefits of exercise, health foods, and herbal remedies, with skepticism toward establishment medicine.

In 1929, he began publishing the monthly magazine *New Life*, which ran until World War II. Retitled *Health News*, he started it up again in 1943. In the 1950s, Dr. Vogel began his world travels, gathering tribal lore and many varieties of herbs for his customers. He traveled in the Americas, Africa, and Asia. Throughout Dr. Vogel's travels, he always found his own ideals confirmed: To "be moderate and live in tune with nature" is the best guarantee for well-being and health.

Once, on a trip through the United States, Black Eagle, chief of the Dakota tribe, drew Dr. Vogel's attention to the purple coneflower *(Echinacea purpurea)*, a Native American medicinal used for many ailments. Alfred Vogel was instrumental in making echinacea, among many other herbal remedies, available worldwide.

Dr. Vogel received an honorary doctorate of medicinal botany from the University of Califonia, Los Angeles, in 1952. In 1963, Mr. Vogel founded the Swiss company, Bioforce, to market products extracted from fresh herbs. His company exports herbs and natural food products to dozens of countries. Alfred Vogel pioneered the use of fresh herbal extracts as medicinals, using the entire plant or part of a plant, rather than trying to isolate one active ingredient. He championed the idea of the wisdom of nature throughout his long life.



Says Art Presser, R.Ph., an herb and natural products developer and educator, "Dr. Vogel was already into his nineties when I met him, but was still blessed with a remarkably straight posture, amazing vitality, and an uncaged and enthusiastic zest for life. He was certainly living proof of the value of his lifestyle, fundamentals, and natural medicine beliefs." — *Wali Stopher*

Excerpts from *Tales of a Shaman's Apprentice*

On one of my last nights in the village, I was up late pressing plants. Most of the Indians had retired to their huts and I was alone with the old Wayana, who seemed lost in thought.

'Grandfather," I asked, "does it bother you that the younger Indians do not learn the old ways? That you have no student to learn your plants. That your medicine is not be given the respect it is due?"

The old man did not answer right away, and I wondered if he had even heard me, or if he found my question impertinent. Then he sighed deeply.

"It is true the youngsters do not want to learn. That is not my problem, but it will be theirs. One day the medicines that the missionaries send from the city will no longer arrive. The people here will come to me to relieve their pains, to protect their crops, to conquer the evil spirits that kill their children. But I will be gone and I will have taken my plants with me."

I spent the better part of the next twelve months in the United States plotting my return to Tepoe; I was obsessed with working with the old Wayana again and learning more about the Indians, their rituals, and their way of life. The medicine man constantly appeared in my dreams, silently beckoning me to return to the healing forest.



Jaguar Shaman. Photo by Mark Plotkin.

I had followed the old shaman through the jungle for three days and, over the course of our trek, we had developed an enigmatic relationship. The medicine man obviously resented my desire to learn the secrets of the forest plants that he knew and used for healing purposes. Still, he seemed pleased that I had come from so far away—he called me the *pananakiri* ("the alien") — to acquire the botanical wisdom that the children of his tribe had no interest in learning.

I did not yet speak his language; an Indian from a neighboring tribe served as our translator. At the end of the third day, the old shaman turned to the other Indian and said, "Tell the pananakiri that I have taught him all that I am going to teach him. Tomorrow I am going hunting." I had no objections; there were other shamans in the village with whom I wished to work and I returned to my hut with the medicinal plants I had collected.

That night, I had a terrifying dream. An enormous jaguar strode into my hut and stared deeply into my eyes, as if trying to divine my thoughts. Powerful muscles tensed in its back as it arched its body to spring.

So vivid was the apparition that I awoke with a scream. I sat upright in my hammock trembling, my body soaked in a cold sweat. Carefully, I looked around the hut: I saw nothing—no footprints on the dirt floor, nothing disturbed or overturned, nothing to indicate the presence of an unwanted visitor. The only sound was the rustling of palm fronds as a gentle breeze blew through the village.

The next morning, just after sunrise, the young Indian who had served as our translator came to my hut. "Shall we go into the forest and look for more plants?" he asked

"Before we do," I said, "find the old shaman and tell him that last night I saw the jaguar." I gave no details, and the Indian left. He returned a few minutes later.

"Did you tell him?" I asked

"Yes."

"What did he say?" I asked.

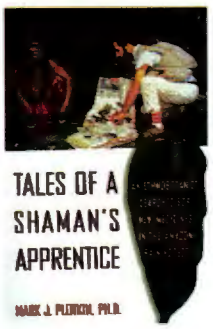
"He broke into a big smile and said, 'That was me!'"

Reprinted with permission from *Tales of a Shaman's Apprentice* by Mark Plotkin, 1994. Viking-Penguin Press. Available from ABC BookStore #B086. See below.



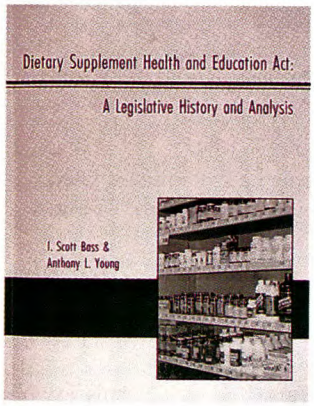
Yanomamo hunter. Photo by Mark Plotkin.

TALES OF A SHAMAN'S APPRENTICE



by Mark Plotkin. 1994. Adventure, onthropology, science, and humor converge in one ethnobotanist's quest among the roinforest shomons for ancient medicines that may hold the cure to today's devostating diseases. Hordcover. 318 pp. $22. #B086

Credit card holders order toll free 800/373-7105, or call 52/331-8868.



The Dietary Supplement Health and Education Act: A Legislative History and Analysis *by I. Scott Bass and Anthony L. Young. 1996, Washington D.C.: Food and Drug Law Institute. Softcover. 319 pp. ISBN #1-885-259-37-9. $99. ABC BookStore #B220.*

The most important piece of legislation affecting the regulatory status of herbs and related products in the last several decades is the Dietary Supplement Health and Education Act of 1994 (DSHEA). This law has created a new regulatory category called "Dietary Supplements" which includes vitamins, minerals, amino acids, herbs, and other botanical preparations. In addition, provisions of the Act declare that these substances are not "food additives" nor are they drugs. Further, DSHEA allows manufacturers to publish more complete directions for use than previously allowed, which include warnings, contraindications, and side effects—information that was previously reserved only for approved drug products. A very interesting and somewhat controversial section of the Act allows manufacturers to publish limited information regarding the benefits of dietary supplements in the form of "Statements of Nutritional Support" as well as so-called "Structure and Function Claims." The Act also requires the development of a new level of good manufacturing practices (GMPs), the creation of a Presidential Commission on Dietary Supplement Labels to advise and recommend to the Food and Drug Administration (FDA) appropriate policy on the labeling and various claims for these products, the creation of the Office of Dietary Supplements at the National Institutes of Health, charged with developing and coordinating research in this area.

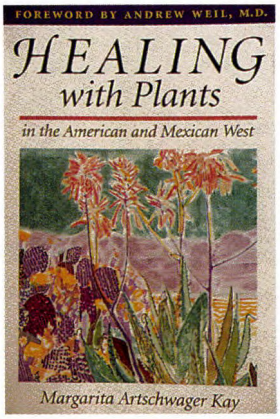
The authors of this book are emminently qualified to present the most complete information on this landmark legislation available in one publication. Both are attorneys representing the National Nutritional Foods Association (NNFA), a trade association of manufacturers, distributors, and retailers in the health food and dietary supplement industry. Both authors were directly involved in the various meetings and negotiations that occurred over a two- to three-year period culminating in the passage of DSHEA.

The book is divided into 11 chapters. Chapter 1 deals with a summary of the Act. Chapter 2 gives a brief history of regulations dealing with dietary supplements in the United States. Chapter 3 discusses several previous Acts that were introduced in Congress in 1992 that dealt with attempts to reform dietary supplement regulation. Chapter 4, one of the most important aspects of this book, deals with the passage of Senate Bill 874, later known as DSHEA, and the various issues that were discussed in Senate hearings, an in-depth comparison of the House and Senate diversions of the bill, and various attempts to effect passage of the final legislation. Chapter 5 deals with the legal definition of dietary supplement as it finally evolved in the Act. Chapter 6 deals with the issue of "New Dietary Ingredients," the term which refers to ingredients that were not commonly sold in the U.S. marketplace prior to the passage of the Act in October, 1994. This section also covers procedures with which companies must comply in order to market a new dietary ingredient as well as additional enforcement power granted to FDA. Chapter 7 covers another more controversial aspect of the bill—transfer of the burden of proof of the safety of a dietary supplement from the marketer to the FDA. Chapter 8 discusses an important aspect of the Act which helps to increase the quantity and quality of educational information on dietary supplements, including so-called "third party literature" and reform of labels under DSHEA. Chapter 9 deals with what is probably the most interesting area of the Act relative to its effect on the explosion of supplement, especially herb, sales in the marketplace, i.e., the statements of nutritional support and structure and function claims, an area of increasing interest and activity to both the FDA and the Federal Trade Commission. Chapter 10 discusses the new label for dietary supplements under DSHEA which includes the ability of industry to provide warnings and directions, nutrient content claims, and a redefined nutrition facts box. Finally, Chapter 11 covers the Commission for Dietary Supplement Labels and the Office of Dietary Supplements at NIH.

The book also provides numerous appendices, including copies of the original Senate versions of the bill, the Acts that were proposed in 1992, and the Amendment to the Senate Act, as well as the Nutrition Labeling and Education Act of 1990 (NLEA), an important piece of legislation upon which the dietary supplement debate in Congress and the passage of DSHEA is predicated.

This is a useful and indispensable book for every U.S. company currently selling any form of dietary supplements. In addition, this book will also provide considerable value to food , pharmaceutical, and foreign companies which manufacture ingredients and/or advanced products intended for sale in the U.S.

Finally, this book will provide considerable value to attorneys, regulatory affairs consultants, and any researchers in the nutrition and botanical fields who would like to have a better understanding of the legal and regulatory landscape in which these increasingly important consumer products are being sold. — *Mark Blumenthal*



Healing with Plants in the American and Mexican West *by Marguerita Artschwager Kay. 1996. Tucson, AZ: University of Arizona Press. Black and white illustrations. 315 pp. $19.95. ISBN # 0-8165-1646-4. ABC Book Store B229.*

One of the erroneous myths that has been perpetrated on generations of American history students is that the history of Europeans in North America started with the landing of the English in Jamestown in 1607. However, as most of us are aware, and as revisionist historians have now rectified in high school history books, the true European history in North America started with the Spanish conquistadors and their exploits in the American Southwest in the 1540s. The Spanish established various settlements throughout West Texas and New Mexico during this time as they did coastal ports in Florida.

