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HERBALGRAM

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

Herbal Medicine in Africa

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NUMBER 43

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Ed. by Bart Holland.1996. Provides guidance for the pharmaceutical researcher interested in the ancient lore of medicinal plants as a source of candidate compounds for investigation. 105 pp. $65. #B327

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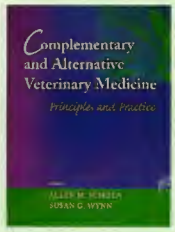
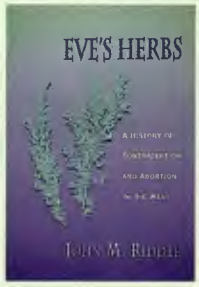


COMPLEMENTARY AND ALTERNATIVE VETERINARY MEDICINE: PRINCIPLES AND PRACTICE
Ed. by Allen Schoen and Susan Wynn. 1998. Introduction to the philosophy, science, and clinical applications of CAVM designed to help practitioners integrate these modalities into their conventional practice. Includes nutrition, physical, energetic and botanical medicine, and homeopathy. 820 pp. $84.95. #B335



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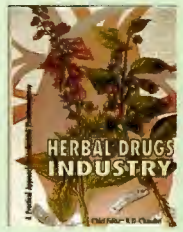
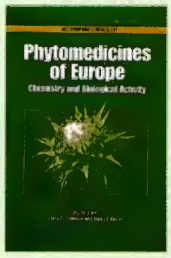
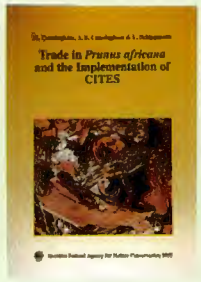
A PRACTICAL GUIDE TO HPLC DETECTION
Ed. by Donald Parriott. 1993. A guide for the practicing chromatographer that explores and compares existing detection systems, outlines the common problems associated with a given detector, and offers proven approaches to avoiding such problems. 293 pp. $71. #B332



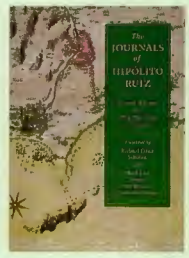
HERBAL DRUGS INDUSTRY: A PRACTICAL APPROACH TO INDUSTRIAL PHARMACOGNOSY
Ed. by R. D. Chaudhri. 1996. Identification, pharmacological classification, selection, processing methods, suggested dosage forms, plant and machinery requirements, testing, regulatory requirements and more. 648 pp. $200. #B336



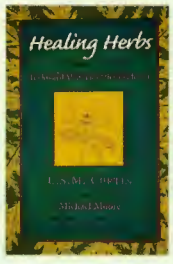
PHYTOMEDICINES OF EUROPE: CHEMISTRY AND BIOLOGICAL ACTIVITY
Ed. by Larry Lawson and Rudolf Bauer. 1998. Articles on the status of herbs in the United States, Europe, the Commission E Monographs, and regulatory concerns; diseases and how they might be affected by a variety of plants; and reviews of the biological activity and chemistry of 12 popular herbs. 324 pp. $115. #B329



TRADE IN *PRUNUS AFRICANA* AND THE IMPLEMENTATION OF CITES
by M. Cunningham, A. B. Cunningham and U. Schippmann. 1997. Summarizes all available information on the extraction, commercialization, and trade in this medicinal plant species and aims at helping customs officials to identify the commodities in trade and to improve the implementation of CITES for this species. 52 pp. $12. #B333

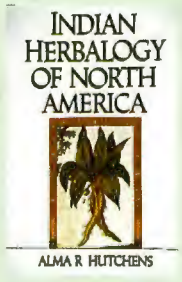


THE JOURNALS OF HIPÓLITO RUIZ, SPANISH BOTANIST IN PERU AND CHILE 1777-1788
Trans. By Richard Schultes and María José Nemry von Thenen de Jaramillo-Arango. 1998. Fully indexed descriptions of 2000 plants make this a valuable botanical resource as well as a unique historical find. 357 pp. $44.95. #B337



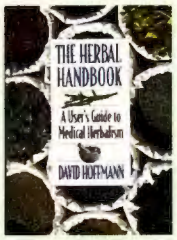
HEALING HERBS OF THE UPPER RIO GRANDE: TRADITIONAL MEDICINE OF THE SOUTHWEST
by L. S. M. Curtin, revised and edited by Michael Moore. 1997. The seminal work on traditional home remedies of the Southwest now updated with Latin names, information on current usage and sources, remedy and general indexes, and alternative views on a number of plants. 236 pp. $14.95. #B330

THE ILLUSTRATED COMPANION TO GLEASON AND CRONQUIST'S MANUAL: ILLUSTRATIONS OF THE VASCULAR PLANTS OF NORTHEASTERN UNITED STATES AND ADJACENT CANADA
by Noel Holmgren with the artistic and editorial assistance of Patricia Holmgren, Robin Jess, Kathleen McCauley, and Laura Vogel. 1998. Line illustrations. 937 pp. $125. #B334

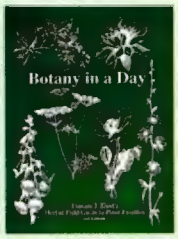


INDIAN HERBOLOGY OF NORTH AMERICA
by Alma Hutchens. 1973. Illustrated encyclopedic guide to more than 200 medicinal plants found in North America, with descriptions of each plant's appearance and uses, and directions for methods of use and dosage. Much data based on Russian research. 382 pp. $19. #B338

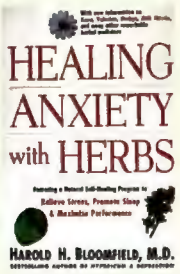
A REFERENCE GUIDE TO MEDICINAL PLANTS: HERBAL MEDICINE PAST AND PRESENT
by John Crellin and Jane Philpott. 1989. This companion to *Trying to Give Ease* is an illustrated reference guide which covers over 700 medicinal plants, including an assessment of each plant's efficacy, current information on its chemical constituents and pharmacological effects, and herbalist Tammie Bass's comments about the plant. 551 pp. $22.95. #B339



THE HERBAL HANDBOOK: A USER'S GUIDE TO MEDICAL HERBALISM
by David Hoffmann. 1998. Includes a reference section of actions, herbal prescriptions for specific illnesses, fundamentals of growing, drying, storing, and cooking with herbs, as well as the making of infusions, decoctions, oils, and ointments. 240 pp. $14.95. #B343



BOTANY IN A DAY
by Thomas J. Elpel. Third edition. 1998. Learn how to identify plants by the dozens by learning to recognize the patterns they share. Related plants have similar features for identification and they often have similar properties and uses. More than 100 plant families and over 650 genera. 182 pp. $17. #B340



HEALING ANXIETY WITH HERBS
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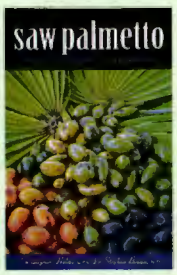
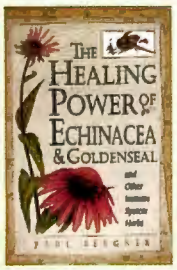


SAW PALMETTO
by Christopher Hobbs and Stephen Brown. 1997. Outlines natural remedies and habits that can help men keep their prostate gland healthy into old age and prevent prostate enlargement. Reviews current research and the medical treatments available. 96 pp. $9.95. #B341



THE HEALING POWER OF ECHINACEA AND GOLDENSEAL
by Paul Bergner. 1997. In-depth discussion of echinacea and goldenseal as well as a detailed list of herbal remedies for specific illnesses, information on proper dosages, and a glossary of immune system terminology. 320 pp. $15. #B345

GUARANA
by Michael van Straten. 1994. Explores the health benefits of this herb that has been used by the natives of the Amazon River basin since the beginning of time. Also covers Lapacho, Pfaffia, Catuaba, and Stevia. 152 pp. $9.95. #B342

ECHINACEA: NATURE'S IMMUNE ENHANCER
by Steven Foster. 1991. Chronicles the history of echinacea, from its controversial medical history to the extensive research conducted on it in Germany, providing the most comprehensive information on the subject available to the layperson. 150 pp. $8.95. #B346

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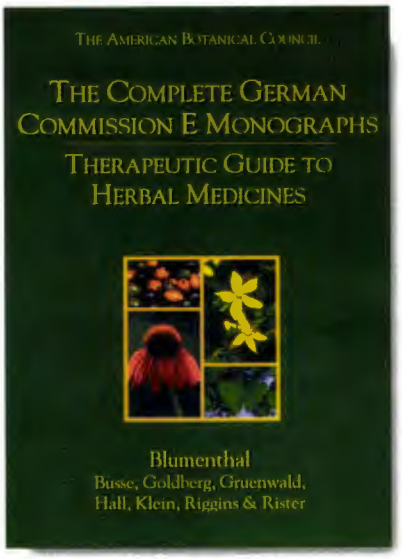

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DEAR READER

The action appears to be heating up a bit between FDA and the herb industry. In late-breaking news, FDA has lost the first round in its legal battle with Pharmanex Inc. over the issue of whether the company's product Cholestin® is a dietary supplement or a drug. A federal judge in Utah has tentatively ruled the product a supplement and has allowed the company to continue to import the raw material from which it is produced, thereby overturning an import ban initiated by FDA.

The regulation of claims for dietary supplements has taken center stage with FDA's proposed rules to implement Section 6 of the Dietary Supplement Health and Education Act of 1994 (DSHEA). The FDA has never really liked this part of DSHEA, which gives industry a chance to inform consumers of what are some of the benefits of herbal products. Before DSHEA, FDA had maintained that any language that claims a health benefit of any kind is really a drug claim. DSHEA specifically forbids dietary supplements from making drug claims, i.e., they cannot treat, cure, or prevent a disease. Now that it's time to make the rules, it appears that FDA's strategy to weaken this provision is to redefine the word "disease" to include normal body functions and conditions. Under FDA's proposal, even menopause may be a disease! Is this not a normal part of aging for all women? I wonder, is the graying of my beard a disease, too? We can expect sharp comments from industry, scientists, and consumers on this issue. The public comment period ends August 27, 1998. We cover these issues in our legal section.

This issue devotes space to various themes from Africa. As part of this coverage we have included an arcticle on the essential oils of Madagascar. This island country contains an enormous biodiversity of animals, flora, and fauna. Of the over 13,000 plants, 85 percent endemic to the island, many are endangered.

Last year ABC co-sponsored its first "Pharmacy on Safari" continuing education trip for health professionals to Kenya and Tanzania. Next year we're going to South Africa. Various articles here deal with the African continent and its ethnomedicine. All of us thoroughly enjoyed the journey and we look forward to our return in 1999. But there's one thing that was truly frustrating: It's really difficult to take an herb walk in Africa—everyone gets distracted by all these strange-looking animals!

Mark Blumenthal

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Number 43 • Summer 1998

DEPARTMENTS

Marigold, *Calendula officinalis.*
Photo ©1997 Steven Foster.
See leutin patent information on page 25.

FEATURES

Photo by John Jonietz for *HerbalGram*

Photo by John Jonietz for *HerbalGram*

Prunus africanum photo by Mark Blumenthal.

Cover: **imphewula** (Xhosa), **plakkie** (Afrikaans), **pigs's ear** , *Cotyledon orbiculata*. This plant is widely used for medicinal purposes. The fleshy part of the leaf is applied to corns and warts to soften and remove, a single leaf can be eaten as a vermifuge, and warmed leaf juice is used as drops for earache and toothache. It may also be applied as a hot poultice to treat boils. From *South African Medicinal Plants* by Ben-Erik van Wyk, Bosch van Oudtshoorn, and Nigel Gericke. Photo by Nigel Gericke.

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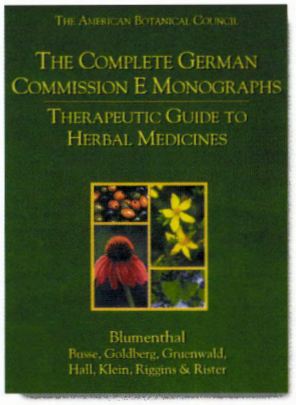


The American Botanical Council Publishes the German Commission E Monographs

ABC is proud to announce the eagerly anticipated publication of *The Complete German Commission E Monographs: Therapeutic Guide to Herbal Medicines*, the English translation of the medicinal herb regulatory guidelines developed by Commission E of the German Federal Institute for Drugs and Medical Devices. Distinguished Professor of Pharmacognosy Emeritus Varro Tyler calls the Commission E Monographs "the most accurate information available in the entire world on the safety and efficacy of herbs and phytomedicines."

In Germany, where medicinal herbs are an integrated facet of modern medicine, doctors and pharmacists rely on Commission E's guidance to prescribe and dispense herbs confidently. Now this guidance is available in English. "Ignorance of the Commission E monographs is ignorance of a substantial segment of modern medicine," continues Tyler. "The information contained in them is now made readily available in the common language of science to a vast audience worldwide. Without question, their ready availability will benefit all of us, consumers and healthcare practitioners alike."

According to Prof. Heinz Schilcher, vice-president of Commission E for 16 years, "It is a shame that the German authorities were not able to translate the monographs into the English language and give a precise introduction in a worldwide understood language. Your book will be very useful not only for the U.S., but also for the European community and the WHO."

Dr. Joerg Gruenwald of PhytoPharm Consulting in Berlin adds that the ABC publication "will be an excellent work and has to be translated back into German, because such a structured and indexed version [of Commission E] has never existed."

Commission E was first convened in 1978. Composed of physicians, pharmacists, pharmacologists, and toxicologists, the Commission actively researched all available information on more than 300 herbs and approved or disapproved them on the basis of whether absolute safety and reasonable efficacy of the herb's use could be established. The monographs published by the Commission include nomenclature, plant composition and key chemical constituents, uses and indications, contraindications, side effects, interactions with other medicines, dosage, and medicinal action of each herb.

ABC's translated edition presents 380 herb monographs, including 81 revisions. The book, over 700 pages, is cross-referenced by common, Latin, and pharmacopeial herb names, and includes a 70-page introduction, a general index, a therapeutic index with "Approved Uses," "Contraindications," "Side Effects," and "Pharmacological Actions" tables, and a 20-page glossary of botanical, medical, pharmaceutical, and technical terms.

Mark Blumenthal, the senior editor of the book, believes that "the translated *Commission E Monographs* will be an essential reference for the shelves of every pharmacy and medical office in the United States.

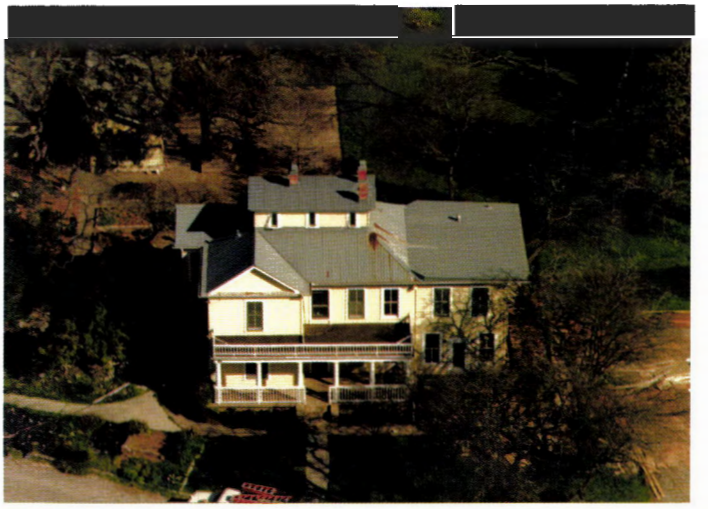
"This publication will increase the acceptance of legitimate medical uses of phytomedicines among physicians, pharmacists, regulators, Congressional members, journalists, the pharmaceutical and herbal industries, and the general public. The monographs will have a positive impact on the current need for authoritative and credible information on the proper uses of herbs."

On June 12, 1998, the final edited version of the manuscript was sent to the printer. ABC plans to begin filling pre-publication orders for the book in August. — *Betsy Levy*

ABC Has Moved!

American Botanical Council has moved in to the new Herbal Education Center at the Case Mill Homestead. As many of our supporters know, in the past 10 years ABC's role has expanded. ABC is a significant source in the United States for scientifically based and accurate information about herbs and medicinal plants. As demand for information has increased, so has the size and the scope of ABC. With a staff of 30, ABC needed more room and selected this historic site where ABC will open the Herbal Education Center, a unique public facility dedicated to medicinal herbs.

ABC expects that around 5,000 people will visit the facility and gardens annually to enhance their knowledge and appreciation of



the safe application and efficacy of healing with herbs. We anticipate that participants in educational workshops will be healthcare practitioners, members of botanical and horticultural clubs, and children and youth from schools and clubs in the Austin area.

So far, extensive renovations on the grounds and the historic 140-year-old home have been made. Improvements include refurbishing the interior while maintaining the house's original charm; upgrading and expanding the gardens; installing a state-of-the-art security alarm and lighting system; and building a new, wheelchair-accessible front porch. Preparations were also made for the infrastructure by digging trenches and installing completely upgraded electrical, phone, gas, and cable lines. The new Annex has been ordered that will accommodate the temporary home of the Education Building. A new site plan is being drawn for the greenhouse, paths and storage building.

The need for funds to finance the home stretch was boosted by major pledges from Extracts Plus and New Hope Communications who joined Enzymatic Therapy and Madis/Pure World Botanicals at the $50,000+ level of giving.

ABC staff looks forward to seeing supporters and subscribers at the new site! — *Wayne Silverman, Ph.D.*

Contributors to ABC's Capital Campaign

The following companies and individuals have made and pledged contributions toward Phase I: The Case Mill Capital Campaign

Visionaries - $250,000 and greater

Architects - $100,000 to $259,999

Builders - $50,000 to $99,999

Enzymatic Therapy*
ExtractsPlus*
Madis Botanicals/Pure World*
New Hope Communications*

Planners - $10,000 to $49,999

Bio Botanica*
Capsugel*
East Earth Herbs*
Müggenburg Extrakt-North America*
Nature's Herbs*
Nature's Way*
Pharmaton Natural Health Products
Stryka Botanics Co.
Whole Foods Market*

Supporters - $5,000 to $9,999

Mark Blumenthal*
Cosmopolitan Trading/Kava Kompani*
Fetzer Foundation
General Nutrition Centers (GNC)
Haworth Press
Henkel Corp.
Indena USA
Lichtwer Pharma US Inc.
Nature's Bounty
Pharmavite
Janet Zand and Michael Marcus

Other Contributors

American Ingredients, Celestial Seasonings, Chai-Na-Ta Corp., Chemco Industries, Inc., Euromed, Flora Manufacturing & Distributors, Steven Foster, Healthnotes Online, Herb Pharm, Herbs for Kids, Hilary's Distribution, Indiana Botanical Gardens, Interweave Press, Jason Natural Products*, Dr. and Mrs. Steven R. King, M.W. International, Metagenics, NOW Foods, Pharmanex, Pharmline, Inc., PhytoMed International, Mark Plotkin, Ph.D., Prince of Peace Enterprises, Procter & Gamble, Pro Pac Labs, Pure Gar, QBI - Quality Botanical Ingredients, Swedish Herbal Institute, Traditional Medicinals, Trout Lake Farm, Tsumura, Wakunaga of America, Inc., David Winston, Herbalist & Alchemist, Xylomed Research, Inc.

* Multi-year pledge

Far left: The Case Mill Homestead, new headquarters for the American Botanical Council. Center: The Homestead and grounds, two and one-half acres of native trees, herb gardens, and wildflower areas. Left: Regeneration of the existing herb gardens. Photos by Joni McClain and Wayne Silverman.

American Botanical Council has Moved!

Please update your records accordingly! And thank you for your continued support!

new phone
512/926-4900

new fax
512/926-2345

new mailing address
P.O. Box 144345
Austin, TX
78714-4345

email remains the same
abc@herbalgram.org
custserv@herbalgram.org

web site remains the same
www.herbalgram.org

ABC Pharmacy Expeditions Scheduled

It's time to get ready for travel! The American Botanical Council, in conjunction with the Texas Pharmacy Foundation and International Expeditions, announces the fifth annual "Pharmacy from the Rainforest" excursion to the Peruvian Amazon, October 31 - November 7, 1998. This expedition is dedicated to Dr. Varro Tyler, who has been an important part of these trips over the past five years. An extension trip to the Andes/Machu Picchu after the stay in the rainforest is also offered from November 7 - 12. Space is limited for Machu Picchu.

Rosita Arvigo's Ix Chel Tropical Plant Research Centre in Belize is a highlight of the "Pharmacy from the Reef & Rainforest" Belize/Tikal (Guatemala) trip scheduled for February 21-28, 1999. This trip also includes an overnight stay at the extensive Mayan ruins at Tikal.

The "Pharmacy on Safari" trip is scheduled for May 28-June 12, 1999, with an exciting new itinerary and destination: South Africa! Mark your calendars!

For a review of the Pharmacy on Safari 1997 expedition, please see the article beginning on page 40 of this issue. For more information on upcoming pharmacy trips, contact Ginger Webb at ABC, Ph: 512/926-4900. Fax: 512/926-2345. Email <gingerw@herbalgram.org>.

New cumulative Index

HerbalGram BackPack Volume III, which contains issues 34-41, is now available. BackPack III includes a cumulative index for these issues.

For more BackPack and ordering information see the Herbal Education Catalog in the center of this issue, page 23.

Look for our new comprehensive cumulative index (*HerbalGram* issues 1-43) in our upcoming fall 1998 Herbal Education Catalog.

ABC Activities: February 1998 - April, 1998

HIGHLIGHTS OF PRESENTATIONS AND MAJOR PAPERS BY ABC EXECUTIVE DIRECTOR MARK BLUMENTHAL

Western States Chiropractic College, Chicago, Ill., "Herbal Medicine: A Continuing Trend"; **Texas A & M Nutraceuticals Conference,** Houston, Texas, "Natural Pharmaceutical Products"; **HEB Prescription for Success,** San Antonio, Tex., "Perspectives on History & Regulation of Herbal Medicine, Part I"; **Northern California Cancer Center,** Stanford, Cal., "Mainstream Acceptance of Herbal Medicine in the U.S."; **Harvard University/Beth Israel Hospital** 4th Annual Conference on Alternative Medicine, Boston, Mass., "Herbal Therapies"; **HEB Prescription for Success,** San Antonio, Tex., "Perspectives on History & Regulation of Herbal Medicine, Part II"; **Western States Chiropractic College,** Oakland, Cal., "Herbal Remedies: A Continuing Trend"; **Drug Topics Magazine,** Braintree, Mass., "Herbal Medicine in the U.S.: Current Use, Regulatory Status, and Benefits of Leading Herbal Dietary Supplements"; **Texas Society of Health-System Pharmacists,** Houston, Tex., "Mainstream Acceptance of Herbal Medicines"; **The Health Show,** Las Vegas, Nev., "Herbal Medicine Goes Mainstream: Out of the Kitchen and into the Clinic!"; **PhytoPharmica Physicians Symposium,** Dallas, Tex., "The German Kommission E"; **The Cincinnati Flower Show,** Cincinnati, Ohio, "The Role of Herbs and Medicinal Plants in the U.S."

HRF TO CONDUCT INTERNATIONAL AGRIBUSINESS SYMPOSIUM

In conjunction with its South African herb development project, the Herb Research Foundation is planning an educational USAID-sponsored symposium to be held Wednesday, September 9, through Sunday, September 13, at Natural Products Expo East in Baltimore, MD. This unusual event, with seminars co-hosted by New Hope Communications, will unite the experience and expertise of leaders in the natural products industry to help give disadvantaged South African farmers and businessmen the information necessary to get a foothold in the booming international botanicals marketplace. The symposium will also benefit members of the herb industry who are interested in developing agricultural and other botanical enterprises on an international basis.

"The international botanical marketplace is a challenging specialty of agribusiness. Our workshop will help growers, producers, and marketers of herbal products understand and follow the market," explains HRF president Robert McCaleb. "Our goal is to foster socially and environmentally conscious sustainable production of high-quality herb products."

The five-day symposium, incorporated into Expo and open to all herb industry members, will be funded in part by the U.S. Agency for International Development (USAID) and the U.S. Department of Agriculture (USDA). Delegates from COMESA (Common Market for East and Southern Africa) as well as delegates from South Africa will attend.

COMESA is made up of entrepreneurs and other businesspeople seeking international market opportunities. HRF is committed to helping small and medium-sized companies develop socially and environmentally conscious herb production programs worldwide.

Seminar speakers will include: James Duke, Ph.D.; Steven Foster, renowned herbalist and author; Robert McCaleb, president of Herb Research Foundation; Mary Mulry, Ph.D., president of FoodWise; James Simon, Ph.D., director of horticulture at Purdue University; and Kay Wright, director of botanical purchasing at Celestial Seasonings, as well as a variety of other international herb development and marketing experts. Planned lecture topics include Agribusiness Essentials, Overview of the International Herb Marketplace, Supplement Development, and Legislative Issues. For more information, contact HRF at (303)449-2265.

INFORMATIVE THIRD PARTY HERB BROCHURES AVAILABLE

Inspired by a growing demand for up-to-date facts about the health benefits and safety of herbs, HRF has produced six colorful, attractive, user-friendly third-party herb information brochures to educate consumers about herbs. The brochures, published by PhytoInformation, contain a wealth of information about the health benefits of herbs for specific conditions, safety and adverse reaction information; recommended dosages, known contraindications, scientific citations, and traditional use information. A five-star rating system shows the amount and quality of research conducted on each herb, and its history of use and safety record. The expanding list of brochures currently includes: St. John's wort, ginkgo, echinacea, ginseng, and garlic—plus the first of the condition-oriented brochures covering depression, anxiety, and stress. To order, contact PhytoInformation at 970/667-4234.

HRF ACTIVITIES: JANUARY 1998 - MAY 1998

Highlights of presentations and papers by HRF President Rob McCaleb

Harvard Medical School Department of Continuing Education, Boston MA. March 1-4, 1998. Guest presenter: *Clinical and Experimental Evidence for Botanicals in Health Care.*

Barnett International, Washington, DC. Dietary Supplements: Strategies to Comply with Emerging Regulations and Promote Product Sales. March 5-6, 1998. Guest Presenter: *The Role of Dietary Supplements in Healthcare: Four Modalities of Medicinal Herb Use.*

The Association of Pharmaceutical Industry in the State of Sao Paulo, Sao Paulo, Brazil. Third Annual Herbal Medicinal Products Conference. March 23-24, 1998. Guest Presenter: *Scientific Evidence for the Safety and Efficacy of Medicinal Botanicals.*

Natural Products EXPO West, Anaheim, CA. March 13-15, 1998. Guest Presenter: *Mood Enhancing Herbs.* Guest on Danielle Linn's syndicated radio show *A Word on Health.*

American Herbal Products Association, Anaheim, CA. March 12, 1998. Guest Presenter: *Update on the Report of the Commission on Dietary Supplement Labels.*

American Herbal Products Association: St. John's Wort Symposium, Anaheim, CA. March 16-17, 1998. Panel moderator.

American Premium Tea Institute, Denver, CO. April 17, 1998. Guest Presenter: *Herbal Tea.*

Moroccan Association for the Development of Aromatic and Medicinal Plants, Assilah, Morocco. Sponsored by USAID's Moroccan Agribusiness and Promotion Project and Agribusiness Marketing Investment (AMI). April 21-14, 1998. Guest Presenter: *Intensification of Mint Production.*

South Africa/ May 3-8, 1998. Assessed opportunities for botanicals agribusinesses and for improving local agricultural research and business development networks. The USAID-sponsored pilot projects in several areas of South Africa are working in cooperation with South Africa's Agricultural Research Council. The botanical pilot projects match disadvantaged traditional rural economies with resources necessary to contribute to the economic growth of their communities. If successful, the projects will be implemented in other sub-Saharan countries.

Columbia University, College of Physicians & Surgeons. Botanical Medicine in Modern Clinical Practice Conference, New York, New York. May 26-29, 1998. Guest Presenter: *Botanical Products: Quality, Sources, Resources and Assessment* and *Botanical Shop: Sampling Botanical Products.*

American Psychiatric Association Annual Meeting, Toronto, Canada. May 30-June 4, 1998. Guest Presenter: *Herbal Medicine: Ancient Roots to Modern Use.*

Traditional Medicinals Provides Stock Gifts to Herbal Non-Profits

Drake and Lynda Sadler of Traditional Medicinals have provided leadership gifts to several non-profit organizations in the form of securities that have appreciated in value since their original purchase. These organizations include American Botanical Council, Herb Research Foundation, and the American Herbal Pharmacopoeia. This generous act will be of immense help to the organizations and, in turn, to the constituencies they serve.

ABC is particularly grateful for this gift as we move into our new facility. The Sadlers are excited about this method of giving, it not only benefits the recipient but also the contributor. Drake Sadler came to Austin in late May to present the gift to ABC. Both he and Lynda have traveled to the other recipient organizations to make similar presentations.

Drake Sadler of Traditional Medicinals. Photo by Wayne Silverman.

One reason for making stock gifts was the Sadlers' intention to set an example for other individuals and companies who may have invested in securities that have significantly appreciated in the current bull market. We hope that it will result in other donors seeing this method of giving as a great benefit not only to ABC but to themselves. Gifts of this kind are obvious boosts to organizations who receive them. The gift is of great value to the donor since they receive a deduction for the full market value of the stock on the day of the transaction and the donor also avoids capital gains. The benefits to donor and recipients may be attractive to some who have made wise investments and also want to help those organizations with a track record of success.

Most importantly for ABC, the Sadlers designated the gift to the new Herbal Education Center because they believe in ABC's mission and vision for the site. Of his recent visit, Drake Sadler said, "It was exciting to view the grounds and existing building and learn of [ABC's] plans for future expansion. I'm sure your project will become a place of significant beauty and an educational resource to the local and global community...."

These gifts came from Whole Foods Markets, Wild Oats Markets, and United Naturals Distribution stocks. "We have been fortunate that the companies we believed and invested in have done so well. Now, we can turn that good fortune into support for herbal education and research," said Lynda Sadler.

In addition, the Sadlers hoped that employees, board members, and investors in these and other similar companies would also see the value in giving part of their appreciated earnings on these fine investments. To accomplish this, they encouraged the companies to publicize these gifts through internal newsletters and other communications. "We hoped that, in this way, we would be able to multiply our gift to these worthy organizations," said Sadler. — *Wayne Silverman. Ph.D.*

OAU Defends Indigenous Property Rights

The draft of a model bill dealing with the bioprospecting and ownership patents on a drug made from natural products found in Africa has been produced by the Organization of African Unity (OAU). The bill was created partly to challenge the Trade Related Intellectual Property Rights Agreement (TRIPs) of the World Trade Organization (WTO), and partly to clamp down on the smuggling of medicinal plants.

The bill states that ownership of new compounds should rest with indigenous local communities for "all times and in perpetuity," calling for states to develop laws guaranteeing such ownership, and for collectors of natural products to share information from research and development with governments on "all discoveries."

The OAU believes that the TRIPs agreement violates the United Nations Biodiversity Convention which makes the "approval and involvement" of indigenous peoples a condition of developing a product based on a natural compound.

The draft will now be circulated among the OAU's 53 member states for comment before its presentation as model legislation for African states. States eager to attract overseas bioprospecting partners—such as Nigeria and Tanzania—may not be willing to pass any legislation that would scare away such partners. — *Barbara A. Johnston*

[Masood E. Africa Defends Rights to Indigenous Knowledge. *Nature*. 1998 Apr 2; 392: 423.]

Chinese Scientists To Test Traditional Medicine in AIDS Treatment

Scientists in China are to conduct clinical tests with a traditional herbal compound to see if it is effective in treating AIDS.

"We hope to achieve reliable and convincing results on the effectiveness of the medication," said Wang Jian of the Chinese Academy of Traditional Chinese Medicine (TCM). He explained that the preparation was a powder mix, containing bupleurum (*Bupleurum chinense* DC., Apiaceae), milk vetch (*Astragalus membranaceus* Moench, Fabaceae), Chinese angelica (*Angelica sinensis* (Oliv.) Daniels, Apiaceae) and licorice (*Glycyrrhiza auralensis* Fisch. ex DC., Fabaceae), that "dissipates heat and toxic materials" and improves immunity.

According to a report from the Xinhua news agency, Wang was a member of a Sino-Tanzanian research group working on the new drug to treat people with acquired immune deficiency syndrome (AIDS). "Pending formal approval, Wang and his colleagues, both Chinese and Tanzanian, will monitor levels of HIV—the AIDS virus—in patients following the application of medication," representatives of the agency said, adding that the scientists would use the commonly used anti-HIV drug AZT on a control group to provide a comparison.

"Research on AIDS treatment with herbal therapies was launched more than 10 years ago. However, Western medical circles failed to recognize verified results owing to different appraisal criteria," said Wang.

Chinese AIDS researcher Guan Chongfen was quoted as saying that traditional herbal remedies had a 40-50 percent effectiveness rate in treating the condition. She said an agreement between Beijing and the Tanzanian government had enabled scientists to test Chinese herbal remedies on 10,000 Tanzanian AIDS patients. "We've recorded a 47 percent effective rate in improving human-immuno functions and various AIDS symptoms, including asthenia, diarrhea, fever, leanness and skin rash. When compared with Western medical treatment which focuses more on attacking HIV, [Chinese medicine] emphasizes improving the patient's immunity in order to block the virus," Guan said. — *Barbara A. Johnston*

[Agence France-Presse. 1998.]

Bupleurum, *Bupleurum chinense*. Photo ©1998 Steven Foster

Nigerian Rural Development and Traditional Medicine Project Launched

The Healing Forest Conservancy (HFC), an independent non-profit organization founded by Shaman Pharmaceuticals, Inc., announced a $40,000 donation to the Fund for Integrated Rural Development and Traditional Medicine (FIRD-TM) at the Fund's inauguration in Abuja, Nigeria, on September 30, 1997. The Association of Traditional Pharmaceutical Manufacturers and the Orange Drug Company of Nigeria then pledged additional moneys to complement the HFC donation. Inauguration of the FIRD-TM was announced in Abuja during an international workshop on medicinal plants attended by five Nigerian ministers and several heads of Nigerian government agencies, including the Director General of the Federal Environmental Protection Agency. Special guest of honor Lt. General J. T. Useni, Honourable Minister of the Federal Capital Territory of Abuja, stated, "...the skills of the traditional medical practitioners who are also the custodians of our native medical culture are now being accorded the right place in society."

Dr. Maurice Iwu, professor of pharmacognosy and Director of the Bioresources Development and Conservation Programme (BDCP), the Nigerian non-government organization responsible for the Fund, added, "The FIRD-TM has an independent board composed of leaders of traditional healers associations, senior government officials, representatives of village councils, and technical experts from scientific institutions. Its objective is to build technical skills in Nigeria so bioresources are a viable vehicle for sustainable development. Improved skills generate pharmaceutical leads that target therapeutic categories for tropical diseases suffered in Nigeria such as malaria, leishmaniasis, and trypanosomiasis. At the local level, technical skills gained from benefit-sharing help standardize phytomedicines, information that

continued on next page

HERB BLURBS

America's First Beers Made with Hemp Seeds Now Available

The first U.S. craft beers brewed with hemp seeds are now available for sale in Colorado and Illinois.

Hempen Ale (Frederick Brewing Co.) was recently awarded a bronze medal for brewing excellence in the herb/spice category at the 16th Annual Great American Beer Festival, a large beer event held in Denver. During the two-day professional panel blind tasting, 85 internationally renowned judges evaluated over 1,800 entries submitted by 457 domestic breweries from 45 states.