The Spanish brought with them not only their philosophy of medicine, but also numerous medicinal plants from Europe which they began to cultivate and which later escaped into the wild and were eventually adopted as medicines by local Native American populations. During the last 400 years, the ethnomedicinal and ethnobotanical development of the Southern U.S. and Northern Mexico has reflected the mix of Native American medicinal plants and the European introductions.

It is estimated that by the year 2000, Hispanic Americans will comprise roughly one-third of the U.S. population, with many of these people living in the Western United States. It is timely and appropriate that a new book has been published that weaves together numerous previous works on medicinal plant use by Hispanic Americans and Native Americans of this region. Previously, the works of Michael Moore (*Medicinal Plants of the Mountain West*, 1979, and *Medicinal Plants of the Canyon West*, 1989) have been two of the leading publications dealing with the traditional uses of the plants of this geographical region. Now the work of Marguerita Kay, Professor Emerita of Anthropology at the University of Arizona in Tucson, and herself a native of the Rio Grande Valley of New Mexico, provides a comprehensive view of not only the local uses of many of these plants, but also some of the pharmacological phytochemical bases for their activity.

The book is in two parts. Part One includes a section on ethnohistory in which Dr. Kay presents background information on the ethnomedicine of Europe as brought over by the Spanish as well as the ethnomedical knowledge of Native Americans of this geographical region. In this section and all throughout the book, Dr. Kay cites authoritative references. In the second chapter, "Plants, Their Names, and Their Actions," the author shows the distinctions between common names as given in a native language or Spanish and the preferred Latin binomials, plus the problems often associated with reliance upon common nomenclature only—especially as one plant may contain numerous colloquial names in the languages of various Indian tribes. To help dispel such confusion, the plants contained in the latter part of the book are listed in order of their Latin generic names. A useful feature of this book is a four-page table, "Medicinal Plant Genera in the American and Mexican West by Culture," in which the author lists 100 genera and their medicinal employment by 15 Southwest cultures, including Mexican Americans and Indians of various tribes. The author chooses to approach the utility of plants based on their phytochemical constituents and has drawn heavily from the NAPRAlert database at the University of Illinois in Chicago for information on the chemical constituents and possible actions of these medicinal plants. Chapter Three, "Illnesses Treated with Plants," discusses both external and internal conditions for which medicinal plants are used in this geographical region and how these plants are prepared. Chapter Four, "Healing the Illnesses of Women and Children," deals with plants that are employed by women for abortion and contraception, menstrual regulation, fertility enhancement, and for childbirth and postpartum conditions.

Part Two is a listing of 100 medicinal plants, starting with various species of Acacia and ending with the genus Zornia (referred to colloquially as "Snake Weed"). The family is listed under each plant along with common name and the species employed medicinally, as well as secondary English common names. Each one- to two-page monograph includes sections on historic use, modern use, and phytochemistry with the discussion of phytochemistry helping to document either historical or modern use. A useful feature of this section is the inclusion of a brief note in the wide margin that gives therapeutic information on each plant, containing three numerated sentences: 1) the common uses of the herb, 2) additional information regarding secondary activity or phytochemistry, and 3) information on safety and/or toxicity. This feature is particularly useful for an at-a-glance review of the essential information on each botanical.

Popular plants covered by this book include garlic, aloe, uva ursi, chile peppers, Mormon tea, juniper, chaparral, chamomile, mint, basil, prickly pear, plantain, rosemary, rue, willow, sage, elder, jojoba, damiana, and valerian. The book also contains 28 accurate line drawings of some of the plants described.

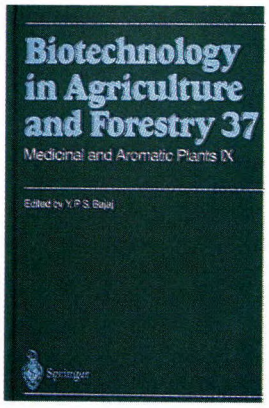
As indicated by Andrew Weil, M.D., in the foreword, "When human beings migrate, they take their plants with them—not only familiar foods and beloved ornamentals but also the healing plants that preindustrial peoples relied on. America has experienced many migrations and is now home to a diversity of ideas and practices

continues on next page

about healing. The medicinal plants of many different ethnic groups are available here, in fresh, dried, and extracted forms. Sorting out the cultural origins of these plants is a daunting task for scholars, let alone assessing their uses and possible value in contemporary medicine."

Dr. Kay has done an admirable job in providing researchers and the general public with a book that will not only substantiate the use of many traditional remedies of the Southwest and Northern Mexico, but will also offer a springboard to research on the potential value of incorporating some of these remedies into modern self-care and health care.

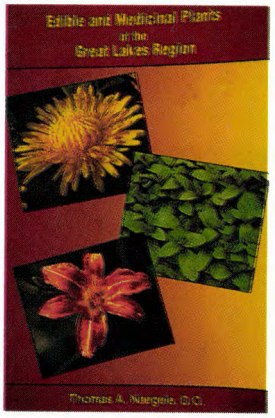
The book also contains numerous footnotes, a brief appendix on medicinal plant safety, a listing of pharmacologically active phytochemicals and their primary activity, extensive reference notes, and bibliographic citations. Overall, this book is written in a scholarly manner and is not an attempt to provide the public another popular "how to" book on herbal medicine. Instead, this publication represents many years of scholarly research on the part of the author in an area with which she is intimately acquainted. As such, this book constitutes a significant contribution to the literature on the ethnobotany of the Southwestern United States and Northern New Mexico. It will no doubt become a classic work and an often-cited reference in this increasingly important subject. — *Mark Blumenthal*



Biotechnology in Agriculture and Forestry, Volume 37: Medicinal and Aromatic Plants *edited by Y. P. S. Bajaj. New York, Springer-Verlag. 1996. 1414 pp. ISBN # 3-540-60597-5. Price $339. ABC BookStore # B230.*

This is the ninth in a series of books on medicinal and aromatic plants dealing with biotechnology developments in producing *in vitro* and tissue culture production of secondary metabolites. With the increased popularity for herbs and phytomedicines and growing demand for botanical materials, new interest is being focused on sustainable methods of agriculture and biotechnical production of both the medicinal plants and, in some cases, the actual enhanced yields of their specific chemical compounds. Although this present volume deals only with *in vitro* (in a laboratory environment) production of specific plants, the research that it represents might be useful for future development of specific compound or group of compounds for food, flavor, or pharmaceutical use, or for production of higher quality strains of the plants themselves on a large-scale agricultural basis.

The book consists of 24 chapters, each dealing with the studies, protocols, and references on specific plants and key compounds within each species. Included in this group of plants are *Anthemis nobilis* (Roman chamomile), *Catha edulis* (Khat), *Catharanthus roseus* (Syn. *Vinca Rosea*; Madgascar Periwinkle), *Mentha* spp. (Mints), *Paeonia* spp. (Peony), and *Portulaca* spp. (Purslane), among numerous others. Other important medicinal and aromatic plants have been reviewed in previous volumes in this series. This book is highly technical and is designed for research scientists involved with tissue culture research and development. — *Mark Blumenthal*

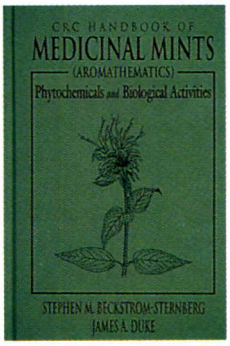


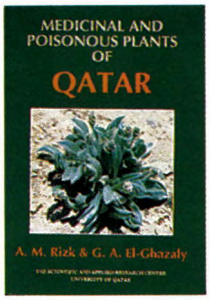
Edible and Medicinal Plants of the Great Lakes Region, *by Thomas A. Naegele, D.O. 1996. Davis Burg, MI: Wilderness Adventure Books. Illustrated, 423 pp., Softcover, $18.95. ISBN # 0-923568-37-9. ABC BookStore #B234.*

This is an interesting and slightly unusual book insofar as it is written by a physician (Doctor of Osteopathy) who has a Master's degree in Botany—an unusual combination that applies to very few physicians in the U.S. This book covers approximately 100 plants that are native or naturalized to the Great Lakes Region. Each plant is provided with a brief one-page monograph and black and white line drawing. The monographs include the Latin name, plant family, and common name. The herbs are sequenced alphabetically by Latin name. The monographs include a brief botanical description, some general information, natural habitat, season of availability for harvesting, preparation techniques, medical terminology (which includes the plant's primary actions as determined by ethnobotanical use and/or modern scientific research), related diseases and symptoms that relate to the actions discussed in the previous section, poisonous aspects, information on the biology and edibility of the plant, chemistry and pharmacognosy information, and the author's personal experimentation with the plant. Fortunately, the author has provided fairly authoritative references for information throughout the brief monographs.

As a physician therefore interested in the medicinal aspects of these herbs, the author provides extensive backpage material in the indices. He has written over 50 pages of tables in which specific physiological actions of herbs are presented with a list of each herb which has been documented for that particular action. Such actions include respiratory, digestive, and nervous systems as general headers; then they are broken down into headache, nervous complaints, asthma, pulmonary problems, colic, indigestion, liver, diarrhea, fever, etc.

In each table the author presents the common name in the first column, the Latin name in the second, and then a series of symbols which indicate whether the plants are





found in the forest, fields and open areas, streams, wet areas, and bogs and which season the plants can be collected. Finally, each of these useful tables contains the page number where the plant monograph is found in the text so the reader can refer to additional information on each botanical.

The author also presents convenient glossaries of botanical and medical terms, cross-references of common and Latin names, and two tables of cross-references of common names-Latin names and Latin names-common names. The book contains a fairly decent bibliography of authoritative references as well as an index.

Unfortunately, dosage information is not given, thereby requiring the potential user to refer elsewhere in the event that he or she intends using an herb medicinally, or using this material as a reference book. Understandably, this type of specificity is difficult as dosages vary depending upon the type of preparation and the intended use. After all, this particular publication is not intended as a manual for self-medication. Otherwise, this is a useful book, especially for anyone interested in collecting ethonobotanical and medical data on the plants of the Great Lakes. — *Mark Blumenthal*

CRC Handbook of Medicinal Mints (Aromathematics) Phytochemicals and Biological Activities *by Stephen M. Beckstrom-Sternberg and James A. Duke. CRC Press, 2000 Corporate Blvd., N. W., Boca Raton, FL 33431. 1996. 458 pp. Cloth, $129.95. ISBN # 0-8493-2665-6. ABC BookStore #B239.*

Since the publication of Duke's previous databases, including the *CRC Handbook of Phytochemical Constituents of GRAS Herbs and other Economic Plants* and the *CRC Handbook of Biological Activities* (both published in 1992), he and colleague Stephen M. Beckstrom-Sternberg have nearly doubled the number of species, phytochemicals, and biological activities included in their database. The present volume focuses only on species of the Lamiaceae (Labiatae), the mint family, one of the most important families of economically significant aromatic species. Data on over 200 taxa are featured, arranged alphabetically by scientific name (followed by common name). An alphabetical list of the known compounds is given, followed by their occurrence in parts per million, the plant part tested, and a citation. For more obscure mint family members, information is often drawn from a single citation. Chemical quantification data in ppm are given in either aggregated (range of ppm) or unaggregated form, with a single figure. The authors have devised computation methods by which the analyses can be evaluated for predicting potential biological activity based on concentration of a specific compound. The database can be accessed at: http://www.arsgrin.gov/~ngrlsb/. A second section of the book provides a list of biological activities for each compound (keyed to a reference). A bibliography of over 500 references complements the text. This useful reference combines aroma-thematics with aro-mathematics to provide useful data in a unique format valuable to any specialist in medicinal and aromatic plants. — *Steven Foster*

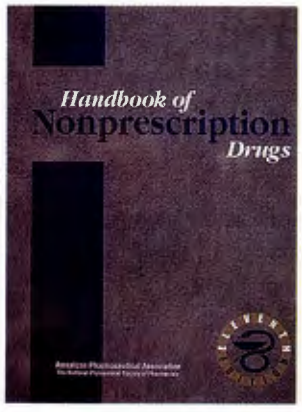
Medicinal and Poisonous Plants of Qatar *by A. M. Rizk and G. A. El-Ghazaly. Scientific and Applied Research Centre, P.O. Box 2713, Doha, Qatar. 1995. 306 pp. Cloth. $40. (Shipping to U.S. and Canada $15.00) ISBN # 99921-21-44-0. ABC BookStore #B224.*

Few among us will have the opportunity to travel to Qatar. Yet this useful volume, limited in its geographic approach, contains many plant species found throughout temperate and tropical regions of the world. At least half of the plants in the book are not native to the Arabian peninsula, but hail from the Americas, Asia, Europe, and other areas of Africa. The native plants are of interest precisely for their geographic limitation. The constituents, uses, effects, and descriptions are given for 184 medicinal plants. In addition, details on flowering period, habitat, and distribution are included, though these are limited to the plants' occurrence in Qatar. Over 250 color photographs of varying quality and clarity are included. The use section in each entry provides good quick reference data on folk and traditional use from around the world, relying heavily on secondary regional compilations. The "effects" data enumerate pharmacological data with references to primary literature. Data on constituents usually lead one to primary literature. The bibliography includes over 500 references. In addition, the book features a medical and botanical glossary, and for Arabic readers a glossary of English technical terms cross-referenced to Arabic. *Medicinal and Poisonous Plants of Qatar* is a useful and valuable addition to the medicinal plant literature, and it should be on the shelves of every well-rounded herbal library.— *Steven Foster*

Handbook of Non-Prescription Drugs. 11th Edition. *1996. Washington, D.C.: American Pharmaceutical Association. Hardbound. 774 pp. Price $130/set. ISBN # 0-91-7330-77-3. ABC BookStore #251.*

continues on next page

BOOK REVIEWS



Non-Prescription Products: Formulations & Features '96-'97. *Washington, D.C.: American Pharmaceutical Association. Softbound. 447 pp. ISBN #0-9173-30-78-1. (Companion to the Handbook of Non-Prescription Drugs 11th Edition.)*

These two volumes comprise the 11th edition of the famous *Handbook to Non-Prescription Drugs*, originally published by the American Pharmaceutical Association in 1967 and revised and expanded 10 times since that year. The Handbook is composed of 36 chapters on all types of non-prescription drug products, including for the first time a chapter on "Herbs and Phytomedicinal Products" (Chapter 35), by well-known botanical authorities Professor Varro E. Tyler and Steven Foster. It is because of this inclusion of the chapter on herbs that this important reference volume and its companion book discussing various specific non-prescription drug and herbal medicine products is reviewed here in *HerbalGram*. To give brief mention to the vast majority of the book, the various chapters deal with specific types of non-prescription medications that correspond to the various over-the-counter drug monograph classifications. For example, there are chapters on internal analgesic and anti-pyretic products, external analgesic products, vaginal and menstrual products, cough, cold and allergy products, asthma products, sleep aid and stimulant products, laxative products, emetic and anti-emetic products, oral health care products, and so on. In addition to the herb publication are the chapters on smoking cessation products, first-aid products, and products for minor wound care.

The fact that this standard drug reference would include a chapter on herbs and phytomedicines attests to the unprecedented growth of these products in the U.S. as self-selective medications and the increased attention they are receiving in the professional healthcare community. Although most OTC drugs deal with minor, self-limiting, self-diagnosable, and self-treatable conditions, people generally tend to use herbal products for the same kinds of indications as well as for a broader range of tonic and/or preventive applications beyond the domain of conventional non-prescription medication. Tyler and Foster have written an excellent, concise overview of the role of herbs and phytomedicines in contemporary society (with an introductory section stating that in general many of the herbs contained in the chapter have demonstrated degrees of safety and efficacy). They also cite the German Commission E as a rational model for the assessment of safety and efficacy of herbs and phytomedicines. The chapter is organized by organ systems and follows somewhat the organization of Tyler's best-selling book in the ABC BookStore, *Herbs of Choice: The Therapeutic Use of Phytomedicinals*, in which the book is organized by physiological systems and the appropriate herbal remedies for conditions associated with each system. Thus, the first chapter of the APhA volume starts with digestive system disorders and includes information on ginger, psyllium seed, peppermint, chamomile, milk thistle, and licorice. Under each specific herb, Latin name or countries of origin, chemical constituents, physiological activity, and therapeutic use, precautions and appropriate dosages are given.

Following the digestive system, other physiological systems covered in the chapter include kidney, urinary tract and prostate, respiratory tract, cardiovascular system, nervous system, metabolic and endocrine disorders, skin, mucous membranes and gingiva, and performance and endurance enhancers. The chapter ends with two case studies and 71 references.

The companion volume, *Formulations and Features,* contains hundreds of specific products in the various categories corresponding to each chapter. The senior author of the herb chapter had sent a questionnaire to numerous herb companies requestinginformation on the products that they sold so this specific information on a product-by-product basis could be published in the second volume. The authors were disappointed that apparently so few herb companies chose to respond. Listed on the five pages of herb products are specific products by brand name and manufacturer, including the dosage form and ingredients of herbs such as bilberry, cranberry, echinacea, evening primrose oil, feverfew, garlic, ginger, ginkgo, ginseng, St. John's Wort, saw palmetto, and valerian, in addition to several others. This section is intended as a guide to commercially available products for both pharmacists and consumers.

The significance of this chapter is not so much for the specific information offered; those in the herb and botanical community have access to considerably more information than is offered here, if one chooses to search from the increasingly vast variety of authoritative literature being published. Nevertheless, the information here is solid, reliable, and authoritative. It is important insofar as it represents recognition by the American Pharmaceutical Association that a growing number of Americans are using herbs as dietary supplements as well as substitutes for conventional non-prescription drugs; that there is a great need for educating pharmacists, students, and consumers regarding the safe and effective appropriate use of these products—especially those that have been shown by scientific research to be safe and effective for a number of common and self-treatable ailments. The publication of this chapter in this highly esteemed and widely-circulated publication will continue to enhance the credibility and the growth of the herb and phytomedicine movement in the U.S. and worldwide. — *Mark Blumenthal*

Top 10 Sellers of ABC BookStore

September through December 1996

Previous standing shown in ( )

1. *German Commission E Monographs:* Blumenthal, Gruenwald, Hall, Riggins, and Rister eds., Klein & Rister (trans) (in press) (1)
2. *Encyclopedia of Herbs and Their Uses:* Bown (3)
3. *Herbs of Choice:* Tyler (2)
4. *Healing Power of Herbs:* Murray (new listing)
5. *Cancer and Natural Medicine:* Boik (9)
6. *Herbal Medicine:* Weiss (tied for 10)
7. *Home Herbal:* Ody (new listing)
8. *Complete Women's Herbal:* McIntyre (new listing)
9. *Essential Oil Safety:* Tisserand & Balacs (tied for 10)
10. *Sastun, My Apprenticeship:* Arvigo (back again after a short absence)

HERBS AS DRUGS?

If herbs get classified as drugs should herb store owners give serious thought to becoming registered Pharmacists? Are there pharmacy colleges that offer courses in botanical products? Will herbalists come under the authority of state board of pharmacies? What will happen to unlicensed herbalists? As an herb store owner of 14 years I'm concerned about these questions. If anyone has comments or suggestions please respond.

Thomas C. Stewart, Herbalist AHG
P.O. Box 12882
Reno, NV. 89510
email: msmataio@aol.com

[*It is not too likely that herbs will be classified as drugs in the U.S. or Canada any time in the near future. Under the Dietary Supplement Health and Education Act of 1994 (DSHEA) herbs are legally classed as "dietary supplements" and are specifically excluded from being regulated as drugs, unless they are marketed with claims that the FDA interprets as being therapeutic or drug-like. Several colleges of pharmacy in the U.S. have begun to offer courses in herbs and phytomedicines. For example, the University of Texas at Austin will offer one this fall. Courses are also available at Purdue and the Philadelphia College of Pharmacy and Science. It should not be necessary for an "herbalist" to get a pharmacy license, although a number of people who consider themselves professional herbalists have become acupuncturists or other licensed health professionals in order to employ their herbal practice within a licensed profession. — Ed.*]

THANKS FROM A PAINTER

Regarding the book *Herbs* by Bremness (ABC BookStore #B207). I certainly got more than I had anticipated in the book. It is a delight to look at, wonderfully done, and informative. I purchased it chiefly in the hope that it would add to my meager source of good color photos and verbal descriptions of plants. It does! But it has much, much, more of interest to offer the general reader for whom, of course, it is intended.

As for my desire for color photos: I paint [water color] medicinal plants and herbs, chiefly; however, some weeds and other plants. Since I simply cannot draw "worth a hoot," I rely upon, for the most part, black/white line drawings that are made by a professional botanical artist, and which I purchase. Nor am I an artist, but have fun painting!