Hemp (h. strains) and marijuana (m. strains) both belong to the species *Cannabis sativa* L., Cannabaceae, but differ in appearance and biochemistry. Unlike marijuana, which is grown for THC (delta-9-tetrahydrocannabinol), the psychoactive drug in its flowers and leaves, hemp is grown for the long, strong fibers of its stalk, and for its seeds. The hemp plant contains only trace amounts of THC—and there is none in the hemp seeds, which are imported from Eastern Europe and China, then sterilized. Hemp is a close relative to hops.

The hemp seeds are combined with barley malt in the mash, the first stage of brewing. The unique protein spectrum of the seeds gives the beer a rich, creamy head, and imparts mellow herbal flavors and aromas.

Two years were spent developing the Hempen Ale brewing process and the marketing procedure.

There is a growing movement in the U.S. to support the cultivation and use of industrial hemp because of its economic and environmental benefits and multiple commercial uses, especially in paper and fabric manufacture. — *Barbara A. Johnston*

[AOL News. Hempen Ale Now Available in Colorado. Nov 7, 1997.
AOL News. Frederick Brewing Co. Launches Hempen Ale and Hempen Gold in Illinois. Feb 4, 1998.]

Big, Big, BIG Bush Down Under

In October 1996, scientists in Australia found what might be the world's oldest living organism, a 40,000-year-old shrub growing on a remote mountainside on the island of Tasmania.

Standing up to 27 feet high, the shrub ranges almost a mile down two secluded river gullies which drain a mountain in Tasmania's remote southwest wilderness area. Called King's Holly, it is the only known specimen of *Lomatia tasmanica* W. M. Curtis, Proteaceae, according to senior Tasmanian Parks and Wildlife Service official Stephen Harris.

Found in 1993, the plant was first assumed to be a community. However, genetic specialists have since painstakingly determined that it is a single plant of a sterile species that cloned itself and did not need other plants to reproduce.

The plant's age was estimated using a fossil found in one of the rain forest gullies. "A fossil of an identical specimen has been found near the site in old gravels, and that's been dated at over 40,000 years," Mr. Harris said. "So what that means is that a clonally reproducing, hybrid individual has existed at the site for at least 40,000 years. This could be the oldest or one of the oldest organisms on the earth."

However, ABC Advisory Board member Robin Marles, Ph.D., a pharmacognosist at Brandon University, Manitoba, Canada, has a different explanation. "What the fossil proves is that the plant has occupied the valley for 40,000 years," he said. "This is not unusual. This does not prove that the current clonal individual is that old. While a clonal shrub of the dimensions described is undoubtedly very old, it could have become established by vegetative propagation, e.g., rooting of a stem fragment, much more recently than 40,000 years ago. The actual age could perhaps be established by locating the center of the plant, or at least the largest stem, and dating a

continued on next page

benefits traditional healers and the health of the communities they serve. The Fund offers an example of how countries, culture groups and companies can work together successfully for the benefit of all shareholders to sustainably develop biodiversity for human health."

Rep. John Porter (R-IL), Chairman of the U.S. House Appropriations Subcommittee for Labor, Health, and Human Services, commented, "Those concerned with the development of bioresources for human health recognize that when local custodians of biodiversity benefit from their sustainable use by others, conservation opportunities are increased. The Convention on Biological Diversity codifies this principle, but the absence of applicable models leaves it largely untested. This Fund in Nigeria is welcomed, for it captures the very spirit of the Convention on Biodiversity."

"The conservation community commends this effort," said Jane Villa-Lobos, botanist at the Smithsonian Institution's National Museum of Natural History. "Nigeria is a country rich in medicinal plant species and the Fund supplies the impetus to conserve the area's extraordinary biological diversity."

According to anthropologist Katy Moran, Director of the HFC, "The HFC donation of $40,000 to the Fund is to assess the feasibility of future trust funds for benefit-sharing. Nigeria offers an ideal situation to test a financial mechanism to distribute benefits among all stakeholders. Chairman of the Board of Management of the Fund, His Royal Highness Eze E. Njernanze of Owerri, is a highly respected traditional ruler. The predominance of traditional solidarity systems, such as tribal associations and professional guilds of healers, supplies a social structure to ensure community participation. Diverse culture groups in Nigeria will receive funds through traditional healers' organizations and villages consistent with their governing customs. Town associations, village heads and professional guilds of healers are empowered to make decisions regarding projects in their localities. Those funded will follow the criteria of promoting conservation of biodiversity and drug development, as well as the socioeconomic well-being of rural cultures."

Shaman Pharmaceuticals, Inc., a U.S. company, uses ethnobotany, as well as isolation and natural products chemistry, to discover and develop novel pharmaceuticals. In 1990, Shaman founded the HFC explicitly to develop and implement a process to return benefits to countries and cultures that contribute to its drug discovery process after a product is commercialized. In concert with terms of the Convention on Biodiversity, Shaman will share benefits from drug discovery with all the biodiversity-rich countries and cultures that participate in its drug discovery process. — *Barbara A. Johnston*

[Healing Forest Conservancy. Nigerian Trust Fund Launched for Integrated Rural Development and Traditional Medicine (Press Release). October 20, 1997.]

Phyto-Riker Pharmaceuticals

Phyto-Riker Pharmaceuticals, Inc., has just completed its acquisition of GIHOC Pharmaceuticals, Ltd., from the Ghanaian Government's Divestiture Implementation Committee. GIHOC is a manufacturer of generic pharmaceuticals products (capsules, tablets, syrups, and ampules) founded in 1968 by former President and visionary Dr. Kwame Nkrumah, to supply the local and regional markets in Africa. GIHOC's major production facility was built in 1991 using the "GMP corridors" design plan. The 104-acre facility is capable of meeting international GMP standards and has an installed capacity of manufacturing 1.64 billion tablets, 2 million capsules, and 182,000 liters of syrup per year. GIHOC has a 34-year operating history, with a reputation for top-quality products.

It was Dr. Oku Ampofo's dream, and the dream of the government, that the plant medicines should eventually be put onto the local market in significant commercial quantities through GIHOC Pharmaceuticals. Phyto-Riker has taken hold of that dream and is making plans to convert the original building on the GIHOC grounds into a world-class facility for the production of plant medicines.

The Plant Medicine Division intends to introduce an initial line of herbal teas, using single plant products that the Centre for Scientific Research into Plant Medicine (in Mampong-Akuapim) has use in their clinical programs for the treatment of various diseases and conditions. Some products with a strong history of use will be considered for market launching as capsules or tablets, and some popular ointments will also be considered. At a further second stage, we will look at developing products using proprietary mixtures of plants developed at the Centre. All of this will be part of our technology transfer program.

The company will then launch a Discovery Programme, conducting further research into developing new plant medicines.

Broad screen assays will be conducted, and eventually compounds will be isolated from the most promising of the plants, with some of them having the potential of being developed into single compound pharmaceuticals in partnership with major pharmaceutical companies.

The Ghanaian Government has recently set up a Food and Drug Board, with whom the company is in discussions. The greatest challenge will be to grow the plants, and a major farming program is being initiated. Several farms will be established that will incorporate demonstration farming techniques into the program for outgrowers who want to contribute to the effort. A significant component of the farming program will be experimental farms to begin to cultivate plants, bushes, and trees that have never been grown in the area before. There is a great deal of interest in establishing a serious reforestation effort, and the whole program will be coordinated with major university support as well as with support from bilateral and multilateral international agencies.

Sites are currently being selected, with land clearing to begin shortly and seed collection to precede nursery development programs. A new medicinal plant growing industry should take off and should have a major impact on the agricultural side of the Ghanaian economy.

Phyto-Riker will be well-positioned to supply both the local Ghanaian market and the regional West African markets. Phyto-Riker intends to position GIHOC as the largest and highest quality manufacturer of pharmaceuticals throughout the western region of Africa, which represents a market opportunity of over 200 million people. Phyto-Riker intends to meet the high demand for quality pharmaceutical products by selling to various world health organizations, West African governments, health care facilities and through a network of regional distributors and over 8,000 pharmacists.

Phyto-Riker GIHOC anticipates ready acceptance of plant medicines—60 to 80 percent of the population across West African regularly use traditional medicine as their primary source of health care. Phyto-Riker (GIHOC) hopes to assist in answering the growing worldwide demand for alternative medicines. — *Diane Robertson Winn (Executive Vice President, Phyto-Riker Pharmaceuticals)*

Seedlings from the Centre for Scientific Research into Plant Medicine en route to the farm. Photo courtesy of Diane Winn

HERB BLURBS

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narrow heartwood (must be dead tissue) core sample by a combination of dendrochronology and carbon-14 dating. That might provide us with a minimum age estimate, although it will be very difficult to say if the oldest stem is the original or a more recent shoot." — *Barbara A. Johnston*

[Anon. Australians Report 40,000-Year-Old Shrub. *New York Times.* October 20, 1996.

Marles R. Personal communication. May 5, 1997.]

Hungry Plants

In *HerbalGram* No. 41, we published a short blurb regarding the number of carnivorous plants (estimated to be from 570 - 630). We received a number of letters regarding this subject, including one which asked if there are any carnivorous plants that are harmful to humans. Research shows that there are none, for the most massive item that even the largest carnivorous plants can digest would be something the size of a frog. Also, the digestive enzymes secreted by these botanicals are comparatively weak.

Occasionally a rat or bird has been found in the bottle-like appendages of such plants as *Nepenthes rajah* of Borneo, not "eaten" but drowned in the liquid. However, according to Dr. Barry Meyers-Rice, editor of *The Carnivorous Plant Newsletter*, most *Nepenthes* victims are frogs or other non-botanical entities which get caught and are too weak to fight their way out.

Many kinds of carnivorous botanicals evolved to take advantage of nitrogen or other nutrients lacking in the environment in which they grow. Some will consume gnats, flies, and moths while others exist on a diet of ants or other crawling insects. So, unless a human suddenly takes on the size and form of an insect, it would seem that we are safe from our carnivorous botanical acquaintances. — *Barbara A. Johnston*

[Ray CC. Questions and Answers. *New York Times.* March 10, 1998.]

WHO Acknowledges African Healers

In more and more villages, traditional healers in Africa are assuming conventional roles in countries struggling with growing populations and overburdened medical services. Such healers combine a traditional blend of mysticism and medicine in order to provide much of Africa's health care.

The international medical community now acknowledges that African healers, particularly herbalists familiar with local diseases and conditions, provide significant primary health care across the underdeveloped continent.

The World Health Organization (WHO) estimates up to 80 percent of Africans—or more than a half billion people—visit traditional healers for some or all of their medical care, a situation in almost location, from village to city.

Although healers remain the strongest link to slowly eroding tribal cultures, new realities and a global shift toward natural remedies are bringing increased attention and status for healers. Registration of healers and their medicines, inclusion in certain health plans, and reimbursement of traditional treatment costs are among the projects sought by various governments.

Because of dwindling sources of medicinal plants and animals, healers have been forced to accept changes in order to preserve and replenish their traditional sources.

During the AIDS scourge that hit Uganda in the 1980s, healers such as Mutebi Moses Tokamalirawo used herbal medicines to soothe symptoms such as rashes and diarrhea, but patients kept dying. The private group THETA (Traditional and Modern Health Practitioners Together Against AIDS) offered training in AIDS counseling, and Tokamalirawo agreed to take part.

He was one of 400 healers to attend the first meeting in June 1993. Only 20 completed the program 15 months later, the rest having left out of intransigence or to keep making money.

"Before the training, I wouldn't distinguish between AIDS patients and others. I treated people as bewitched by ancestral spirits,'" Tokamalirawo said in his Spartan, one-room office in a dusty Kampala neighborhood. "Now I accept that it is a disease I cannot cure. AIDS has changed society and the healers have to change to deal with it."

As a result of the THETA training, he and the others who completed the course have been able to demystify the disease. That's what THETA wanted when it began the training, which has spread to five of Uganda's 39 districts and about 150 healers.

In South Africa, in order to establish ethical and procedural standards and weed out charlatans, the first black-led government is trying to create a register of the estimated 250,000 healers. The government had also begun testing herbal remedies for regulation. Full integration is hindered by centuries of mistrust and secrecy for, according to Dr. Peter Folb, chairman of South Africa's Medicines Control Council—similar to the U.S. Food and Drug Administration—words such as "control, regulation, proscribed behavior" are wrong when applied to healers.

African healers come in all shapes and sizes, with dozens of labels as distinctive as the tribes and regions that produce them—"sangoma" and "okomfo" for a diviner or prognosticator, "inyanga" and "dunseni" for herbalists who blend medicines from the forests and fields.

These healers use knowledge passed down for generations to diagnose common ailments—from malarial fevers and skin rashes to depression and hypertension—and treat them with natural remedies often mixed with superstition. In some cases the cure is worse than the ailment and may result in accidental poisoning, the biggest problem in African traditional remedies.

Methods used range from herbal teas, enemas, poultices rubbed in cuts into the skin, and inhaling fumes to bizarre rituals and potions made from animals and even human body parts intended to rid superstitious patients of evil or unhappy ancestral spirits. Chameleons are prized for potions that bring change—such as winning back a wayward lover—because the reptiles can change color.

Simply dismissing superstition can be a mistake. "Ancestors play a central role in daily life in most African cultures, and healers use that as a way to intervene in problems and behavior," said Dr. Nigel Gericke, a South African who studied with a rural healer for a year.

In most countries, people too poor for treatment at modern hospitals can afford the small amount of cash, or barter to pay the local healer who relieves the burden of patients on already overcrowded clinics. In Ghana, there is an average of one healer for every 400 people, compared to one conventional doctor for every 12,000.

A formal shift from the Christian missionary targeting of healers as witch doctors came in 1978, when a United Nations-sponsored health conference called for governments to look at incorporating traditional healers and medicines into national health plans to provide more formal care for the poor.

Almost 20 years later, the British company McAlpine, Thorpe and Warrier Ltd., estimates worldwide sales of herbal medicines will reach $14.4 billion this year, more than 20 percent greater than in 1996—a rate that has affected the global pharmaceutical industry.

Healers handle most common ailments. Dr. Gottlieb Noamesi in rural Hohoe town of Ghana's Volta region makes dozens of herbal potions and medicines in heavy iron pots over open fires. His medical degree is from Lakeland College in Wisconsin. He also has a 1988 Organization of African Unity report citing him for successfully treating sexually transmitted diseases "which defy treatment with orthodox drugs."

His vision-restoring powder, taken twice a day, caused Reinhard Jakoby of Karlsruhe, Germany, to put away his bifocals. Jakoby, 48, said in a telephone interview with Tom Cohen of the Associated Press that the compound he learned about from a television documentary changed his life. "I could only see blurred things without my glasses," said Jakoby, a nurse. "Now, I can go without my glasses. I can read without my glasses. ... The vision was restored and it didn't fail."

There are obstacles in getting herbal remedies out of the African bush and into worldwide production. Failed deals and unkept promises make African healers wary of foreigners promising big money for their secrets. Robert McCaleb, founder of the Herb Research Foundation in Boulder, Colorado, said both sides lack understanding.

African healers want to market new medicines without the money, training, and equipment needed while Western pharmaceutical companies seek to test every known healing plant—what McCaleb calls "chemical prospecting"—instead of working with healers. "Generations of use by humans is better safety data than testing on thousands on rodents," he said.

The answer is partnerships between traditional practitioners and Western companies to quantify the healers' knowledge and spawn significant local industries—such as farms to grow medicinal plants and factories to make the medicine.

"It will show the scientists that our people are not just a bunch of superstitious savages," said Credo Mutwa, 76, a celebrated Zulu healer. "If the world accepts many of our herbal medicines, this will help to ensure the survival of our traditional healers." — *Barbara A. Johnston*

[AOL News. WHO Acknowledges African Healers. Nov. 18, 1997.

Reeder A. UN-AIDS, Geneva. Personal communication. April 21, 1998]

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Hawthorn Benefits Chronic Heart Failure

Hawthorn, *Crataegus* spp.
Photo ©1998 Steven Foster

This review article offers a very straightforward comparison of hawthorn leaf and flower extract (*Crataegus* spp., Rosaceae) to the standard drugs adrenaline, amrinone, milrinone, and digoxin in treating chronic heart failure. Heart failure is defined as an inadequate supply of oxygen and nutrients to the body's peripheral areas as a result of heart disease. Emphasizing that acute heart failure is a medical emergency, the author makes it clear that phytotherapy is an option only in cases of chronic heart failure. Using the same three treatment goals of standard drug therapy, he scrutinized hawthorn's efficacy as measured by an increase in survival rate, improvements in primary measurements such as quality of life and exercise capacity, and in secondary measurements such as threshold hypertension, tachycardia (rapid heartbeat), and arrhythmia (irregular heartbeat). Though long-term studies of survival time are lacking, randomized, double-blind clinical studies of a Crataegus extract standardized to 2.2 percent flavonoids have shown positive results in improving primary and secondary measurements. Hawthorn appears to show potential in treating chronic heart failure, being well-tolerated with broad therapeutic indications and no known drug interactions.

Like the conventional inotropic drugs studied, hawthorn produced a dose-dependent increase in the force of cardiac contraction. While the mechanism of hawthorn's action remains unclear, *in vitro* and *in vivo* studies have revealed a pharmacodynamic profile that varies strikingly from standard drugs used for chronic heart failure. The key ways in which Crataegus differs from conventional drugs (especially digitalis) are that it prolongs the refractory period (resistance to treatment), has no effect on heart rate, and lowers consumption of oxygen and energy by the heart muscle. In common with conventional drugs, except for digoxin, hawthorn successfully shortened AV-conduction time (bloodflow to the atria and ventricles of the heart), increasing the efficiency of nerve impulses in the heart muscle. Hawthorn has also demonstrated cardioprotective benefits against ischemia (oxygen deprivation of the heart muscle). The results of this review further document hawthorn's antiarrhythmic effect.

Based on the entire body of laboratory, human pharmacological, and clinical research, the two phytotherapies considered valuable for chronic heart failure to date are extracts of cardiac glycosides and Crataegus. It is known that plant extracts containing crude cardiac glycosides act in a qualitatively similar manner to the pure glycosides digoxin and digitoxin, because they bind to the same glycoside receptor. The reader should bear in mind that while the cardiac glycoside-containing plants such as oleander leaves and Convallaria (lily of the valley) are poisonous, the glycosides derived from them are not. On the other hand, hawthorn does not contain the typical cardiac glycosides.

Because of the narrow therapeutic index for cardiac glycosides, the author concludes by stressing the necessity of using phytotherapies that meet explicit criteria. Herbal alternatives for chronic heart failure need to have pharmacologically known constituents, adequate bioavailability and known onset, a set duration of action, and known processes of activity and elimination. Researchers also need to have access to methods for therapeutic monitoring of and detecting toxic concentrations of glycosides in the blood plasma. — *Krista Morien*

[Loew D. Phytotherapy in heart failure. *Phytomedicine.* 1997; 4(3): 267-271.]

Garlic Prolongs Elasticity of the Aorta

Building on previous research suggesting that garlic has protective effects against a variety of cardiovascular diseases, German investigators designed a cross-sectional, observational study to assess the effects of long-term garlic use (*Allium sativum* L., Liliaceae) on elasticity of the aorta in healthy, nonsmoking adults (Breithaupt-Grögler, 1997). They hypothesized "that if garlic has any protective effect against cardiovascular diseases related to aging, regular garlic intake would delay the stiffening of the aorta related to aging."

As the largest artery in the human body, the aorta is essential to the healthy function of the entire cardiovascular system. Although gradual loss of aortic elasticity occurs as part of the normal aging process, studies have established a positive correlation between aortic stiffening and elevated cholesterol. Aortic stiffening is also seen in patients with high blood pressure.

The study compared 101 healthy adults of both sexes, aged 50 to 80, who had been taking >300 mg of standardized garlic powder daily for at least two years with 101 age-and sex-matched control subjects. (Authors state that the average time of intake was 7.1 years). Blood pressure, heart rate, and lipid profiles were similar in the two groups. Subjects taking cardiovascular medications that might affect aortic elasticity or the effects of garlic were excluded

from participation. The elastic properties of the aorta were assessed via a measure of cardiovascular function known as pulse wave velocity (PWV), as well as pressure-standardized elastic vascular resistance (EVR), described as an index of aortic stiffness.

Results demonstrated a clear association between long-term intake of standardized garlic powder extract and decreases in both PWV and EVR. PWV was significantly lower in subjects taking garlic than in control subjects ($p<.0001$), as measured while subjects were at rest and during a handgrip isometric exercise. The difference in PWV results between garlic and placebo groups was greater in older subjects.

To find out whether the decrease in aortic stiffening among garlic subjects was dependent on the amount of garlic consumed per day, garlic users were subdivided according to their reported daily intake: 300 mg/day (n=36), 400 mg/day (n=21), and 600 mg/day (n=39); the other five subjects reported taking 500 mg or 900 mg/day. Analysis of these subgroups revealed no dose effect between garlic consumption and changes in aortic stiffness. In other words, the degree of improvement was approximately the same in all three dosage subgroups, suggesting the maximal effect was achieved with the lowest dose reported.

According to the authors, "The results of this cross-sectional observational study suggested for the first time that regular long-term garlic powder intake attenuated age-and pressure-related increase in aortic stiffness." They postulate that this effect may be related to mediation of nitric oxide synthase activation "and subsequent restoration of impaired endothelial function" but conclude, "The precise mechanism or mechanisms of this effect of garlic on the elastic properties of the aorta remain to be defined."

As noted earlier, elevated cholesterol is associated with increased aortic stiffness. While the authors acknowledge that garlic may have direct cholesterol-lowering effects, they assert that possible cholesterol-lowering effects of garlic "...cannot account for differences in the elastic properties of the aorta because serum lipid levels were similar in the two groups." To support this point, they cite a 1995 study published in the journal *Atherosclerosis* in which 28 patients with high cholesterol showed no reductions in plasma cholesterol after three months of treatment with garlic powder at a dose of 900 mg/day (Simons, 1995).

Possible study shortcomings suggested by the investigators include potential inaccuracies in subject's reporting of dosages, a narrow dosage range that might not allow for accurate judgment of dose-effect relations, inherent limitations of the methods used to assess aortic elasticity, and the epidemiological, cross-sectional study design itself. The garlic powder preparations taken by the subjects were not identified in the paper, however it would be easy to assume they were taking Lichtwer's Brand Kwai. Kwai tablets are the only known brand sold in Germany that are both standardized and contain 100 mg. of garlic powder. — *Evelyn Leigh*

[Breithaupt-Grögler K, Ling M, Boudoulas H, Belz GG. Protective effect of chronic garlic intake on elastic properties of aorta in the elderly. *Circulation*. 1997; 96(8): 2649-2655.

Simons LA, Balasubramaniam S, Konigsmark M, Parfitt A, Simons J, Peters W. On the effects of garlic on plasma lipids and lipoproteins in mild hypercholesterolemia. *Atherosclerosis*. 1995; 113; 219-225.]

Echinacea pallida shortens the duration of upper respiratory tract infection

Various Echinacea species have been shown to improve clinical outcomes in minor infections, and numerous in vitro and animal studies have been performed to elucidate the mechanisms of the herb's immune-stimulating actions. In a recent placebo-controlled, double-blind study conducted at a European clinic, an aqueous ethanolic extract of *Echinacea pallida* (Nutt.) Nutt., Asteraceae, root was significantly more effective than placebo in shortening the duration of illness in upper respiratory tract infections of both bacterial and viral origin (Dorn *et al.* 1997).

The study compared the effects of *E. pallida* extract to placebo in 160 adults with upper respiratory tract infections (URTI) of no more than three days duration. URTI was broadly defined by the investigators to encompass sinusitis as well as cough and pharyngitis. For study inclusion, patients had to demonstrate a score of at least 15 based on a three-point scale assessing the severity of typical URTI symptoms. Elevated differential neutrophil count was used as an indicator of bacterial infection, and elevated differential lymphocyte count of viral infection. Initial evaluation also included determination of the incidence of URTI over the previous three years,- one of the aims of the study was to determine how URTI frequency might affect the success of treatment with echinacea. Patients were excluded from the study if they had auto-immune disorders or infections other than URTI or if they were taking medication that might interfere or interact with the herb preparation.

Patients were randomized to receive eight to 10 days of treatment with either placebo (n=80) or *E. pallida* root extract (n=80) at a total daily dosage of 900 mg.

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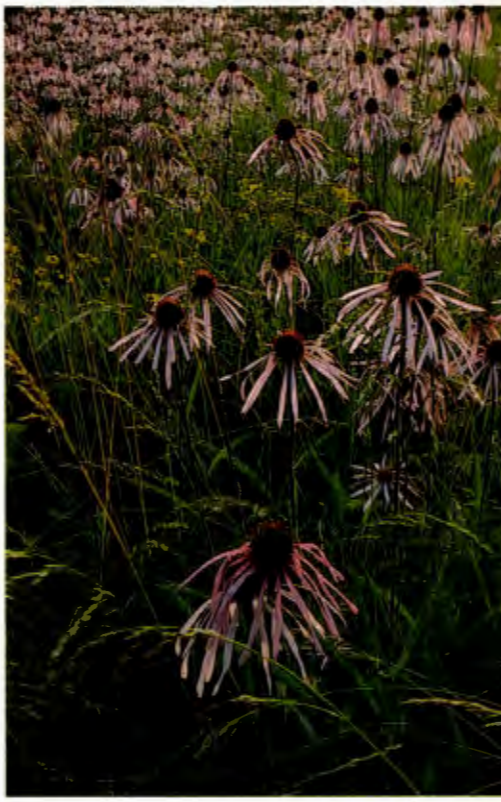

Pale Coneflower, *Echinacea pallida*. Photo © 1998 Steven Foster.

Evaluations were performed at baseline, three to four days after entry into the study, and eight to 10 days after entry into the study. Outcome criteria were resolution of cough and cold symptoms and reduced duration of illness as demonstrated by normalization of lymphocytosis and differential neutrophil count.

According to the results, duration of illness was reduced from 13 days to 9.8 days in bacterial infections and to 9.1 days in viral infections. These results were considered highly significant compared to placebo ($p<0.001$). Frequency of infection during the previous three years had no effect on treatment outcome. The authors concluded, "From these results, it is quite clear that *Echinaceae pallidae radix* [*E. pallida* root] shortens the course in URTI as compared with placebo...The specific clinical signs and symptoms improved and in fact disappeared far more swiftly with real treatment than with placebo treatment." — *Evelyn Leigh*

[Dorn M, Knick E, Lewith G. Placebo-controlled, double-blind study of *Echinaceae pallidae radix* in upper respiratory tract infections. *Complement Ther Med.* 1997; 3; 40-42.]

Herbal Alternatives for Chronic Active Hepatitis

In this review article, the author evaluated five promising phytotherapies in the treatment of chronic active hepatitis B virus (HBV). Based on statistics from the World Health Organization showing that HBV is one of the leading causes of death worldwide, he called for the promotion of scientifically proven herbal medicines. Currently, two-fifths of the world's population have been exposed to the hepatitis B virus, with 350 million chronically infected. Chronic infection often leads to death, due to liver diseases such as active hepatitis, cirrhosis, and liver cancer. The standard treatment with alpha interferon is cstly and fraught with difficulties, including an inadequate success rate (25-40 percent) and serious side effects, ranging from bone marrow suppression and interstitial pneumonia to depression.

The seven studies presented in this article focused on *Phyllanthus amarus* and *P. urinaria*, Sho-Saiko-To (the traditional Japanese Kampo medicine based on a traditional Chinese formula), glycyrrhizin (from licorice, *Glycyrrhiza* spp.), catechin (found in green tea and other plants), and silymarin (from milk thistle, *Silybum marianum*). Though the active constituent remains unknown, the traditional Ayurvedic plant *Phyllanthus* has produced encouraging clinical results with no reported side effects. In a study of 60 subjects with chronic HBV infection, patients were given either 200 mg of *P. amarus* encapsulated extract or placebo three times daily for one month. After six weeks, 59 percent of the treated group had lost their hepatitis surface antigen (HBsAG), a standard marker of infection, compared to only four percent of the placebo group. The therapy was less successful in treating patients who also had the hepatitis core antigen (HBcAG), which indicates active viral replication. A study in China comparing species of Phyllanthus found *P. urinaria* to be more active against chronic HBV, effectively bolstering HBcAG antibodies from 51 percent to 89 percent . One criticism of the work done on the Phyllanthus genus, in general, concerns proper identification of the species used in individual studies. Overall, clinical results with various Phyllanthus species have ranged from excellent to no activity.

A traditional Kampo formula containing seven herbs, Sho-Saiko-To is composed of *Bupleurum falcatum* (bupleurum), *Glycyrrhiza glabra* (licorice root), *Panax ginseng*, *Scutellaria baicalensis* (Chinese skullcap root), *Zizyphus jujuba* (jujube fruit), *Zingiber officinale* (ginger root), and *Pinellia ternata* (half summer root). In a study of 14 children with chronic HBV and liver disease, Sho-Saiko-To reversed the HBsAG positive reading in 50 percent of the children after less than a year of treatment, compared to 22.7 percent in the control group. It also stimulated HBcAG antibodies in 25 percent of the children. Though the exact mechanism of action remains unclear, *in vitro* and *in vivo* tests suggest that Sho-Saiko-To may enhance the immune system by activating macrophages, natural killer cells, and cytokines. Though the formula appears to be quite safe by itself, combining it with alpha interferon has been shown to increase the possibility of interstitial pneumonia.

Far right: **Licorice root,** *Glycyrrhiza uralensis;* right: **Korean Ginseng,** *Panax ginseng.* Photos © 1997 Steven Foster.

Used in Japan to treat chronic hepatitis B and C, glycyrrhizin (a main constituent in licorice root) is traditionally given intravenously in a solution called Stronger Neo Minophagen C. In one clinical study it compared favorably with alpha interferon, producing a 30-40 percent success rate in treating chronic HBV infection. More research is necessary to determine whether glycyrrhizin may be useful in therapy-resistant cases of hepatitis C when combined with alpha interferon.

A slightly more controversial treatment for hepatitis is the flavonoid catechin, which is isolated from several medicinal plants including *Uncaria gambir* (black catechu). Catechin has been shown to reduce the hepatotoxicity of many chemicals, and *in vitro* studies suggest that it may work by increasing cell-mediated immunity. Though clinical studies have shown effectiveness in treating chronic, active hepatitis B, catechin is associated with a number of side effects, including fever and hemolytic anemia. A few patients have even died taking this drug.

A safer, long-term treatment for chronic active hepatitis is silymarin, the active flavonoid compound found in *Silybum marianum* (milk thistle). This well-known plant's hepatoprotective benefits have been seen in over 300 clinical and laboratory studies. In cases of acute hepatitis B, silymarin improves liver function tests without affecting HBsAG. Though it does not lower viral replication (HBcAG), silymarin still has a therapeutically useful effect in chronic hepatitis B. Clinical studies have shown reductions in necrosis (liver cell death) and lowered formation of fibrous tissue, along with reduced levels of serum transaminases (a marker for cell damage) and MDA (a marker of lipid peroxidation) in patients with chronic hepatitis B and C. — *Krista Morien*

[Reichert R. Phytotherapeutic Alternatives for Chronic Active Hepatitis. *Quart Rev Nat Med.* 1997 Summer: 103-108.]

New Research Supports Ayurveda's Traditional Uses

Based on far-reaching traditional uses for a class of Ayurvedic herbs known as "rasayanas," researchers were able to clarify the scientific mode of action for six of these plants, using new laboratory, clinical, and *in vitro* studies along with previous research. The authors hypothesized that rasayanas work by acting on components of the immune system, which in turn have broad effects on the entire body. Reputed to strengthen the "primordial tissue" that nourishes the rest of the body, rasayanas are said to enhance longevity, youth, memory, intellect, the immune system, and physical endurance.

The authors used six rasayanas to test their hypothesis, including *Emblica officinalis* (now *Phyllanthus emblica* L.), *Tinospora cordifolia*, *Asparagus racemosus* (now *Protasparagus racemosus*), *Withania somnifera*, *Terminalia chebula* and *Piper longum*. In laboratory studies on both normal and immunosuppressed animals, pretreatment with all six rasayanas protected animals from infection, shortened recovery time, and lowered the mortality rate. The plants produced a stronger healing effect when combined with antibiotics. The authors concluded that rasayanas work by enhancing leucocytosis (an increase of white blood cells), and by preventing neutrophil destruction after exposure to toxins such as cyclophosphamide. Important immune functions like phagocytosis, intra-cellular killing, and macrophage activity also increased in treated animals as compared to control groups.

Top: **Ashwagandha,** *Withania somnifera;* above: **black pepper,** *Piper longum.* Photos ©1997 Steven Foster

In addition to these six "general" rasayanas, previous research supports the traditional use of "specific" rasayanas to strengthen individual tissues or organs. For example, *Tinospora cordifolia* is known to be useful for the liver, *Emblica officinalis* for the pancreas, *Asparagus racemosus* for the stomach, and *Piper longum* for the lungs. In a double-blind study of 30 patients with obstructive jaundice, researchers found that *T. cordifol*ia (TC) combined with conventional therapy reduced mortality to 6.25 percent, compared to 39 percent in the placebo group. The therapy minimized complications and significantly improved overall quality of life. In a follow-up laboratory study, the researchers determined that TC works by activating the immune cells of the liver and by increasing bile flow to the intestines. In another placebo-controlled, randomized, double-blind study of 50 tuberculosis patients, TC produced fewer side effects in combination with conventional therapy, as compared to placebo. A third double-blind study of 40 breast cancer patients showed that white blood cell counts remained higher and general well-being improved in subjects given TC as an adjuvant to cancer chemotherapy.

Although many of the original studies from the authors' lab were of good quality, a major drawback of this review article was the researchers' summary and evaluation of their own work. Scientists continue to examine the intricate cascade of physical events associated with Ayurvedic rasayanas. At the Ayurvedic Research Center (KEM Hospital in Mumbai, India), preliminary clinical studies are evaluating the effects of rasayanas on anal fistula, hemorrhoids, and asthma. Currently, the center is appraising adverse drug reactions in order to ensure safety and effectivness for all Ayurvedic medicines. Despite 6,000 years of traditional use, volumes of

Ayurvedic knowledge have not been translated from Sanskrit and further scientific studies are called for. Those who have an interest in Ayurveda are advised to work with a skilled practitioner. Like any complex healing system, even "the science of life" (Ayurveda) can cause adverse events, especially when misused through self-prescription. — *Krista Morien*

[Dahanukar S, Thatte U. Current Status of Ayurveda in Phytomedicine. *Phytomedicine*. 1997; 4(4): 359-368]

Cardiovascular effects of Ephedra in normal volunteers

In the wake of recent FDA warnings advising consumers not to ingest supplements containing ephedrine, American investigators evaluated the effects of commercially available ephedra capsules on heart rate and blood pressure in 12 healthy men and women between the ages of 23 and 40 (White *et al*, 1997). The study also sought to assess the variability in ephedrine and pseudoephedrine content among capsules of the same product lot and to investigate the pharmacokinetic properties of these two constituents at recommended dosages. Ephedra capsules manufactured by Solray, Inc., were used as the study preparation. Each capsule contained 375 mg of powdered *Ephedra sinica* Stapf, Ephedraceae (ma-huang).

The study subjects underwent two phases of ambulatory blood pressure monitoring. Normal blood pressure was established during the control phase, and cardiovascular effects after ingestion of ephedra were measured during the treatment phase. Blood pressure readings were taken every 15 minutes during both phases. For the treatment phase, the subjects ingested four capsules of powdered ephedra with breakfast and, nine hours later, took another four capsules with dinner.

None of the 12 study participants experienced adverse effects at any time during the trial. However, six had statistically significant increases in mean 12-hour heart rate after taking ephedra, three had slight increases, and three showed no changes. In the first three hours after taking ephedra, four subjects had statistically significant increases in systolic blood pressure, while two demonstrated significant decreases in diastolic blood pressure during that time. None of these effects were considered clinically significant.