The number of such drawings I have found is quite limited. Needless to say, live specimens of the plants are difficult to come by, at least for me.

I am 87 years old and extremely limited in physical abilities due to asthma, osteoarthritis, and osteoporosis. I get about in the apartment complex where I live via electric cart. The painting, etc. I do to keep occupied. I sometimes write a note or notes re the plants—their history, medical and other. I thoroughly enjoy *HerbalGram.*

Lt. Col. Ret. Henry B. Webb
Weslaco, Texas

KUDOS FOR PRESENTATION

I am absolutely delighted both with the content and with the beautiful presentation of Barbara's article and the superb reproduction of the illustrations, which far exceed the quality one would normally hope for even in a specialist arts magazine. Congratulations and many many thanks. It is flattering enough just to be featured in *HerbalGram*, but to be sandwiched between my old friend Dick Schultes and two features on the one herb, ginger, to which I am virtually addicted, was an especial privilege. Even your obituary page had a personal connection: Roger Tory Peterson attended the opening of my very first exhibition of botanical sculptures, at Cartier in New York in 1972, and was kind enough to authenticate the accuracy of my work and give it the approval that has been greatly valued.

With my best wishes for your continued and increasing success with HerbalGram.

Patrick O'Hara
Currabinny, Carrigaline
County Cork, Ireland

READER TAKES UMBRAGE

I was irritated by your publication of the letter from Bill Wrabez regarding lack of marijuana coverage (*HerbalGram* 38). While you went to great pains to print the letter complete with all errors in grammar and spelling, along with a coy *sic* pointing out each one just in case we hadn't noticed, you made absolutely no effort to address the substance of the letter. So why on earth did you publish it? Merely to embarrass the writer? To give your "real" readers a chuckle at his expense? I for one would appreciate a little less intellectual snobbery. Shame on you.

Sylvia Gilbertson
Cremeno, Italy

[*As is the case with many publications, we do not feel compelled to respond to every letter that we publish. In general, we try to publish most letters we receive to allow our readers a forum to voice their interests and opinions. In the case of Mr Wrabez's letter on our "lack of marijuana coverage" we though it was interesting that he would put forward such a strong opinion and criticism of our publication, at the same time not bothering to take a few moments to check his own spelling. Actually, we have been contemplating an article on this subject for quite some time and one of our contributing editors has been researching this subject for a future issue. — Ed.*]

SEEKING SPONSORSHIP FOR NEW CARIBBEAN BOTANICAL GARDEN

I have recently become the land development manager for a 350-acre estate called Grand Bois which is located on the Caribbean island of Saint Lucia. The estate can best be described as a lush rain forest. It has a small river with two very scenic waterfalls running through it. Vegetation on the land consist of a host of different fruit trees, vegetable plants, and other exotic plant life. Animals on the estate are restricted to mainly birds and parrots including the Saint Lucian Parrot, one of the world's rarest parrots.

Located between Martinique and St. Vincent, the island of St. Lucia is just 27

miles long by 14 miles at its widest point. The first inhabitants were the Arawak Indians who came up from South America in 22 A.D. to escape their warlike enemies, the Carib Indians. Eventually the Caribs found and conquered them but history reveals even more battles, with at least 14 conflicts between the British and the French through a 150-year period. St. Lucia was finally ceded to the British in 1814, and became an in-dependent country within the British Commonwealth in 1979.

Until recently, St. Lucia was little known—favored by a small number of devotees for what it lacked rather than what it offered. But, like everything else, St. Lucia is changing. Fortunately, the island has not yet experienced the rampant development that has raped so many other Caribbean jewels.

Our intention at Grand Bois is to open the estate to tourism, however our main aim will be to develop the estate in such a way as to increase its existing natural beauty. One of the ways we are seeking to do this is by adding botanical gardens. The gardens will be used mainly as an educational facility for the tourist.

I am looking for a partnership with an Institution, Educational/Research or Commercial, which would be willing to provide the necessary expertise to make this possible. We are interested in making contact with any entities that have extensive experience in: 1) Exotic plants, especially those specializing in Orchids, and 2) Herbal Plants.

I would be most grateful if you could assist me, or point me in the right direction by way of recommendation, to any persons or entities that might be interested in this venture. If you can help me or for further information please do not hesitate to contact me.

Ian M. Mitchell
Land Development Manager
Grand Bois, Saint Lucia
10941 Palm Ridge Lane,
Tamarac, Florida 33321
Phone/Fax: 954/720-9096
Email:GrandBois1@AOL.com



Pyrethrum, *Tanacetum cinerariifolium*

GINGER AND AYURVEDA

I am an Ayurvedic physician working as a research fellow in Foundation for Revitalisation of Local Health Traditions, Bangalore, India as a Research fellow. I am a regular reader of *HerbalGram.* It is really informative. In the last issue of *HerbalGram* (Number 38, Fall 1996) came across an article on ginger. This article talks on the "Lack of adverse effects of ginger" which reads, "In British Pharmacopoeia of 1988, and in the Austrian, Swiss, Belgian, German, Chinese, Indian, Japanese, and Netherlands pharmacopoeia, there is no mention of any recorded adverse side effects..." But this is not true. Ayurveda explains contraindications on the usage of ginger! This is elaborated in the well known Ayurvedic lexicon called *Bhavaprakasa Nighantu* of 1550 AD. The sanskrit verse goes like this, "*Kushtte panduamaye kruchre raktapitte vrane jware dahe nidagha saradornaiva poojitha-mardrakam.*" (*Bhavaprakasa nighantu*, Haritakyadi varga, 50th verse). This means that the usage of ginger is not suggested in (few types of) skin diseases, aneamic conditions, difficult micturition (urination), bleeding disorders, wounds, burning sensation and in seasons like Summer and Autumn. Generally there is a feeling that herbal medicines are safe and without adverse effects. But ayurveda advocates the appropriateness of any consumption and in many instances the adverse effects are well described. It is quite unfortunate that most of the times these descriptions go unnoticed. Hope you will convey this message to the authors of this article and the readers. My special regards and thanks to you, for your efforts in rejuvenation of herbal medicine.

Dr.Unnikrishnan.
Research fellow, FRLHT
Foundation for Revitalization of Local Health Tradition
Bangalore-560 0024. India.
Ph: +91 80 3336906, 3330348
Fax: +91 80 3334167
Email: root@frlht.ernet.in
Home Page : http://ece.iisc.ernet.in/ernet-members/frlht.html

[*We appreciate Dr. Unikrishnan's response. Actually, the statement by the authors of the ginger article in* HerbalGram *#38, Drs. Fulder and Tenne, is correct: there is no mention to our knowledge of adverse side effects in the pharmacopoeias noted. Dr. Unnikrishnan cites a classic Ayurvedic text of the 16th century, which, although it may contain interesting and potentially relevant therapeutic information, is not considered an official government-approved pharmacopoeia. We are, nevertheless, grateful for the additional information. — Ed.*]

GINGER AND MORNING SICKNESS

The article on the use of ginger and morning sickness is of great interest to me. (I've written two books on the subject of morning sickness, one video, an audio tape and a few articles and chapters, interviewing over 1,000 women with morning sickness before the first work appeared.)

Ginger (*Zingiber officinalis*) in food and/or beverages (ginger tea, ginger ale, ginger conserve, candied ginger) provides not only necessary fluids for a woman suffering from morning sickness but probably some calories and nutrients—concentrated ginger [in capsules] is not the same. The amount of active ingredients in ginger capsules is not known. Unfortunately no one has yet demonstrated in pregnant rats that the equivalent amount ingested in "early pregnancy" (by proportional body weight to dose) will not affect fetal development. One only has to recall the remedy used historically for the

management of morning sickness, (i. e., thalidomide) and its effect on fetal development, to call for some animal studies. This appears an easy study to conduct, and I am amazed it has not yet been undertaken. (Don't expect to find morning sickness in rats...data from the late Herbert Borrison shows not all animals vomit...and the rat does not!)

Another aspect which has not been evaluated in ginger efficacy with morning sickness/ hyperemesis is how abnormal electrolyte status may or may not contribute to overt success. Sick women often are low in potassium and magnesium... this affects gastric emptying. It is hard to compare hyperemetic women (the really sick variety) with morning sickness. Hyperemetic women often have low serum potassium and magnesium levels, both also affect gastric emptying.

According to Duke, the active ingredients in ginger vary by geographic region. Maybe this is why some cultures show better results in nausea control than others. Of note, in one study comparing ginger to placebo, they used lactose in the placebo which might not be considered to be an appropriate agent, given this substance may not be inert.

Lastly, comparing nausea from morning sickness to seasickness is like comparing oranges to apples; one is the result of altered hormones and the other connected with ear/ eye/brain communications. How and why ginger in its natural form might reduce nausea is certainly worthy of study. One trick I've found in managing the morning sickness population is to control for smells, odors, aromas, etc. This group of women is "hyperolfactory" and smells are a major trigger to setbacks. Again, it is hard to tease this aspect out of published studies.

Unfortunately, I am not able to get copies of international articles in foreign languages translated but am trying to track the international literature on the use of herbs, spices, and botanicals in the treatment of morning sickness. If anyone can help me out, I'd be most appreciative.

I look forward to every issue of *HerbalGram*.. And thanks for the address in the Duke article to the ethnobotany databases! This is like an early birthday present!

Miriam Erick, MS, RD, CDE. Dept of Nutrition Brigham and Women's Hospital, Boston.
http://ourworld.compuserve.com/homepages/MErick
or 104122.1515@CompuServe.com

RESPONSE TO CRANBERRY

Certainly the prize for the outstanding botanical misstatement of 1996 must go to *HerbalGram* #38, page 51, in the article "Cranberry" where, in prominent italic type, we read:

> Cranberries...are a member of the heath family and are one of three fruits native to North America.

How such a statement could pass scrutiny and be published in an otherwise reputable journal boggles the mind. Let's consider the statement.

In the first place, North America has about 20,000 species of flowering plants (angiosperms), each of which produces fruit, such production being one of the things that angiosperms do. That means about 20,000 kinds of fruits occur on the continent. Of course most of these are not the type of structure that the average person thinks of as "fruit," i.e., usually sweet (but not cranberries), juicy, and fleshy.

Could the statement mean edible fruits? No. Our flora produces many more than three kinds of fruits that delight the palate. Just check any book on edible plants and note all the edible fruits mentioned therein. A few that come quickly to mind include (in random order) serviceberries, crowberries, mulberries, currants, gooseberries, grapes, mountain ash, barberries, papaws, persimmons, ground-cherries, elderberries, mayapples, strawberries, raspberries, blackberries, cloudberries, prickly-pears, maypops, roses, and so on.

Could it mean edible fruits of the genus *Vaccinium*? No. In that genus are blueberries, deerberries, and lingberries in addition to cranberries. This makes four.

Could the statement mean edible fruits of the heath family? No. That family, in eastern North America alone, produces huckleberries, bearberries, teaberries, moxieplums, and the just mentioned *Vaccinium* fruits. And let's not forget the madrones of the west. There are more.

Could the statement mean commercial edible fruits? No. Not only are cranberries and blueberries commercially important but so are American plums and grapes. Then, too, there are choke cherries and elderberries, which are made into the jelly that one can sometimes find in food markets. These are not all.

The statement remains inexplicable. No matter how one looks at it, the meaning remains elusive.

There seems no excuse for *HerbalGram* to publish such a patently ridiculous datum. Perhaps your fact-checking department should be improved.

"Cranberry" is marred by other errors, too. For example, the leaves adorning the photo of cranberries seem to be leaves of the black walnut. I am at a loss to understand the relationship between these two kinds of plants. Certainly the foliage of cranberry would have been a better choice.

In the picture legend on page 54 I read "Cranberry, *Vaccinium* spp." Because the picture appears to be of but one species of *Vaccinium* the scientific name should have been "*Vaccinium* sp."

At the start of the article the implication is made that there are three kinds of cranberries in North America. Then three scientific names are cited: *Vaccinium macrocarpon*, *V. oxycoccos*, and *Oxycoccus quadripetalus*. But one of these, *Oxycoccus quadripetalus*, is a synonym of one of the other two, *Vaccinium oxycoccos*. Thus two valid scientific names are listed for the "three" kinds. Rather like saying that there are three kinds of fruits in the bowl: oranges and apples.

Certainly you folks, with your large and distinguished advisory board, can do better. Or is the board just for show?

John W. Thieret
Herbarium, Department of Biology
Northern Kentucky University
Highland Heights, Kentucky

[Ed. note - *No, the board is not just for show. Many members of our "distinguished" Advisory Board actually do review the material in* HerbalGram. *We are grateful for Prof. Thieret's comments and criticisms.*]

[*Author's response: Let me focus on the statement which Dr. Thieret finds most problematical, "Cranberries are a member of the heath family and are one of three fruits native to North America." This statement is a paraphrase of information prepared both for the consuming public and food technicians by Ocean Spray Cranberry, Inc., one of the largest producers of cranberry and cranberry-derived products in the world. In terms of my article, which is based on a literature review and not on original research, I felt comfortable with the statement and its source to include it in my article. Since I am not a professional botanist by training, I do not feel it is appropriate for me to comment on Dr Thieret's other issues. I will say, however, that most of these items do not mislead the general readership of your publication nor will they impact significantly on the educational value of the information presented in my article.–Arthur A. Siciliano, Ph.D.*]

LETTERS

A MEMORY OF JULIA MORTON

re: Obituary of Julia Morton in *HerbalGram* #38

You may be amused about my first, and only, encounter with Julia Morton. It was in Chicago in, I think, 1987 at the Society of Economic Botany symposium.

I'd booked a room in the women's dorm. The morning after I arrived I walked down to the floor's bathroom to take a shower. With only towel, soap, and a shower cap in hand I looked for an unoccupied shower stall. I was surprised to see another attendee step out of her stall. Her red-tinged grey hair marked her as a senior citizen, but, unadorned, she had the body of a 20-year old. (Yes, I looked! The contrast was that startling.) "I'm Julia Morton," she said, without embarrassment. The name meant nothing to me, but she looked interesting and I said I'd like to join her for breakfast.

Only later did I find out what an important figure in the world of botany she was.

At breakfast for the next two mornings Ms. Morton told a group of us who sat together amazing stories about several Miami murders she had helped Miami police solve. Her in-depth botanical knowledge was used forensically to pinpoint such evidence as time of death based on plant material over and under the body. She could identify the season of death (of one woman in a late stage of decomposition) by the growth of new leaves on a nearby clipped hedge based on its growth since being clipped. The clippings had been used to cover the body, but the leaves had long since dried up and blown away. She could tell the police whether a body had been killed on the spot or had been dragged to it from somewhere else. There was more, all fascinating, but that was 10 years ago, and the above is what I remember most vividly.

I doubt that Mrs. Morton's many admirers knew of this aspect and use of her expertise. Shades of Brother Cadfael!* Ms. Morton's botanical and literary talents stretched across many disciplines indeed.

Portia Meares
Madison, Virginia

*[*Ed note - Brother Cadfael is a medieval herbalist-detective in a series of mystery novels. He solves problems relying on his knowledge of herbs and humanity.*]

ACCESS

In this department of *HerbalGram*, we list resources such as publications, organizations, seminars, and networking for our readers. A listing in this section does not constitute any endorsement or approval by *HerbalGram*, ABC, HRF, or the HRF Professional Advisory Board.

Four-year degree program in Ayurveda by Ayurvedic Company of Great Britain, in partnership with Wolfson College of Health Sciences and Thames Valley University of London, starts Autumn 1997, first university degree course in Ayurveda outside India and Sri Lanka. Contact: Amy Corzine, The Ayurvedic Company of Great Britain, 50 Penywern Rd., London, SW5 9SX, England. Fax 44-171-370-5157.

Dining on the Wilds, Edible Wild Plants Video Library by Forage Ahead and Wilderness Leadership International. 280 wild edibles, their identification, habitat, season, edible parts, food preparation, herbal usage and nutritive value. 6-hour entertaining video set, 2 reference manuals. $149.95 plus $6 shipping (CA residents add $11.62 sales tax). Outdoor Equipment, 24414 University Ave. #34, Loma Linda, CA 92354. Ph. 909/796-8501.

Future World Trends in the Supply, Utilization and Marketing of Endangered Medicinal Plants, study by The Herbal Medical Database Ltd. division of McAlpine, Thorpe & Warrior Ltd. Comprehensive report plus appendices gives data on plants, raw materials traders andmanufacturers of herbal medicines and extracts; evolving strategies and trends on international basis. Focuses on Asia, Europe, Far East, South America and U.S. Contact Amy Corzine,MTW, 50 Penywern Road, London, SW5 9SX, England. Fax: 44-171-370-5157.

FDA News Capsules, every Wednesday by fax. Get simple facts about FDA drug/device decisions and policies. Late-breaking FDA News, *Federal Register* FDA notices, just-released Warning Letters, Citizen Petitions within 24 hours of FDA posting, results of Advisory Committees and calendar. Annual subscription $395. Fax order: 717/731-1427.

Focus on Alternative and Complementary Therapies (FACT), new journal by the Department of Complementary Medicine, Postgraduate Medical School, University of Exeter, UK. Review journal presenting evidence on complementary medicine in analytical and impartial manner, also keeps up with literature published on complementary medicine. Contact Mrs. Elizabeth Stewart, Dept. of Complementary Medicine, Postgraduate Medical School, Univ. of Exeter, 25 Victoria Park Rd., Exeter EX2 4NT, UK.Fax: 44-1392-424989.

Gardens, Glasshouses, and Great Explorations, lecture series presented by New York Botanical Garden Continuing Education Department, heralding the May '97 opening of the newly restored Enid A. Haupt Conservatory. Eight lectures by world-renowned horticulturists, landscape designers and botanists, offering "insiders" perspective of the world of the Conservatory. Ph: 718/817-8747.

Institute of Medical Herbalism comprehensive classroom course in botanical medicine specifically for health professionals, beg. February '97. Curriculum includes most common and effective herbs for each body system, dosing, toxicities and interactions with pharmaceuticals. Every six weeks on weekends/seven sessions. Contact Dr. Nancy Welliver, N.D., The Institute of Medical Herbalism, P.O. Box 1149, Calistoga, CA 94515. Ph: 707/942-1250.

The Natural Medicine Forum on CompuServe, a Holistic Health Forum for exchange of information and ideas. Health, business, education and politics, with professionals, paraprofessionals, natural product retailers and suppliers, consumers, lobbyists, and members of the press. Type "Go Holistic" and use Internet to connect with people interested in holistic health and natural products. Ph: 800/848-8199, operator 525.

United Plant Savers (UPS), non-profit grassroots organization for restoration and sane cultivation of commercially vulnerable and environmentally threatened medicinal plants in North America. Consulting and referral services in land use planning and permaculture design; referral services for ethical sources of seeds, roots, plants. Botanical Sanctuary and Educational Center for workshops, seminars in field botany, medicine-making, herb cultivation, and woodlot management. Membership $35/yr individual; $50/yr organization. Contact UPS, P.O. Box 420, East Barre, VT 05549. Ph: 802/479-9825. Fax: 802/476-3722. Email: ups@ilhawaii.net

U.S. Tea is "Hot" Report, new 1996 edition, the most comprehensive information source available for facts, analysis and resources in and on the burgeoning United States tea industry. Single copy price $275. Discounts for students and non-profit organizations. Contact Sage Group, 1712 Warren Ave. N., Seattle, WA 98109. Ph. 206/282-1789. Fax 206/282-2594.

February 23-26: Chemistry, Biological and Pharmacological Properties of Medicinal Plants from the Americas, Panama City, Panama. International Joint Symposium sponsored by the International Organization for Chemical Sciences in Development (IOCD) and Programa Iberoamericano de Ciencia y Tecnologia Para el Desarrollo (CYTED). Contact Prof. Kurt Hostettmann, Chairman, IOCD Working Group on Plant Chemistry, Institute of Pharmacognosy and Phytochemistry, University of Lausanne, B.E.P., CH - 1015 Lausanne-Dorigny, Switzerland. Ph. 4121-692 45 61. Fax 4-121-692-45-05. Email Kurt.Hostettmann@ipp.unil.ch

March 4-9: The Society for Applied Anthropology Annual Meeting, cosponsored by Society for Medical Anthropology, Council on Nursing & Anthropology, and Political Ecology Society, Seattle, WA. Topics include health and medicine, community development, environmental resource protection, and educational reform in policy domain and every realm of application. Society for Applied Anthropology, P.O. Box 24083, Oklahoma City, OK 73124, Ph. 405/843-5113. Fax 405/843-8553. Email sfaa@telepath.com

March 8-15: ACEER Rainforest Photography Workshop, led by author/botanist/photographer Steven Foster. Contact International Expeditions, One Environs Park, Helena, AL 35080. Phone 800/633-4734. Fax 205/428-1714.