Ephedra, *Ephedra sinica*.
Photo © 1997 Steven Foster.

Blood samples drawn during the treatment phase from six subjects who had agreed to take part in the pharmacokinetics portion of the study were used for analysis of absorption and elimination kinetics. Serum concentrations of ephedrine alkaloids were obtained from these samples via high-performance liquid chromatography (HPLC). The test results were compared with results of earlier research utilizing similar methodology and dosages of ephedrine tablets and an oral ephedrine solution (Pickup *et al*, 1976). Elimination kinetics were similar among all product forms, but absorption of ephedrine was as complete but much slower with the capsule formulation: 3.9 hours for maximal absorption of ephedrine from the capsule of powdered herb vs. two hours from a tablet of ephedrine.

HPLC test results showed that the variability in content of ephedrine and pseudoephedrine among capsules was low. Analysis of 32 capsules yielded a mean ephedrine content of 4.84 + 0.45 mg, and mean pseudoephedrine and methylephedrine contents of 1.22 + 0.28 and 0.31 + 0.07, respectively. Therefore, the study dosage of four capsules contained roughly 19.4 mg of ephedrine, 4.9 mg of pseudoephedrine, and 1.2 mg of methylephedrine. By comparison, a nonprescription drug dose typically contains 25 mg of ephedrine hydrocloride or sulfate.

The authors concluded that "the pharmacodynamic aspects of ingestion of ma-huang in a normotensive, young population were fairly benign." However, they also believe that use of ephedra in combination with other stimulants or in doses higher than recommended could result in clinically significant elevation of heart rate and blood pressure. They suggested that the danger "is heightened for herbal products containing ephedrine because many of these products and their ephedrine alkaloid content are not regulated—a problem exacerbated by the extreme variability in ephedrine alkaloid content associated with different Ephedra species and their place of origin—and they are marketed to 'produce euphoria and increase sexual sensation,' which in itself is a calling card for potential overdose."

Possible study shortcomings include an extremely small sample size (only 12 subjects) and no mention of whether subjects' sex or weight determined how they were affected by the ephedra. — *Evelyn Leigh*

[Pickup ME, May CS, Senadagrie RS, Patterson JW. The pharmacokinetics of ephedrine after oral dosage in asthmatics receiving acute and chronic treatment. *Br J Pharmacol*. 1976; 3: 123-134.

White LM, Gardner S, Gurley B, Marx MA, Wang PL, Estes M. Pharmacokinetics and cardiovascular effects of ma-huang (*Ephedra sinica*) in normotensive adults. *J Clin Pharmacol*. 1997; 37: 116-122.]

Grapefruit Juice Squeezes More Out of Medications

Researchers, led by a team from the University of Michigan Medical Center, Ann Arbor, have isolated a pair of substances in grapefruit juice (*Citrus* x *paradisi* Mcfadyen, Rutaceae) that cause greater absorption of certain drugs in the human body. The new findings are published in the November 1997 issue of the journal *Drug Metabolism and Disposition.*

Earlier studies found that patients who took certain medications with grapefruit juice absorbed more of the medicine. The key to how grapefruit juice enhances drug absorption lies in the interaction between the grapefruit juice and an enzyme found in the small intestine.

Paul B. Watkins, M.D., director of the U of M General Clinical Research Center, and his colleagues have isolated two substances in grapefruit, called furanocoumarins, that are responsible for the so-called grapefruit effect. Watkins says the two components act like suicide bombers, attaching themselves to the enzyme and destroying its ability to interfere with drug absorption.

The enzyme, known as CYP3A4, normally acts as a sort of gatekeeper against certain types of medication, including those prescribed for high blood pressure, heart disease, allergies, AIDS, and organ transplantation. These types of drugs, unlike most medications, are not absorbed efficiently in the intestines because they are largely broken down by CYP3A4 in the intestinal wall. Watkins says people typically have varying levels of the enzyme in their intestines—which appears to explain why some individuals absorb greater amounts of a given medication than others.

Watkins says the two furanocoumarins have different properties. The major active substance in grapefruit juice is called 6',7'-dihydroxybergamottin (DHB) and the researchers named the other ingredient they discovered FC726. Where the two differ is that DHB appears to have multiple effects, while FC726 seems to work specifically on the CYP3A4 enzyme.

Watkins says these findings could have important ramifications for the future of drug-making. Researchers now believe that by adding one of the furanocoumarins contained in grapefruit to certain oral medications, the reliability and safety of the drugs can be noticeably improved. "This discovery allows for the development of improved oral medications, not just for existing drugs, but more importantly, drugs that would not have made useful oral medications without this prior understanding," Watkins says. "By placing DHB or FC726 directly into a pill, much more of the drug will be absorbed in a reliable manner."

Another interesting finding in the study was that the concentration of the active ingredients varies dramatically among grapefruits and grapefruit juices, even within the same product line. This is most likely because of growing conditions in different regions and because manufacturers typically buy their grapefruits from many areas. "For this reason," Watkins says, "it would be preferable to add the active ingredient to pills, rather than just taking medication with grapefruit products."

Watkins believes there are probably additional substances in grapefruit that control drug absorption. "The direction of the research now," he says, "is to continue to search for these furanocoumarins to find the magic bullet, the one that just does what we want it to without interfering with anything else. We believe the grapefruit harbors all kinds of compounds that will be useful in formulating different kinds of drugs." — *Barbara A. Johnston*

[Lown KS, Bailey DG, Fontana RJ, Janardan SK, Adair CH, Fortlage LA, *et al.* Grapefruit Juice Increases Felodipine Oral Availability in Humans by Decreasing Intestinal CYP3A Protein Expression. *J Clin Invest.* 1997 May; 99(10): 2545-2553.

Schmiedlin-Ren P, Edwards DJ, Fitzsimmons ME, He K, Lown KS, Woster PM, *et al.* Mechanisms of Enhanced Oral Availability of CYP3A4 Substrates by Grapefruit Constituents. *Drug Metab Dispos.* 1997 Nov; 25(11): 1228-1233.

Wilkins D. University of Michigan Medical Center (Press Release). Nov 19, 1997.]

Clinical Study Concludes Dong Quai Not Effective for Menopause

A recent 12-week study conducted by Kaiser Permanente Medical Care in Oakland, California, does not support the use of the herb dong quai (*Angelica sinensis* (Oliv.) Diels, Apiaceae) as a solo agent for the relief of menopausal symptoms such as hot flashes and sweating. The study involved 71 women, roughly half of whom received placebos; dong quai recipients took 4.5 g dried root per day. Incidence of symptoms dropped in both placebo and dong quai groups over the study's course, with no statistically significant difference.

Unfortunately, *The New York Times* coverage may give the cursory impression that the study results disproved any therapeutic value at all for the herb ("An Herb, Yes; a Remedy, No"). Traditional Chinese Medicine (TCM) practitioners usually prescribe dong quai in combination with other herbs, and for other therapeutic applications that have not yet been studied in the West.

The New York Times identifies the therapeutic effect sought by Western dong quai consumers as "an attempt to get the benefits of estrogen without the side effects, which include a heightened risk of breast cancer." The herb sells very well in the U.S. for this use. In a personal communication with Mark Blumenthal, Dr. Subhuti Dharmananda, Director of the Institute for Traditional Medicine, asserts that "the idea that dong quai has hormonal action was perpetrated by Western herbalists by the method of guess, tell, then sell; it is used for woman's problems, we guess it works via hormones, let's tell people it works by hormones, and sell it to them on that basis." Dr. Dharmananda notes that the study was otherwise well-conducted, and hopes that in the future, Western herb researchers will refer to existing "serious" research literature to see if there is a basis for a given investigation. *The New York Times* incorrectly identified the length of the study as 24 weeks.

The study did not deal with a major use of dong quai as an antispasmodic for menstrual irregularities.

The New York Times added that a double-blind clinical trial of a traditional mixture of 10 Chinese herbs for the alleviation of hot flashes is underway at Columbia University. Dr. Fredi Kronenberg, the study's director, expects that the results will be published this summer. — *Betsy Levy*

[Bates B. Dong Quai Shown Not Effective for Menopause. *Internal Medicine News.* 1997 Aug 1: 46.

Gilbert S. An Herb, Yes; a Remedy, No. *New York Times.* 1998 Jan 13.

Hirata JD, Swiersz LM, Zell B, Small R, Ettinger B. Does dong quai have estrogenic effects in postmenopausal women? A double-blind, placebo-controlled trial. *Fertil Steril.* 1997; 68(6): 981-986.]

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PLANT PATENTS

By Karen Dean

GINKGOLIDE PAF ANTAGONISTS

As researchers continue to document the beneficial effects of *Gingko biloba,* commercial producers are developing new ways of making this potent herbal agent proprietary, by patenting novel extraction and formulation processes and combinations with other natural products.

Extracts of *Ginkgo biloba* and their methods of preparation. Invented by Ezio Bombardelli, Giuseppe Mustich, and Marco Bertani, all of Milan, Italy. U.S. Patent 5,700,468. Assigned to Indena, SpA, Milan, Italy. Issued Dec. 23,1997.

Patent provides the process for producing a purified extract from *Gingko biloba* leaves by solvent extraction with selected solvents, and describes pharmaceutical compositions comprising dimeric flavones or polyphenols. Indena continues to accumulate process and formulation patent protection on the numerous plant extracts and products it researches, manufactures, and markets.

Anxiolytic ginger/ginkgo combination. Invented by Rudiger Hacker (Herrsching, Germany) and Claudia Mattern (Starnberg, Germany). U.S. Patent 5,622,704. Assigned to Arrowdean Limited., Dublin, Ireland. Issued April 22, 1997.

Covers use of a medication containing active ingredients from ginger (*Zingiber officinale*) and gingko (*Ginkgo biloba*) for the treatment of anxiety states. [This combination apparently attempts to capitalize on the fairly well documented anti-emetic, anti-nausea effects of ginger and the cardiovascular and cognitive effects of ginkgo.]

Medication for impotence containing lyophilized roe and a powdered extract of *Ginkgo biloba.* Invented by Lotfy Ismail Omar (Kew Gardens, NY). U.S. Patent 5,730,987. No assignee. Issued March 24, 1998.

Patent discloses the process of manufacture and the method of use of an orally administered composition for treating impotence in human males. The composition contains a mixture of lyophilized (freeze-dried) sturgeon roe and a dry powdered extract of *Ginkgo biloba* leaves, standardized to include flavonoid glycosides and terpenes. The mixture is preferably encapsulated and provides lyophilized roe and lyophilized *Ginkgo biloba* in the ratio of approximately 12.33:1. [The documented action of *Ginkgo biloba* as a circulatory oxygenation enhancer is most likely responsible for the contribution of the gingko extract to the activity of this combination.]

FEVERFEW

Process for preparing microclustered water. Invented by Lee H. Lorenzen (Trabuco Canyon, CA). U.S. Patent 5,711,950. Issued January 27, 1998.

Feverfew (*Tanacetum parthenium*) has a long history of use in the prevention and treatment of migraine headaches. Like most pharmacologically active herbs, feverfew has fallen short of its full commercial potential, in large part because of the difficulties of making natural products proprietary.

A California company, La Jolla Diagnostics (LAJD), has established one type of proprietary hold on feverfew by licensing a novel method of formulating it (and other herbal extracts) into a highly absorbable saline solution. The manufacturer describes the liquid, called ClusterWater, as being chemically identical to unprocessed water, and as forming "polywater complexes" when exposed to active biological molecules. The complexes reportedly take on structural and electronic qualities of the biomolecules, which are claimed to enhance the effectiveness of the agent in the solution.

ClusterWater technology enables the manufacturer to deliver active herbal ingredients in a sublingual spray, directly to the bloodstream, through the oral cavity. The patent covers the method of preparing microclustered water from steam produced under specified conditions, and then adding biological, pharmaceutical, or chemical agents to the condensed steam, which clusters around the active ingredients as the condensed steam depressurizes. The active ingredient becomes more readily absorbable in microclustered water, thereby allegedly increasing the effectiveness of medications, catalysts, agricultural products, and other bioproducts formulated this way.

LAJD has introduced a feverfew-ClusterWater-based oral spray and plans to launch a similar nose spray, and eventually a line of allergy-relief products. The company is not commenting on the likelihood or identity of future herbal products. The strongest patents on naturally occurring substances, such as herbs and their active ingredients, are generally those protecting some sort of processing of the natural substance. These processes can run the gamut from extraction and purification methods to chemical modification or novel formulation and delivery of the active ingredient. ClusterWater technology may provide La Jolla Diagnostics with the means of developing a varied line of herbal products.

LEUTIN

Process for the formation, isolation and purification of comestible xanthophyll crystals from plants. Invented by Rodney L. Ausich and David J. Sanders (Des Moines, IA) and assigned to Kemin Industries, Inc. (Des Moines, IA). U.S. Patent 5,648,564. Issued July 15, 1997.

Kemin is an animal feed and agricultural specialty ingredient company with an international market presence of more than 25 years' duration. One of the company's flagship products has been marigold (*Tagetes* sp.) flowers, sold principally for poultry feed. The flowers are rich in nutrients, including lutein, a bright orange-yellow carotenoid that enhances the commercial value and color of egg yolks. By the early 1990s, numerous scientific papers had reported research demonstrating that lutein, which is also found abundantly in green leafy vegetables and yellow corn, plays a critical role in maintaining good macular health in humans. Advanced age-related macular degeneration (AMD) is one of the leading causes of blindness and visual impairment in humans. A growing body of evidence suggests that consumption of a diet rich in lutein and the related carotenoid, zeaxanthin, is associated with a decreased risk of AMD. Kemin has taken a vigorous role in making this research available to the interested public.

Since the mid-1990s, Kemin has focused increasing attention on uncovering the role of carotenoids in human health, and on the processes of extraction and purification of food- or pharmaceutical-grade pigments. The company has patented a solvent-based method of isolating and purifying xanthophyll crystals, particularly in the forms of lutein from marigold flower petals, zeaxanthin from wolfberries (*Lycium* spp.), or capsanthin and capsorubin from red pepper (*Capsicum* spp.). The isolated and purified xanthophyll crystals are suitable for human consumption, and can be used as a nutritional supplement and as an additive in food. Kemin sells lutein as a dietary supplement for humans and as a nutritional ingredient for other food, pharmaceutical, and dietary supplement manufacturers to incorporate in their products.

FDA Proposes New Rules on Dietary Supplement Structure-Function Claims

Agency Redefines "Disease" in What Critics Call an Attempt to Limit Claims and Weaken DSHEA

by Mark Blumenthal

The Food and Drug Administration (FDA) has published proposed rules to regulate claims made by manufacturers of dietary supplements. On April 29, 1998, FDA published in the *Federal Register* a proposed set of rules titled "Regulation on Statements Made for Dietary Supplements Concerning the Effect of the Product on the Structure or Function of the Body" (FDA, 1998a).

One of the major areas of innovation in the Dietary Supplement Health and Education Act of 1994 (DSHEA) is found in Section 6 of the Act, where Congress allowed the labels or labeling of dietary supplements to carry a statement that "describes the role of a nutrient or dietary ingredient [e.g., herbal products] intended to affect the structure or function in humans" or that "characterizes the documented mechanism by which a nutrient or dietary ingredient acts to maintain such structure or function." (DSHEA, Sect. 6). Such claims are known as "structure/function claims."

DSHEA specifically points out that such claims are not drug claims; that is, they are not allowed to claim to "diagnose, mitigate, treat, cure, or prevent a specific disease or class of diseases." (DSHEA)

COMMISSION GUIDANCE

Because there can be confusion between a disease (drug) claim, a health claim under NLEA, and a statement of nutritional support or structure/function claim under DSHEA, the President's Commission on Dietary Supplement Labels (CDSL), published in November 1997, provided guidance to FDA to clarify the issue. The CDSL report provided the following guidance:

1. Statements of nutritional support should provide useful information to consumers about the intended use of a product.

2. Statements of nutritional support should be supported by scientifically valid evidence substantiating that the statements are truthful and not misleading.

3. Statements indicating the role of a nutrient or dietary ingredient in affecting the structure or function of humans may be made when the statements do not suggest disease prevention or treatment.

4. Statements that mention a body system, organ, or function affected by the supplement using terms such as "stimulate," "maintain," "support," "regulate," or "promote" can be appropriate when the statements do not suggest disease prevention or treatment or use for a serious health condition that is beyond the ability of the consumer to evaluate.

5. Statements should not be made that products "restore" normal or "correct" abnormal function when the abnormality implies the presence of disease. An example might be a claim to "restore" normal blood pressure when the abnormality implies hypertension.

6. Health claims are specifically defined under NLEA as statements that characterize the relationship between a nutrient or a food component and a specific disease or health-related condition. Statements of nutritional support should be distinct from NLEA health claims in that they do not state or imply a link between a supplement and prevention of a specific disease or health related condition.

7. Statements of nutritional support are not to be drug claims. They should not refer to specific diseases, disorders, or classes of diseases and should not use drug-related terms such as "diagnose," "treat," "prevent," "cure," or "mitigate." (CDSL, 1997; FDA 1998a).

NEW DEFINITION OF DISEASE

Although FDA says that its proposed rules are based on guidance from the CDSL, regulatory attorneys in the dietary supplement industry have criticized FDA's position. According to Loren Israelsen, head of the Utah Natural Products Alliance (UNPA), a trade group representing many of the largest manufacturers of dietary supplements in Utah, the FDA previously used a different definition of disease for the health claim regulations written pursuant to the passage of the Nutrition Labeling and Education Act of 1990 (NLEA). Israelsen says, "This new definition gives FDA significantly more authority and interpretive power to decide what is a disease and what is not." (Israelsen, 1998).

"Consider these conditions: baldness, poor night vision, age-related memory loss, menopause, fatigue, joint stiffness, irregularity, and water retention. Are these diseases or are they health conditions? Under this proposed rule, FDA would now make these decisions. I find this alarming, and while I recognize FDA is grappling with a difficult issue and one that virtually defies definition, what has been proposed is unacceptable." (Israelsen, 1998). Israelsen is intimately familiar with DSHEA and its legislative history. He was one of the lead negotiators for the industry involved in the fine points of the negotiation of DSHEA. In his view, "DSHEA stands for the principle that consumers should be given more and not less freedom of information and freedom of choice. Just like the USDA's proposed organic standards regulations, we must now tell FDA clearly and with great frequency that the proposed definition of disease simply will not do, and that a more broad-based definition is in order.

"Consumers with proper guidance and advice are prepared to take more responsibility for their health. This includes being trusted to make choices for the conditions noted above as well as many others. Granted, some conditions are tricky and require professional advice and diagnosis. However, I think we all are prepared to take steps to govern our lives and make healthcare choices, knowing this involves a greater degree of self-responsibility." (Israelsen, 1998)

In the new proposed rules FDA now defines disease as follows:

> A disease is any deviation from, impairment of, or interruption of the normal structure or function of any part, organ, or system or combination thereof of the body that is manifested by a characteristic set of one or more signs or symptoms. For purposes of the definition, signs or symptoms include laboratory or clinical measurements that are characteristics of a disease, such as elevated cholesterol fraction, uric acid, blood sugar, glycosylated hemoglobin, and characteristic signs of disease, such as elevated blood pressure or intraocular pressure." (FDA 1998a)

However, statuatory definition of disease in the Code of Federal Regulations at the time Congress passed DSHEA (Oct. 1994), was more limited: The present definition is in 21 CFR Sec. 101.14 (a)(6) as follows:

> Disease or health-related condition means *damage* [emphasis added] to an organ, part, structure, or system of the body such that it does not function properly (e.g., cardiovascular disease), or a state of health leading to such dysfunctioning (e.g., hypertension); except that diseases resulting from essential nutrient deficiencies (e.g. scurvy, pellagra) are not included in this definition (claims pertaining to such diseases are thereby not subject to Sec. 101.14 or 101.70). (Young, 1998.)

According to Varro E. Tyler, Dean and Distinguished Professor Emeritus at the College of Pharmacy and Pharmacal Sciences at Purdue University, the former definition of disease is "a sickness or malady which impairs the performance of a vital bodily function." (Tyler, 1998). Under FDA's broadened definition, writes Tyler, "various conditions ranging from hiccups to minor cuts and bruises, and even snoring, could be classified as diseases. ... I strongly object to the broadened definition of disease as proposed by FDA because it greatly limits the amount of information that can be made available to the consumer on the label of certain dietary supplements." (Tyler, 1998).

Professor Norman R. Farnsworth, Research Professor of Pharmacognosy and Senior University Scholar at the University of Illinois, was a member of the CDSL. In reference to previous FDA rules on the subject of structure and function claims for cholesterol levels, he wrote the following comments to Michael A. Friedman, M.D., Lead Deputy Commissioner of FDA:

> The FDA final rules on labeling statements, in my opinion, were not helpful to the industry as to how to craft truthful and not misleading health claims. For this reason, the [CDSL] stated, "it is possible to craft a statement of nutritional support regarding the maintenance of healthy blood cholesterol levels that is a statement of nutritional support and not a health claim or drug claim." It seems to me that having a mild to moderately elevated cholesterol level being lowered is a clear structure-function claim as opposed to a statement that lowering cholesterol may prevent atherosclerosis. (Farnsworth, 1997).

Scott Bass, one of the principal participants in the drafting of DSHEA and National Nutritional Foods Association general counsel, believes that the proposal is, in part, a good faith attempt to draw a line between the protections needed to encourage pharmaceutical research and the freedoms provided by DSHEA. But the proposal also contains many subtle points of great concern to the industry. On top of that list is a practical enforcement issue: FDA may be able to stop claims without having to prove that a disease claim was actually intended. For example, just by including menthol, an OTC drug ingredient, in a product, FDA would be able to say that an implied drug claim is present. Said Bass, "In addition, much like the old food additive cases in which FDA merely submitted an affidavit of one scientist to establish that an ingredient was not generally recognized as safe to obviate any defense, FDA would need only the opinion of one health professional to support the view that any claim was intended as a disease claim." (Bass, 1998)

Also on the issue of OTC drugs, Tony Young, attorney for the American Herbal Products Association (AHPA), says there is

Types of Claims Not Allowed Under FDA's Proposed New Rules

1. Statements about the formulation of the product, including a claim that the product contained an ingredient that has been regulated by FDA as a drug and is well known to consumers for its use in preventing or treating a disease (e.g., aspirin, digoxin, or laetrile).
2. Citation of a title of a publication or other reference if the title refers to a disease use.
3. Use of the terms "disease" or "diseased."
4. Use of pictures, vignettes, symbols etc. (e.g., Rx) that suggest an effect on a disease. Whole human body is OK.
5. Product class names strongly associated with diagnosis, cure, mitigation, treatment or prevention of a disease or diseases, e.g., "antibiotic," "laxative," "analgesic," "antiviral," "diuretic," "antimicrobial," "antiseptic," "antidepressant," or "vaccine."
6. Statement implying that a dietary supplement has an effect on a disease by claiming that effect of the DS is the same as that of a recognized drug or disease therapy. ("Herbal Prozac" or "use as part of your diet when taking insulin to help maintain a healthy blood sugar level")
7. A statement that may contain an express or implied disease claim if it suggests that the product cures, mitigates, treats or prevents a disease or diseases by augmenting the body's own disease-fighting capabilities:
   "supports the body's antiviral capabilities"
   "supports the body's ability to resist infection"
8. Claims that the DS is intended to counter adverse events resulting from medical intervention are considered claims that the product is intended as part of the treatment program and, as such, are claims that the DS is intended to mitigate, treat, or cure the disease state:
   "reduces nausea associated with chemotherapy"
   "helps avoid diarrhea associated with antibiotic use"
   "to aid patients with reduced or compromised immune function, e.g., patients undergoing chemotherapy"

(Source: derived from Notice of Proposed Rulemaking, *Federal Register*, April 29 1998; FDA, 1998a; Anon, 1998 — *Tan Sheet*)

FDA Examples of Acceptable and Unacceptable Claims for Dietary Supplments

Acceptable Structure/Function Claims

Helps maintain a healthy cholesterol level for men over 50 years old
Helps maintain regularity to meet nutritional needs during pregnancy
Supports the immune system
Promotes relaxation

Helps promote urinary tract health
Helps maintain cardiovascular function and a healthy circulatory system
Helps maintain intestinal flora
Helps maintain healthy intestinal tract

Reduces stress and frustration
Inhibits platelet aggregation
Improves absentmindedness
Use as part of your weight loss plan

Cardiohealth
Heart Tabs

Energizer
Rejuvenate
Revitalizer
Adaptogen

Disease Claims/Unacceptable for Dietary Supplements

Lowers cholesterol
Improves urine flow in men over 50 years of age
Alleviates constipation
Toxemia of pregnancy
Supports body's ability to resist infection
Supports the body's antiviral capabilities

Protective against the development of cancer
Reduces the pain and stiffness associated with arthritis
Reduces joint pain
Relieves headache
Decreases the effects of alcohol intoxication

Premenstrual syndrome
Presbyopia

Alzheimer's disease
Decreased sexual function
Hot flashes

Herbal Prozac
Carpaltum
Raynaudin
Heptacure

Use as part of your diet when taking insulin to maintain a healthy blood sugar level
Reduces nausea associated with chemotherapy
Helps avoid diarrhea associated with antibiotic use
To aid patients with reduced or compromised immune function, such as patients undergoing chemotherapy

(derived from Notice of Proposed Rulemaking, *Federal Register*, April 29, 1998; FDA 1998a; Anon, 1998—*Tan Sheet*)

a "tension between DSHEA's structure/function claim allowance and FDA's over-the-counter drug regulations. Several OTC drug categories, such as laxatives, address structure/function issues as much as they address disease. Thus, the proposal is also as much a product of the economics and research incentive rationale underlying the OTC reviews, as it is a product of the Commission's report." (Young, 1998)

Young states, "Against the background of FDA's proposal, it is important that all concerned understand that DSHEA, by its terms, may in fact allow more claims, especially with respect to health-related conditions, than FDA would ever recognize. For dietary ingredients, DSHEA allows statements of nutritional support to be made, consistent with NLEA's health claims regulation requirement, if the statements do not claim to diagnose, mitigate, treat, cure, or prevent a disease. This includes statements regarding the structural or functional effect of such dietary ingredients on the body. Thus, under the law as it is written, there is no bar to relating these structural or functional effects to health-related conditions, those natural conditions that are not diseases or a class of diseases. FDA's proposed disease definition would swallow up this distinction." (Young, 1998)

COURTESY LETTERS AND UNAPPROVED CLAIMS

The proposed regulations are generally consistent with FDA's position as noted in so-called "courtesy letters"—letters that were sent by the agency over the past few years to manufacturers, in response to the 30-day notification letters sent by them to FDA containing the manufacturers' structure-function claims, as required by DSHEA. In these courtesy letters FDA informs the company that its claims are not acceptable under the agency's interpretation of DSHEA.

Young, voicing AHPA's concerns, says, "Statements that relate matters of structure and function to natural health-related conditions such as sleeplessness, pre-menstrual syndrome, functional effects of menopause, elevated cholesterol, overweight, circulation, effects of aging, and fatigue, to name a few, are arguably allowed under DSHEA because these are merely conditions and not diseases. FDA, however, has indicated otherwise both in its proposed regulations and repeatedly in response to manufacturers' 30-day notification letters describing the statements being made for their products." (Young, 1998)

For example, Young cites the FDA Home Page, which states that "[d]espite its sometimes annoying, peripheral problems, more than ever before menopause is now seen as a natural process, not a disease." (FDA, 1998c). Yet FDA has objected to the statement that soya isoflavones "avert menopausal symptoms" because it suggests that the product is intended to treat a disease. FDA has also asserted that a claim that a product is "important for women concerned about the discomforts of menopause" is a disease claim (Young, 1998).

Menstruation and pre-menstrual syndrome have been treated as diseases in FDA courtesy letters regarding claims made for dong quai, gamma linoleic acid (GLA), and evening primrose oil. Statements that these products "help minimize discomfort associated with the monthly cycle" or "help alleviate the symptoms of premenstrual syndrome" were considered claims to treat or mitigate disease (Young, 1998).

Products containing Saw Palmetto and *Pygeum africanum* that claim to "reduce [or inhibit] prostate inflammation" or "manage prostate enlargement" were also cited by FDA as suggesting an intention to treat or mitigate disease; namely, benign prostatic hypertrophy or prostatitis. Yet, prostate enlargement is common in men over 50y and is sometimes referred to as male menopause. Similarly, structure-function claims for products affecting cell damage resulting from light exposure were considered to be mak-

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Federal Court Lifts FDA Import Ban on Cholestin®

by Mark Blumenthal

A district federal court in Utah has delivered an initial blow to the Food and Drug Administration (FDA) by preliminarily declaring Cholestin® a dietary supplement, not a drug, thereby allowing the manufacturer, Pharmanex Inc. of Simi Valley, Calif., to resume importation of the raw material for the product.

Pharmanex sued FDA after FDA had taken action against Cholestin. FDA had issued a 30-page ruling on May 20, 1998, to Pharmanex attorney Stuart M. Pape of the law firm of Patton and Boggs in Washington, D.C., arguing that Cholestin is an unapproved drug under the Food, Drug, and Cosmetic Act and the Dietary Supplement Health and Education Act of 1994 (DSHEA). FDA has been investigating Cholestin since November 1997. During this time FDA has met with Pharmanex officials three times and has received hundreds of comments from academia and the dietary supplement industry. As part of its actions against the product, FDA had issued an import bulletin on March 27, 1997, intended to keep Pharmanex from importing red yeast rice manufactured by Beijing WBL Peking University Biotech Co., from which the product is made.

In a three-page decision, U.S. District Judge Dale Kimball indicated that Pharmanex would suffer irreparable injury if the FDA's ban continued. "The threatened injury to Plaintiff [Pharmanex] greatly outweighs whatever damage the proposed injunctions may cause to Defendants [FDA]," Kimball wrote in his decision, acknowledging that FDA does not consider the product to pose a public health problem.

Pharmanex officials have indicated that the Cholestin issue could become a test case for the dietary supplement industry and DSHEA. Judge Kimball noted that the company had "raised substantial and serious questions regarding the lawfulness of FDA's interpretation of 'article' to include an active ingredient in an approved drug product." This refers to the definition of "dietary supplement" in DSHEA in which Chris Noonan of Pharmanex indicated that in the next 60 to 90 days the judge will rule on the issue of whether Cholestin is a dietary supplement or an unapproved drug. There is an indication that Pharmanex may get a favorable ruling, but the outcome of this decision remains to be seen. Contrary to some press reports and industry faxes, the current decision only allows importation of raw material but does not deal with the dietary supplement vs. unapproved drug issue.

Cholestin is made from red yeast rice (*Monascus purpurea* Went), an ingredient in Chinese cooking that gives the characteristic flavor and color to Peking Red Duck and other dishes. The yeast contains appreciable levels of a compound called mevinolin which is chemically similar to lovastatin, an ingredient synthetically produced by the pharmaceutical company Merck & Co. and marketed as the cholesterol-lowering prescription drug Mevacor® since 1987.

As part of its case against Cholestin, FDA has maintained that Pharmanex has marketed the product by promoting the presence of lovastatin in the product, thereby making reference to an approved drug ingredient. In the warning section of the Cholestin package there is language that reads, "ingredients in Cholestin (HMG-CoA reductase inhibitors, e.g., lovastatin)..." HMG-CoA reductase inhibitors are compounds that affect the enzyme HMG-CoA reductase and thus have an effect on cholesterol metabolism.

FDA had previously impounded 10 tons of the red yeast rice. At the hearing held before Judge Kimball on June 15, Pharmanex asked that the material be released. The judge's decision orders FDA to release the material for entry into the country immediately and allow the company to import additional material at the rate of six tons every three months, or whatever quantity the company needs to meet its demand.

Pharmanex president Bill McGlashan is quoted in a press release as saying, "We are thrilled with the Court's decision and believe it is a reflection of the weakness of the FDA's legal and factual position...." In an Associated Press article he is quoted, "It shows that the FDA cannot arbitrarily declare a drug from something that is clearly a food." FDA is reportedly planning "to continue to pursue the case on its merits." ❑

SOURCES

Anon. Pharmanex Wins Fight to Import Product While Courts Decide Case on Cholestin®. 1998.

Carter M. Judge Orders Cholestin Ban Lift. Associated Press. Jun 17, 1998.

Food and Drug Administration. "Cholestin from Beijing WBL Peking University Biotech Co. Ltd., Beijing, China." Import Bulletin #61-B02. Revised Mar 27, 1998.

Noonan C. Personal communication. 1998.

Stolberg SG. Judge Rebuffs Drug Agency on Effort to Ban Diet Supplement. *New York Times*. June 17, 1998.

U.S. District Court for District of Utah, Central Division. Order. Case No. 2: 97CV 0262 K. Pharmanex Inc. v. Shalala and Friedman. 1998.

USP Publishes Information Monographs on Ginger and Valerian

Pharmaceutical body claims "lack of adequate scientific evidence and conflicting study results"

by Mark Blumenthal

In a development that may surprise many herb users and advocates, the United States Pharmacopeia (USP) has published Information Monographs on the herbs ginger root and rhizome (*Zingiber officinale*) and valerian root and rhizome (*Valeriana officinalis*), in which USP has concluded that neither botanical is sufficiently documented for its therapeutic benefits.

USP has published the Information Monographs on valerian and ginger, both of which were reported as final in the December 1997 *USP DI Update*. After several drafts of each monograph were reviewed by independent peer reviewers, the decision of an advisory panel was that there is insufficient evidence in the scientific literature to warrant use of valerian as a short-term treatment for insomnia and to support the use of ginger for nausea and vomiting, whether from motion sickness or other types of nausea. The panel concluded that there was a lack of sufficiently strong evidence in the few clinical studies available for each botanical, since the subject size in most studies was relatively small and that conflicting results were found in the studies.

In virtually identical wording, the "USP assessment" section of each monograph reads:

"USP advisory board panels recognize that [ginger or valerian] has a long history of use, including current extensive use, a lack of reported harmful side effects, and limited supporting evidence in the scientific literature for [the prevention and treatment of nausea and vomiting associated with motion sickness and prevention of postoperative nausea and vomiting—ginger; [short-term treatment of insomnia characterized by difficulty in falling asleep and poor sleep quality—valerian]. A general recommendation for its use, however, cannot be supported by the

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Essential Oils of Economic Value in Madagascar: Present State of Knowledge

Philippe Rasoanaivo and Philippe De La Gorce, Institut Malgache de Recherches Appliquées, B.P. 3833, 101-Antananarivo, Madagascar.

The authors bring together scattered data on the chemical analysis, production, and export of essential oils from aromatic plants in Madagascar. The objectives of the survey are to expand traditional export markets and to open up new markets, with a view to increasing foreign exchange earnings.

Photo by John Jonietz for *HerbalGram*.

Madagascar is the fourth largest island in the world, with an area of about 592,000 square km, a length of approximately 1,600 km, an average width of 400 km, and a maximum width of 580 km. It is situated in the Indian Ocean and is separated from Africa by the 400-km-wide Mozambque channel. It extends from 11° 57' to 25° 32' latitude South, thus forming a small continent. Its southern extremity is a little outside the Tropic of Capricorn and the rest is included in the southern tropical zone.

Madagascar is like nowhere else on Earth. It has long been famed for its unique fauna, which has evolved in comparative isolation from mainland species ever since the island separated from Africa some 140 million years ago. The same is true for its flora, which has acquired a pronounced individuality with an unparalleled degree of endemism [native or confined to a certain region]. Many botanists have praised the unique flora of Madagascar, but the most relevant praise likely came from the French botanist Commerson

MADAGASCAR
General bio-regions
for more precise mapping, see
http://www.mobot.org/MOBOT/Madagasc/vegmad1.html

Map not to scale
Map by Ginger Hudson for *HerbalGram*

when he wrote, in 1771: "What an admirable country is Madagascar. It deserves not an itinerant observer but entire academies. Madagascar is truly the naturalist's promised land. Here nature seems to have withdrawn into a private sanctuary in order to work in designs which are different from those she has created elsewhere. At every step you are met by the most bizarre and wonderful forms." Madagascar harbors some 13,000 plant species, of which 85 percent are endemic to the island. However, so much of Madagascar's wildlife is now threatened that the island is frequently considered to be the single highest conservation priority in the world.

Madagascar can be roughly divided into two well-marked physical regions: about one-third of the mass consists of highlands. The other two-thirds is a belt of extensive plains elevated not more than a few hundred meters above sea level. The greater part of the highlands is at an elevation between 1,000 and 1,500 meters, but this is surpassed by old volcanic massifs such as Tsaratanana in the north, the highest point of the island (2,876 m), the Andringitra massif in the south with Pic Boby (2,658 m), and the Ankaratra massif in the center with Tsiafajavona (2643 m). The belt of plains is narrow on the eastern side but much broader in the west, and in the south it occupies a wide continuous area. On the whole the relief of Madagascar is "accidenté" [hilly, uneven, broken, and rough] and one characteristic feature is its west-east asymmetry. The highlands slope steeply toward the east while the escarpment is much less pronounced in the west. This asymmetrical relief produces a consequent asymmetry in the climate. The southeast trade winds discharge most of their precipitation on the steep slopes of the eastern mountains and so reach the western region as dry winds. This has resulted in the specification of many distinct phytogeographical regions, ranging from the dense, evergreen and ombrophilous [plant life able to survive in and withstand much rainfall] eastern rainforests to the strong aridity of the southwest region, where the vegetation is extremely xerophilous [able to withstand a dry, hot environment] with several adapted aphyllous [having or bearing no leaves], prickly or succulent species with swollen trunks for water storage. Such a great ecosystem diversity allows most medicinal and aromatic plants used in modern industry to be cultivated in one or another region of the country.

Since the Malagasy flora is disappearing at an alarming rate due to massive deforestation, there is an urgent need to evaluate the present state of knowledge of this flora in terms of economic value (Rasoanaivo, 1990 and 1996), and to conserve the remaining forests to ensure the future availability of known and undiscovered medicines, essential oils, and foods. The first paper dealing with the inventory of aromatic plants of Madagascar dates back to 1921 (Gattefossé). Two years later, Perrier de la Bathie (1923), who also made a substantial contribution to the knowledge of the Malagasy flora, published a list of aromatic plants of Madagascar. Then, based on 30 years botanical fieldwork of some western researchers in Madagascar, Decary (1955) published an updated list of aromatic plants. Finally a recent paper made a comprehensive literature compilation of aromatic plants growing in Madagascar (Rakotovao, 1996). We report here the present state of knowledge on these plants in terms of scientific and economic importance.

INTRODUCED AROMATIC PLANTS OF ECONOMIC VALUE IN MADAGASCAR

When the Dutch abandoned Mauritius in 1638, after attempting to colonize it, the island entered into the possession of the French, who named it "Ile de France" and appointed first Mahé de Labourdonnais and then Pierre Poivre (1767-1772) as governors. As a passionate botanist, Poivre undertook the beneficial initiative of planting all available tropical aromatic and medicinal plants in a botanical park he named *Jardin des Pamplemousses*. For this purpose, he sent several boat crews to collect mainly spice plants all over the world. He also took part in some of these perilous expeditions. Because Madagascar constituted a focus of attraction for botanists since the 1650s under the impetus of E. De Flacourt, Poivre sent his nephew Sonnerat in 1768 to the great island, with the aim of collecting Malagasy palms to supply the Jardin des Pamplemousses. Other French botanists working in Madagascar, namely Commerson, Le Chapelier, and Michaux, shipped several plants to the Ile de France. Conversely, Poivre disseminated various plants in the neighboring islands of Madagascar, Bourbon Island (presently La Réunion), Comoro, Seychelles, Zanzibar, and Pemba (François, 1935). There was, therefore, a high traffic of plant exchange in the Indian Ocean in the 18th century. It is likely that most plants introduced to Madagascar entered the island via Mauritius.

The extremes of Madagascar. Top: Southwest dry region with xerophytic vegetation. Below: the eastern rain forest. Photos by the Phillipe Rasoanaivo.

Probably aware of the success of the Jardin des Pamplemousses, General Gallieni delimited 740 acres of land in Mahanorokely Ivoloina (14 km from Tomasina center), just two years after the beginning of the French colonization in 1895, for the experimental cultivation of indigenous and introduced plants of economic value for local uses and export. Introduced plants came mainly from Mauritius, La Réunion, Sri Lanka, Singapore, Java, the Philippines, Congo, Mauritius, Antilles, and the Museum National d'Histoire Naturelle de Paris (National Museum of Natural History of Paris). Plants selected on the basis of their optimal growth were then disseminated to various areas of Madagascar. With respect to aromatic plants, the cultivation program focused on those used in perfumes and cosmetics, i.e. ylang-ylang, geranium rosat, lemon grass, vetiver, and patchouli (Chalot, 1927). It is worth noting that, based on Chalot's paper, Madagascar exported in 1925 0.8 ton of geranium oil, 12.8 tons of ylang-ylang oil, 2.78 tons of clove oil, 11.7 tons of lemon grass oil, 52 kg of patchouli oil, 1.3 tons of citronella oil, and 16.3 tons of miscellaneous oils. This reflects the development of the production and export of essential oils in Madagascar at that time. Since then, the culture of aromatic plants has been extended to other species, i.e. niaouli, cinnamon, and combava.

Perrier de la Bathie (1933) published an exhaustive list of introduced plants in Madagascar, from which it is easy to identify 59 species reported to be aromatic. For clarity of presentation, it is convenient to classify them into three groups: the first group includes the so-called traditional essential oils (clove, ylang-ylang, cinnamon), the second group includes plants from which essential oils have been exported in a large scale (estimated at higher than 200 kg per year) for several years, and the third group includes aromatic plants of potential economic value for which export of essential oils has been successfully initiated but production has not yet been sufficiently developed.

TRADITIONAL ESSENTIAL OILS

Clove oils. Native to the Moluccas Islands, cloves *(Syzygium aromaticum* (L.) Merr. & Perry, Myrtaceae (Spreng) Bullock and Harrison) was for a long time under exclusive and strict control of the Dutch, who had the monopoly. However, Poivre and his team managed to collect 300 seeds in the Moluccas Islands. They were successfully harvested in La Reunion, then imported in 1795 to Zanzibar and Pemba islands, which eventually became the principal producers of cloves, and to Sainte Marie Island around 1820 (François, 1927; Ledreux, 1928). Since then, distribution of cloves in the eastern coastal region of Madagascar has been remarkable, and during the short period 1924-1926, it was estimated that one million cloves [trees] were planted in the Mananara region. Now cloves are grown mainly between Vatomandry and Maroantsetra, although attempts have been made to cultivate them in the northeast (Antalaha) and southeast (Manakara and Mananjary). Clove oils, in terms of quantity, are by far the most important essential oils produced in Madagascar. Several exporting companies are involved in the production of clove oils, which are available in three different qualities: clove bud oil, clove stem oil, and clove leaf oil. While Madagascar had practically the monopoly of the world market in the 1970s, only half of it came from Madagascar in 1988. Now, production fluctuates widely, probably due to the appearance of new exporting countries such as Brazil, Indonesia, Sri Lanka, and Tanzania. From the scientific point of view, one paper dealt with the differentiation of clove bud and clove stem oils from Madagascar by multidimensional analysis of gas chromatography data (Gaydou *et al.*, 1987).

Ylang-ylang oil. Ylang-ylang (*Cananga odorata* (Lam.) Hook.f. & Thomson, Annonaceae) was introduced in La Reunion Island in 1880 and then in Madagascar in 1905. Since then, it has been successfully cultivated in the northern part of Madagascar, mainly in Nosy Be island and Ambanja region

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(Chalot, 1927). The highest quantity exported so far from Madagascar amounted to 31.6 tons in 1922 (François, 1935). Madagascar is now the second producer of ylang-ylang essential oils for the world market, behind Mayotte. About a dozen companies are now involved in the production and export of ylang-ylang essential oils, using high capacity and modern distillation units. Some of them have exclusive market contracts with importers, whereas others are suppliers to various companies. While the essential oils obtained by steam distillation of fresh flowers are currently available in the market with four grades, extra, first, second, and third, only the first, second, and third grades are produced in Madagascar. The first and second grades are reported to have special olfactory properties in comparison to those originating from Mayotte. Soil composition and climate factors are claimed to play a role in the composition of essential oils of ylang-ylang in Madagascar. To our knowledge, only one paper has appeared in the literature for the composition of a first grade essential oil of ylang-ylang produced in Madagascar (Gaydou *et al.*, 1986).

Cinnamon oil. Native to Sri Lanka, cinnamon (*Cinnamomum verum* J. Presl, Lauraceae) grows in the Ambanja region (northern Madagascar) and along the eastern coastal region, mainly between Vatomandry and Maroantsetra. It is said that the distribution of the cinnamon tree is partly due to two Malagasy birds, Marotaina and Rova, which eat mature fruits and let seeds fall on the ground for germination. Although China, Sri Lanka, and Southeast Asia are the main suppliers of cinnamon for the world market, Madagascar exports both scraped and non-scraped barks (up to 4,000 tons/year) and essential oils (unspecified quantity) from leaves (0.4 percent yield) and barks (0.6-1.5 percent yield). Exporting companies buy cinnamon barks or leaves from farmer collectors. Collecting can be done all year long but the best period is February-May, since the collectors are mostly available during this period. The quality of cinnamon oils produced in Madagascar has been largely investigated through engineering dissertations (Razafindramiarana, 1985; Vognogno & Ranivoarisoa, 1987; Raharivelomanana, 1988; Randriamanantena, 1992). Results are summarized in the table below.

Four relevant points can be deduced from these results: (1) cinnamon oil from fresh leaves is rich in eugenol while dried leaves are claimed to contain unexpectedly high percentages of benzyl benzoate; (2) cinnamon oil from bark close to roots contains a high amount of camphor, which is a limiting factor for good quality ex-

Constituents of Cinnamon Oils

Constituents	*#1*	*#2*	*#3*	*#4*	*#5*	*#6*	*#7*	*#8*	*#9*
Linalool	0.7	2.4	5.4	0.4	0.7	0.2	3.1	4.5	2.5
Camphor	—	—	—	1.3	7.3	37.5	—	—	—
ß-caryophyllene	0.7	0.9	1.7	2.0	1.3	1.5	2.7	5.9	13.8
Cinnamaldehyde	1.4	0.8	45.5	60.7	33.7	24.8	57.4	34.6	22.4
Cinnamyl acetate	—	—	7.2	12.6	29.4	1.7	8.6	4.9	2.5
Eugenol	89.2	37.9	19.5	2.2	2.6	1.9	5.1	7.0	25.4
Eugenyl acetate	0.5	—	0.2	0.6	0.6	—	—	3.6	—
Benzyl benzoate	5.5	53.4	4.2	—	—	—	0.6	0.1	7.7

1: From fresh leaves; 2: From dried leaves, 3: From oxidized barks; 4: From crude barks; 5: From scraped barks; 6: From barks close to roots; 7: Crude bark sample from Tomasina region; 8: Crude bark sample from Sambava region; 9: Crude bark sample from Fenoarivo region.

Collecting Niaouli leaves for essential oil distillation. Photo by Phillippe Rasoanaivo.

port; (3) essential oil compositions are different from one region to another; and (4) it is likely that the way that barks are dried plays a role in the oil composition. Because of over-exploitation and lack of cultivation, good scraped cinnamon barks are no longer available in Madagascar in great quantity. Alarmingly, some collectors supply roots instead of barks. Good quality cinnamon oil can be produced in Madagascar if careful attention is paid to the proper collecting and drying of the bark and to the renewal of cultivation.

ESSENTIAL OILS EXPORTED ON A LARGE SCALE

Niaouli oil. Native to the Moluccas islands, the niaouli tree grows in tropical areas and particularly in Australia, Indonesia, Malaysia, and New Caledonia. In Madagascar, it is found in abundance in the swamps along the eastern coastal region. For a long time it has been botanically named *Melaleuca viridiflora* Gaertn. by Humbert and then by Cabanis. Recently some authors have claimed that, based both on the Blake revision of the genus *Melaleuca* and the comparison of the Malagasy voucher specimens with those deposited at the Museum National d'Histoire Naturelle in Paris, the niaouli tree in Madagascar must be called *Melaleuca quinquenervia* (Cav.) S. T. Blake , Myrtaceae -(Ramanoelina *et al.*, 1994). One feature that characterizes the niaouli essential oils is the existence of several chemotypes occuring as a result of ecological effects: a chemotype rich in 1,8-cineole (40-60 percent), a chemotype rich in (E)-nerolidol (40-80 percent), two chemotypes rich in methyleugenol (up to 99 percent) or methylisoeugenol (up to 88 percent), a chemotype rich in linalool. Investigation of niaouli essential oils in Madagascar reveals the existence of the 1,8 cineole (37 percent) chemotype as predominant, a chemotype relatively rich in 1,8-cineole (23 percent), viridiflorol (20 percent) and terpinolene (5 percent), the (E)-nerolidol (87 percent) chemotype with low oil content, and the newly described viridiflorol (48 percent) chemotype which seems to be native to Madagascar (Ramanoelina *et al.*, 1994). However, in a daily massive collecting of niaouli tree for commercial exploitation, it is impossible to discriminate niaouli chemotypes by a simple differentiation of morphological characters, since chemotypes are not well delimited in specific areas. As a result, the essential oils produced in one region of Madagascar might be a mixture of various chemotypes. The niaouli essential oil produced in the Ampanotoamaizina region contains a high percentage of 1,8-cineole (57 percent), along with 8.2 percent limonene, 1.4 percent a-terpineol and 5 percent viridiflorol. This essential oil composition is close to the Australia type. It was also reported that the seasonal influences do not affect the niaouli chemical content and therefore the essential oil composition is fairly stable all year long.

Camphor oil. *Cinnamomum camphora* (L.) J. Presl, Lauraceae, commonly named ravintsara, was introduced in Madagascar in the middle of the 19th century. It grows in the Hauts-Plateaux (Antananarivo, Antsirabe, Ankazobe) as ornamental trees in public and residential areas. Trees are also found wild growing in the central east (Anjiro, Moramanga) and south (Ambositra, Ambohimasoa). The essential oil from the leaves, with a yield range of 0.7-1.0 percent and the highest yield (1.5 percent) in December-February, contains a high proportion of 1,8 cineole (up to 60 percent) and sabinene (13 percent), while a very low camphor content is unexpectedly observed, in contrast with camphor oils originating from Japan (45 percent yield in camphor) and Taiwan (39 percent yield in camphor). *Cinnamomum camphora* has been erroneously named *Ravintsara aromatica* as a result of a regrettable confusion in vernacular names. Thus, based on the published gas chromatography pattern, reminiscent of that of *C. camphora*, it is likely that the plant investigated in a previous paper under the botanical name *R. aromatica* might be *C. camphora* (Théron *et al.*, 1994). Despite the importance of the demand, large scale export of camphor oil from Madagascar is somewhat hindered by the lack of supply of the raw material. Aware of this problem, some exporting companies have initiated a large scale cultivation of ravintsara, which hopefully will increase export of camphor oil within seven years.

Basil oil. *Ocimum basilicum* L., Lamiaceae, originates from Asia and now grows in several regions of tropical and temperate countries around the world. It is cultivated on a large scale in the north (Ambanja) and also previously in the southwest (Toliara) of Madagascar. Its essential oils have acquired commercial importance. The annual export from Madagascar is estimated at 400-600 kg. One main feature of basil oils is the existence of several chemotypes, depending on the geographic origin. European basil oils are characterized by their equal linalool and methyl chavicol proportions. Basil oils that originate from La Réunion Island, the Comoro Islands, Thailand, and Vietnam are rich in methyl chavicol (80-90 percent). Basil oils from India, Pakistan, Haiti, and Guatemala have higher methyl cinnamate content than the others. Basil oils distilled in Russia and North Africa (Egypt, Morocco) are rich in eugenol. Investigations of the basil oils produced in Madagascar have shown that several samples collected in the period 1979-1982 are fairly homog-

Imported plants now grown for commercial use include ginger, cinnamon, lemongrass, cloves, and black pepper. Photo by John Jonietz for *HerbalGram*.

enous in composition, methyl chavicol (estragole) being the main constituent, 74-87 percent of the essential oil, along with low content in linalool, methyl cinnamate, and eugenol (Randriamiharisoa *et al.*, 1986). These results indicate that the Malagasy basil oils belong to the Reunion chemotype. This relevant information is useful for importing companies who want to order a precise quality basil oil from Madagascar.

Palmarosa oil. *Cymbopogon martinii* (Roxb.) J. F. Watson var. *motia* Bruno, Poaceae, is cultivated in the northern (Nosy Be, Ambanja), western (Mahajanga) and southwestern (Toliara) regions of Madagascar. The Malagasy Palmarosa essential oil (0.13 percent yield) is a pale yellow fluid with a characteristic rose green odor. The annual production is estimated at 500 kg. Investigation of its composition led to the identification of 69 components, of which geraniol was by far the main constituent, as expected (Randriamiharisoa *et al.*, 1987). Although the quality of the Malagasy Palmarosa oils is fairly constant, it is said that, many times in the past, the Malagasy Palmarosa oil exported to the U.S. via Europe was blended with Indian oil and therefore lost its identity (Champon, 1972).

Pepper oils. Native to India and Indonesia, *Piper nigrum* L. Piperaceae, was first cultivated in the Agricultural Station of Ivoloina in 1900, then successfully disseminated in the northwest (Ambanja and Nosy Be) and later on throughout the eastern coastal region of Madagascar (Sambava to Farafangana). The first export of pepper from Madagascar dates back to 1928, with an amount of 60 metric tons. Two quality peppers are available in the market: black pepper and green pepper. Madagascar produces annually 200-300 kg of pepper oil for export. With a density of 580 g/l and characteristic volatile constituents, Malagasy pepper oil is valued in international trade.

Combava oil. *Citrus hystrix* DC., Rutaceae, is a robust plant growing under a wide range of climatic conditions and therefore is found in every part of Madagascar: Tomasina, Antananarivo, Antsirabe, Fianarantsoa, Marovoay, Ambovombe, Nosy Be, Ambanja (Chapot, 1952). It is also currently cultivated in gardens as a domestic tree. Several companies are actively involved in the production of combava leaf oil and combava zest oil. The annual export is estimated at 300-500 kg. In our opinion, the cultivation of combava trees should be further developed in Madagascar.

Lemongrass oil. Originally from India, *Cymbopogon flexuosus* (Nees ex Steudel) J.F. Watson, Poaceae, is cultivated in northwestern Madagascar. While the production of lemongrass oil amounted to 11.7 metric tons in 1925 and 54 metric tons in 1933, the annual production has fluctuated widely since 1970, ranging from as low as 100-300 kg to an average of 7-8 metric tons.

Foraha oil. Foraha is the common name given to *Calophyllum inophyllum* L., Clusiaceae, This plant grows in abundance in the eastern coastal regions of Madagascar. Mature seeds, available only in August-November each year, contain fatty acids that are used as ingredients in shampoo and also medicinal purposes for burns, hernias, atonic wounds, post-surgical wounds, ulcers, skin cracks, and chapped feet and hands. Our institute can produce annually up to 600 kg of foraha oils.

AROMATIC PLANTS OF POTENTIAL ECONOMIC VALUE

Geranium. Geranium species belong to the botanical genus *Pelargonium*. The labelled "Geranium Bourbon," also called Geranium rosat, is reported to be a specific hybrid of *P. capitatum* (L.) L'Her. ex Alt., Geraniaceae, and *P. radens* H. E. Moore, Geraniaceae. Native to the Cap de Bonne Espérance, geranium was first cultivated in Madagascar in the 1920s. It is generally assumed that the samples for such a purpose came from La

Combava, *Citrus hystrix,* by Rumphius, G. E. 1741, Herbarium amboinense. Courtesy of the Missouri Botanical Gardens, St. Louis, MO.

Because of over-exploitation and lack of cultivation, good scraped cinnamom barks are no longer available in Madagascar in great quantity, and alarmingly some collectors supply roots instead of barks.

Réunion Island, following the French policy to maximize the exploitation of natural resources in the colonial countries. In 1925, 800 kg of geranium essential oils produced in Madagascar were exported to France. Probably due to the high quality and quantity of the geranium produced in La Réunion Island, the cultivation of geranium was gradually abandoned in Madagascar. The production of Bourbon geranium has drastically dropped as a result of the impoverishment of the lands and the increase of labor cost. There is, therefore, a growing interest in the production of geranium essential oils in the highlands of Madagascar, which share some ecological features with La Réunion. Large scale cultivation has been successfully achieved in several areas such as Tsiroamandidy, Anjozorobe, Ambatolampy, Moramanga, Ambohimasoa, and Betampona. In 1996, 500 kg of essential oils with similar quality to that of Bourbon geranium were exported, and it is expected that this quantity will increase in the coming years. Careful monitoring of the world market for geranium oil should be performed regularly in order to avoid overproduction in Madagascar, a situation which could lead to a drop in prices.

Patchouli. Native to India, Indonesia, and the Philippines, *Pogostemon patchouli* Pellet. var. suavis Hook.f., Lamiaceae, (syn. *P. cablin* Benth.) was introduced in Madagascar in 1898 and cultivated in the Ivoloina agricultural station. It was then disseminated to Tomasina, Moramanga, Nosy Be, and Ambanja. The Itasy region also produced patchouli oil in the past. In 1925, Madagascar exported 25 kg of patchouli oil. Since 1960, production has decreased gradually as a result of the high concurrence with other producers. Indonesia (90 percent of the world market, of which 32 percent is exported to the U.S.), Malaysia, and India are the main suppliers of the patchouli oil for the world market, while small quantities come from La Reunion, Seychelles, Comoro, Tanzania, Paraguay, former USSR, Singapore, and Brazil. Paradoxically, two exporting companies of essential oils in Madagascar have had to import patchouli oil for their needs in cosmetic manufacturing. However, since many regions of Madagascar fulfill all climatic conditions for the optimal growth of patchouli, cultivation of this plant should be encouraged. Chemical analysis of the patchouli oil produced in Ambanja showed that it possesses all quality requirements for export (Randriamihanta, 1994).

Vetiver. There is now a renewed interest in the cultivation of *Vetiveria zizanoides* (L.) Nash ex Small, Poaceae, various regions of Madagascar: Antalaha, Ambanja, Ambato-Boeni, Moramanga, and Ankazobe. Several exporting companies are involved in the production of vetiver essential oil (1.2 percent yield) and it is expected that the quantity produced will increase.

Radriaka. Radriaka is the local name given to *Lantana camara*, L., Verbenaceae, a very old plant introduced originally from South America. It is an invasive plant in the highlands and in the East coast of Madagascar. There are two varieties: one with blue flowers and another with orange-colored flowers. Aerial parts give a strong odor essential oil with a 0.2 percent yield. This oil has been exported sporadically by several companies in small quantities.

Longoza. Known under the local name "longoza," which is also shared with another Zingiberaceae species, *Aframomum angustifolium*, *Hedychium coronarium* J. Koenig var. *flavescens* Carey ex Roscoe, Zingiberaceae, grows in abundance in humid areas. Relevant data that arose from the preliminary investigation of this plant are the yield range of the essential oil from the rhizomes (0.17-0.7 percent) and the presence of several chemotypes depending on the areas of collecting (Randrianalison, 1995). The rainfall, altitude, and soil composition are claimed to affect longoza essential oil composition and

Cedrelopsis grevei, by Baillon, H. and Drake del Castillo, E., 1886 *Histoire naturelle des plantes*. Courtesy of the Missouri Botanical Gardens, St. Louis, MO.

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yield. In particular, high rainfall favors the presence of monoterpenes such as b-pinene and sabinene (Marozevo and Mandraka regions) whereas high altitude and moderate rainfall increase the proportion of a-terpinene, a-phellandrene and linalool (Ambositra region) or b-caryophyllene and terpinolene (Anjozorobe region). Longoza essential oil has been exported sporadically.

Eucalyptus. Several *Eucalyptus* species are present in Madagascar. Only two of them, *E. citriodora* Hook, Myrtaceae, and, to a lesser extent, *E. globulus*, Labill., Myrtaceae, have attracted attention for their essential oils. However, small quantities have been exported so far, although Madagascar has the potential for a larger production.

Tagete. *Tagetes minuta* L., Asteraceae grows abundantly in the wild in the highlands of Madagascar during the rainy seasons. Large scale cultivation has been achieved in the Ambanja region, and it has also been initiated in the middle south (Betafo) with the aim at increasing the tagete oil production and export. Two companies are actively involved in the export of tagete oil. The main volatile constituents are trans-tagetone (37.4 percent), hydrotagetone (21.5 percent), and ocimene (3.1 percent) (Rakotondramasy, 1994). Tagete oil is used locally as one of the main liquid soap ingredients.

Citrus. In addition to the classical *Citrus* species, *Citrus medica* L. subsp. *bajoum* H. Perrier, Rutaceae, deserves special attention. It was introduced in Madagascar in the 18th century, and since then, it has been well-adapted in the littoral eastern forest from Ambila to Ampanotoamaizina. The leaf essential oil has a specific composition, probably due to ecological factors, and has been recently exported to Germany.

Ginger. *Zingiber officinalis* Roscoe, Zingiberaceae, is cultivated in the highlands and the central eastern regions, mainly in Beforona and surrounding districts. Two varieties exist in Madagascar: one with yellow flesh rhizomes, more suitable for consumer use, and another with blue-gray stringy flesh rhizomes, suitable for essential oil and oleoresin extraction. It is said that because of the nature of the Malagasy ginger, the essential oil yield may be higher than that previously recorded (1.3-3.5 percent).

Alembic for the production of Niaouli in the eastern forest of Madagascar. Photo by Phillipe Rasoanaivo.

Cypress. *Cupressus lusitanicus* Miller, Cupressaceae, is a well-adapted cypress tree in the highlands and the central regions (from Mandraka to Moramanga). It is used mainly as fencing around houses, and in public and private gardens. Essential oils have been sporadically exported to Europe and U.S. Larger cypress oil quantities from cypress could be produced for export according to the demand.

Ocimum. *Ocimum gratissimum* L., Lamiaceae, is another *Ocimum* species growing in the wild in the highlands and the southwestern regions. Essential oil has been sporadically exported in low quantities.

ENDEMIC AND INDIGENOUS AROMATIC PLANTS IN MADAGASCAR

Fifty-five indigenous aromatic plants, 89 percent endemic to Madagascar, have been inventoried so far. However, analysis of the local literature, together with Pascal and Medline databases, shows that only a few of these plants have been exported, or even phytochemically investigated for their essential oil contents.

ESSENTIAL OIL PRODUCTION AND EXPORT FROM ENDEMIC PLANTS

Agathophyllum aromaticum* (Sonnerat) Willd., Lauraceae, *(Ravensara aromatica). The best known endemic aromatic plant is certainly ***A. aromaticum***, commonly named havozo or, to a lesser extent, hazomanitra (aromatic tree) in the Malagasy language. It is a tree of 20-30 meters height growing wild in the evergreen, humid cental eastern rain forests of Madagascar at 700-1000 meters altitude (Ambodinifody, Nosy Be an'Ala, Anjojorobe, Ambatondrazaka); but it is also found sparsely in the coastal eastern forests. It was first described in 1642 by E. de Flacourt as an aromatic tree of great interest for all its plant parts. He reported that the local people, instead of climbing the tree, cut it merely to collect the clove-flavored seeds, which are cooked with ginger and fish to give a highly appreciated dish. Although full botanical characterization of this plant was achieved in 1782 by Sonnerat, it is a matter of regret that much confusion remains regarding its correct botanical

Involving local population in prospecting new sources of aromatic plants (author is second from left). Photo courtesy of Phillipe Rasoanaivo.

name. In 1925 Danguy described a species under the botanical name *R. anisata*, probably because of its aniseed odor. In 1950 Kostermans established the botanical identity of *R. aromatica* and *R. anisata*. Therefore, the botanical name *R. aromatica* Sonnerat has precedence over that of *R. anisata* Danguy then is a synonym of *R. aromatica*. Unfortunately, they are still erroneously described in some publications as two distinct species. What's more, the botanical word ravensara came from the Latinization of the Malagasy word *ravintsara* ("good leaves"), which refers the introduced species *Cinnamomum camphora* Nees, Lauraceae, in the local language, and this is another source of confusion. As noted previously, *C. camphora* is sometimes erroneously named *R. aromatica* since its vernacular name is ravintsara and it is aromatic, while *R. aromatica* is designated as *R. anisata* merely because of its aniseed odor. Additional confusion comes from the word *raventsara* found in some papers. This word is a hybrid between the Malagasy word *Ravintsara* and the botanical genus *Ravensara*, and is completely inaccurate. The major essential oil component of stem barks of *R. aromatica* is estragole (methyl chavicol), amounting to 90 percent (Groebel *et al.*, 1969; Raharivelomanana, 1988), along with some minor constituents. The essential oil composition of the leaves, completely different from that of stem barks, consists of 5.2 percent b-myrcene, 6.1 percent 1,8-cineole, 12.5 percent linalool, and 5.5 percent carotol. Essential oils from the stem barks and leaves have been exported to Europe and the U.S. Based on an odor reminiscent of that of cloves, the fruits are claimed to contain a high percentage of eugenol; but no phytochemical studies have been undertaken to support this assumption.

***Helichrysum bracteiferum* and *H. gymnocephalum*.** Among the Malagasy helichryses, two abundant species, *H. bracteiferum* (DC.) Humbert, Asteraceae, and *H. gymnocephalum* (DC.) Humbert, Asteraceae, have long attracted attention for their essential oils content (Ranaivo, 1932). They are commonly known under the same vernacular name, rambiazina, although they can be distinguished through the size of their leaves: *H. bracteiferum*, with small leaves, is said to be the male *Rambiazina*, while *H. gymnocephalum*, with larger leaves is named the female *Rambiazina*. These two species are resistant to drought and fire and are found in abundance in the central highland and the central eastern hills at 800-1000 m altitude. Leaves of both species have similar and complex essential oils composition with low yield (0.12 percent), from which 1,8-cineole has been identified as the major component in samples analyzed so far; but the presence and the yield of other constituents vary from one sample to another (Bouchet *et al.*, 1991; DeMedicis *et al.*, 1992). Our ongoing investigation shows that essential oils originating from the central highlands (Antananarivo region) and the central eastern (Mangoro region) share comparable qualitative gas chromatography patterns regardless of the season of collecting, but interestingly our results differ from previous published results in the yield of some relevant constituents, i.e., b-caryophyllene and a-terpineol. Further investigation is needed to determine *Rambiazina* chemotypes. The essential oils of *Rambiazina* are valued by exporting companies and therefore have been exported to Europe and the U.S. However, recent information has revealed that the Malagasy helichrysum oils do not meet the required quality as do those of European origin.

***Vepris madagascarica*.** Several aromatic species have been reported in the Rutaceae family in Madagascar. Among endemic aromatic species, only one, *Vepris madagascarica* (Baillon) H. Perrier, Rutaceae, attracted much attention in the past for its content of essential oils, which were exported to the Far East for use in toothpastes. Known under the vernacular names manitranzety and anzety, in reference to the aniseed odor of the plant, this species, of 2-10 m height, grows in the littoral humid forests. It also shares the same vernacular name tolongoala with several aromatic plants, namely *V. pilosa* (Baker) I. Verd., *Croton anisatum* Baill., Euphorviaceae, *Dicoryphe noronhae* Tul., Hamameliadaceae, *Boutonia cuspidata DC. (DC.) (Periblema cuspidatum)*, and *Citrus medica* subsp. *bajoum* H Perrier, Rutaceae. In the Malagasy language, it is common to find one vernacular name for several plants that share common features, e.g., flavor, morphological characteristics, and pharmacological properties. This is often a source of confusion in the correct botanical identification of these plants. Phytochemical investigation of the essential oils from aerial parts of *V. Madagascarica* showed that the main constituents include a-pinene, p-cymene, eugenol, methyleugenol, and estragole (Billet & Favre-Bonvin 1973). Interestingly, our ongoing work has shown that essential oils from the fruits have a particular composition, including 30 percent estragole, 31 percent cis-anethole, and 33 percent trans-anethole as major constituents. Regarding the commercial aspect, export of the *V. madagascarica* essential oils has gradually decreased, although sporadic exports have been recently reported. It is the opinion of the

continued on page 58

Top: Member of Masai tribe, photo by Steve Morris, N.D.; above: Lake Elmenteita, photo by Dan Wagner; right: although this zebra appears to be eating **Gotu kola,** it is actually drinking from the lake at Ngorongoro Crater, Tanzania, photo by Joan Weingardt, Ph.D.

Pharmacy on Safari

African

INSTRUCTORS

James A. Duke, Ph.D., a regular instructor for ABC/TPF/IE Pharmacy Workshops, and Masai medicine man identifing **Pygeum**, *Prunus africanum*, in the field, photo by Joan Weingardt, Ph.D.

Dominic Nguguna, Herbalist and Instructor. Photo by Mark Blumenthal.

STUDENTS

Jack Klee tasting the bark of **Pygeum,** *Prunus africanum*. Photo by Cindy Klee.

Mary Marquis above and Matthew Di Pasquale, left. Photos by Mark Blumenthal.

Beneath the limitless blue skies of the African savannah lives an explosive population of wildlife, staggering in its numbers and diversity. Equally diverse grasslands supply both humans and animals with resources of food and medicine. In June 1997, "Pharmacy on Safari" visited the Great Rift Valley to explore the evolutionary interrelationships of animals, plants, and humans in this "cradle of civilization." Amidst a manifold array of East African habitats in Kenya and Tanzania, a series of workshops was led by Dr. James Duke and Mark Blumenthal, with field excursions conducted by local healers and naturalists.

Camp Delamere sits on the shore of Lake Elmenteita in the beautiful Soysambu Wildlife Sanctuary, deep within the Great Rift Valley of Kenya, famous for its ornithological variety and splendor. A continual murmer of squawking, grumbling, and growling rises from the landscape. Here among the acacia woodlands, euphorbia forests, and savannah grasslands, workshops were conducted on the geology and evolution of the Great Rift Valley, on the bush medicine of the Ndorobo hunter-gatherers, and on African birds. A sidetrip to nearby Lake Nukuru National Park, known as the "ornithologist's Serengeti," provided ample opportunity en route to view other spectacular African wildlife.

The Lewa Wildlife Conservancy, a 170-square-mile ecosystem in the northern foothills of Mount Kenya, encompasses habitats including thick bushland, dry savannah, wooded gorges, and the last vestige of indigenous montane forest in the region. An astonishing assortment of plant and animal species exist here. Field workshops included savannah ecology and vegetation, forest medicinals of

SOUTH AFRICAN

From *Medicinal Plants of South Africa* by Ben-Erik van Wyk, Bosch van Oudtshoorn, and Nigel Gericke. Photos in this excerpt by Nigel Gericke.

uzara (German, English), **ishongwe** (Zulu), **bitterwortel** (Afrikaans) *Xysmalobium undulatum*. One of the most important medicinal plants of South Africa. The roots have been used since early times as a remedy for diarrhea and colic.

brandblare, katjiedrieblaar (Afrikaans), *Knowltonia vesicatoria*. The fresh leaves are an old Cape remedy for lumbago and rheumatism.