March 9-11: Prairie Medicinal and Aromatic Plants '97 Conference, Manitoba, Canada. Hosted by the Manitoba Crop Diversification Centre. Production, marketing, and use of medicinal and aromatic plants that can be grown on the Canadian Prairies or in local greenhouse operations. Contact Dr. Scott Wright or Clayton Jackson, Manitoba Crop Diversification Centre, P.O. Box 309, Carberry, MB ROK OHO, Canada. Ph: 204/834-6000. Fax: 204/834-3777. Email: cjackson@mail.techplus.com

March 9-12: Alternative Medicine: Implications for Clinical Practice, Boston, MA, sponsored by Harvard Medical School, Dept. of Continuing Education, Beth Israel Hospital Dept. of Medicine. Objective is to provide clinicians with sufficient information to responsibly advise patients who use or seek alternative therapies. Contact Professional Meeting Planners, 5 Central Square, Ste. 201, Stoneham, MA 02180. Ph. 800/378-6857, 617/279-9887. Fax 617/279-9875.

March 14-16: AOBTA Central Regional Conference, Advance Training in Oriental Bodywork, Austin, TX. Shiatsu, Extra Meridians in Jin Shin Do, Qi Gong Massage, and Special Teaching techniques. All classes on an advanced level for the practitioner. Testing for certified instructors on March 13th. Contact Academy of Oriental Medicine, P.O. Box 9446, Austin, TX 78766. Ph: 512/454-1188.

March 22-23: Herb Fest '97 Conference and Festival, sponsored by TriLife Foundation, Inc., Biloxi, MS. Workshops, herb walks, vendors, healing arts, entertainment. Featuring Rosemary Gladstar, James Berg, M.D., Dee Anne Domnick, and more. Contact TriLife Foundation, 14373 Jim Byrd Rd., Biloxi, MS 39532. Ph: 601/392-6226. Email: tonyjery@datasync.com

March 24 & 25: Nutrimarket '97. Promoting Functional Foods, Medical Foods, and Nutrutionals, sponsored by the Pharmaceutical Division of the Institute for International Research.Contact IIR, 708 Third Ave., 4th flr., New York, NY 10017-4103. 800/999-3123. Fax: 212/661-6677. e-mail: us002506@interramp.com.

March 26-29: 20th Annual Conference of the Society of Ethnobiology, University of Georgia, Athens. Integrating historical and contemporary issues, the theme is "Unity and Diversity in Ethnobiology" presenting interdisciplinary research that explores past or present relationships between humans and living organisms. Contact LaBau Bryan, University of Georgia, 250 Baldwin Hall, Athens, GA 30602-1619. Ph: 706/542-1433. Fax: 706/542-3998. Email: lbryan@uga.cc.uga.edu

April 11-21: Explore Peru and the Orchids of the Cloud Forest, with the American Orchid Society. Experience the Northern Highlands of Peru, visiting Moyobamba, known as the City of Orchids. Led by orchid expert Dr. Isaias M. Roland, and accredited AOS judge Alejandro Capriles. Limited to only 19 participants. Contact Erin Boyer, International Expeditions, One Environs Park, Helena, AL 35080. Ph:. 800/633-4734, ext. 136. Fax: 205/428-1714.

April 12-13: 2nd Annual Southwest Conference on Botanical Medicine, "Botanical Treatment of Chronic Disease," Tempe, AZ. Teachers include Michael Moore, Silena Heron, N.D., Donald Brown, N.D., David Hoffmann, Jill Stansbury, N.D., Paul Bergner, Terry Willard, Ph.D., and more. Vendors welcome. Contact Herbal Educational Services, P.O. Box 3427, Ashland, OR 97520. Ph: 800/252-0688.

April 20: Cultivation and Preservation of Medicinal Plants, UC Santa Cruz Arboretum, Santa Cruz, CA, hosted by the United Plant Savers. Focusing on the sustainable cultivation of medicinal plants, with emphasis on "at risk" plants, identification of wild medicinal plants, ecological herbalism, plant conservation principles and techniques, and bioregional herbalism as a healthy way of living. Contact United Plant Savers, Box 420, East Barre, VT 05649. Ph: 802/479-9825. Fax: 802/476-3722. Email: ups@ilhawaii.net

May 15-17: International Symposium on Kava and Other Medicinal Herbs of the South Pacific, Hilo, Hawaii. Contact Jeff Morrison, Executive Director, American Herbal Products Assn, P.O. Box 30585, Bethesda, MD 20824. Ph: 301/951-3204. Fax: 301/951-3205.

May 24-26: 3rd Annual Pacific NW Herbal Symposium: "Medicine From the Heart of the Earth," Wilsonville, OR. Hosted by Wise Woman Herbals, Inc. & Reflections Magazine. Topics include women and children's health care, toxicology of herbs, energetics of herbs, parasites, Ayurvedic herbalism, formulations, Alzheimer's, pharmacology of kava, and more. Contact Wise Woman Herbals, P.O. Box 279, Creswell, OR 97426. Ph: 541/895-5152. Fax: 541/895-5174.

May 24-31: 7th World Congress on Holistic Life, Health and Aesthetics, Pugnochiuso del Gargano, Italy. Themes of holistic life, health, and aesthetics in depth and delineation of the future course of holistic movement. Il Melograno Association, 7th World Congress on Holistic Life, Health and Aesthetics, Via La Rusca, 1/3R, 17100 Savona, Italy. Ph: 019/822-803. Fax: 019/853-928.

May 31-June 2: Medicines from the Earth, "Exploring Nature's Pharmacy," Black Mountain, NC. A symposium on herbal medicine, featuring over 40 botanical protocols. Keynote speaker: Dr. Bernard Jensen. Workshops on women's health, pharmacognosy and Ayurvedic marmatherapy. Continuing education credit for pharmacists, nurses and naturopathic physicians. Early registration deadline 4/2/97. Contact Herbal Education Services, P.O. Box 3427, Ashland, OR 97520. Ph; 800/252-0688.

June 1-4: International Symposium on Herbal Medicine, Honolulu, HI. Sponsored by the San Diego State University and the United Nations Industrial Development Organization (UNIDO). Topics include "Medical/Pharmaceutical Concerns," "Consumers Protection Concerns," "Environmental Protection Concerns," and "Indigeneous Peoples' Concerns." Contact International Institute for Human Resources Development, College of Health and Human Services, San Diego State University, San Diego, CA 92182-1872. Ph: 619/594-2817. Fax: 619/594-2811.

CALENDAR

June 6-8: Cultivation and Preservation of Medicinal Plants, Equinox Botanical Sanctuary, Rutland, OH, hosted by the United Plant Savers. Focusing on the sustainable cultivation of medicinal plants, with emphasis on "at risk" plants, identification of wild medicinal plants, ecological herbalism, plant conservation principles and techniques, and bioregional herbalism as a healthy way of living. Contact United Plant Savers, Box 420, East Barre, VT 05649. Ph: 802/479-9825. Fax: 802/476-3722. Email: ups@ilhawaii.net

June 13-27: 1st Annual "Pharmacy on Safari." Study the medicinal plants of Kenya and Uganda. Registered pharmacists may receive continuing education credits. Cosponsored by the American Botanical Council, Texas Pharmacy Foundation, and International Expeditions. Contact the American Botanical Council, P.O. Box 201660, Austin, TX 78720. Ph: 512/331-8868. Fax: 512/331-1924.

June 16-27: International Training Program in New Crops: Aromatic and Medicinal Plants, Purdue University, West Lafayette, IN. Sponsored by the Center for New Crops and Plant Products, Dept. of Horticulture, Purdue Univ., and the Program for Collaborative Research in the Pharmaceutical Sciences, College of Pharmacy, Univ. of Illinois. Training in economic botany, horticulture, agronomy, processing, and pharmaceutical and industrial products. $1,900. Contact Tom Robertson, Continuing Education, Purdue University, 1586 Stewart Center, Room 116, West Lafayette IN 47907-1586. Ph: 317/494-7220. Fax: 317/494-0567.

June 20-22: California Association of Acupuncture and Oriental Medicine Expo '97, "Care of the Spirit, The Heart of Chinese Medicine," San Francisco, CA. Contact Jill Stocks, CAAOM Expo '97 Coordinator, 11644 Barnett Valley Rd., Sebastopol, CA 95472. Ph:. 707/829-8001. Email: jill@pgon.com

July 3-13: Costa Rica Rainforest Herbal Adventure: Led by Steven Foster, herbal authority, author, and renowned photographer. Two days at LaSelva Verde and eight days exploring the rainforests and national parks of Costa Rica on the M/V Temptress Explorer, an expeditionary cruise ship. Includes visit to MUSA, a medicinal plant women's cooperative, seminars on medicinal plant conservation, photographing herbs, herb cultivation, and the herbal history of Costa Rica. Contact Steven Foster Group Desk at Valley Travel Group, Ph: 800/348-7865 or 818/785-6053. Email: vtg@pacbell.net

July 4-6: Aroma '97, The Fragrant Planet, 3rd International Conference, Warwick University, UK. Hosted by the International Journal of Aromatherapy. Cutting edge aromatherapy research and information, with international speakers, seminars, aromatic plant display, gala dinner, trade fair and entertainment. Contact Aroma '97 Conference Office, P.O. Box 746, Hove, East Sussex BN3 3XA, UK. Ph: 44 (0) 1273 772 479. Fax: 44 (0) 1273 329811.

July 7-August 30: Summer Program of the Academy of Oriental Medicine, Austin, TX. Extensive and intensive training in various aspects of Oriental Medicine, including Oriental nutrition, Oriental bodywork, anatomy and physiology, basics in Oriental philosophy, and advanced courses in Chinese herbs. Contact Academy of Oriental Medicine, P.O. Box 9446, Austin, TX 78766. Ph: 512/454-1188.

July 19: 1st National Herb Gatherings 2000 Conference, West Lafayette, IN. A day of fun and education for herb enthusiasts of all interests and levels of experience. Herbal educators include authors Rosemary Gladstar, Colleen K. Dodt, and Dorie Byers. Contact Herb Gatherings 2000, 10949 East 200 South, Lafayette, IN 47905-9453. Ph:. 317/296-4116.

July 26-30: 38th Annual Meeting of the American Society of Pharmacognosy, University of Iowa. Three symposia with 10-12 lecturers, 96 oral presentations, and 100-200 posters. Contact Ms. Jo Dickens, Iowa Memorial Union, University of Iowa, Iowa City, IA 52242.