Workshops

the Kikuyu, and bush medicine at the Sumburu Clinic, a rural health facility near Lewa.

The pastoral Masai moved into the fertile savannahs of the Great Rift Valley and surrounding uplands over a thousand years ago. The Masai Mara game preserve extends from Kenya into Tanzania, and the grasslands here are noted for their abundance of big game. An introduction to Masai culture and traditions and an interpretative walk on the Masai Medicine Trail gave insight into the healing traditions and medicinal plant uses of this tribe.

In Nairobi, "Pharmacy on Safari" visited the Nairobi Hospital Pharmacy, the Bugoma Women's Programme Kenya Project—Agroforestry and the Preservation of Medicinal Trees, and the African Medical and Research Foundation's (AMREF) headquarters. AMREF distributes medical supplies to rural areas and airlifts emergency and ill patients from these rural locations to hospitals in Nairobi and other urban areas for conventional medical care.

Pharmacy on Safari was co-sponsored by the American Botanical Council, Texas Pharmacy Foundation, and International Expeditions. — *Dawnelle Malone*

THANK YOU, PHOTOGRAPHERS

ABC would like to thank all the Pharmacy on Safari participants for attending the 1997 workshops. *HerbalGram* would like to thank all participants who submitted photos for our Pharmacy on Safari photo contest. The images we liked best can be seen in this special review section.

For information on upcoming Pharmacy expeditions, please see page 10 or 46 of this issue or page 29 of the Herbal Education Catalog in the center of this issue.

INSTRUCTORS

Adenath Amwega, Ph.D., Geography Instructor. Photo by Mark Blumenthal.

Above: Paul Kabochi, Botanist Instructor, discussing **senna**, *Cassia didymobotrya*, noted for its laxative properties. Paul planted most of the medicinal plants at the Camp Delamere where this lecture was given.
Right: Domenic Nyuguna showing the students *Spilanthes mauritiana*, used for toothaches. Taken on the hike up the mountain trail at Lewa Downs. Photos by Constance Nozzolillo, Ph.D.

MEDICINAL PLANTS

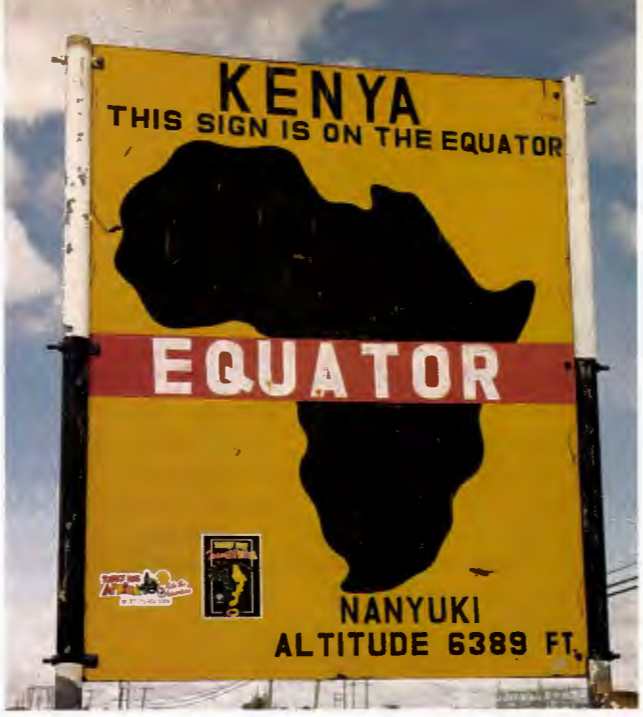
For a complete book review, see page 69 of this issue.
To purchase this book, see the Herbal Education Catalog in the center of this issue, or page 46.

aambeibossie, bitterbossie (Afrikaans), **Christmas berry**, *Chironia baccifera*. A decoction of the whole plant is taken as a blood purifier. Its purgative use, especially for hemorrhoids, is widely known.

isidakwa (Zulu), **wild yam**, **wildejam** (Afrikaans) *Dioscorea dregeana*. The tuber is used topically for scabies; made into a lotion for cuts and sores; and is a remedy for hysteria, convulsions, and epilepsy.

Paul Kabochi with one of the many **prickly pear**, *Opuntia* spp. An example of an introduced plant that is now valued locally. Photo by Mark Blumenthal.

The Environment



Top left: Colorful boats used along the coast; top right: the landmark designating the mid-line of the earth; center left: aerial view of a typical Masai village; center right: African/Masai landscape; above: Impala. photos by Mark Blumenthal.

SOUTH AFRICAN

duiwelsklou (Afrikaans), **devil's claw**, *Harpagophytum procumbens.* characteristic fruit. Roots are used to treat rheumatism and arthritis.

muvevha (Venda), **umfongothi** (Zulu), **sausage tree**, *Kigelia africana*. Parts as they are sold for medicinal use. Dried fruit is used as dressing for ulcers, sores, syphilis, and applied locally for rheumatism.

MEDICINAL PLANTS

umganu (Zulu), **morula** (Northern Sotho), **Marula** (English), **maroela** (Afrikaans), *Sclerocarya birrea*. In South Africa, the bark is used to treat diarrhea, dysentery and stomach problems. Elsewhere in Africa, the main use is in treatment of diabetes.

dawidjiewortel (Afrikaans), *Cissampelos capensis*, rhizome–the traditional product, taken as a blood purifier, for boils, syphilis, bladder ailments, diarrhea, colic and cholera.

Top: Lake Elmenteita as seen from Camp Delamere, photo by Joan Weingardt, Ph.D.; center left: the stately cheetah at the Masai Mara, photo by Constance Nozzolillo, Ph.D.; above right: a group of grey shrikes at the Masai Mara, photo by Constance Nozzolillo, Ph.D.

Right: Two Masai herdsmen/elders at the village the workshop participants visited, photo by Constance Nozzolillo, Ph.D.; far right: an experienced Cape "bossiedoktor" holding a sample of **dawidjiewortel**, *Cissampelos capensis*, photo by Nigel Gericke; left: what trip to Africa would be complete without sight of a beautiful lion! photo by Joan Weingardt Ph.D.

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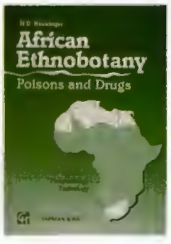
African books available from ABC's Herbal Education Catalog

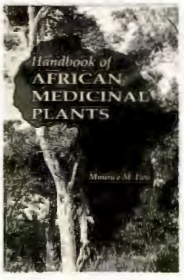
MEDICINAL PLANTS OF SOUTH AFRICA
by B. Van Wyk, B. Van Oudtshoorn, and N. Gericke. 1997. 132 medicinal plants; over 500 photographs of plants, plant parts used and products; introductory chapters on cultural aspects of healing, methods of collection and storage, methods of preparation and administration; plant list according to ailments; 132 geographical distribution maps; and comprehensive references for further reading. Hardcover, 104 pp. $75. #B314

MEDICINAL PLANTS OF WEST AFRICA
by Edward Ayensu. 1978. 187 plants that occur in West Africa, their uses, local names, and standard scientific binomials. Bibliography, glossary of medical terms, medical and botanical indexes. 127 illus. Hardcover. 330 pp. $39.95 #B094



AFRICAN ETHNOBOTANY: POISONS AND DRUGS
by H. D. Neuwinger. 1994. Comprehensively reviews the chemical composition, pharmacology and toxicology of more than 240 plants. Covers botany, vernacular names, hunting poison, traditional medicine, chemistry, pharmacology/toxicology, and literature. Hardcover, 941 pp. $229.95. #B325 (See review on page 68 of this issue.)

HANDBOOK OF AFRICAN MEDICINAL PLANTS
by Maurice M. Iwu. 1990. Reference text on ethnobotany, chemical constituents, and probable therapeutic application of African medicinal plants. Hardcover, 435 pp. $129. #B025



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

MEDICINAL PLANTS OF NORTH AFRICA
by Loutfy Boulos. 1983. Authoritative, systematic, and wide-ranging work, illustrated with 103 line drawings. Over 500 species. Medical, common name, and botanical indexes. Hardcover, 286 pp. $39.95. #B125

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Sustainable Botanical Agriculture in Africa

Top: Small farming village in Mali. Bottom left: Winnowing hibiscus in the wind, Sudan. Bottom right: McCaleb demonstrates the seed removal tool.

Photos by Rob McCaleb

One of the goals of the Herb Research Foundation is to help preserve traditional herbal medicine use as a source of affordable health care. In many cases, dwindling native plant populations and expanding human populations threaten both as medicinal herbs become more scarce in the wild. One of the best solutions is cultivation to produce sustainable medicinal plant resources. Beyond growing herbs for herbal self-care at home, however, herbs can be an important source of income to impoverished farmers throughout the world. The Herb Research Foundation is working to help African farmers to grow profitable herb crops for local and international markets. The project, sponsored by the US Agency for International Development (USAID), helps encourage sustainable production of botanicals, which can lower health care costs and provide much needed income to local populations. Over the past eight years, HRF has worked in Senegal, Uganda, Zambia, Morocco, and Mali. Currently, HRF is working in South Africa and Ghana on projects to bring botanical agriculture and value-added botanical products to a state of economic viability for the local populations.

One project of particular interest is a wonderful success story in local and international cooperation in Mali, West Africa, one of the world's most impoverished countries. The project resulted in the establishment of a Niger River Valley hibiscus growing cooperative and provided training and income for more than 1,000 people who were able to improve cultivation and processing methods to meet strict international standards for quality and cleanliness of the hibiscus crop *Hibiscus sabdariffa*.

This USAID-sponsored hibiscus project was a collaborative effort between Ronco Consulting, a USAID contractor, the Herb Research Foundation, and the Malian Office du Haute Vallee du Niger (OHVN). The project was designed to develop sustainable herb agriculture for domestic, regional, and international use. In 1995, after initial assessments were made regarding what botanical crops might be grown, harvested, and exported successfully in Mali, test crops of hibiscus, echinacea, and milk thistle were planted from superior seed supplied by HRF. One of the most important considerations in botanical agribusiness plans is cost of freight. The fact that Mali is a landlocked country substantially increases freight costs, so botanical products that have value added on-site, or dense, high value crops are the most viable. Hibiscus is fairly dense and although it is not an extremely lucrative crop, it thrives in the hot African sun and offers opportunities for success. Hibiscus was the herb of choice because of ease of growing, light weight, market potential (it is one of the most popular tea ingredients), value with minimal investment.

The project's goals included training Malian farmers to produce high quality crops, from planting through harvest and preparation for market. One key innovation was the introduction of a simple hand tool used to remove the seed pod from the hibiscus fruits. This increased the efficiency of seed pod removal, making it up to five times faster than traditional methods, dramatically increasing the economics of the crop for the farmer. The project also trained farmers in improved quality management techniques that raised the crop's value, so that the finished crop was a very clean, high quality product.

The project produced 12 tons of hibiscus—well over the expected seven to eight tons. Two hundred eighty local farmers and their families in the Sirakorola area participated in the production of the crop. The "depodding" tool, which is widely used in Thailand and China, was provided to each farmer, and speeded up the processing of the calyces (hibiscus flowers) as well as equalizing the work load between women and men. Traditionally men cut the hibiscus plants down and women remove the seed pods, a process which formerly took much more time than cutting the plants. Now, men both cut the plants down and remove flowers from the stems and women, using the tool, can prepare them for drying as fast as they can be harvested.

The seed pods are dried separately and the farmers produced more than enough seed to double production for the next season. Because of the quality of hibiscus produced, local traders quickly purchased most of the crop, leaving little for the export market. The project was considered a success in providing good income to local farmers, and production will increase as long as the local and export demand continues to grow. It is possible that because of high freight costs in Mali the domestic market may always be better for farmers than export. This is the case in Mexico as well, once a major hibiscus exporter until local prices began to exceed the price exporters could pay.

The success of the Mali hibiscus project has surpassed expectations on many levels. HRF's goal was to help the farmer and improve the quality of the end product. The seed removal tool HRF introduced is

traditionally made in Thailand of metal, but this can impart a metallic taste to the acidic hibiscus flowers, and requires a machine shop or at least tubing cutters and files to make. The Mali project substituted plastic water pipe, which is inert to the hibiscus acids and can be fabricated with only a pocket knife.

Other experimental crops in Mali included *Echinacea purpurea* and milk thistle (*Silybum marianum*). Milk thistle in particular may have special significance for Mali. There is a high rate of liver disease in this developing nation, and thus a compelling need for the preventive and therapeutic benefits of milk thistle seed. In addition, edible seeds (including hibiscus seed) are commonly ground and added to food in Mali. Since the traditional dose of milk thistle seed is only 12 to 15 grams, effective doses could be easily incorporated into food. Its widespread use as a food could greatly contribute to improved liver health in Mali and perhaps throughout the developing world.

SOUTH AFRICAN BOTANICAL PROJECT UNDERWAY

Based on the remarkable success of HRF's Malian hibiscus-growing project, the planning process has begun for a similar venture in South Africa. The explosive growth in the worldwide botanicals market, coupled with the changing political atmosphere and favorable growing conditions in South Africa, lay the groundwork for a cultivation project that promises to benefit the people and economies of both South Africa and the United States. Three main challenges exist in South Africa: to help protect wild plant populations through cultivation of over-collected species used in traditional medicine, to foster regional production and distribution of traditional herbal remedies, and to develop cash crops for low-income farmers. HRF's goal is to work with disadvantaged farmers on growing projects that will generate income from herbal cash crops as well as provide improved access to low-cost botanical medicine.

HRF, USAID, and the Agricultural Research Council of the South African Ministry of Agriculture have teamed up to develop agribusiness opportunities in South Africa for crops with established markets. At present, there is little or no cultivation of medicinal herbs in South Africa. HRF identified the Northern Cape as an initial area to research potential crops for export, and this year will be planting some test crops. Trials will begin in September, at the start of the growing season in South Africa.

Sustainable herb cultivation offers small farmers in South Africa the opportunity to create a profitable niche for themselves in a highly competitive market. Small farmers are currently at a disadvantage, as they lack the resources to compete in the well-established fruit, flower, and vegetable markets now dominated by large producers. Sustainable herb cultivation offers the potential to bolster local rural economies and improve quality of life for thousands of disadvantaged families. Because of its location in the southern hemisphere, South Africa also has the opportunity to become one of the few producers of off-season herbal raw materials, which would be available at a time when world market prices are at their peak.

An additional project goal is to protect and preserve native South African plants and the traditional healing system of South Africa by identifying and cultivating regional medical plants now endangered by overcollection. Currently, at least 60 percent of the South African population relies exclusively on traditional plant-based medicine for primary health care. Almost all of these plant medicines are gathered from the wild. Now, displaced rural people, who are emigrating to urban areas such as Cape Town and Johannesburg, no longer have access to the traditional folk medicines which have formed much of the basis of their self-care.

At the same time, the increasing demand for wild South African medicinal plants for export and domestic use has created great environmental pressure on local plant populations. This situation has forced the closing of some areas to collection, further increasing the pressure on other areas. Exhaustion of botanical resources presents a threat not only to the environmental well-being and biodiversity of South Africa, but could virtually eliminate the traditional medicinal system on which such a large part of the population depends. Identification and cultivation of threatened plants will reduce demand on wild populations and help preserve the South African traditional healing system by ensuring a continued supply of native medicinal botanicals.

Cooperative herb growing projects such as these improve lives—by boosting the local economy through earth-friendly, sustainable agriculture, by providing the community with better low-cost health care, and by providing the world market with high quality, organic botanicals.
— *Rob McCaleb*

Far left: Hibiscus drying on nylon sheets. Left: Seed pod removal from fresh hibiscus. Lower left: Malian hibiscus field. Lower right: Egyptian calendula field.

Passing Problems: Prostate and Prunus

African Team Works to Maintain Sustainable Supply of Pygeum Bark

A.J. Simons, I.K. Dawson, B. Duguma, and Z. Tchoundjeu

International Centre for Research in Agroforestry, Nairobi, Kenya

Enlargement of the prostate, technically known as Benign Prostatic Hyperplasia (BPH), affects most men over the age of 50 and manifests itself as an increased frequency of urination, inability to empty the bladder, pain in passing urine and post urinary dribbling (Garnick, 1994). While BPH and prostate cancer are two separate afflictions (BPH being a non-malignant enlargement of the prostate), their underlying causes share similarities. The culprit is believed to be an extremely active form of testosterone (dihydroxytestosterone, DHT) that is produced from testosterone by the enzyme 5-alpha-reductase (Flamm et al., *1979).*

Tony Simons holds a piece of pygeum bark.
Photo by Mark Blumenthal.

The urologist's arsenal to treat BPH includes drug, surgical, and herbal options. Notwithstanding their side effects (nausea, fatigue), drugs such as finasteride (Proscar®) that inhibit 5-alpha-reductase are often a first-line defense in the early stages of BPH. Prostate surgery sounds drastic but, despite some serious side effects (impotence, urinary incontinence), is routinely performed to remove the part of the gland that is impinging on the urethra. Reassuringly for most men, the historic cure of castration to control BPH has been abandoned. For many, the oldest and perhaps most effective remedies are the natural alternatives of herbal medicines. Among these, three plants are regularly used in European phytotherapy either singularly or in combination. They are nettle root (*Urtica urens*), saw palmetto berry (*Serenoa repens*) and pygeum bark (*Prunus africana*). Interestingly, they hail from three different continents (Eurasia, North America, and Africa, respectively) and three unrelated families (Urticaceae, Arecaceae and Rosaceae, respectively). *P. africana*, and the issue of its sustainable production to meet increased demand, is the focus of this article.

HARVEST

Prunus africana (Hook. f) Kalkman (aka *Pygeum africanum* Hook.) is a montane forest species occurring naturally from Ethiopia in the north, down to South Africa, as far west as Nigeria and as far east as Madagascar (Cunningham and Mbenkum, 1993). It is an evergreen, mid-to-late successional species that can attain a height of 45 m. It is found only above 1000 m altitude and hence is confined to isolated populations that form a wide but disjunct distribution. Among the 200-plus species in the genus *Prunus*, it is the only one native to Africa. European interest in the species began as early as the 1700s when medicine men from Natal tribes in South Africa related to early settlers the palliative effect of pygeum bark on bladder pains. Similarly, Bakweri peoples on the slopes of Mount Cameroon revealed to colonists that they had used the bark of *Prunus* to treat "old man's disease" for centuries (Mbai, 1998). Despite the clearly African-derived indigenous knowledge it was a French entrepreneur, Dr. Jacques Debat, who lodged the first patent for pygeum bark extract in 1966 (Cunningham and Mbenkum, 1993). Today it is no longer one of nature's secrets, with thousands of Internet addresses advertising its merits.

When people first started to collect bark of the species they did so in a sustainable way. Small pieces or panels of bark were removed and the standing trees could easily regenerate the removed portion (Eben-Ebai *et al.*, 1992). PlanteCam-MediCam (a company that evolved from Laboratoire Debat) and others have made a real effort in Cameroon to train bark collectors to ensure sustainable bark collection. The recommended procedure is to remove bark from opposite quarters of the trunk from about 35cm above ground level to the height of the first branch. After seven to eight years, the bark regrows to allow the alternate quarters to be removed. This provides a mean bark yield of 55 kg per tree with a range from 38-74 kg (Macleod, 1987). Such practices, however, were destined to be replaced as larger and larger quantities were sought and when recently licensed entrepreneurs entered the picture (Sunderland and Nkefor, 1997). In an unpublished report from Mount Oku, Mbenkum and Fisiy record the presence of 8,000 dead but standing trees, while at Mount Kilim it was observed that 80 percent of mature trees die as a result of poor harvesting techniques.

In the past 10 years, the annual harvest of *P. africana* bark has risen to approximately 3,500 tons, of which the majority comes from Cameroon (2,000 tons) and Madagascar (600 tons) (Dawson, 1997). The rise in the annual quantities harvested has been most marked in Cameroon where according to official figures only 200 tons were harvested in 1980 but by 1991 this had peaked at 3,100 tons (Cunningham and Mbenkum, 1993). Most worrying is that a large proportion of this comes from destructive harvesting of the entire bark of a tree through felling (Mbai, 1998). The remaining fragmented populations of *P. africana* are at best under threat of genetic erosion and at worst liable to extinction (Walter and Rakotonorina, 1995).

REGULATION

Such is the concern for its survival that trade in the bark of *P. africana* has been added to Appendix II of the Convention in Trade in Endangered Species (CITES)—trade in both wild and captive bred/artificially propagated specimens is allowed but subject only to licensing.

Laws are one thing and enforcing them is another. In one month alone (July 1996) on Mount Cameroon, a dedicated but under-resourced Provincial Delegation of the Environment and Forestry seized 100 tons of illegally collected bark (Mbai, 1998). Ndibi and Kay (1997) provide a comprehensive review of the regulatory policies and their effectiveness in Cameroon. According to these authors, anomalies exist which have hastened the exploitation of the species. For instance, export licenses were given to operators who did not have exploitation permits, and who subsequently carried out large-scale illegal harvesting on Mount Cameroon. This encourages destructive harvesting by engendering the attitude in others that "well if I don't cut the tree down and only strip bark it then I won't be able to come back again in seven years because someone else will have cut the tree down." These attitudes are hard to reverse although one successful participatory initiative by the Mount Cameroon Project (MCP), based at Limbe Botanic Garden, involves the custodians of the resource, namely the local communities (Glyn Davies, MCP, Limbe, Cameroon).

Pygeum trees at International Centre for Research in Agroforestry in Nairobi, Kenya. Photo by Mark Blumenthal.

CHEMISTRY AND PHARMACOLOGY

What is the magic of pygeum bark that has led to its near extinction? From chemical and pharmacological studies the efficacy of pygeum is believed to be a synergistic effect of a cocktail of a number of known and unknown compounds (Legramandi *et al.*, 1984; Waterman, 1994; Bassi *et al.*, 1987). On the list of knowns are: (1) phytosterols (e.g. beta-sitosterol), which have anti-inflammatory effects by interfering with the accumulation of pro-inflammatory prostaglandins in the prostate; (2) pentacyclic triterpenes (ursolic and oleanic acids), which have an anti-edema or decongesting action; and (3) ferulic esters (n-docosanol and tetracosanol), which reduce prolactin levels and block accumulation of cholesterol in the prostate (significant because prolactin increases uptake of testosterone by the prostate and cholesterol increases binding sites for DHT) (Murray, 1995). Lipophilic extracts from dry, powdered bark are obtained through chloroform extraction and standardized to 12-13 percent total sterols (as beta-sitosterol).

MARKET DEMAND

There is no doubt that the market for herbal treatments for urological and prostatic problems is lucrative. In 1994, German men spent US $150 million for this purpose alone with a large proportion of this being *P. africana*-based products (Gruenwald and Buttle, 1996). In the U.S., where *P. africana* use is more limited, a survey of Health Food Stores revealed that saw palmetto accounts for 4.4 percent of all sales of herbal products (Brevoort, 1996). The OTC trade in *Prunus* remedies is currently estimated at US $220 million annually. (Cunningham *et al.*, 1997).

With a rising incidence of prostate problems, an aging population, and growing confidence in natural medicines, some companies believe the market for *Prunus* remedies could double or triple in the coming decade. Assuming this demand profile is accurate, from where will future stocks of *Prunus* be supplied? All of the bark currently harvested comes from wild populations although many observers consider production to have peaked in Cameroon and Madagascar. While moderately sized natural stands still exist in Democratic Republic of Congo, Kenya, and Uganda, these could easily be exhausted within 5-10 years. Cultivation appears to be the only long-term solution.

CULTIVATION

The earliest recorded attempt at cultivation is a 0.4 hectare block established at Ngong in Kenya in 1913 (Forest Department Inventory, Kenya). Interestingly, this trial plantation as well as 64 others established in Kenya during the period 1914 to 1992 (total 628 hectares) were planted for timber production and not bark extraction. *Prunus africana* produces a high-value, quality hardwood (specific gravity 0.75) exported for veneers and paneling (Brown, 1978). Farmers also value it for axe handles, agricultural implements, and construction because of its durable nature (Simons, 1996). Reliable timber trade figures for *Prunus* are scarce. In Kenya, Leakey (1995) reports a nine-fold increase in timber production (mostly from wild stands) during the decade leading up to 1993 to reach a volume of 170,000 m3 (cubic meters; timber is measured by volume not weight).

The suitability for *Prunus africana* to be grown in plantations in East Africa was not matched in Cameroon experiences. This can largely be attributed to the low altitude at which it was planted, where a wood boring beetle larvae (Cerambycidae) attacked 87 percent of trees (Cunningham, 1995) in contrast to the 9 percent of trees attacked at higher altitudes (2,300 m). The real tree-planting surge in Cameroon, however, is happening on farms. Cunningham (1995) estimates that about 3,250 small-scale farmers in Cameroon are planting seedlings of *P. africana*. A serious constraint faced in the expansion of on-farm tree planting is seed availability. Here a key difficulty is the recalcitrant nature of seed. Further, although a large tree can produce up to 20 kg of seed (5,000 seeds per kg), this fluctuates widely between years. The seed shortage is likely to be exacerbated in future years as sizes of natural populations of trees diminish. Since the approximate time to the first flowering and fruiting is 15-20 years, establishing reliable seed sources is an urgent priority.

Raising awareness about the need for seed provision and other activities as part of a wider domestication effort has been a long but fruitful process for the WWF/UNESCO/Kew People and Plants Initiative. In this regard, most credit should be accorded to Alan Hamilton and Tony Cunningham. For a medicinal species that involves impoverished farmers, deteriorating rainforests, international regulation and big business, it would be unusual if there were not conflicts. Certainly mutual suspicion of private sector companies

between conservation, research, NGO, and policy groups is evident. On the brighter side, companies are appreciating the need to be more ethically and environmentally minded. The attendance by industrial representatives (e.g. Jean-Francois Colas, Industrial Director, Groupe Fournier) at a recent workshop in Nairobi (March 1997) demonstrates a positive and changing philosophy. From the industrial point of view, the *Prunus* market is mainly about economies of scale, profitability, pseudo-monopolistic control and the sustainability of the supply of raw material. Price paid to bark collectors is likely a lower priority but one that will need greater attention as more material is sourced from farm sources. The prospect for farmer interest groups to collectively market their produce, perhaps with a "green label," may result in greater returns to rural communities.

MARKET VALUE

What one considers as equitable returns to the various actors involved in the product marketing chain (i.e., those with tree tenure rights, harvesters, transporters, middlemen, processors, exporters, governments where bark originated, and pharmaceutical companies) will depend on one's perspective. Little reliable data are available on margins and mark-ups. The crudest calculation of worth is to divide the annual OTC figure (US $220 million) by the yearly harvest (3,500 tons), which gives a value of US $63 per kg of bark. It is easy to point the accusing finger at the most obvious actors, the pharmaceutical companies, but this tendency has led to their reluctance to get involved in open forums. In this regard, PlanteCam deserve praise for venturing out into the foray of criticism (fair and unfair) against them.

Obviously, bark harvesters cannot expect to get US $63 per kilo. In addition, however low the current price they receive, it is still a strong incentive to continue in this activity. Dawson (1997) reports from Madagascar that villagers residing at forest margins receive US $0.20 per kilo for delivered bark. In Cameroon, in 1997, licensed harvesters were paid 170 CFA (US $0.35) per kilo at the PlanteCam factory gate (Gerard Del Vechio, General Manager, PlanteCam). PlanteCam stresses, however, that the buying price does not represent the sole investment in villagers on Mount Cameroon by the company since they have been involved in training bark harvesters, providing seedlings, and community development projects. In Kenya in 1997, bark was typically bought from an entire tree on site (personal communication; Jonathan Leakey, sole exporter in Kenya to Groupe Fournier). A tree with 100 kg of bark fetches about 2,500 Kenya Shillings (US $40), equal to about US $0.40 per kilo. After adding the costs for reconnaissance, transportation, administration, obtaining CITES permits and containerization, Leakey maintains a profit is made on the price (US $2 per kg) he sells to Groupe Fournier, but it is not exorbitant.

COMMERCIAL

One kilo of bark produces approximately 5 g of dried extract. Tadenan and other products with a similar concentration of extract (50 mg per capsule) sell for between US $0.30 and US $0.80 per capsule. One can derive 100 capsules (50 days' worth of treatment) from a kilogram of bark. The most expensive product found during a cursory search of the Internet was from Life Health Inc (Ohio, USA). This might be expected given their more expensive processing to a liquid extract (steeped in distilled water and grain alcohol for two to six weeks, cold-pressed and filtered). In this product, 28 g of bark (presumably containing an equivalent of 140 mg of powdered extract on three capsules) cost US $5.50. It was revealed during another Internet search that one company (Sequential Healing Health Services, North Carolina, USA) no longer sold *Prunus* extract with the explanation "because of the severely endangered status of the pygeum tree, tablets are no longer carried."

CONSERVATION EFFORTS

As for the conservation of the species it is clear for *Prunus* that it will not become extinct. However, total loss, or at best genetic erosion, of specific populations has already occurred. It is likely that useful genetic variation has been lost with these local extinctions due to the pronounced intra-specific variation in the species as revealed by DNA-based molecular markers (Barker *et al.*, 1994; Dawson and Powell, in press). Clearly, the top priority for domestication of *P. africana* is collection of germ plasm from extant stands. The International Centre for Research in Agroforestry (ICRAF) together with its national partners (Kenya Forest Research Institute—KEFRI; Institut de Recherche Agronomique et Development—IRAD) has, with modest funding from UNESCO, carried out germ plasm collections in Kenya (2 populations) and Cameroon (3 populations). These have been planted out in large blocks to serve as conservation stands, comparative trials, seed orchard and selection gardens for sexual or vegetative propagation. They have also been planted in farmers' fields as part of a participatory domestication effort. The traits for improvement in the species logically center around yield (quality, amount, timing, etc.). These traits are in urgent need of assessment to determine the genetic control and expected gains from selection.

Palevitch (1988) questioned the scope for genetic improvement of secondary metabolite yield in medicinal plants, citing low heritability due to strong environmental influences. This conflicts with a report by Ohlendorf (1996) who described the process of domesticating a medicinal tree species (*Duboisia*) which until the late 1950s was largely collected from the wild. In this instance, a large pharmaceutical company (Boehringer Ingelheim) took the bold decision to support silvicultural and tree improvement research, which has resulted in enhanced alkaloid content (scopolamine, hyoscyamine), ease of vegetative propagation, elevated alkaloid yield and increased hardiness. In *Prunus*, environmental influences (temperature, light, altitude, soil) will partly determine the potency of the bark but genetic differences are also likely. For example, PlanteCam researchers are able to distinguish bark from the northern and southern slopes of Mount Cameroon (personal communication; G. Del Vechio, General Manager, PlanteCam, Cameroon). One source has high docanosol levels and low beta-sitosterol levels, and the other the reverse.

What may be biologically possible in terms of genetic improvement (e.g., clonal development through vegetative propagation with rooted cuttings) may not be economically profitable for farmers or industry. Economic and marketing analyses are urgently required to back up the enthusiasm being generated about *Prunus* domestication. The fact that *Prunus* appears to perform better under an inter-cropped situation than in plantations (Bahiru Duguma, IRAD/ICRAF Project, Cameroon, personal observation) is encouraging for rural development, and it is here that greatest efforts should be focused with a need for extension materials. Declining natural populations and concerns over local extinctions may be a passing problem with *P. africana* if continued collaborative efforts result in policy reforms and greater on-farm cultivation. ❑

REFERENCES

Barker N, Cunningham AB, Morrow C, Harley EH. A preliminary investigation into the use of RAPD to assess the genetic diversity of a threatened African tree species: *Prunus africana*. In: Huntley B, editor. *Botanical diversity in southern Africa*. Pretoria, South Africa: NBI; 1994. p. 221-230.

Bassi P, *et al*. Standardised *Pygeum africanum* extract in the treatment of benign prostatic hypertrophy. *Minerva Urol Nefrol*. 1987; 39: 45-50.

Brevoort P. The US botanical market. *HerbalGram*. 1996; 36: 49-57.

Brown WH. Timbers of the World. Africa Timber Research and Development Association; 1978.

Cunningham AB. An economic evaluation of *Prunus africana* cultivation for medicinal bark: a case study from Cameroon. WWF/UNESCO/Kew People and Plants Initiative, unpublished trip report; 1995 April 3-26.

Cunningham AB, Mbenkum FT. Sustainability of harvesting *Prunus africana* bark in Cameroon. A medicinal plant in international trade. People and Plants Working Paper 2. Paris: UNESCO; 1993.

Cunningham M, Cunningham AB, Schippmann U. *Trade in* Prunus africana *and the implementation of CITES*. German Federal Agency for Nature Conservation, Bonn, Germany. 52 pp. 1997.

Dawson IK. *Prunus africana*: how agroforestry can help save an endangered medicinal tree. *Agroforestry Today*. 1997; 9(2): 15-17.

Dawson IK, Powell W. Genetic variation in the afromontane tree *Prunus africana*, an endangered medicinal species. *Mol Ecol*. In press.

Del Vechio, G. Personal communication. June 1998.

Duguma, B. Personal communication. June 1998.

Eben-Ebai S, Ewusi B, Asanga C, Nkongo J. An evaluation of the quantity and distribution of *Pygeum africanum* on the slopes of Mount Cameroon. Divisional Service of Forestry Report. Limbe, Cameroon: DSF; 1992.

Flamm J, Kiesswetter H, English M. An urodynamic study of patients with benign prostatic hypertrophy treated conservatively with phytotherapy or testosterone. *Wien Klin Wochenschr*. 1979; 91: 622-627.

Garnick MB. The dilemmas of prostate cancer. *Sci Am*. 1994 Apr: 52-59.

Gruenwald J, Buttle K. The European Phytotherapeutics market: Figures, trends and analyses. *Drugs Made in Germany*. 1996; 39: 6-11.

Leakey, Jonathan. Personal communication. June 1998.

Leakey RRB. Domestication Potential of *Prunus africana* in sub-saharan Africa. UNESCO/UNEP Workshop on Biodiversity Conservation and Utilization; 1995 Jul 24-28; Nairobi, Kenya: 13 pp.

Legramandi C, *et al*. Importance of *Pygeum africanum* in the treatment of benign prostatic hypertrophy. *Gazz It Medical*. 1984; 143: 73.

Macleod H. The conservation of Mount Oku Forest, Cameroon. International Council for Bird Preservation Study Report No. 15. Cambridge: ICBP; 1987.

Mbai VN. *Prunus africana*—The brown gold of Mount Cameroon. In: *Prunus*—Bulletin Annuel D'informations de PlanteCam. 1998; No. 7: 15-17.

Murray MT. *The Healing Power of Herbs*. Rocklin (CA): Prima Publishing; 1995. p. 286-293.

Ndibi BP, Kay EJ. The regulatory framework for the exploitation of medicinal plants in Cameroon: the case of *Prunus africana* on Mount Cameroon. *Biodiversity and Conservation*. 1997; 6: 1409-1412.

Ohlendorf W. Domestication and crop development of *Duboisia* spp. (Solanaceae). In: Domestication and Commercialization of Non-timber Forest Products in Agroforestry Systems, Non-Wood Forest Products No. 9, FAO Special Publication, Forest Division. Rome: FAO; 1996. p. 183-187.

Palevitch D. Agronomy Applied to Medicinal Plant Conservation. In: Akerele O, Heywood V, Synge H, editors. *Conservation of Medicinal Plants*. Cambridge University Press; 1988.

Simons AJ. Delivery of improvement of agroforestry trees. In: Dieters MJ, Matheson AC, Nikles DG, Harwood CE, Walker SM, editors. *Tree Improvement for Sustainable Forestry*. Caloundra, Queensland: QFRI-IUFRO; 1996. p. 391-400.

Sunderland T, Nkefor J. Conservation through cultivation. A Case study: the propagation of pygeum—*Prunus africana*. TAA Newsletter. 1997 Dec: 5-12.

Walter S, Rakotonorina JCR. L'exploitation de *Prunus africana* a Madagascar. Report to PCDI Zahamena and Department of Water and Forests; Antananarivo, Madagascar; 1995: 23 pp.

Waterman PG. Trees for drugs and other extractives: future prospects. In: Leakey RRB, Newton AC, editors. *Tropical trees: potential for domestication and the rebuilding of forest resources*. London: HMSO; 1994. p. 42-48.

Jim Duke and author Tony Simons in Nairobi, Kenya.
Photo by Mark Blumenthal

ITALIAN BOTANICAL EXTRACTOR SUPPORTS REFORESTATION OF PYGEUM IN MADAGASCAR

The Society for the Industrial Development of Plants of Madagascar (SODIP) is actively involved in the reforestation of the pygeum tree in Madagascar. A pygeum plantation program began in 1996 with the location of adequate land, and the purchase of seedling wild stock. The initial planting was one hectare (2.47 acres). Every year additional trees will be planted, and the plantation controlled and followed for research purposes. Indena®, a leading manufacturer of botanical extracts in Milan, Italy, has been a collaborator in the pygeum plantation since its inception. Indena purchases all of its pygeum bark supplies from Madagascar, and has long been involved in reforestation efforts there. As part of their collaboration with SODIP, Indena plants one new pygeum tree for every one that is harvested. Indena supports the responsible collection of pygeum bark, and plans to continue efforts to insure the trees have long term survival.

Major Diversity Loss: 1 in 8 Plants In Global Study Threatened

by Barbara A. Johnston

At least one out of every eight known plant species on Earth is now threatened with extinction or nearly extinct.

A 20-year effort among 16 organizations working on an international survey showed that habitat destruction and introduction of nonnative species have caused approximately 34,000 species to become so rare that they could easily disappear. This constitutes 12.5 percent of the 270,000 fern, conifer, and flowering species known worldwide. Of the imperiled species, 91 percent exist in no more than one country.

According to the report, these statistics are "just the tip of the iceberg," with increasing alarmingly numbers as more information becomes available.

The more detailed a country's species inventory, the higher its proportion of threatened plants. For example, in the United States, which probably has the planet's best-studied flora, about 29 percent of 16,000 species are at risk. Similar percentages have been recorded for Australia and South Africa.

W. John Kress, chairman of the department of botany at the Smithsonian's National Museum of Natural History, said, "This is the first comprehensive assessment of threatened species we've ever had. It's a wake-up call to a major extinction event."

Entire plant families were in trouble in some species. For example, 75 percent of the yew family—which produces the anti-cancer drug taxol—is threatened with global extinction. Familiar groups are also in jeopardy, including approximately 14 percent of roses, 32 percent of lilies and irises, 29 percent of palms, and 14 percent of cherry species.

With more than half of all prescription drugs modeled on natural compounds, and one-fourth taken directly from plants or chemically modified versions of plant substances, medical science may well be affected by the problem. "Plants have historically provided some of the most important drugs that we have," said chemist David G. I. Kingston of Virginia Tech. Celebrated staples such as morphine, aspirin, and quinine, as well as a number of less common drugs such as anti-cancer medications derived from the periwinkle, are included. "We've screened about 50,000 plant species so far, and gotten about 50 drugs," Kingston said, "so that's about one per thousand." If the same ratio of 1:1,000 holds, the loss of 34,000 species could well doom development of 34 pharmaceuticals.

Loss of potential new food strains and ecosystem vigor would affect agriculture. "There is an accumulating body of evidence indicating that as biological diversity is lost, there are changes in the way both natural and managed ecosystems function," said ecologist Christopher B. Field of the Carnegie Institution of Washington, "and they can often have negative impacts on goods and services. When there are more plant species present, the recovery from disturbance is faster and total production is greater."

Diversity provides a biological buffer "against things like climate change or migrations," said U.S. Fish and Wildlife Service biologist John J. Fay. "Every time we lose a species of plant we're losing a unique gene pool that has undetermined but possibly very significant benefits to mankind."

The World Conservation Union (IUCN), in conjunction with the Smithsonian, the World Wildlife Fund, the Nature Conservancy, the Royal Botanic Gardens in Kew and Edinburgh, and 10 other government and independent research and conservation groups in a half-dozen countries produced the 862-page report, titled "1997 IUCN Red List of Threatened Plants."

To be classified as threatened, a species must have reached the point at which there are fewer than 10,000 individuals worldwide, or fewer than 100 locations in which it is found. Comparing the latest census against decades of field records and combined collections totaling 20 million specimens, experts found a pace of species decline far above the historic extinction rate. The study included only vascular plants, those with water and nutrient-conducting tissues. Algae, lichens, fungi and the like were not studied.

The IUCN released the study simultaneously in Washington, London, Capetown, and Canberra, emphasizing that data from some parts of the world "are patchy or lacking," particularly in sections of Africa, Asia, the Caribbean, and South America. Brazil, for example, with 56,215 reported plant species, is listed as having only 2.4 percent of its flora threatened.

A 1987 survey held by the Center for Plant Conservation (CPC) in St. Louis, found about 25 percent of American species in danger. Anukriti Sud, manager of conservation programs at the CPC, feels that it is difficult to quantify the significance of shrinking biodiversity. The U.S. figures from the report agree in general with the CPC study. "We just don't know how important these things are," she said, "and that's what makes it so hard to say definitively that this is so terribly serious. It's going to take more of an understanding that [biodiversity] actually means the difference between life and death. . . . It's something really fundamental. It's not a luxury."

[Editorial. A Census of Botanical Risk. *New York Times*. April 12, 1998.

Stevens WK. One in Every 8 Plant Species Is Imperiled, a Survey Finds. *New York Times*. April 9, 1998.

Suplee C. 1 in 8 Plants in Global Study Threatened; 20-Year Project Warns of Major Diversity Loss. *Washington Post*. April 8, 1998.]

Brazil Designates Conservation Acreage

In early spring of 1998 Brazil promised to set aside 62 million acres of Amazon rain forest for conservation, underscoring the government's renewed commitment to the faltering preservation of the imperiled tropical wilderness. Aided by financial and technical assistance from the World Bank and the World Wildlife Fund International, three times as much acreage can be protected as is being protected now. The success of the long-term project faces enormous challenges from the Brazilian logging, farming, mining, and grazing industries. The conservation project would be the largest undertaken by Brazil but would hardly halt the degradation in a region that covers nearly one-third of the remaining tropical forests which may hold one-tenth of all plant and animal species.

Deforestation has increased in the past 10 years with nearly seven million acres burned in the 1994-95 burning season and even more area burned in the intense and widespread fires over the last few months. Of the nearly one billion acres of Amazon land, nearly 130 million acres are deforested due to decades of perennial fires, logging, and other forms of land clearing. *—Barbara A. Johnston*

[Cushman JH, Jr. Brazil to Set Aside Vast Tract in the Amazon for Conservation. *New York Times*. April 30, 1998.]

Frontier Herbs Establishes Herb Preservation Center

Early in April an international study—conducted by the Smithsonian Institute, the World Wildlife Fund, and others—was released and reported by the *New York Times* and *Washington Post*, alerting the public that one in eight plants and perhaps 29 percent of the plants in the United States are in peril of extinction. In March at the Natural Products Expo West, Frontier Natural Products Co-op introduced its solution to this potential problem—the creation of the National Center for the Preservation of Medicinal Herbs. Recognizing the need to protect and expand populations of medicinal herbs for the future, Frontier established the Center on a 68-acre site in Meigs County, Ohio, to focus on the research and protection of "at risk" herbs, as determined by United Plant Savers "at risk" and "watch" lists.

The National Center for the Preservation of Medicinal Herbs is a not-for-profit facility that will be funded by Frontier with the help of industry sponsorship. Working together for the common good, these manufacturers, retailers, environmental organizations, media, growers/farmers, and researchers will guide the development of the Center. Their efforts will ensure that new herb research and organic farming methods are adopted by organic farmers and promoted within the natural products industry.

"Without direct intervention, our own grandchildren won't be able to enjoy the benefits of our most treasured botanicals," says Frontier CEO Rick Stewart. Jeff Tripician, V.P. of Marketing, adds, "We've invited our business partners and our competitors to work with us to create an invaluable resource which will benefit our entire industry and everyone who uses herbal remedies."

Frontier purchased the land to save it from potential deforestation by local loggers. The shade of the woodland ecosystem will now continue to protect a variety of wild medicinal herbs, with additional herbs cultivated for the purposes of research. Noted grower and researcher Tim Blakely has been retained as the manager of the Center to work on projects with professionals, university students, regional farmers, and volunteers. An existing house will be developed into a botanical education site and lab to facilitate research and information sessions.

Frontier's goal is to provide consumers with the highest quality and integrity in its natural and organic products, while supporting and promoting socially responsible business practices, organic agriculture, environmental activities, and positive, healthy lifestyles.

Members of the Center's Advisory Council represent a wide range of the industry including manufacturers, retailers, distributors, growers, researchers, educational institutions, and media.

[Frontier Natural Products Co-op. PRNewswire: Boulder, CO. April 14, 1998.]

FDA RULES

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ing drug claims. FDA interpreted the statement that lutein and zeaxanthin "may serve to protect the macular region from light induced damage or other oxidative insults" as suggesting an intent "to prevent eye damage." Another product that claimed to "repair skin cell[s] damaged by everyday exposure to sunlight" and "promote the skin's DNA repair system and prevent the spread of DNA damaged skin cells" was objected to as demonstrating an intent "to prevent the formation and spread of abnormal cells and to repair, that is, to treat, damaged cells." (Young, 1998).

Some statements regarding digestive-related conditions have also been characterized by FDA as drug claims. One example is a product's claim to "help correct minor and common gastro-intestinal imbalances and ensure that the digestive tract works at the optimal level, without the discomfort associated with flatulence, gaseous distention and hyperacidity." FDA also objected to statements made for ginger which claimed that "its unique compounds can help offset the distresses which cause stomach discomfort from motion or certain foods." FDA interpreted this statement as making a drug claim for the treatment or mitigation of nausea (Young, 1998).

FDA has also sent a number of courtesy letters to supplement manufacturers making cholesterol-reduction claims for their products. Objectionable statements for these products include "[h]elps lower cholesterol," "may help lower blood cholesterol levels," "[r]educe [y]our [c]holesterol up to 15 percent in 4 weeks," and "[m]ay help to decrease [c]holesterol and [t]riglyceride." FDA regards these claims as suggesting an intent to prevent, treat, or mitigate heart disease and notes that "[a] product that claims to lower cholesterol, but is not used in the context of dietary management, is a drug...." The Commission on Dietary Supplement Labels acknowledged FDA's resistance to cholestol-reduction claims and asserted that "this position may need reconsideration in light of DSHEA and that it would be possible to craft a statement of nutritional support regarding the maintenance of healthy blood cholesterol levels that is a statement of nutritional support and not a health claim or drug claim." FDA's proposal regarding structure-function regulations specifically invites comment on the subject of cholesterol claims (Young, 1998).

As Young points out, FDA's proposal would allow a product to be named Cardiotabs, to claim to help maintain a healthy cholesterol level but prohibit providing consumers with truthful and not misleading information on the label about the cholesterol levels maintained (reduced) by the product when used in conjunction with sound dietary management. This flies in the face of DSHEA's goal of providing more, not less, information to consumers, according to Young.

The issue of the new broadened definition of disease is the main concern by some observers. UNPA's Israelsen is concerned that industry and consumers may be diverted from the central issue. "FDA, by creating a 'punch list' of various specific claims, may cause our industry to focus on the wrong point. The real issue of substance is the attempt to redefine 'disease,' he warned (Israelsen, 1998).

In another notice published in the *Federal Register* on the same day, FDA commented on the Report of the Commission on Dietary Supplement Labels (FDA, 1998b). (For more details on the CDSL report, see *HerbalGram* 41, pp. 24-27, 57, 64.)

The public can file comments on the proposed rules until August 27, 1998. Interested persons can file to Docket No. 98N-0044, Dockets Management Branch, (HFA-305) FDA, 12420 Parklawn Dr. Rm 1-23, Rockville, MD 20857. ❑

REFERENCES AND SOURCES

Anon. Supplement Claims Referring to "Characteristic" Disease Claims Symptoms. *The Tan Sheet*. Chevy Chase, MD: F-D-C Reports. May 4, 1998.

Bass S. Personal communication. June 4, 1998.

Commission on Dietary Supplement Labels. Report to the President, Congress, and the Secretary of the Department of Health and Human Services. 1997 Nov.

Farnsworth NR. Letter to Michael A. Friedman (FDA). Dec 15, 1997.

Food and Drug Administration. 1998a. Regulations on Statements Made for Dietary Supplements Concerning the Effect of the Product on the Structure or Function of the Body. *Federal Register*. 1998 Apr 29; 63(82): 23623-23632.

Food and Drug Administration. 1998b. Dietary Supplements; Comments on Report of the Commission on Dietary Supplement Labels. *Federal Register*. 1998 Apr 29; 63(82): 23633-23637.

Food and Drug Administration. 1998c. Website <http://www.fda.gov>.

Israelsen LD. Personal communication. May 24, 1998.

Tyler VE. Letter to Gary C. Stein, American Society of Health-System Pharmacists. May 27, 1998.

Young A. Personal communication. May 27, 1998.

103d Congress. Public Law 103-417. Dietary Supplement Health and Education Act of 1994. (21 USC 3419(r)(6)).

GINGER AND VALERIAN

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advisory panels due to the lack of adequate scientific evidence and conflicting study results. USP advisory panels encourage further research on [ginger/valerian], including at least one adequate and well-controlled trial for the reported use(s)."

Since a resolution passed in 1995, USP's Committee of Revision began to look into herbs and has become increasingly interested in helping set standards for and distribute information on leading herbal dietary supplements. In July 1996 USP held an open conference on botanicals in order to develop priorities in this area. USP decided it would publish two kinds of monographs on herbs. The first, Standards Monographs, deals with identity and purity of botanicals and is designed for publication in the *United States Pharmacopeia* and the *National Formulary (USP-NF)*. These monographs contain standards for determining proper botanical identity and chemical tests for purity of botanical ingredients. Standards Monographs contain no therapeutic data.

Information Monographs focus on the therapeutic aspects of botanicals used as dietary supplements in the U.S. Many of these herbs are recognized as approved nonprescription drugs or "traditional medicines" in other industrialized nations (Germany and France) and a significant amount of data exists to document their historical and traditional use, as well as scientific data on their chemistry, pharmacology, and toxicology; in many cases, clinical studies are also available. USP Information Monographs focus on these studies and highlight the proposed uses, plus adverse side effects, contraindications, duration of use, interactions with conventional drugs, and related therapeutic data, if this information is known from the scientific literature. USP publishes Information Monographs after they are reported as final in the monthly *USP Drug Information Update*.

According to a recent review article on clinical trials on herbal products affecting psychological states, "Valerian is the best known drug of this group worldwide, but at the same time the one with the weakest basis for its efficacy from modern clinical studies.... In contrast to ginkgo, hypericum and

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authors that the essential oils from different parts of this species are worthy of further attention for commercial purposes.

Croton anisatum. Several *Croton* species, Euphorbiaceae, have also been described as aromatic. One species, *Croton anisatum* Baillon, has become increasingly interesting because of its essential oils, which have been exported recently to Germany. It is a shrub growing wild in the littoral humid forests, and its local name, anzety, reflects also its aniseed odor. Based on our preliminary work on this species, essential oil composition includes 79.9 percent anethole and 3 percent estragole. Further investigation is under way to identify the most volatile constituents in this species.

ENDEMIC PLANTS INVESTIGATED FOR THEIR ESSENTIAL OIL CONTENTS

So far, five endemic plants have been chemically investigated for their essential oil contents. Such studies have been undertaken for academic purposes, mainly within the framework of agronomy and chemistry engineering dissertations. We have made an exhaustive compilation of these scattered documents because they contain useful information and they are not easily accessible for western importers who may want to get precise data on a given aromatic plant available in Madagascar. To the best of our knowledge, no successful attempts have been made to bring these essential oils into the market place.

Aside from *Vepris madagascarica* described previously, *V. elliotii* (Radik) I. Verdoorn, Rutaceae, was investigated among the nine *Vepris* species described as aromatic in the Malagasy flora. The ampodimadinika are shrubs growing in the littoral humid forests. The main constituent of the essential oils extracted from their aerial parts is methyleugenol (56.3 percent), together with minor volatile constituents (Ramaroson *et al.*, 1988).

Hernandia voyronii Jumelle, Hernandiaceae, (vernacular name hazomalany) is an aromatic tree found in west and southwest Madagascar. The French botanist Capuron claimed that, based on morphological characteristics, this species should be ranked in a new endemic genus that he named *Hazomalania*. Because of its intensive use for manufacturing water-resistant coffins, dugouts, and wooden buildings, this species has become increasingly endangered. Essential oil compositions of leaves (0.2 percent yield), stem (< 0.1 percent yield) and stem barks (not stated) are quite different. The main volatile oils from the leaves include 10.2 percent 1,8-cineole, 10.4 percent limonene, 17.6 percent linalool, 11.2 percent perilla aldehyde, and 19.0 percent b-caryophyllene, while the stem barks contain 82.8 percent perilla aldehyde, and the stems are reported to contain 30.0 percent limonene, 13.5 percent perilla aldehyde, and 7.3 percent 1,8-cineole (Andrianaivoravelona, 1993). One relevant result is the identification of perilla aldehyde as the major constituent of the stem barks. In our opinion, essential oils of this plant may have special interest for commercial purposes.

Cedrelopsis grevei Baill., Meliaceae (vernacular name katrafay) is a tree found in the western part of Madagascar. This species is also seriously threatened as a result of its extensive use as firewood by the local population. Investigation of the essential oils from leaves (0.1 percent yield) resulted in the identification of several constituents, among which b-caryophyllene was found to be the major component (Razafindrabe, 1986; Andrianaivoravelona, 1993). It is worthwhile emphasizing the high percentage of sesquiterpenes (67.5 percent), which are known as fixative flavors. The essential oils from leaves of this plant, which may be a useful source of b-caryophyllene, deserve special attention for commercial exploitation.

Canarium species (Burseaceae) are generally all known under the same vernacular name, ramy, in Madagascar. So far *C. madagascariense* Engl., *C. luzonicum* (Bl.) A. Gray, Burseraceae, has been investigated, resulting in the identification of sabinene (60.3 percent) and a-pinene (23.0 percent) as the major volatile compounds, along with several common constituents (Lamaty *et al.*, 1993). In our opinion, essential oils of *C. madagascariensis* (0.4-0.5 percent yield), different from those of classical elemi oils (*C. luzonicum*), have no particular features and therefore may not present useful applications.

Among the nine *Potameia* species (Lauraceae) reported to be aromatic in Madagascar, *P. incisa* Kostermans, Lauraceae, (vernacular name antavaratra) was studied for its essential oils content (0.1 percent yield). More than 50 constituents were identified from gas chromatography analysis, of which trans-ocimene (60.0 percent) was identified as the major component (Lamaty *et al.*, 1993).

CONCLUSION

Madagascar has tremendous potential for the production of traditional and new essential oils. It is likely that most aromatic plants can be cultivated in one or another region of the island. The annual turnover for essential oil export is estimated at US$ 6 million. However, one striking point that arises from this review is the regrettable paucity of our knowledge regarding scientific investigations of endemic aromatic plants of Madagascar and also the relatively little work that has been done to explore their economic potential. There are a few reasons for this. Because the essential oil market is highly competitive as well as aleatory, exporting companies have focused on traditional oils easily sold in commercial trading. Diversifying essential oil production or launching new essential oils is a good strategy in itself, but requires a long-term investment to be productive. The lack of collaboration between universities and exporting companies should be also stressed. The situation is changing since there is now a renewed interest in the exploitation of essential oils as evidenced by the increasing number of new exporting companies. ❑

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IMRA was founded in 1958 as a non-governmental institution of applied research. Main objectives are the study of medicinal and aromatic plants, the promotion of their sustainable utilization, and the improvement of traditional foods in Madagascar. Facilities include clinical and research departments, and an extraction unit. As a self-supporting institution, IMRA also has an export section.

REFERENCES

Andrianaivoravelona JO. Analyse de la composition chimique de quelques huiles essentielles malgaches par chromatographie en phase gazeuse et spectrométrie de masse. Mémoire de DEA, Ecole Supérieure Polytechnique, Université d'Antananarivo; 1993.

Billet D, Favre-Bonvin J. Constituants de l'huile essentielles de Vepris madagascarica. *Phytochemistry*. 1973; 12: 1194.

Bouchet P, Petitjean A, Rasoanaivo P. Contribution à l'étude des huiles essentielles et des concrètes de Lantana camara, d'Helichrysum bracteiferum et Helichrysum gymnocephalum. *Bulletin de l'Académie Malgache*. 1991; 66(1-2): 131.

Chalot C. La culture des plantes à parfums dans les colonies françaises. *Agronomie Coloniale*. 1927; 112: 105.

Champon B. Essential oil of the Indian Ocean. *American Cosmetics and Perfumery*. 1972; 87: 42.

Chapot H. Le Combava, Citrus de la Réunion et de Madagascar. *Revue de Botanique Appliquée*. 1952; 32: 377.

Commerson P. Voyage à Madagascar en 1770: notes concernant les dates et les observations d'histoire naturelle faites dans le Sud, notamment dans la région de Fort-Dauphin, Manuscrit conservés à la Bibliothèque du Muséum National d'Histoire Naturelle, Paris; Copie partielle déposée dans la Bibliothèque Grandidier, Tsimbazaza, Antananarivo. 1771.

Decary R. Quelques plantes aromatiques et à parfum de la flore de Madagascar. *Journal d'Agriculture Tropicale et de Botanique Appliquées*. 1955; 2: 416.

De Medicis D, Pierretti S, Salvatore G, Nicoletti M, Rasoanaivo P. Chemical analysis of essental oils of Malagasy medicinal plants by gas chromatography and NMR analysis. *Flavour and Fragrance Journal*. 1992; 7: 275.

François E. Le girofle: l'avenir de sa production à Madagascar. *Bulletin Economique de Madagascar*. 1927; 27: 145.

François E. Parfums et huiles essentielles. *Revue de Madagascar*. 1935; 9: 37.

Gattefossé J. Les végétaux aromatiques de Madagascar. *Agronomie Coloniale*. 1921; 46: 113.

Gaydou EM, Randriamiharisoa RP. Mutidimensional analysis of gas chromatographic data, application to the differentiation of clove bud and clove stem essential oils from Madagascar. *Perfumer & Flavorist*. 1987; 12: 45.

Gaydou EM, Randriamiharisoa R, Bianchini J-P. Composition of the essential oil of ylang-ylang (*Cananga odorata* Hook Fil. et Thomson forma genuina) from Madagascar. *Journal of Agriculture and Food Chemistry*. 1986; 34: 481.

Groebel A, Lenoir D, Pernet R. Uber die inhaltsstoffe aus Ravensara aromatica einer auf Madagaskar vorkommenden Lauraceae. *Planta Med*. 1969; 18: 66.

Lamaty G, Menut C, Molangui T, Valade I, Rasoanaivo P, Petitjean A. Huiles essentielles de quelques plantes aromatiques malgaches. Proceedings of the 5th NAPRECA Symposium; 1993 Sept. 19-23. *Antananarivo*. 1993: p. 61.

Ledreux. Le giroflier dans les régions de Fénérive, Soanerana et Sainte Marie. *Bulletin Economique de Madagascar*. 1928; 28: 38.

Perrier de la Bathie H. Sur quelques plantes à parfum de Madagascar. *Bulletin Economique de Madagascar*, 1er Trimestre. 1923: 210.

Perrier de la Bathie H. Les plantes introduites à Madagascar. *Revue de Botanique Appliquée*. 1931; 11: 719.

Raharivelomanana PJ. Contribution à l'étude des huiles essentielles de Laurus nobilis, *Cinnamomum zeylanicum*, Ravensara anisata (Lauraceae): composition chimique, inhibition microbienne. Mémoire de DEA, Faculté des Sciences, Université d'Antananarivo; 1988.

Rakotondramasy SF. Contribution à l'exploitation et à la valorisation de Tagetes minuta Linner comme nematicide. Mémoire de fin d'étude d'Ingéniorat, Ecole Supérieure des Sciences Agronomiques, Université d'Antananarivo; 1994.

Rakotovao LH, Randrianjohany E. Origine et répartition bioécologique des plantes aromatiques de Madagascar. In: Lourenço WR, ed. *Biogeography of Madagascar*. Paris: ORSTOM Editions; 1996: p. 187.

Ramanoelina PA, Viano J, Bianchini J-P, Gaydou EM. Occurrence of various chemotypes in Niaouli (*Melaleuca quinquenervia*) essential oils from Madagascar using multivariate statistical analysis. *Journal of Agriculture and Food Chemistry*. 1994; 42: 1177.

Ramaroson JD, Ravoavy-Harisoa JN. Etude des huiles essentielles de deux arbres des cotes malgaches, Hernandia voyroni et Vepris elliotii. Mémoire de fin d'étude d'Ingéniorat, Ecole Supérieure Polytechnique, Université d'Antananarivo; 1988.

Ranaivo C. Emplois thérapeutiques du Rambiazina. *La Parfumerie Moderne*. 1932: 491.

Randriamanantena AA. Approche technico-économique de l'extraction industrielle d'huile essentielle d'écorces de cannelle. Mémoire de fin d'étude d'Ingéniorat, Ecole Supérieure Polytechnique, Université d'Antananarivo; 1992.

Randriamihanta TH. Relance de la production et de valorisation d'esences de patchouli à Madagascar. Mémoire de fin d'Etude d'Ingéniorat, Ecole Supérieure des Sciences Agronomiques, Université d'Antananarivo; 1994.

Randriamiharisoa RP, Gaydou EM, Bianchini J-P, Ravelojaona G, Vernin G. Etude de la variation de la composition chimique et classification des huiles essentielles de basilic de Madagascar. *Sciences des Aliments*. 1986; 6: 221.

Randriamiharisoa RP, Gaydou EM. Composition of Palmarosa (*Cymbopogon martinii*) essential oil from Madagascar. *Journal of Agriculture and Food Chemistry*. 1987; 35: 63.

Randrianalison JY. Contribution à l'étude de l'huile essentielle de Longoza (*Hedychium coronarium* var. *flavescens*) de Madagascar: variabilité de la composition chimique selon les zones de collecte. Mémoire de fin d'Etude d'Ingéniorat, Ecole Supérieure des Sciences Agronomiques, Université d'Antananarivo. 1995.

Rasoanaivo P. Rain forests of Madagascar: sources of industrial and medicinal plants. *AMBIO*. 1990; 19: 421.

Rasoanaivo P. Plantes médicinales et aromatiques à valeur économique à Madagascar. *Les Cahiers du CITE*. 1996; 4: 5.

Razafindrabe F. Reserches ethnobotanique et phytochimique sur le Katrafay ou Katafa de Madagascar *Cedrelopsis grevei* H. Baillon (Meliacées), Thése de Docteur d'Etat en Pharmacie, Montpellier, France. 1986.

Razafindrake, 1986

Razafindramiarana H. Contribution à l'étude de l'huile essentielle de la cannelle. Mémoire de fin d'étude d'Ingéniorat, Ecole Supérieure Agronomique, Université d'Antananarivo. 1985.

Théron E, Holeman M, Potin-Gautier M, Pinel R. Authentication of *Ravensara aromatica* and *Ravensara anisata*. *Planta Med*. 1994; 60: 489.

Vognono F, Ranivoarisoa H. Contribution à l'étude de quelques huiles essentielles, concrétes et absolues de plantes aromatiques de Madagascar. Mémoire de fin d'Etude d'Ingéniorat, Ecole Supérieure Polytechnique, Université d'Antananarivo; 1987.

MARKET REPORT

by Peter Landes

Spices: As the monsoon approaches India (the *real* monsoon, not those wimpy, paltry showers that El Niño brought to California this year) it is time to sit back and reflect on an unusual year in spices. Most of the action in the spice markets for the period covered by this report really had nothing to do with spices; rather it resulted from *very* active Asian currency.

Readers who follow the financial news (or, by now, any news at all) are surely aware of the precipitous drops in the values of various Asian currencies, but the two of most concern to spice traders are the Indonesian Rupiah and the Indian Rupee. India and Indonesia are large producers of tropical spices, particularly Black and White Pepper, Nutmeg, Mace, Cloves and Cassia in Indonesia, and those and almost everything else in India.

The devaluations in Indonesia have created far greater problems than those in India and so far have led to the downfall of the Suharto government and riots and murders of ethnic Chinese Indonesians. This is one of those countries where three, four, or five percent of the population controls 70 or 80 percent of the wealth and that small percentage happens to be ethnic Chinese. This is greatly resented by the ethnically Indonesian Indonesians and they tend to take out their frustrations (and it certainly must be frustrating to find you have today about a fifth or quarter of the money you had yesterday) on the Chinese. Imagine going down to the local gas station and finding that gas, which was $1.29 a gallon yesterday is $6.00 today, you only have $10.00 and you have to drive 200 miles. Imagine the loaf of bread which was $1.00 yesterday is $5.00 today. Imagine every single item you need to survive is suddenly four or five times the price it was yesterday—and you have no job because the factory just closed because it could no longer afford raw materials, nor could it afford to pay the debt it has incurred during the "economic miracle" days. This might make you angry.

On top of these currency problems there are, of course, the same basic supply and demand considerations that have always existed in trading markets. The current crop of **White Pepper** is not large—adequate to supply a slightly diminished world demand, but certainly not large. Demand actually increased from Asia during the golden years, but that is thought to be a thing of the past as reality hits home and Asians cut back on their purchases of "luxury" items like Pepper. The new crop, harvested in August and September, is reported fairly large so there is a huge discrepancy in "old crop" vs. "new crop" White Pepper prices, currently around 80 cents/lb difference. Consequently, every user is trying desperately to make do with present inventories until the cheaper new crop Pepper arrives so the White Pepper market is thinly traded and nervous. In **Black Pepper**, India has had a normal-to-large crop, and has marketed about a third of it at high prices since January. But now competition is starting to loom from Malaysia and Indonesia and this will intensify further when Brazil markets its crop in September. Prices have just recently shown a great deal of nervous weakness as Indian exporters, reeling from a weak Rupee, realize they still have two-thirds of their crop to market and the party may be over as price pressure comes from competitors across the Bay of Bengal and the Andaman Sea (pretty exotic and romantic locales, huh?)

So, what will happen to spice prices? The short-term immediate effect has been a precipitous price drop and dire predictions of further weakening. But markets have a way of doing exactly the opposite of any logical analysis. This is what makes them endlessly fascinating and worthy of study— and what makes some traders rich and others poor.

Early-harvest Mediterranean spices such as **Basil, Marjoram**, **Fennel** and the **Mints** (Spear- and Pepper-) continue to languish. Pricewise these have certainly been the sad sacks of the spice world for years and this year looks no different. We can only wait for the too-cheap-for-too-long syndrome to manifest itself yet again and for farmers and gatherers to finally say, "What? Basil? Fennel? Marjoram? For that price? The hell with it—I'll grow something else." Then the inevitable shortages and commensurate higher prices will prevail and there will be money in growing Basil again—and then the overproduction phase will come again. 'Round and 'round it goes…

Later-harvesting crops such as **Cumin, Laurel**, and **Oregano** are still a question mark at this time.

Botanicals: These markets remain *very* active, as we predicted in our last report. Faithful readers (and you know who you are) will recall that the problem discussed was one of stagnant or even reduced supply just at a time when demand was exploding, especially in the US. Since we wrote our last Market Report there have been attempts here and elsewhere to meet demand, but efforts have been spotty and often less than successful from a quality standpoint.

In many instances inappropriate, carelessly harvested plant parts have been marketed (the whole damn plant instead of just the rootlets or the flowering tops) or whole fields with delicate ecologies have been decimated. Careful cultivations are underway in many places by concerned agronomists but many projects have yet to reach fruition. The burgeoning demand is causing market disruptions all over and there have been reports of operators coming into areas and attempting to buy five years worth of wildcrafted production at once. The effect will probably be devastating in these areas.

The usual "hot" herbs are, of course, in *extremely* short supply and this will not change soon. These include, of course, *high quality* **St. John's Wort**, **European Valerian**, **Saw Palmetto**, various **Echinaceas**, **Black Cohosh**, etc. Just check the "Hot Herbs for Health" feature in any supermarket magazine. We've also seen the power of the mass media, especially television. One feature on "20/20" or "60 Minutes" can increase demand by a factor of 10, 20 or 100. Interesting products, interesting markets. Needless to say, careful and prompt purchasing is key here. Competition for scarce supply increases almost daily as more and more new players, smelling big profits from mainstream use of these once-esoteric products, enter the market.

Potpourri Items: Same as last issue- qualities good, prices cheap, exporters desperate to sell. Will this worm turn? Probably—and probably soon. If anyone cares they should buy now—these lovely little items—perfect hostess gifts—can be purchased by the ton from (you guessed it) K.H.L. Flavors, Inc. ❑

Indonesian Clove Market Board Axed

In January of this year, the International Monetary Fund (IMF), in a move to restore confidence in the economy of Indonesia by deregulation of domestic trade in all agricultural products, called for the elimination of the Clove Bufferstock and Marketing Board (known as BPPC) by June 1998.

Much of Indonesia's clove (*Syzygium aromaticum* (L.) Merr. & Perry, Myrtaceae) crop is used to flavor kretek, the popular clove cigarettes. For years, clove farmers in Java were poor, selling directly to local cooperatives or traders who would help store and dry the cloves, then sell them to the cigarette producers. A group of Indonesian businessmen and speculators who tried to corner the market and failed went directly to former President Suharto's son, Hutomo Manfdala Putra, known as Tommy, for help and proposed that the government require clove cigarette manufacturers to buy all their cloves from BPPC. They had nearly 17,000 tons of cloves and Tommy had the clout.

In theory BPPC was to charge the cigarette companies more for the cloves and thus pay higher prices to the farmers. In 1990, BPPC was awarded an exclusive license for importation and sale of cloves and the Bank of Indonesia advanced the group $325 million in credits and loans. The price of cloves skyrocketed, farmers grew more and the result was an oversupply. In recent years the board became more of a "kickback situation," as family members of President Suharto took turns battling allegations of corruption.

The kretek industry generates about $2 billion a year in revenue and employs 4 million Indonesians one way or another from raising the crops to hand rolling the cigarettes. About five years ago, the country became self-sufficient in clove production, but in 1997 the island nation was hit by a series of three disasters.

First, major clove areas were hit by forest fires, then came a drought and, finally, torrential rainstorms soaked the island. The country's monetary crisis has put a hold on purchase of the 8,000 to 12,000 tons of cloves Indonesia was ready to buy to fill in the shortfall.

Indonesia controls the world market in cloves as the largest user of this item. When Indonesia *buys* cloves in the world market prices rise precipitously. When Indonesia *doesn't buy* (or even worse, actually sells), clove prices drop dramatically.

The last time Indonesia had a serious clove crop failure (1981) clove prices in New York topped out at about $5.38/lb. Currently the price is about $.75/lb. so the difference between Indonesia's importing or not importing cloves can be that dramatic. — *Barbara A. Johnston*

[*Chemical Market Reporter*. February 2, 1998.
Farley M. A Familiar Scent of Monopoly. *Los Angeles Times*. March 21, 1998.
Landes P. KHL Flavors, Inc. Personal communication. April 28, 1998.]