August 1-3: Cultivation and Preservation of Medicinal Plants, Sage Mountain Retreat Center, East Barre, VT, hosted by the United Plant Savers. Focusing on the sustainable cultivation of medicinal plants, with emphasis on "at risk" plants, identification of wild medicinal plants, ecological herbalism, plant conservation principles and techniques, and bioregional herbalism as a healthy way of living. Contact United Plant Savers, Box 420, East Barre, VT 05649. Ph: 802/479-9825. Fax: 802/476-3722. Email: ups@ilhawaii.net

August 4-7: International Mint Symposium, Seattle, WA. Information and insight into the science and technology of today's mint industry. Perfumer & Flavorist, 362 South Schmale Rd., Carol Stream, IL 60188-2787. Ph: 708/653-2155. Fax: 708/653-2192.

August 9-17: 3rd Annual Costa Rican Rainforest Expedition. Registered pharmacists may receive continuing education credits. Contact the American Botanical Council, P.O. Box 201660, Austin, TX 78720. Ph: 512/331-8868. Fax: 512/331-1924.

August 18-21: Las Cruces Biological Field Station at Wilson Botanical Garden. Study tropical medicine research and field plant collection. Registered pharmacists may receive continuing education credits. Contact the American Botanical Council, P.O. Box 201660, Austin, TX 78720. Ph: 512/331-8868. Fax: 512/331-1924.

October 17-20: Eighth Annual American Herbalists Guild Symposium cosponsored by the John Uri Lloyd Library and Museum and the American Botanical Council. Over 25 teachers, 40 seminars, 4 panel discussions. Academic poster session, Bookstore and Herbal exhibits, plus seven scheduled one-hour tours of the John Uri Lloyd Library and Museum. Contact Rebecca Briggs/AHG Symposium Cordinator, 328 1/2 Liberty St., Ashland, OR 97520. Ph: 541/488-6260. Fax: 541/488-6459. E-mail: AHG97@aol.com. Website: //www.healthy.net/herbalist/ahg97.bt.

October 18-25: 4th Annual Peruvian Amazon Rainforest Ethnobotanical Expedition. Explore the 1/4-mile Canopy Walkway 115 feet above the rainforest floor. Workshop leaders include Dr. Jim Duke, Dr. Varro Tyler, Dr. Larry Wilson, and Mark Blumenthal. Contact the American Botanical Council, P.O. Box 201660, Austin, TX 78720. Ph: 512/331-8868. Fax: 512/331-1924.

November 4-6: International Workshop on Prospects of Medicinal Plants in Providing Health Care by 2000 AD and Beyond, Solan, Himachal Pradesh, India. Sponsored by the International Union of Forestry Research Organizations (IUFRO). Contact Dr. P. L. Gautam, Organising Secretariat, DR YS Parmar University of Horticulture & Forestry, Nauni 173230 Solan (HP), India. Fax: 91 1792 6 2242.

CLASSIFIED

A listing in this classified section does not constitute any endorsement or approval by *HerbalGram*, the American Botanical Council, the Herb Research Foundation, or the HRF Professional Advisory Board. *HerbalGram* Classified ad rates: $1.25 per word; $35 minimum. Contact Margaret Wright, P.O. Box 201660, Austin, TX 78720. 512/331-8868. Fax 512/331-1924.

CORRESPONDENCE COURSES AND SEMINARS

Green Terrestrial offers herbal and earth awareness workshops, quality herbal products, and apprenticeships in an atmosphere of co-creative partnering with the Earth. Pam Montgomery, P.O. Box 266, Milton, NY 12547. 914/795-5238.

Grow Gourmet & Medicinal Mushrooms. Shiitake, Reishi, Morels, Oysters.... Seminars on cultivation. Free brochure. Commercial catalog $4.50. Fungi Perfecti, P.O. Box 7634HG, Olympia, WA 98507. Call 800/780-9126. Fax 360/426-9377.

"Healing with Flowers" Conference, June 6-8, 1997. During this Age of Flowering, we gather to honor and learn from the flowers which bridge spirit and form. Join leading herbalists and flower essence practitioners as we explore essences, medicinals, edibles, aromatherapy, Devas, chakras, and much more. Held at Rowe Conference Center, Rowe, MA. Contact Pam Montgomery, 914/795-5238 or Gail Ulrich, 413/625-6875.

Institute of Chinese Herbology has been teaching courses in Chinese Herbal Medicine since 1986. Our 130-hour audiotaped program (includes extensive notes and herb samples) is excellent for anyone who wants to gain a working knowledge of Chinese herbs. Free brochure: Admissions 2HG, 3871 Piedmont Ave., #363, Oakland, CA 94611. Ph./Fax 510/428-2061.

The Institute of Dynamic Aromatherapy - Correspondence, certification, in-class training programs. Contact: IDA 604/267-7433 or write Unit 98, 936 Peace Portal Drive, Blaine, WA 98231-8014.

Pacific NW Herbal Symposium '97. May 24-26, Wilsonville, Oregon. Nineteen speakers include Rosemary Gladstar, Dr. Tieraona Low Dog and Cascade Anderson Geller. There are 44 classes, with four classes being offered simultaneously during each lecture period. Call 541/895-5174 for information.

10th Annual Women's Herbal Conference - Join Dr. Rosita Arvigo, Juliette de Bairacli Levy, Amanda McQuade Crawford, Gail Ulrich, Rosemary Gladstar and 20 leading women herbalists for a wonderful weekend of woman-spirit & workshops for all levels on Herbalism & Women's Health. Held at a beautiful retreat center in southern New Hampshire. $235 includes workshops, herb walks, meals, camping, & entertainment. Cabins are $35. $195 before May 15. Write: Women's Herbal Conference, c/o Sage, P.O. Box 420, East Barre,. VT 05649 or call 802/479-9825.

The School of Natural Healing was founded in 1953 by Dr. John R. Christopher, M.H., N.D., and continues in his time-tested modalities. The SNH offers Master Herbalist (M.H.) training in 18 course levels at $100 each. This full spectrum of courses is taught by expert instructors, in the convenience of your own home, on professionally produced video and audio tapes. Books, workbooks, and home assignments are also provided. Upon completion of the 18 courses, students are eligible to attend the intensive certification seminar held at our own beautiful retreat in the majestic Wasatch Mountains. For free information, call 1/800/372-8255 or write to the School of Natural Healing, P.O. Box 412, Springville, UT 84663.

PUBLICATIONS

American Herb Association Quarterly Newsletter — $20/yr. AHA, P.O. Box 1673, Nevada City, CA 95959.

Aromatherapy Quarterly Magazine — Prestigious English journal, the longest-running aromatherapy magazine in the world; read in over 50 countries by aromatherapists, herbalists, masseurs, and medical practitioners. A world-class resource for the latest developments in aromatherapy; beautifully crafted, filled with practical information. Subscriptions $30. Free information: Suite 249, PO Box 421, Inverness, CA 94937-0421. 415/663-9519.

Australian Journal of Medical Herbalism — quarterly publication of the National Herbalists Association of Australia (founded in 1920). Deals with all aspects of Medical Herbalism, including latest medicinal plant research findings. Regular features include Australian medicinal plants, conferences, conference reports, book reviews, rare books, case study and medicinal plant review. Aus/$40 plus Aus/$15 if required by airmail. National Herbalists Association of Australia, Suite 305, 3 Smail St., Broadway, NSW 2007, Australia.

The Bu$iness of Herbs — Comprehensive reporting, business news, marketing hints, sources, and resources. Subscription $20/yr. Brochure/SASE from Northwind Farm, 439 Ponderosa Way, Jemez Springs, NM 87025.

Foster's Botanical and Herb Reviews— Information resources, book reviews, new periodicals, etc. Quarterly, $10/yr from Steven Foster, P.O. Box 1343, Fayetteville, AR 72702. 501/521-5887. Fax 501/521-6369.

HerbalGram — Quarterly journal published by the American Botanical Council and the Herb Research Foundation. $25/yr., $45/2 yrs, $60/3 yrs. P.O. Box 201660, Austin, TX 78720. 800/373-7105 or fax 512/331-1924. See pages 4-5 in the accompanying Herbal Education Catalog for ordering information.

HerbalVoices —A network of amateur and professional herbalists sharing the medicinal, culinary, wildcrafting, and organic growing arts of herbs. Members write in their experiences, receive support and feedback, and seek assistance. Our quarterly publication is $12/yr. Sample $3. 3936 Mt. Bliss Rd., East Jordan, MI 49727.

Herban Lifestyles — Bimonthly newsletter with entertaining, eclectic, and sometimes esoteric reports on how we live, work, and play with herbs. Money-back guarantee. Sample $3. $18/yr. Free brochure. Stone Acre Press, 84 Carpenter Rd., Apt. 78711-1, New Hartford, CT 06057.

The Herb Growing and Marketing Network— An information service for herb businesses and serious hobbyists. Includes *The Herbal Connection*, a 36-page bimonthly trade journal, *The Herbal Green Pages*, annual resource guide with over 5,000 listings, free classified advertising for subscribers, and more. Entire package $60/yr. (Higher outside North America) Sample newsletter, $4. The Herbal Connection, P. O. Box 245, Silver Spring, PA 17575. 717/393-3295. MC/Visa accepted.

The Herb Quarterly —When the world wearies and ceases to satisfy, there's always *The Herb Quarterly*, a beautiful magazine dedicated to all things herbal—gardening, medicinals, crafts, folklore, alternative uses of herbs, and more. Rates Sample issue $5; introductory subscription (5 issues) $19.95. P. O. Box 689, San Anselmo, CA 94979. 1/800/371-HERB.

Join the Åromatherapy Revolution! — The American Alliance of Aromatherapy, a non-profit organization, has been established to strengthen, inspire, and advance the field of aromatherapy. Offering the following publications to keep you updated with aromatherapy developments worldwide: *The Alliance NewsQuarterly*, *The Aromatic Thymes*, *The International Journal of Aromatherapy*, *The Aromatherapy Guide - 2nd Edition*, and *The Aromatherapy Records*. For information, including a complimentary issue: 800/809-9850, Fax 800/809-9808.

Medical Herbalism — Subtitled "A Clinical Newsletter for the Herbal Practitioner." Edited by Paul Bergner. $24/yr, $42/2 yrs. Canada $29/yr. Overseas $39/yr. Sample/$4. Medical Herbalism, P. O. Box 33080, Portland, OR 97233.

Washington Insight — a quarterly newsletter designed to keep natural products scientists abreast of funding opportunities and other important happenings in Washington, D.C., including

CLASSIFIED

interviews with Congressmen, Senators, or other government officials, that may affect them and their institution. In addition to the newsletter, subscribers receive Funding Alert, which provides pre-advertised information on funding opportunities, and Compound Alert, listing of compounds of interest to the National Cancer Institute which need research to insure adequate supplies—another opportunity for research grants. Annual subscription, U.S. personal/$45; institutional/$85. Foreign: personal/$50; institutional/$95. Contact: Washington Insight, 11000 Waycroft Way, North Bethesda, MD 20852. 301/881-6720, Fax 301/984-7372.