Chinese Herbal Medicine Sales Up

China has experienced high-speed development in finished traditional Chinese medicine sector in recent years with total output value hitting US $3.7 billion in 1996, Mr. Zhang Wenkang, viceminister of MOH and head of the State Administration of Traditional Chinese Medicines, told the recent TCM development conference in Beijing.

Up to now, 13 out of the top 50 TCM producers have been listed publicly on Chinese domestic stock exchanges. There are 14 state-owned TCM companies, each achieving annual sales of US $24 million in 1996. A total of 14 Chinese finished TCM producers have passed the GMP certification conducted by the Australian and German pharmaceutical administrations.

The government encourages the establishment of large-scale TCM production enterprises by mergers and acquisitions. Five companies are expected to reach annual sales of RMB 2-3 billion (US $240-360 million) each by the year 2000. The government aims to form a TCM multinational company with sales of more than US $1 billion by the year 2010.

[Yuquan W. *China Medipharm Insights*. April 8, 1998.]

Herb Sales Up 101% in Mainstream Market

	Dollar Sales		*% increase in 1998 over 1997 based on $ volume*	*% of herb sales based on $ volume*	
	52 week ending May 18, '97	52 week ending May 17, '98	52 week ending May 17, '98	52 week ending May 18,'97	52 week ending May 17, '98
Total Herbal Supplements	**$292,192,768**	**$587,336,112**	**101.0**	**100.00**	**100.00**
Echinacea/Goldenseal	$32,508,184	$63,553,612	95.5	11.13	10.82
Garlic	$65,550,763	$81,090,618	23.7	22.44	13.81
Ginkgo	$52,056,152	$126,230,314	142.5	17.82	21.50
Ginseng	$76,485,744	$96,219,614	25.8	26.18	16.38
Pycnogenol/Grape Seed	$7,393,439	$11,074,712	49.8	2.53	1.89
St. John's Wort	$1,019,662	$102,939,518	10,001.3	0.35	17.54
Other Herbs	$57,148,820	$106,139,614	85.7	19.56	18.07

Source: Courtesy of Nature's Resource, from Information Resources, Inc. Scanner Data, FDM (Food, Drug, Mass Market combined), Total U.S., 52 weeks ending May 18, 1997 and May 17, 1998.

Nicole Maxwell
1906 - 1998

Nicole Maxwell, seeker of medicinal plants in the Amazon, former debutante, dancer, and artist's model, died in a nursing home in West Palm Beach, Florida in May. Maxwell, who became fascinated with native medicines on a 1947 trip into the Ecuadorian jungle while on a visit to Quito, Ecuador, spent 12 years running the first shoestring tourist service in Lima, Peru. She subsequently made dozens of trips into the remotest regions of the upper Amazon, befriending the local Indians and slowly learning the secrets of their vast medical lore. In 1958 she obtained a small grant from a drug company and made a special expedition to obtain samples of the medicinal plants she had been cataloging. She discovered what she felt was a variety of highly effective contraceptives and other botanicals used by the Indians to prevent tooth decay, dissolve kidney stones, heal burns, and cure or prevent many other maladies. Maxwell found out later, much to her disgust, that the company had no intention of researching the botanicals, but used her findings as a publicity stunt. Hoping to salvage some of her work, she wrote *Witch Doctor's Apprentice*, published in 1961 and reprinted in 1975 and in 1990. She returned to South America and continued her research until 1986, eventually collecting more than 350 plants used to treat more than 100 common ailments. She continued her work compiling a manual on Amazon remedies, confident that it would be recognized by mainstream science. "As soon as I'm gone," she said, "they'll come running." — *Barbara A. Johnston*

Oku Ampofo
1908-1998

A LIBRARY HAS BURNED DOWN IN THE HILLS OF GHANA

A "library" has indeed burned down. Dr. Oku Ampofo, who died on February 18th in his home of Mampong-Akuapim, nestled among the rolling hills in Ghana, was a vast library of information on Ghana's medicinal plants. He was most likely the last Western-trained physician who also possessed the knowledge of many traditional herbalists who had passed on over the last 50 years.

He was beloved by all—by the herbalists, who entrusted him with their secrets because he showed respect for them and was genuinely interested in their work and by his patients, who cherished him, trusted him completely, and who benefited by his healing touch. He used the tools with which they were familiar—their traditional herbal medicines. Herbalists came to him until the day he died, sharing with him secrets both new and old.

He was one of a kind, a multi-talented man in medicine, music, and the arts. His one ambition was to serve humanity. He served his family, his village, Akuapim, and the entire nation. He was totally selfless and unassuming, able to relate to people of all ages and from all walks of life.

Dr. Oku Ampofo was born on a small cocoa plantation just outside Adawso, on November 4, 1908, to Chief Kwasi Ampofo and Madam Akua Adwo. During his early childhood his father's family bought land at Amanase which became their home. He described his father as kind, gentle, and loving. When his father was made Chief of Amanase, Oku, as a young child, enjoyed sitting on the sheep's skin placed in front of his father during court sessions.

In 1932, he was awarded a Gold Coast (Ghana's former name) government scholarship to study medicine. After a pre-medical course, he left for Edinburgh University in Scotland in 1933.

During his seven years' stay in Edinburgh, despite the rigorous demands of the medical course, he studied sculpture and music. In 1939, he qualified as a doctor at the Royal College of Surgeons and followed this up with short courses at the Karolinska Hospital in Stockholm and the Liverpool School of Tropical Medicine. In 1940 he returned home to Ghana as a fully qualified medical doctor.

Having been told by the Director of Medical Services that there was no vacancy for African doctors, he set about looking for capital to establish a medical practice in Mampong. Unable to raise a loan with a reasonable interest rate, he started his practice anyway with 25 pounds. With such little capital, he had to make weekly trips to Accra to replenish his stock of medical supplies. In a very short time, he gained a reputation as a skillful and greatly loved practitioner. Many patients were treated free of charge. Dr. Ampofo also conducted research into the treatment of a number of tropical diseases that plagued the inhabitants of Akuapim. Among these were yaws [a tropical skin disease caused by *Treponema pertenue*, characterized by multiple red pimples, also called "frambesia"], tuberculosis, and tropical ulcers. He established another clinic in Suhum and recommended the creation of sick bays and school clinics.

I met Dr. Ampofo in early 1963, shortly after he began working with the traditional herbalists. I first went to Ghana in 1962 as part of a National Institutes of Health research group. We had gone on the heels of the first Peace Corps group that was sent to Ghana by President Kennedy, both groups having been requested by President Kwame Nkrumah.

Having returned to his native village to practice medicine, Ampofo was facing a lack of import licenses for foreign drugs, and

was just starting to work with the traditional herbalists to discover what they were using. He was the first of the Western-trained physicians who showed respect for the herbalists and, as a result, they shared their secrets with him. His purpose was to discover plants that were cheaper and more available to the local people. In the process, he found that, in his opinion, many were better than Western medicine.

His memory was incredible; up until the very end, he remembered every plant he had ever used, he knew the botanical name, what part was used, the habitat (down to a particular corner round the bend of a particular village, just behind the tallest silk cotton tree where a particular bush grew and there only), the course of treatment, the other plants that were prepared with it and in what proportion, which patients were treated, the number of patients whom he had treated and the success rate, how quickly they were helped, and whether they were completely cured or continued taking the treatment.

Much of what he knew he credited to "Diane's First Husband." It was because of an old herbalist, S. Adu Dako from Akropong, who claimed to have cured a woman with breast cancer, I was first invited to meet at Dr. Ampofo's home. The old man took one look at this 23-year-old American woman and, at the ripe age of 91, announced to Dr. Ampofo that he wanted to take me as his thirteenth wife, because he had never had a white wife before. We carried on this wonderful charade for well over a year, even meeting with wife number 12 and eventually asking the old man's permission to take a second husband when I became engaged to a Scottish banker. It took some time of introspection before he reluctantly granted me the permission I sought. Those were wonderful days full of learning—learning the value of the plants, how to make the preparations, testing them on rats in my lab at Korle Bu Hospital. To the day he died, Dr. Ampofo referred to the old herbalist in conversation as "Diane's First Husband" and credited him with many discoveries that helped many people.

In 1976, the government recognized Dr. Ampofo's efforts and set him up in the Centre for Scientific Research into Plant Medicine in his hometown of Mampong-Akuapim. We were there for the groundbreaking of the Centre, and I have raised money over the years to help to support its work. The Centre, according to Dr. Norman Farnsworth, is the only plant medicine research center he knows of that has a clinical unit. They currently see approximately 1,600 patients a month and treat diseases such as hypertension, asthma, arthritis, diabetes, malaria, gout, diarrhea, piles, epilepsy, herpes, and other skin diseases. Patients are seen jointly by an herbalist and a Western-trained physician. The Centre also has a clinical laboratory, a phytochemistry laboratory, a pharmacology laboratory, an animal house, a herbarium, an arboretum, several farms, a production unit, and a dispensary. The staff are encouraged to pursue advanced studies and regularly participate in conferences, seminars, and symposia. Dr. Farnsworth visited Ghana in 1994 and was impressed by the potential for good work being done at the Centre.

In an article published in *HerbalGram* No. 31, Dr. Ampofo was quoted as saying that "the beauty of traditional medicine is that there is a hope of discovering something yet unknown to the Western world."

He was "convinced that among all these thousands of plants around us, there are some with as yet unknown bioactive principles. If we can find useful applications for these, we shall have made a significant contribution to the world of medicine." — *Diane Robertson Winn*

Dan Palevitch 1935-1997

Good-bye, Dan. You have left a lot of friends here. As a mentor, you were adept in guiding and encouraging others. As a scholar, you helped establish the science related to medicinal and aromatic species. As a vicepresident in the Medicinal and Aromatic Plant Section of the International Society for Horticultural Science, you contributed leadership and direction in building a strong organization. As a member of the Editorial Board for the *Journal of Herbs, Spices, and Medicinal Plants*, you provided useful and timely advice for creating a scientific publication dedicated to the study of medicinal and aromatic plants. We miss you, Dan. — *Lyle E. Craker, Ph.D.*

Professor Dan Palevitch, "Dashi", was born in Czechoslovakia in 1935 and immigrated to Israel in his childhood. He studied agronomy and completed his Ph.D. from the Faculty of Agriculture, Rehovot, Israel, in 1967.

For many years he worked in agricultural research at the Vulcani Institute where he established the department for medicinal plants and was its director until 1991. He organized ethnobotanical research on the medicinal plants of Israel and their use in the Arab and Bedouin populations. The results of this research were published in the book *The Medicinal Plants of the Land of Israel* by Dan Palevitch and Zohara Yaniv, as articles in an international journal and in *Herbs, Spices and Medicinal Plants*. In 1996 he authored another book: *Medicinal Plants*.

Research projects under the direction of Professor Palevitch were treatment of enlarged prostate with *Opuntia* (prickly pear) flowers,prevention of migraine headache with feverfew (reviewed in *HerbalGram* No. 42, page 18), and development of new strains of paprika and specific cultivation methods leading to outstanding yields. For this research he was awarded the Kaplan Prize, one of Israel's highest honors, in 1996.

Professor Palevitch was a pioneer in the field of medicinal plants in Israel. He was among the first to be involved in the teaching of this subject in many and varied frameworks. His international activities included the organization of two international conferences held in Israel. Within the framework of the International Association of Horticulture, he headed a group which dealt with the cultivating of medicinal and aromatic plants.

Dashi was highly appreciated as a researcher, a colleague, and a friend. The vacuum that he leaves will not easily be filled. — *Mina Ferna*

African Ethnobotany—Poisons and Drugs: Chemistry, Pharmacology, Toxicology

by Hans Dietter Neuwinger

Introduction

The use of poisoned weapons is a fascinating aspect of the attempts of humankind to gain mastery over a hostile environment, to provide themselves with food and protect themselves from animal and human enemies. Peoples in all parts of the world, with the possible exception of Australia and New Zealand, have used poisoned weapons. Early evidence of that use comes from Ancient Egypt. One arrow in a tomb from the First Intermediate Period (about 2181-2050 BC) was found with largely water-soluble poison, whose aqueous extract was cardio-active in mice like the cardenolide strophanthin and muscle relaxant like the alkaloids in curare poison. Much information has already been lost. But in spite of their often-prognosticated disappearance, arrow poisons are by no means a thing of the past. They continue to be utilized not only in hunting to procure food and to protect against the depredations of wild animals but also for tribal warfare, especially in Africa.

On the other hand, throughout the ages, almost all poison-based biologically active plants have also found application in traditional medicine and yielded drugs and remedies for treatment of diseases. In the Africa of today, they belong to the most renowned plant sources for traditional medicines. Some of our most valuable drugs were discovered by primitive peoples.

The dreaded arrow poisons have also provided modern scientific medicine with effective therapeutics, or have been applied as tools in research; the best known examples are ouabain and k-strophanthin for acute cardiac insufficiency, physostigmine for the treatment of glaucoma and myasthenia gravis, d-tubocurarine as a muscle relaxant in anesthesia, reserpine as an antihypertensive and psychotropic drug, and ajmaline for cases of cardiac rhythm disturbance. Often, however, the therapeutic effects of the plant extract with its complex of compounds may be more beneficial than the effects of an individual compound. Certainly, the biologically highly active arrow poisons are many times more likely to possess therapeutically valuable compounds than higher plants selected at random.

Sooner or later, arrow poisons will disappear. It must be in the interest of various sciences to research these poisons and to evaluate them before their use disappears completely. Undoubtedly, here lies a great potential for future development of medicines and the beneficial utilization of otherwise highly poisonous substances. Remember the Paracelsian dictum: "Only the dose determines that a thing is not a poison," in other words: one man's poison—another man's medicine. Remember also the saying of the renowned West African poet Amadou Hampate Ba: "When an old man dies in Africa, an entire library burns."

There exist two wider reviews which deal with arrow poisons, but in the lack of detailed facts both are more general discussions: the book of Perrot and Vogt (1913) in France and that of the toxicologist Lewin (1923) in Germany. Both are out-of-date, but they are of historical value in showing the extent to which such poisons have been used. The work of Lewin is more concrete and useful because he investigated many poisoned arrows from Africa, Asia, and South America (Leipzig, Museum of Ethnology) for their toxicological activity in laboratory animals and showed for the first time the great number of cardiac poisons among the African arrow poisons. Little was known, however, about the botanical base and almost nothing about the chemistry and pharmacology of the poisons and their active principles. Finally, the literature is vast, scattered, often incorrect, and of doubtful scientific value.

Arrow poisons can be roughly classified:

- Africa with a clear predomination of cardiac poisons (cardenolides)
- South America with almost exclusively muscle-paralyzing (curarising) poisons (alkaloids)
- Asia mainly with cardiac poisons followed by tetanising poisons (cardenolides, alkaloids)

With few exceptions, African and most Asian arrow poisons as cardiac poisons are

incwadi (Xhosa), **incotha** (Zulu), **muwandwe** (Shona), **bushman poison bulb**, *Boophane disticha*. Bulb scales, flowering plant, bulb. Photo by Nigel Gericke from *Medicinal Plants of South Africa*. See book review on page 68 of this issue.

absolutely deadly; there is no antidote against them, in contrast to the South American curare poisons which usually can be survived by true antidote or artificial respiration.

The first white man who was killed with an African poisoned arrow was probably Nuno Tristan in 1447 at the mouth of the Gambia River in West Africa. The next centuries showed that poisoned arrows were nowhere as common and used to such an extent as in Africa.

There are monovalent poisons, but more often the poisons are polyvalent and consist of a mixture of plant materials up to 12 ingredients. Strongholds of such complex poisons are the forest zones. Generally one or two of the components are the primary source of activity ("base poison") and others are added for a variety of reasons: to increase the toxicity and effectiveness of the poison, e. g., by promoting its absorption from the wound, to enable it to adhere better to the arrowhead, for magical purposes, and perhaps also to hide the real toxic components. Today, most poisons consist of 2-4 components.

According to ethnic variety, there is a great assortment of poisons: in principle, all types of poisons are to be found and their composition is often complicated. The unique variety and complexity of the African hunting poisons together with a secrecy which appears completely insuperable made their identification and exploration difficult for a long time. Only after the Second World War did the dark begin to lighten and a few detailed and scientifically useful findings on African arrow poisons from special areas were published. Even today, in certain areas, the composition and preparation of arrow poison is a closely guarded secret of selected individuals.

POISONED WEAPONS

The bow and arrow is the most widespread weapon. As a crude rule, it can be said that forest people have small bows and mostly wooden-tipped arrows; savannah people have large bows and arrows with iron tips.

The "forest type" of arrow consists of hardwood, with the tip hardened in a fire; the "savannah type" of arrow with an iron head and mostly complicated barbs, which are wrapped round behind with plant material for better adhesion of the poison. Experienced hunters never smear the poison on the iron head, but always behind the head, so that fresh poison cannot be stripped off when piercing the skin. Often the shaft behind the head is notched: when the animal runs through the bush, the shaft of the arrow breaks off easily and the poisoned tip stays in the wound. The same effect can be achieved by subdividing the arrow: a thin additional shaft as the holder of the poison is inserted into a hollow in the upper shaft. When bolting, the animal loses the main shaft which is largely jutting out and the thin shaft with the poison stays in and takes effect. In central Africa (Southeast Cameroon, Southwest Central African Republic, North Congo, North Gabon, Equatorial Guinea) a very efficient weapon for poisoned arrows is used by many societies, mainly the pygmies: the crossbow; formerly, it was also to be found in tribes in Southeast Asia.

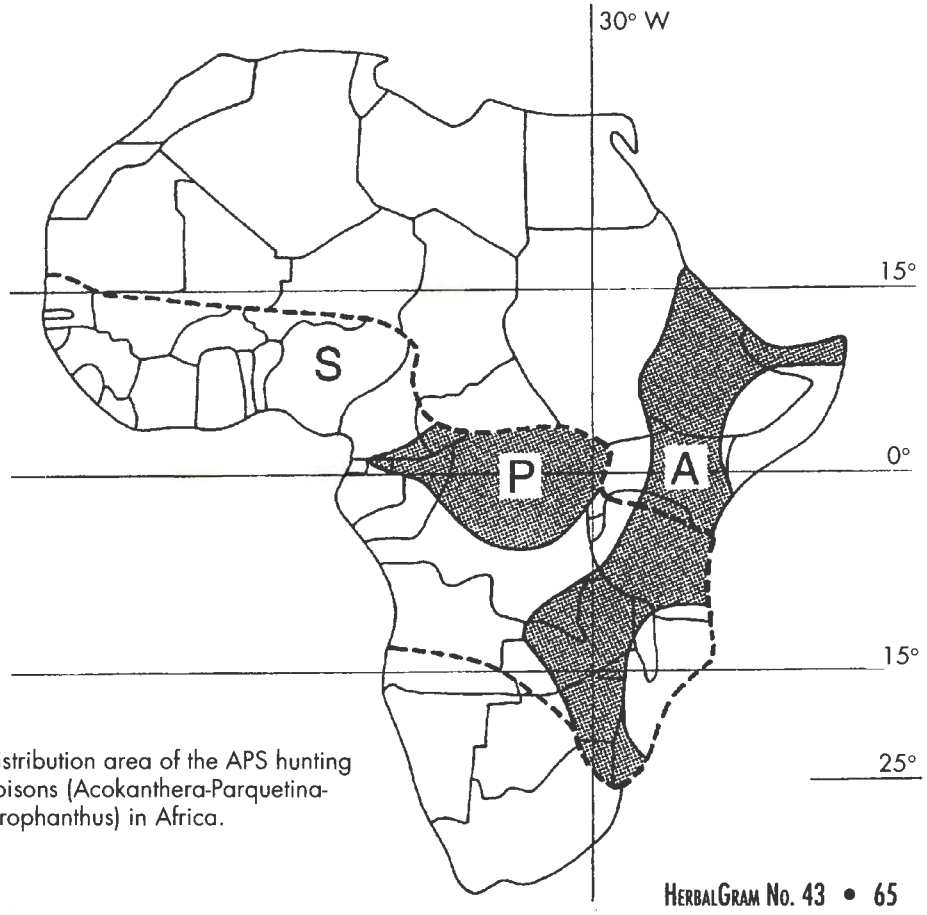
POISON PREPARATION

The secrets of poison composition and preparation are known to the medicine man, magician, herbalist, a selected person or family, and today often the hunter himself. The poison preparation is regarded as a medicinal-magical art and even today, poison-making is sometimes accompanied by mysterious rituals and taboos. Thus a poisonmaker would never prepare poison when unwell; in this condition his weakness could be transmitted to the poison and make it weak and ineffective.

There are three principal methods of poison preparation:

• Boiling in water (aqueous decoction).

The most common poison preparation is boiling of the ground plant material in water. Often the boiling time is long, several hours to several days, with continuous



Distribution area of the APS hunting poisons (Acokanthera-Parquetina-Strophanthus) in Africa.

addition of water. After concentration, a viscous mass remains; it is smeared in a thick layer on the wooden tips or behind the arrow head if the tip is iron. The technique of the preparation ranges from primitive boiling in an open pot to a subtle poison extraction in special equipment.

• Pounding of the fresh ingredients and addition of glutinous sap.

This method of poison extraction is mostly restricted to oil-rich plant parts such as seeds or roots. The addition of glutinous sap helps to hold the poisonous mass together and helps the poison to adhere to the arrow head. Especially strong is the adhesive power of the latex of cactiform *Euphorbia* species, an almost constant component of arrow poisons. *Euphorbia* species are highly toxic themselves, and to be found almost everywhere.

• Squeezing out the fresh plant material.

This method for wooden-tipped arrows is typical of the forest tribes, especially the pygmies. There is a large stationary press and a small mobile press for making poison during the hunt. The plant material must be fresh and rich in sap: thin twigs, stem bark and roots of young bushes and trees, lianas and herbaceous plants.

Often, however, the therapeutic effects of the plant extract with its complex of compounds may be more beneficial than the effects of an individual compound.

PLANT SOURCES AND THEIR ACTIVE PRINCIPLES

Green plants are essential for all life on earth since they convert solar energy into organic compounds and have the remarkable capacity of producing carbohydrates, protein, fats and vitamins and, most importantly, oxygen. In addition, the "plant laboratory" produces countless other products, the so-called secondary products or secondary metabolites. These "waste products" often are the most conspicuous of the constituents of a plant and have been in use for many purposes since prehistoric times. Constituents with special properties often occur in a remarkably high concentration and sometimes with great purity in a particular plant.

All drugs act by three basic mechanisms: stimulation, inhibition, or irritation of a physiological system, they operate in a dose-dependent manner, and will kill if the dosage is high enough. It is the skill of a poisonmaker to find out which plants contain highly toxic principles easily extracted with water in a sufficient amount to achieve a "toxic" preparation that acts in the desired way and is suitable as a hunting poison which acts rapidly and surely. It is the skill of a good medicine man to find out which poison possesses little toxicity or few unpleasant effects at a "therapeutic" dose level and has a high degree of accuracy and safety. It is easy to understand that, if they achieve success, they guard the secrets of poison making or medicinal treatment from anyone else.

Almost all of the primary active ingredients of African hunting poisons come from plants. At least 80 per cent of the poisons are based on cardio-active components, mostly cardiac glycosides. The main plant sources in reference to this are *Acokanthera, Parquetina, Strophanthus ("APS-Poisons")* and scattered or in more special areas *Adenium, Mansonia, Calotropis, Pergularia, Corchorus,* and *Erythrophleum,* the last an exception, in that it has cardiac alkaloids. Several other large groups of poisonous principles of African hunting poisons are alkaloids, triterpenoids, especially saponins (many plant genera), and diterpenoids, e.g., the highly irritant esters of diterpenoid alcohols (*Euphorbia, Gnidia, Jatropha).* Most saponins are able to cause hemolysis of erythrocytes with only a few mg/ml. They also have other toxic properties which do not always run parallel to the hemolytic properties. Saponin-bearing plants are extensively employed as fishing poisons, as are plants with diterpenoid esters *(Euphorbia* species). *Euphorbia* latex is esteemed for its glutinous properties. Beyond that, its extremely irritant diterpene esters may promote the absorption of the toxic principle through stimulation of peripheral blood circulation, in addition to being highly toxic on their own account. *Capsicum frutescens* has similar properties, its fruit or seeds found in many arrow poisons all over Africa. Its pungent capsaicinoid complex not only causes strong irritation and inflammation around the arrow wound, but also shows acute fatal toxicity when a dose is administered parenterally.

Alkaloids, with a diversity of structure types, are known to have a wide range of pharmacological activities. They rank among the most powerful plant constituents and are responsible for the activity of a wide variety of poison ingredients. The muscle-relaxant, cardiovascular, respiratory and CNS activities derive mainly from alkaloids. Quite a few of the alkaloid-bearing plants can be used as base poisons and several are indeed so used, e.g., *Strychnos* species, *Boophane disticha, Crinum* species, *Triclisia dictyophylla, Nicotiana* species, *Physostigma venenosum, Sarcocephalus latifolius, Erythrophleum* species. The last take a special place among the alkaloid-bearing plants: their poisonous principles are alkaloids chemically, but behave like cardenolides pharmacologically and toxicologically.

Plants with cyanogens often enter into the preparation of arrow poison, they liberate enzymatically volatile hydrogen cyanide on damage to the plant cell, but the compound does not survive the process of preparing the poison.

Flavonoids show a wide range of activities, valuable pharmacologically and medicinally, but they seldom function as a primary source of toxicity for mammals, except for several compounds of special structure, such as rotenoids in *Tephrosia* and *Lonchocarpus* species; they are in the first instance toxins for fish poisoning.

Many other plant toxins used have a variety of activities, but their toxic effects are long-term rather than acute, e.g,. sesquit-

erpene lactones, iridoids, pyrrolizidine alkaloids, tannins. Mostly it is unclear and can scarcely be evaluated to what extent the adjuvant plants contribute to the activity of the poison. It is known that the final poison is often essentially more active than the concentrated extracts of the corresponding plants. This may be due to possible interactions between the various compounds during the elaborate processing of preparing the poison.

ANIMAL POISONS

Almost all of the primary active ingredients of African hunting poisons come from plants, only a few from animals (toads, snakes, insects). Only the bushmen of the Central Kalahari desert use animal poison exclusively. It is prepared from the highly toxic larvae of several leafeating beetles *(Diamphldia, Polyclada),* and their flesh-eating parasitic larvae *(Lebistina),* found deep in the ground under certain host bushes and trees. Bushmen of other areas mix the larvae with plant extracts.

All other animal venoms from snakes, scorpions, millipedes, and insects, are incorporated as minor ingredients into arrow poisons and contribute marginally or not at all to the toxic properties of the final product; they may be highly toxic in laboratory tests but, because of the lack of heat stability of most of these toxins, they rarely survive the usual long-lasting boiling process in preparing the poison and are seldom effective arrow poison adjuncts. It must also be remembered that the amounts of these venoms in the arrow poison mixture are usually too small and their effects would be greatly diluted. Only the heat-resistant toad toxins (bufadienolides, similar to cardenolides), survive the boiling process and may be effective in the final poison. Toads are nowadays used only rarely for arrow poison ingredients.

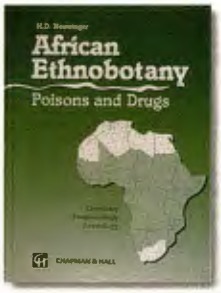
There is an interesting report, which has been confirmed by several independent sources, on a species of "tree" frog used by the Kikuyu in Kenya for poison, at least in former times. This frog (*Hyperolius marmoratus glandicolor* Peters; "kiengere" in Kikuyu language), white above and reddish below, sits in low-growing vegetation and is accidentally ingested by cows. The stomach swells up, the cow foams at the mouth, and death ensues rapidly. Apparently in the early days of European settlement the Kikuyu used to feed European cows with these frogs in bundles of hay. When they died they would customarily be buried. The Kikuyu would dig them up later and eat them (Verdcourt and Trump, 1969). According to our investigation this frog has never been used for arrow poison as South American natives use tree frogs. ❑

COMMENTS ON INTRODUCTION TO AFRICAN ETHNOBOTANY

Aside from highly specialized volumes, such as McIntyre's *Curare, History, Nature and Clinical Use* (1947), detailed information on arrow poisons has not been readily available to Anglophones. Perrot and Vogt's *Poisons de Fléches et Poisons d'Epreuve* (1923) and Lewin's *Die Pfeilgifte* (1923) constituted the principal references in the field, and they were both ancient and quite difficult to locate. Tschirch's more recent (1933) chapter "Pharmacoethnologie" in his *Handbuch der Pharmakognosie*, 2nd ed., devotes less than seven pages to the subject.

Consequently, Neuwinger's 1998 volume in English, excerpted here, is a welcome addition to this obscure but fascinating subject area. The author sagely observes that arrow poisons of plant origin have great potential for future development of medicines. They are far more likely to possess therapeutically valuable compounds than higher plants selected at random. Consequently, all persons interested in botanical medicine will find them, and this book, of considerable interest.

The excessive costs of publishing limited editions of books on highly specialized subjects in the United Kingdom will prevent many individuals from purchasing this volume. However, as exemplified in the section reproduced here, *African Ethnobotany—Poisons and Drugs* overflows with interesting and valuable information not available elsewhere in organized form. If you cannot personally afford the $229.95 investment in knowledge, persuade your library to purchase a copy. — *Varro E. Tyler, Ph.D., Sc.D.*



African Ethnobotany—Poisons and Drugs: Chemistry, Pharmacology, Toxicology *by Hans Dietter Neuwinger. 1996. New York: Chapman & Hall. 941 pp. Hardcover. 202 drawings, 67 color photos. $229.95. ISBN 3-8261-0077-8. ABC Catalog #B325.*

A common vision many people have of ethnobotany is of the botanist or anthropologist traveling in South America or Africa encountering a tribe of native peoples who use poison-tipped arrows and darts either to paralyze or kill their prey, either animal or human. The use of poisonous plants in traditional societies to aid in hunting is an ancient art. As a source of modern drug development, this is epitomized by the creation of d-tubocurarine, a presurgical muscle relaxant derived from South American arrow poisons, discovered in this century as a function of ethnobotany. This book constitutes what is clearly the most extensive and authoritative work in this field pertaining to the African continent. An interesting explanation of different types of arrow poisons and their development into drugs is provided in the introduction excerpted on pp. 64-67 of this issue of *HerbalGram*.

The book contains extensive monographs on 240 poisonous plants. All are arranged alphabetically by family name. Each monograph takes up from one-half page to several pages and contains the following elements: the botanical name and synonyms, local vernacular names in tribal languages, a line drawing of Africa showing the region of distribution, detailed botanical descriptions of the whole plants and parts, including line drawings in many of the monographs, geographical distribution, information on traditional medicinal use and, in some cases, thorough explanation of the chemistry of the plant including occasional diagrams of chemical structures. References also accompany each monograph. The section on vernacular names is usually broken down by country and an interesting and detailed section on "hunting poison" provides some of the most interesting aspects of the monographs, particular to the theme of this book. Detailed pharmacological data is also presented when available.

Under the section "hunting poison" the author has included historical data from the first European observers in the 19th century, botanical data as noted in various herbaria, chemical and chromatographic data when available, and ethnobotanical/anthropological observations by other authors, including other plants with which the particular plant poison is mixed.

The book also contains a short chapter on fish poisoning plants, consisting of an index of plants used as fish poisons organized alphabetically by family name, indicating which plant parts are used as fish poisons and from which countries in Africa they have been observed. A bibliography of references on traditional African medicine is provided, organized by the traditional medicine literature of each of 31 countries. The book also contains indexes based on plant and subject. Although the obvious emphasis of this book is the development of poisons, there is considerable good data to be gleaned for the student or researcher looking for traditional medicine information. This book is a wealth of information and deserves a space in the libraries of anyone interested in poisons from medicinal plants of these regions. There is no doubt that Newinger's book will become the classic reference on this subject; it is of value not only to botanists and ethnobotanists, but also to chemists, toxicologists, physicians, and others interested in this field.

Although some of the monographs consist of only one to two pages, the monograph on *Erythrophleum sauveolens* (Saesalpiniaceae family) consists of at least 19 pages with over four pages devoted to the "hunting poison" section alone and over four pages devoted to pharmacology and toxicology.

In general, African hunting poisons are quick-acting cardiac poisons; this is in contrast to South American arrow poisons that are mostly muscle relaxants. The three plant genera that constitute the predominant poisons of Africa are *Acokanthera* in East Africa, *Parquetina* in Central Africa, and *Strophanthus* in West and Southeast Africa. These are termed by the author the "Big Three," which he says are chemically and toxicologically similar to/known as the APS poisons. "They are ideal hunting poisons: fast, easy to obtain and fast in action!" There are seven plants that produce hunting poisons, more toxic and more widely dispersed. In addition, there are hundreds of other plants that are combined with up to twelve ingredients. The author notes that contrary to other regions, Africans do not rely on poisons based solely on animal ingredients (e.g., beetles, scorpions, toad venoms, etc.). The book attempts to focus on chemistry of the plants when possible—much of this data has not been available before in a concise format. — *Mark Blumenthal*

Medicinal Plants of South Africa *by Ben-Erik Van Wyk, Bosch Van Oudtshoorn, and Nigel Gericke. 1998. Pretoria, South Africa: Briza Publications. 304 pp. Hardcover. Color photographs. $75.00. ISBN 1-875093-09-5. ABC Catalog #B314.*

This book, now available in English, is a most colorful introduction to the rich plant diversity of South Africa, a country of more than 30,000 species of higher plants. Cape Floral and Kingdom, according to the book, has nearly 9,000 species of plants and is probably the most diverse temperate floral region on Earth. This diversity produces about 3,000 species of plants, of which about 350 are commonly used and traded as medicinal plants. The book highlights 132 of

the most popular and well-researched of these medicinal plants, plus several other related plants as well.

The first part of the book gives a beautifully illustrated introduction into the cultural aspects of healing, including some of the ethnic cultures of South Africa, plant parts used in traditional medicine, methods of collection and storage, dosage forms and methods of preparation, methods of administration, and active ingredients (i.e., brief paragraphs on active phytochemicals).

On each right-hand facing page, the publishers have included three or more high-quality color photographs, making this book a valuable publication independent of the text offered on each plant. The skeletal monographs include Latin name, family name, local colloquial or vernacular names in the tribal languages, botanical description of the plant, plant part used, medicinal uses, preparation and dosage, active ingredient, pharmacological effect, and geographical distribution. The geographical distribution is also indicated with a color-shaded area on a line drawing of the map of South Africa. The active ingredients are also represented with chemical diagrams of one or two major active compounds. Each monograph contains six to eight references.

The book also has a brief glossary of medical terms, a cross reference of plants included in the book according to the various ailments for which they are used, and a general index. With over 500 color photographs of excellent quality, this book provides compelling visuals of the major medicinal plants of this beautiful country. The authors are a professor of botany, a retired professor of pharmacy, and a medical doctor and expert in ethnobotany. As interest in medicinal plants increases worldwide, as research increases on medicinal plants of Africa and, as Africa expands, this book will become an important part of the literature, especially as an initial means of study for students, pharmacists, researchers, and industry. Although the information provided on each plant is brief, the referencing provides avenues to further research for someone who wants more detailed information. — *Mark Blumenthal*

Trade in *Prunus africana* and the Implementation of CITES *by M. Cunningham, A.B. Cunningham, and U. Shippmann. 1998. Bonn: German Federal Agency for the Conservation of Nature. 52 pp. $12.00. ISBN 3-89624-608-9. ABC Catalog #B333.*

Prunus africana (Hook f.) Kalkman (formerly *Pygeum africana* Hook f.), a member of the rose family (Rosaceae), is a large tree that grows in highland/mountain forest islands and is harvested commercially in Cameroon, Kenya, Tanzania, Madagascar, and the Democratic Republic of Congo. Like the fruits of saw palmetto and the root of stinging nettle, the bark of pygeum is valued in European phytotherapy for the treatment of benign prostatic hypertrophy. (See article on page 49 of this issue.)