Wildflower — North America's only popular magazine devoted solely to the study, conservation, and cultivation of our continent's native flora. Offering an appealing blend of art and science, this 48-page quarterly examines all aspects of popular botany in North America from the rain forests of Panama to the micro-mosses of the Arctic tundra; from gardening with native trees, shrubs, wildflowers, and ferns to the latest projects in habitat and native plant conservation. The green revolution begins in our own backyard. *Wildflower* is published by the Canadian Wildflower Society, 90 Wolfrey Ave., Toronto, Ontario, Canada M4K 1K8. Tel: 416/466-6428. Subscriptions and membership are $30/1 yr., $55/2 yrs. Sample copy $5.

MOVING?

Our mail permit does not allow us to forward HerbalGram. If you move or change your mailing address, please notify us immediately so you will not miss any copies. Send your change of address notice to Margaret Wright, Circulation Manager, American Botanical Council, P.O. Box 201660, Austin, TX 78720-1660. 512/331-8868, Fax: 512/331-1924.

SCHOOLS

Australasian College of Herbal Studies offers 11 unique personal, professional, and specialty, distance learning courses. Diploma and Certificate curriculum includes Aromatherapy, Nutrition, Herbal Medicine, Iridology, Homeopathy, Flower Essences, and Homeobotanicals. Free prospectus. 800/48-STUDY (78839). E-mail achs@herbed.com

Chinese Herbology, health professionals' training, certification. Learn from experienced instructors (clinical/scientific research). Clinical case emphasis. Residential intensives, mailed homework. Brochure: Rocky Mountain Herbal Institute, P. O. Box 579-C, Hot Springs, MT 59845. 406/741-3811. http://www.ronan.net/~rmhi/. E-mail rmhi@ronan.net.

Dreamtime Center for Herbal Studies offers comprehensive education for beginners as well as practitioners, with programs reflecting the rich diversity of herbal medicine. Modules include clinical research, pharmacognosy, physiology, the art and science of medicine making, ecological wildcrafting, gardening, and intuitive relationships with the plant kingdom. Our commitment is to preserve whole plant medicine and to elevate herbalism as a profession. 1997 programs: Foundations of Herbalism - 9-month certificate program; Advanced Herbalism - 6-weekend Intensives; Plant Spirit Medicine with Eliot Cowan (full). For a free brochure, write the Center at P. O. Box 215, Flint Hill, VA 22627 or drmtime@shentel.com.

The National College of Phytotherapy — Three-year residency program designed for the serious student wishing to practice the science and art of herbal medicine: Western phytotherapy, plant pharmacy, health sciences, fieldwork, and 3rd year Clinical/Counseling experience. Key faculty: Tieraona Low Dog, M.D.; Amanda McQuade Crawford, MNIMH. Graduates receive a Bachelor of Science in Phytotherapy (Herbal Medicine). We are not yet accredited. Classes begin September 1996. Tuition: $3,900 per year. Class schedule permits full- or part-time work; time payments may be arranged with the office upon being accepted into the program. No work study at the College is available. Call or send $3.00 for catalog and application: The Registrar, 120 Aliso SE, Albuquerque, NM. 87108. Phone: 505/265-0795.

Northeast School of Botanical Medicine — Six-month 360+ hour residency program emphasizing clinical skills, botanical identification, materia medica, herbal pharmacy, wildcrafting, field trips, and student clinic. A one weekend-per-month course is also offered April through October. 7Song, P.O. Box 6626, Ithaca, NY 14851. 607/564-1023.

Academy of Oriental Medicine - Austin. Accredited three-year, 2,800-hour Oriental medicine program which includes extensive training in Oriental herbs (600 hours); AOBTA, 1 year; 600-hour Oriental body work programs; financial assistance. Approved. 800/824-9987.

The Rocky Mountain Center for Botanical Studies, comprehensive, balanced herbal curriculum of academic and earth-centered studies. Certification programs and advanced clinical internship available. Call or write for a free brochure, or send $3 for a complete catalog. P. O. Box 19254, Boulder, CO 80308-2254. 303/442-6861.

Wild Rose College of Natural Healing — established 1975, offering classroom and correspondence courses in Herbology, Pharmacognosy, Nutrition, Wholistic Health, Biology, Physiology, Iridology, and many other fields. Programs for Master Herbalist (two years), Wholistic Health Therapist (three years), Clinical Herbalist (three years), Practical Herbalist (8 months), Counseling (one and three years). Send $3 for detailed calendar, #400, 1228 Kensington Rd. NW, Calgary, Alberta, CANADA T2N 4P9. 403/270-0936.

OTHER

Chinese and indigenous (North American) medicinal plant seeds. Catalog of books and organic, biodynamically grown seeds. Write Elixir Farm Botanicals, Brixey, MO 65618. Or call 417/261-2393.

Herbal Educational Services: A large selection of herbal audio tapes including the 1996 Southwest Conference on Botanical Medicine and the 1996 Gaia Symposium, Medicines from the Earth. 800/252-0688.

Herbalist: Leading national herbal extract manufacturer seeks individual with herbal knowledge to support, train, and educate retailers and public in your area. Response to VP, 320 Oser Avenue, Hauppauge, NY 11788.

Herb slides - for use in classes, lectures, collections. Hundreds of species labeled with common and Latin names. Publication rates available. Martin Wall, 2011 Walker Ave., Greensboro, NC 27403. 910/379-1934. E-mail hebslide@concentric.net.

Progressive manufacturer of standardized extracts, botanicals, and supplement ingredients is seeking a candidate to market and promote our full line of products. Full compensation package and benefits commensurate with experience. Send resume to Frutarom Meer Corporation, 9500 Railroad Ave., North Bergen, NJ 07047.

Common Burdock
Arctium minus (Hill) Bernh., Family Asteraceae

UTILITY

Cooking this malodorous herb produces something deserving the appellation "vegetable." Having read that cooking with baking soda partially breaks down the tough fibers in the leafstalks, I bravely bit into one that had survived two changes of water. With the soda, I gained some tenderness, lost some vitamins. The large roots, diced, came out quite tasty after similar treatment. Remembering the celery-onion soup mom used to give me when I had a cold or flu, I gathered up more burdock leafstalks and some wild garlic flower heads, and boiled them up together. The result: one of the better culinary episodes in the foraging chapters of my life, especially after I added salt and pepper and oleo. Rogers and Powers-Rogers (1988) note that claims of endurance and sexual virility sell a lot of this herb in Japan. Yanovsky (1936) notes that Iroquois ate the Great Burdock (*Arctium lappa)* as a greens. Indians also used the roots in soups, as have I, and they dried and stored the roots for winter use. Scorched roots serve as coffee substitutes. Only in 1990 did I learn that the NCI had an interest in burdock lignans as chemopreventive anti-mutagens. Ironically burdock is conspicuous in several allegedly "quack" cancer remedies, e.g., the "Essiac" and "Hoxsey" formulas. With my immune system and liver overassaulted by overmedication, I am imbibing a little of the Essiac formula, just in case! Hartwell mentions folk use of *Arctium* for cancer in such diverse places as Belgium, Canada, Chile, China, India, Indiana, Italy, Japan, Oklahoma, South Africa, Spain, Ukraine, and Wisconsin. All three *Arctium* species on the Weed Science Society of America (WSSA) list might be sampled judiciously.

DISTRIBUTION

Especially common in full sun or partial shade about old rural dwellings, pastures, old fields, and waste places, starting to flower in June (North Carolina) to July (Maryland) and fruiting on up to frost. Flowering and fruiting specimens are all but useless for food. As with most biennials, it is the food in the roots of the first year's winter rosette that is most copious. The plant exhausts this when it goes to flower (bolts) in its second year. Ranges through all contiguous 48 states; climate zones 4-8 (average annual minimum temperatures of -20° to 20°)[1].

DESCRIPTION

Coarse biennial or perennial herbs, as much as six feet tall when in flower.

LEAVES: huge, in basal rosettes during the vegetative year(s), the stalks seemingly arising from the ground, hollow (or solid in the Great Burdock, *Arctium lappa),* the blades egg-shaped to nearly rounded or heartshaped, somewhat pointed at the tip, irregularly saw-toothed at the margin, heart-shaped or notched at the base, whitish beneath; flowering stems have leaves one at a node, alternating along the stalk, the stem leaves smaller, with shorter stalks, grading into much smaller leaflike appendages below the flower clusters.

FLOWERS: thistlelike, of dense clusters of minute flowers aggregated into the "thistle," sepals 5, minute; petals 5, fused to each other throughout much of their length; stamens 5; ovary simple, with 2 terminal processes.

FRUITS: aggregated in the developing burrs which readily attach to animals and foragers, explaining the wide distribution of this pesky weed.

— James A. Duke. Illustration by Peggy Duke.



Burdock, *Arctium minus,* illustration by Peggy Duke

1. USDA Plant Hardiness Zones
Rogers, B. and Powers-Rogers, B. 1988. *Culinary Botany.* PRP-Rogers, Rogers & Plants, Kent, WA. 176 pp.
Yanovsky, E. and Kingsbury, R. M. 1938. Analyses of some Indian food plants. *J. Assoc. Off. Agric. Chem.* 21:648-665.

This article is the first in a series of excerpts from *The Handbook of Edible Weeds*, 1992, CRC Press, Inc., and is presented with permission of CRC Press and James and Peggy Duke. *The Handbook of Edible Weeds* is available from ABC BookStore, #B024.

HERBALGRAM

The Journal of the American Botanical Council and the Herb Research Foundation

THE Key to Unlocking Nature's Medicines



- Research
- Legal Issues
- Features
- Conferences
- Books
- Market Reports

AMERICAN BOTANICAL COUNCIL

Credit card holders order toll free: 800/373-7105

24 hours/day or Fax: 512/331-1924 order form on page 78.
Please see the Herbal Education Catalog enclosed with this issue for other herbal information products and order form.
P.O. Box 201660, Austin, TX 78720-1660
e-mail: custserv@herbalgram.org
World Wide Web: www.herbalgram.org
ABC is a non-profit research and education organization under IRS code 501(c)(3).

Educating the public on the use of herbs and phytomedicinals

SUBSCRIBE today

4 issues only	8 issues only	12 issues only
$25.00	$45.00	$60.00
	(10% discount)	(20% discount)