In African counties the bark is used by traditional healers for inflammation, kidney disease, malaria, stomachache, and fever, among other uses. Closely related to cherries, the fruits are small and very bitter. The freshly cut bark, fresh crushed leaves, and fruits contains hydrocyanic acid, thus have a strong cherry or almond fragrance. In Natal the bark was traditionally made into a tea in milk, which was used to treat problems of difficult urination. Pharmacological studies confirmed its potential value. In 1966, a patent was issued for use of the bark extract in the treatment of benign prostatic hypertrophy.

Three different classes of chemical constituents have been found in non-water-soluble extracts, including phytosterols, triterpenes, and organic acids that produce a beneficial effect on the prostate. This includes anti-inflammatory activity, reduction of cholesterol levels in the prostate, and inhibition of prostaglandin synthesis. In the past two decades, 26 clinical trials on extracts, at a dose of 100/200 mg per day, have shown positive effects in the treatment of symptoms associated with BPH such as difficulty in urination, frequent nighttime urge to urinate, and volume of residual urine. Pharmacological studies have shown it may increase prostate secretions, improving seminal fluid composition, and may improve sexual functions. Most research and clinical experience has been in Italy and France, rather than Germany. It is often used in combination with stinging nettle root and/or saw palmetto berry extracts. Its future will depend upon sustainable development of supply. A 1993 report, "Sustainability of harvesting *Prunus africana* bark in Cameroon," by A. B. Cunningham and F.T. Mbenkum, published in UNESCO's "People and Plants Working Papers" series, highlighted the adverse environmental impact on the harvest of bark in Cameroon and surrounding countries. This and other studies led to the inclusion of *P. africana* in Appendix II of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) at the 9th Conference to the Parties. The listing became effective on March 15, 1995.

Better understanding of the complexities of international trade and how best to monitor the tree's survival are the subjects of a new report published by the German Federal Agency for Nature Conservation. This book explores the structure of international and national trade, resource management, and CITES implementation in countries of origin, as well as recommendations. In international trade, *P. africana* is sold as air-dried unprocessed bark, bark extract, and finished herbal products. Most of the harvest goes to Europe, estimated at 3,310 metric tons per year, excluding figures from the former Zaire (Democratic Republic of Congo), due to political unrest.

According to the report, 54 percent of crude extract originates from Cameroon. Madagascar is second, supplying 18 percent, followed by Tanzania at 3.6 percent. Cameroon supplies 18 percent of the crude bark in international trade, and Kenya supplies 6.3 percent of the world's bark. Most bark is locally processed, then shipped to Italy or France. This detailed report contains data on legal and illegal international trade from countries of origin. Information on harvest, manufacturing processes, and the companies that utilize or market *P. africana* provides identification details for crude bark from a macroscopic and organoleptic perspective. Chemical analysis of the bark is also included. The varying procedures for resource management in both Cameroon and Madagascar are explored, along with political and market factors that impact how the bark is managed and problems with obtaining accurate data on trade for current CITES reporting procedures. The authors acknowledge the need to balance rural economic development and resource management with the need to strengthen national and regional conservation issues. Noting that European pharmaceutical/phytomedicine companies are the primary beneficiaries in the trade of *P. africana* products, the authors highlight the need to shift from "resource-mining" practices from wild stocks to a strategy that combines limited sustainable harvest from carefully managed wild stocks with further development of cultivated resources. This report provides a fascinating, detailed look at highly complex scientific, environmental, trade, and political issues revolving around the supply of the bark of an indigenous African tree to the world market. Given its thorough treatment of the subject with clear recommendations and strategies for long-term development of *P. africana* supplies, the report serves as a model for other phytomedicine source plant conservation efforts. The work includes 11 illustrations (including 22 color photographs on three color plates), and 10 tables that give the reader quick access to key information points. Would that we had such detailed data for all "at risk" species in international trade. Anyone who offers pygeum products should read and understand this important report. — *Steven Foster*

Flowering Plants of the Gambia *by Michael Jones. 1994. AA Balkema: Rotterdam, the Netherlands and Brookfield, Vermont. 133 pp. Softcover. Color illustrations. ISBN 90-5410-197-0.*

The Gambia is a river flowing westward in western Africa bordering the country of Senegal. Senegal has approximately 2,000 indigenous and naturalized plants and about 300 introduced. This book acts as a guide, with illustrations of 160 species in color photographs, and text describing an additional 173 species. The color photographs are arranged in order of color while the text is organized by family. Each 1/4- to 1/2-page write-up provides the Latin binomial and possibly synonym, botanical description, a guide to the flowering times (an essential ingredient for identification *in situ*), and the colloquial names in both the Mandinka and Wollof names. The book also contains a brief glossary of botanical features, references, and a botanical index that includes English common names, Latin names, geographical distribution, and local vernacular names. This book is designed to be a guide, and a stimulant to increase research and commercial interest in the flowering plants of the Gambia. Unfortunately there is little information regarding ethnic use and traditional medicine to be had here. Nevertheless this is a useful volume; the color photography is quite good providing opportunities to view plants not readily available elsewhere. — *Mark Blumenthal*

continued from page 57

kava-kava, the pace of data gathering on valerian since compilation of its monograph [i.e., the Commission E monograph in 1985] has been far slower. It may come as a surprise, with such an internationally familiar herbal remedy as valerian, to learn that at the present time only four placebo-controlled double blind studies in patients with sleep disorders are available." (Schulz *et al.*, 1997).

USP published Standards Monographs for ginger and powdered ginger in the *USP-NF Supplement 7* (1997 Sep 15) and for valerian and powdered valerian in the *USP-NF Supplement 8* (1998 Mar 15). These monographs deal with standards for assaying the identity and purity of ginger and valerian and will not deal with therapeutic aspects covered in the information monographs.

In an article in the *American Journal of Health-System Pharmacy*, Ann Corken, supervisor of USP's Division of Information Development, the group at USP that produces the monographs, said that USP has relied on "ad hoc reviewers" because the conventional medical experts on USP's advisory panels have no background (or a limited background) in botanicals. She acknowledged that reviewers who are practitioners and are knowledgeable about botanical medicines are difficult to find (Thompson, 1998). In that article, Jerome A. Halperin said USP monographs are characteristically developed by an evidence-based process using a consensus of experts.

Interestingly, the consensus of experts in the U.S. has led to a different conclusion than their counterparts in Western Europe. As noted above, both ginger and valerian are approved in Germany and other countries as nonprescription medicines. They both are subjects of positive evaluations by the German Commission E, an expert committee of physicians, pharmacists, biostatisticians and other medical experts, appointed by the German Federal Institute of Drugs and Medical Devices (BfArM). Commission E published monographs on both ginger root (published in 1988 and revised in 1990) and valerian root (published in 1985 and revised in 1990) in the *Bundesanzeiger*, the German equivalent of the *Federal Register* (Blumenthal *et al.*, 1998).

The health authorities in Canada have recognized the value of valerian as a nighttime sleep-aid. Health Canada approves valerian root and rhizome extract (ethanolic) as a Traditional Herbal Medicine sleep aid and sedative. The Block Drug Co. markets "Nytol Natural Source" made of valerian extract (Awang, 1998).

The European Scientific Cooperative on Phytotherapy (ESCOP), an association of 15 scientific societies in Western Europe, also has reviewed the scientific literature on ginger and valerian and has published therapeutic monographs indicating safe and effective benefits for both herbs (Blumenthal, 1997).

In the U.S. ginger and valerian are both subjects of citizens' petitions to amend OTC drug monographs. In June 1994 the European American Phytomedicines Coalition (EAPC), a consortium of European phytomedicine manufacturers and their U.S. importers and marketing partners, filed a petition with FDA to amend the OTC nighttime sleep-aid monograph to include valerian root (Pinco and Israelsen, 1994). In May 1995 EAPC followed up with another petition to amend the OTC monograph for antiemetic products with ginger as an OTC drug (Pinco and Israelsen, 1995). Considerable market data was included in both petitions, indicating that both herbs have been sold for a "material time" and to a "material extent" in European countries where well established pharmacovigilance systems are in place to monitor adverse reactions. Both herbs have an excellent safety record, a fact acknowledged in both the USP DI monographs. To date (June, 1998) FDA has not yet responded to either EAPC petition.

The USP information monographs have no legal or regulatory standing; they are intended as information for pharmacists and other health professionals.

In a related move, the December *USP DI Update* also reported the final status of a negative monograph on the herb comfrey (*Symphytum officinale*), which was negatively evaluated due to concerns regarding the hepatotoxicity of pyrrolizidine alkaloids (PAs) found in the leaves and roots. (Due to concerns about PAs the American Herbal Products Association issued a general policy on June 4, 1993, that comfrey should be used for external use only.)

The USP DI monographs for comfrey, ginger, and valerian are available from the USP, Attn: Arline Bilbo, 12601 Twinbrook Pkwy, Rockville, MD 20852 ($25 each; must be prepaid). Ph: 301/881-0666. Email <amb@usp.org>. Commission E and ESCOP monographs are available from the American Botanical Council, P.O. Box 144345, Austin, TX 78714-4345. Ph: 512/926-4900. Fax: 512/926-2345. Email <custserv@herbalgram.org>. Website <http://www.herbalgram.org>. ❑

REFERENCES AND SOURCES

Awang DVC. Personal communication. May 21, 1998.

Blumenthal M. Herbal Monographs Initiated by Numerous Groups. *HerbalGram*. 1997; 40: 30-35, 37-38.

Blumenthal M. EAPC Files Petitions for OTC Drug Use for Valerian and Ginger. *HerbalGram*. 1995; 35: 19-21, 63.

Blumenthal M, Busse WR, Goldberg A, Gruenwald J, Hall T, Riggins CW, Rister RS, editors. Klein S, Rister RS, translators. *The Complete German Commission E Monographs—Therapeutic Guide To Herbal Medicines*. Austin, TX: American Botanical Council; Boston, MA: Integrative Medicine Communications. In press 1998.

Fulder S, Tenne M. Ginger as an Anti-nausea Remedy in Pregnancy: The Issue of Safety. *HerbalGram*. 1996; 37: 47-50.

Pinco RG, Israelsen LD. European-American Phytomedicines Coalition Citizen Petition to Amend FDA's Monograph on Antiemetic Drug Products for Over-the-Counter ("OTC") Human Use to Include Ginger. 1995 May 26.

Pinco RG, Israelsen LD. European-American Phytomedicines Coalition Citizen Petition to Amend FDA's Monograph on Nighttime Sleep-aid Drug Products for Over-the-Counter ("OTC") Human Use to Include Valerian. 1994 Jun 27.

Schulz V, Hübner W-D, Ploch M. Clinical Trials with Phyto-Psychopharmacological Agents. *Phytomed*. 1997; 4(4): 379-387.

Thompson C. USP Moves Forward in Providing Information on Botanical Products. 1998; 55.

USP. Ginger (*Zingiber officinale*). Information Monograph. Rockville, MD: United States Pharmacopeia; 1998.

USP. Comfrey (*Symphytum officinale*). Information Monograph. Rockville, MD: United States Pharmacopeia; 1998.

USP. Valerian (*Valeriana officinalis*). Information Monograph. Rockville, MD: United States Pharmacopeia; 1998.

Valerian, *Valeriana officinalis.*
Photo ©1998 Steven Foster

LETTERS

PHYTOTHERAPY IN ITALY

The publication in *BMJ* [*British Medical Journal*] of some articles concerning the use of *Hypericum perforatum* for a cure of depression[1,2,3] helped for a correct approach to phytotherapy also in Italy, where phytotherapy recently became a part of a National Health-Care Service, with a new unit inside our Hospital.

We also founded a centre of drug control that monitors adverse reactions during the use of medicinal plants and derivatives, because, unfortunately, there is a lack of knowledge among some doctors, but also the wrong employment of phytotherapics (being not titrated or standardized in active principles or even the use of improper extracts) [4]. For example the Mother Tincture (Ph. Fr) of *Hypericum perforatum* has been used until today in Italy and in France for the cure of depression syndrome. In reality we showed that it has a very low and insufficient content of hypericin and flavonoids for the treatment of this illness: hypericin 0.007 - 0.09 mg/ml, flavonoids 0.25 - 0.60 mg/ml [5].

We believe that it is necessary and should be obligatory for all the physicians to have a basic introduction and chemical studies of phytotherapy with a foundation in botany, phytochemistry, and pharmacology.

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50053 Empoli (Firenze) - Italy

1. Linde K, *et al.* St. John's wort for depression - an overview and meta-analysis of randomised clinical trials. *BMJ*. 1996 Aug 3; 313: 253-258.
2. De Smet PAGM, Nolen WA. St. John's wort as an antidepressant. *BMJ*. 1996 Aug 3; 313: 241-242.
3. Houghton PJ. St John's wort for depression. *BMJ*. 1996 Nov 9; 313: 1204-1205.
4. Firenzuoli F. Le insidie del naturale. Tecniche Nuove Ed., Milano; 1996.
5. Stankov BM, Firenzuoli F. Determinazione del contenuto di ipericina nelle tinture madri di *Hypericum perforatum* utilizzando HPTLC. Atti Congresso SIFIT; 1997. p. 27.

Laurel, *Laurus nobilis*

AUTHOR RESPONDS

I have just received a copy of your review of my Dictionary (*HerbalGram* No. 42). I thought the review was very well done and showed that you had made a quite thorough study of the text. However, I have found several errors in your critique as follows:

Under *Hypericum perforatum*, I have given details of therapeutic use, however omitting the important indication of depression. Siberian ginseng is defined under ginseng. Bilberries (the fruit) as shown. Cat claw comes under catclaw. *Uncaria guianeses* is only one of 10 species defined; although I do not have *U. tomentosa*.

Under chemical compounds I included allicin, alliin, and diallyl disul (under *Allium sativum*). Similarly given are ginsenosides and ginkolides and eleutherosides. Under chromatography, you will find GC, TLC, etc.

I should have included under serials the various newer herbal journals.

George M. Hocking, Ph.D.
Auburn, Alabama

We are grateful for Professor Hocking's clarification of our oversights reflected in our review of his voluminous dictionary. His comments will make an already comprehensive reference even more useful. — Mark Blumenthal

STRIP MINING OF ECHINACEA

I am fortunate to be working with a graduate student who is writing her thesis on the wildcrafting of *Echinacea angustifolia* from eastern Montana. She's gone to areas hard hit to talk with local folks, local buyers, harvesters, and herb manufacturers. She has taken photos of hundreds of holes in the hills (no, they don't bother to fill them back up). Photos of a tool designed to make the digging more efficient. Photos of children holding up huge (and probably very old) roots from a "contest" to find the biggest roots!

The short of it is that there are two major companies, dozens of medium-sized companies, and a couple dozen entrepreneurs who are strip-mining Montana of every last Echinacea root. And they are moving into Wyoming right now.

So, what can I do? I can't stop the harvesting at the source because these people are either poor and unconnected to the Earth or helpless to stop the constant digging. The only thing I CAN do is to inform herb manufacturers of the facts. The main fact is that if they are buying ANY wildcrafted Echinacea they are responsible for encouraging the strip mining of Echinacea and the resulting degradation of American prairie lands. They can no longer pretend they don't know about the strip mining. The truth is out!

Robyn Klein
Bozeman, Montana

*Wildcrafting is creating problems everywhere. Here in Manitoba there are problems created by the wildcrafting of narrow-leaved purple coneflower (*Echinacea angustifolia *DC., Asteraceae) and senega snakeroot (*Polygala senega *L., Polygalaceae).*

Robin Marles, Ph.D.
Brandon University,
Brandon, Manitoba

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 144345, Austin, TX 78714-4345. 512/926-4900, Fax: 512/926-2345.

PRAISE FROM AN HERBALIST

ABC and HRF have accomplished fantastic feats over the years, and, as an herbalist, I very much appreciate the efforts of your dedicated staff. *HerbalGram* has made a big difference in people's understanding of medicinal plants and the politics surrounding their use in our culture. Although as an herbalist I would like to see more herb methodology presented (models such as Eclectic, Ayurveda, and TCM). Sigh. Well, a publication must keep its focus, after all and must temper all that controversy. But with cancer coming on as the number one cause of death in the U.S. by the year 2000, and the fact that many alternative treatments are showing more promise than toxic Western cancer treatments, I have hope.

Robyn Klein, A.H.G.
Bozeman, Montana

PICTORIAL HISTORY LACKS FEMALE FOCUS

I was disappointed that the pictorial history of botanicals in medicine and pharmacy (*HerbalGram* No. 42) included few women and them mostly in peripheral roles—e.g. standing in the background and draped in infants ("Before the Dawn of History") or languishing before Galen ("Galen and Drug Compounding") who looks like he might have experimented with steroids as well as botanicals.

I realize that public history is long on men and short on women, but I thought that publication dealing with botanicals might be interested in the "domestic" history of herbs and other botanicals—which surely included women as experimenters and practitioners.

Leigh Coffey
Portland, Oregon

Feedback has run strongly positive on this particular article—most people appreciating the fact that we were even able to obtain the rights to reprint these beautiful paintings. We believe that we are contributing a valuable service to the cause of herbal medicine by reminding people in the conventional health field that much of their heritage is tied to the development of botanical medicine. Unfortunately, the history of medicine and pharmacy has usually been written by men about men. Perhaps as we all grow personally and move into more enlightened times, the significant role that women have played in all the healing arts throughout the centuries will be given appropriate recognition. — Mark Blumenthal

WILD HARVESTED HERBS

Here at Herb Pharm, we decided last year that we will no longer purchase wild *E. angustifolia*. We did the same thing with wild American Ginseng (*Panax quinquefolius*) 3 years ago. Now we are only using organically cultivated *E. purpurea* from our own farm and the farm of a close neighbor. After years of Echinacea cultivation we are now able to grow superb quality *E. purpurea that* is as buzzy or buzzier than wild *E. angustifolia*.

However, I can not get too self-righteous here because we still buy wild Goldenseal. We are now into the second year of our Goldenseal cultivation project that will, hopefully, allow us to convert to using only cultivated plants and cease buying the wild. So far this project has cost mucho money and produced little except knowledge about what *not* to do. However, this is the price of research and we have also had enough success to encourage us to continue. What other choice do we have?

Ed Smith, Herb Pharm
Williams, Oregon

BLACK COHOSH OVERHARVESTING

The eastern forests have been reverberating recently with black cohosh (*Cimicifuga racemosa* (L.) Nutt., Ranunculaceae) digging, to the extent that the sound has reached me way out here on the West Coast. Anybody else hearing the same thing?

First, my friend Charles Perry in eastern Kentucky called me up and said "What's with the Black? There shore is a lot, I mean *a lot* of it going out right now." Then, I got a fax from a West Virginia dealer stating that he has an inventory based on harvest of 10,000 dry pounds a week. I talked to him later, and he gave me to believe that his inventory is *small* compared to some of the "big boys." Again, according to this source, he knows of a warehouse containing 200,000 pounds of black cohosh. At 40 plants to the pound, this equates to eight million plants. Hard to believe, and disturbing.

Richo Cech
Williams, Oregon

ST. JOHN'S WORT

In your *HerbalGram* No. 41 I read a letter "advertising" St. John's wort by Mr. Craig M. Jones in which he is talking about hepatotoxicity in long-term use of the herb. Did he provide, as you requested, data about liver toxicity? My son is taking SJW since three months ago with superb results. Last week he complained about pain in the liver area and went through some tests (blood, urine, liver ultrasound, etc.). The tests showed high cholesterol and triglycerides index, but no liver toxicity. But still I would like to know which is the truth about Mr. Jones's comments.

And, by the way, you are doing an extraordinary job with your magazine. Please keep enlightening us about herbs!!!

Juan Carlos Bonetto
Laguna Hills, California

To our knowledge, no data has surfaced here in the U.S. or in Europe in regard to any hepatotoxicity associated with ingestion of St. John's wort. If it did, it would have been included in the American Herbal Pharmacopoeia monograph published in HerbalGram #40 in summer 1997 as well as during the SJW conference in March in Anaheim, California, attended by top European researchers. Also, there has been no mention of such indications in the German Commission E and ESCOP monographs. Although idiosyncratic liver dysfunction can occur without being associated with a particular source, in general, St. John's wort appears to be relatively safe from a liver perspective. Also, the majority of clinical research on SJW is based on a specific proprietary standardized extract from Germany. With the proliferation of hundreds of products containing SJW here in the U.S., there is no way to guarantee the safety of all these products—at least not by reference to the clinical literature. We think this herb can still be recommended without concern about liver damage. — Mark Blumenthal

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.

Amruth: The Magazine on Medicinal Plants, published bimonthly by the Foundation for Revitalisation of Local Health Traditions (FRLHT). Focus of *Amruth* is to disseminate information on medicinal plants conservation efforts. FRLHT was formed in 1991 to help protect India's medical heritage. U.S. and other foreign subscriptions are US $30 for one year (postage included). Contact: Medplan Conservatory Society, No. 8, 1st Floor, IV Main, MSH Colony, Anandnagar, Bangalore - 560 024, India. Ph: 91 80 343 4464/333 6909. Fax: 91 80 333 4167. Email <root@frlht.ernet.in>.

Compendium of Asian Patent Medicines 1997-1998. Published results of study that screened 260 imported Asian patent medicines for heavy metals, drug, and chemicals. Purpose of study to educate public on potential danger of some patent medicines, and to provide imported Asian patent medicine information to herbal industry, public, and medical community. 304 pp. Copies available for US $10 (includes shipping) from California Department of Health Services, Food and Drug Branch, Drug Safety Team, 601 N. 7th St. MS-357, P.O. Box 942732, Sacramento, CA 94234-7320. Ph: 916/445-2263. Email <rko@hwl.cahwnet.gov>.

Complementary Medicine Journal: Frontier Medicine, published by the South African Complementary Medicine Association (SACMA), a review journal for medical doctors. Current topics in frontier, alternative, complementary, and holistic medicine, including traditional and herbal medicine. SACMA was established in 1991 to support and promote complementary medicine in South Africa, as practiced by medical practitioners, forging closer links and understanding with African Traditional Healers. Subscription rate for 4 issues per year is U.S. $47, includes air postage. Contact: Janet Sykes, SACMA, P.O. Box 18558, Wynberg, 7824, South Africa. Ph: 27 21 7978912. Fax: 27 21 7976026. Website <www.icons.co.za/africa/med/journal.htm>.

Conservation Trees Booklet, published by the National Arbor Day Foundation. Available to the public free of charge. Send name and address to Conservation Trees, The National Arbor Day Foundation, Nebraska City, NE 68410.

Integrative Medicine, the first peer-reviewed journal dedicated to integrating some of the best ideas from conventional and alternative medicine. Andrew Weil, M.D., Editor-in-Chief. A valuable information source for today's practicing physician. Published quarterly, and presenting original research, clinical studies, and literature reviews covering many areas of medicine. Volume I (1998, 4 issues) available for U.S. $48 for those outside Europe and Japan. For residents of Europe and Japan, cost is 84 NLG (Dutch Guilder). Subscription is U.S. $98 or 171 NLG. Contact: Elsevier Science, 655 Avenue of the Americas. New York, NY 10010. Ph: 888/437-4636 or 212/633-3730. Fax: 212/633-3680. Website <www.elsevier.com/locate/intmed>.

Journal of the American Nutraceutical Association (JANA). A new journal published by ANA, an alliance of individuals with interest in nutraceutical science, technology, marketing, and production. Established to develop and provide educational materials and continuing education programs for health care professionals on nutraceutical technology and science. Published 3 times per year, with frequent supplements. Annual rate $15 member, $24 non-member. Add $5 for Canada and $8 for other countries. Contact: ANA Editorial Dept., 4647T Hwy. 280 East #133, Birmingham AL 35242. Ph: 205/980-5710. Fax: 205/991-9302. Email <ana@americanutra.com>. Website <www.AmericaNutra.com>.

Journal of Ayurveda, Poetry and Philosophy. Premiere issue now available. Covering medical, intellectual, social, and spiritual issues. Features editorials, clinical studies, advice from Ayurvedic doctors on health problems, poetry, color illustrations, and more. Published by the Delhi London Poetry Quarterly, in association with the Herbal Medical Database Limited. First issue cost is 2.50 (British pound). Contact: DLPQ, 50 Penywern Rd., London SW5 9SX. Ph: 44 171-370-2255. Fax: 44 171-370-5157.

Know Your Plants...safe or poisonous? Brochure from the California Poison Control System. Send a legal-sized, stamped, self-addressed envelope to: California Poison Control System, University of California San Francisco, P.O. Box 410330, San Francisco, CA 94141-9917.

Lundellia, a new journal of botanical systematics, published by the Plant Resources Center, an independent research unit of the College of Natural Sciences, The University of Texas at Austin. Contributions by faculty, staff, students, and collaborators. *Lundellia* is named for Cyrus L. Lundell, renowned botanist and generous benefactor of the Plant Resources Center. May 1998 issue available for $20 (individuals) or $30 (libraries). Contact: Carol A. Todzia, Editor. Fax: 512/471-3878. Email <ctodzia@mail.utexas.edu>.

MedWatch: The Food and Drug Administration's (FDA) program to report serious reactions and problems with medical products such as drugs and medical devices. Consumers and health professionals can now report adverse reactions to dietary supplements including herbs directly to the FDA MedWatch program online. Website <www.fda.gov/medwatch>. Phone line for consumers, FDA Office of Emergency Operations, Ph: 301/443-1240. Health professionals may contact Ph: 800/FDA-1088, or Fax: 800/FDA-0178.

MycoMedicinals: An Informational Booklet on Medicinal Mushrooms. A new resource guide on medicinal mushrooms, with data useful to physicians, naturopaths, acupuncturists, researchers, and end-users. 48 pp. U.S. orders $5.95 (plus $3.50 S&H). Published and distributed by MycoMedia, a division of Fungi Perfecti, P.O. Box 7634, Olympia, WA 98507. Ph: 800/780-9126. Fax: 360/426-9377. Email <mycomedia@aol.com>. Website <www.fungi.com/mycomed.html>.

Natural Medicine Journal: The physician's guide to clinical research. Each monthly issue of this new journal features the most current scientific information on the use of nutrients and botanicals in natural medicine. Edited by Michael Murray, N.D. Annual subscription (12 issues) for U.S. residents $59/yr or $99 for 2 yrs. Canadian residents $79/yr or $119 for two yrs. Published by Fairfax Publications Inc., 828 High Ridge Road, Stamford, CT 06905. Ph: 203/595-0006. Fax: 203/322-5544. Email <nmedjrnl@aol.com>.

The Scientific Review of Alternative Medicine, a new journal devoted exclusively to evaluating the claims of alternative medicine. Peer-reviewed, with original research, critiques of published studies, reviews of available evidence for claims, and methods and principles of valid research. Published biannually for $50 (individuals in U.S. and Canada), or $90 (institutions and overseas). Send to SRAM, Prometheus Books, 59 John Glenn Dr., Amherst, NY 14228-2197. Ph: 800/421-0351 or 716/691-0133. Fax: 716/691-0137 Email <prometheusbooks@worldnet.att.net>. Website <www.hcrc.org/sram>.

July 15-17: International Symposium on "Worldwide Herbal Industry: Present and Future," Hong Kong. Strategies to discover, develop, approve, manufacture, market and regulate proprietary phytopharmaceuticals as safe and efficacious dietary supplements and drugs for the global market. Contact: Dr. K.P. Fung, Dept. of Biochemistry, Chinese University of Hong Kong, Shatin, Hong Kong, People's Republic of China. Fax: 852 26035123. Email <kpfung@cuhk.edu.hk>.

July 16-19: Herbs '98: International Herb Association, Lexington, KY. Dr. James Duke, Keynote Speaker. Lectures, workshops, and much more, including information on growing and using medicinal herbs. Contact: IHA, Ph: 847/949-HERB. Fax: 847-949-5896. Email <IHAOffice@aol.com>. Website <www. herbpros.com>.

July 19-24: 39th Annual Meeting of the American Society of Pharmacognosy (ASP), Orlando, FL. Topics include biodiversity and chemical ecology, innovative strategies in drug discovery, biosynthesis and bioengineering, and International Cooperative Biodiversity Group (ICBG) Update. Contact: Dr. Samir Kouzi at 318/342-1693. Fax: 318/342-3286. Email <pykouzi@alpha.nlu.edu>. Information and registration available online at <www.temple.edu/ASP>.

July 20-24: 27th Annual International Summer Herbal Seminar, Botanical Gardens, University of British Columbia. A 5-day conference celebrating herbal medicine. CE credits recognized by the Canadian Herbalist Association of British Columbia. Contact Dominion Herbal College. Ph: 604/521-5822. Fax: 604/526-1561. Email <herbal@uniserve.com>. Website <www.dominionherbal.com>.

July 31-August 2: Wild Herb Weekend, Valle Crucis, NC. Sponsored by the North Carolina Herb Association. Speakers, classes, herb walks, and more. Contact Jean Turman, NCHA, 1915 San Fernando Dr., High Point, NC 27265. Ph: 336/454-4517.

August 2-7: XXV International Horticultural Congress, Brussels, Belgium. Scientists will address state of the art horticultural research. Contact H. Wilcox, Secretary 25th IHC, c/o Ministry of SME and Agriculture, Bolwerklaan 21, 15th Floor, B-1210 Brussels, Belgium. Fax: 32 2 206 7209. Email <25ihc98@tornado.be>. Website <http//:www.agr.kuleuven.ac.be/ishs/ishshome.htm>.

August 8-14: Shamanic Herbalism: Ancient Roots of Healing, Rocky Mountain Center for Botanical Studies, Boulder, CO. This 42-hour intensive course features Stephen Buhner, Trishuwa, and Matthew Wood presenting sacred plant medicine, herbal medicine wheel, and more. Contact: RMCBS, P.O. Box 19254, Boulder, CO 80308-2254. Ph: 303/442-6861. Email <rmcbs@indra.com>. Website <www.herbschool.com>.

August 14-16: The Health Show, Austin Premiere, Renaissance Austin Hotel. Focus is on Holistic Health and Natural Therapies. Three day educational conference for anyone interested in maximizing their longevity and quality of life. Speakers include Andrew Weil, Mark Blumenthal, Alan Gaby, Michael Murray, and more. Contact InterShow, 1258 N. Palm Ave., Sarasota, FL 34236. Ph: 800/226-0323 or 941/955-0323. Fax: 941/366-5755.

August 14-16: HerbFest '98—Cultivating Herbal Wisdom, 7th annual weekend herb conference hosted by Frontier Natural Products Co-op, on Frontier's 60-acre farm in Norway, Iowa. Top herbalists and experts from around the world, including Rosemary Gladstar, Roy Upton, Christopher Hobbs, Tieraona Lowdog, Rosita Arvigo, and more. Over 40 workshops and seminars. For program guide contact: HerbFest '98, PO Box 299, Norway, Iowa 52318. Ph: 800/669-3275.

August 17-22: XIIth International Congress of Traditional and Indigenous Medicine: Transforming the Art of Healing Through Diversity, Albuquerque, NM. Sponsored by the Mexican Academy of Traditional Medicine, and the University of New Mexico. Topics include: Reality of Global Medicine, Access to Care, Traditional Pharmacy and Ethnobotany, Medicine of Tomorrow, and Incorporating Diversity. Contact: Congress, University of New Mexico, Latin American Institute, 801 Yale NE, Albuquerque, NM 87131-1016. Ph: 505/277-7049. Fax: 505/277-5989. Email <congreso@unm.edu>.

August 20-22: Saw Palmetto Symposium, Naples, FL. Presented by the American Herbal Products Association. Lectures by top experts on latest advances in the science, uses, cultivation, and economics of saw palmetto. Identify alternative solutions to the key scientific, legal, and economic issues facing saw palmetto industry, and develop retailer, medical professional, and consumer-oriented answers to the top 10 questions asked about saw palmetto. Contact: Accurate Image Marketing, 212 S. Henry St., 2nd Floor, Alexandria, VA 22314. Ph: 703/549-9500. Fax: 703/549-9074.

August 27-30: 15th Annual Breitenbush Hot Springs Herbal Conference, Detroit, OR. Three days of herbal workshops taught by some of the finest herbalists in the country in a setting of green forests, wild rivers and healing mineral hot springs. Teachers include Rosemary Gladstar, David Hoffmann, Stephen Buhner, Paul Bergner, Mindy Green, Greg Tilford, and more. Over 40 workshops for the beginning herbalist to the established clinician. Contact Autumn Summers at P.O. Box 2131, Sebastopol, CA 95473. Ph./Fax: 707/579-6209. Email <autumnsu@aol.com>.

August 28-29: Herb Days at Callaway Gardens, Pine Mountain, GA. Presentations and workshops by Art Tucker, Lucinda Mays, and more. Contact: Callaway Gardens Education Dept., Ph: 800/225-5292 or 706/663-5153. Email <education@callawaygardens.com>.

August 31-September 3: Society for Medicinal Plant Research 46th Annual Congress, Vienna, Austria. "Quality of Medicinal Drugs and Phytomedicines" is the focus. Includes botany, cultivation, plant breeding, biotechnology, processing, phytochemistry, biosynthesis, analytical methods, pharmaceutical technology, pharmacology, toxicology, and clinical studies. Contact: Prof. Dr. W. Kubelka, Institute of Pharmacognosy, University of Vienna, Center of Pharmacy, Althanstraha 14, A-1090 Wien, Austria. Email <Pharmacognosy@univie.ac.at>.

September 1-4: XIXth International Conference on Polyphenols, Lille, France. Contact: Dr. Christian Rolando, Université des Sciences et Technologies de Lille, UFR de Chimie, Bat. C3, 59665 Villeneuve d'Ascq Cedex (France). Fax: 33 1 43 37 55 51. Email <polyphen@univ-lille1.fr>.

September 2-3: NIH Workshop on Omega-3 Essential Fatty Acids and Psychiatric Disorders, National Institutes of Health, Bethesda, MD. Sponsored by the Office of Dietary Supplements, the Office of Research on Women's Health, the National Institute on Alcohol Abuse and Addiction, and the National Institute on Mental Health. Registration is free but limited. To preregister contact Linda Crafts, Ph: 301/496-4452.

September 6-9: 29th International Symposium on Essential Oils (ISEO), Frankfurt, Germany. Topics include all aspects of essential oils and related natural products ranging from analysis, biogenesis and chemistry, to biological activity and utilization. Contact: Prof. Dr. Armin Mosandl, Institut für Lebensmittelchemie, Marie-Curie-Str. 9, D-60439 Frankfurt am Main, Germany. Ph: 49 69 798 29202. Fax: 49 69 798 298 29207. Email <Mosandl@em.uni-frankfurt.de>

September 10: Botanical Identification by Thin Layer Chromatography (TLC): Advanced, Baltimore, MD, during Natural Products Expo East. TLC applications for botanicals, specific methods. Regulatory and labeling concerns, including Chinese, European, American definitions of adulteration vs. substitution; how USFDA approaches adulteration. Contact: Alpha Chemical Laboratories, 1365 Redwood Way, Petaluma, CA 94954. Ph: 800/92-ALPHA. Fax: 707/792-7309.

CALENDAR

September 10-11: 2nd Annual Pharmacovigilance '98, Washington, D.C. Management strategies for the modernization of the adverse events process. Sponsored by: IBC USA Conferences, 225 Turnpike Rd., Southborough, MA 01772-1749. Ph: 508/481-6400. Fax: 508/481-7911. Email <inq@ibcusa.com>. Website <www.ibcusa.com>.

September 13-14: Ginseng Growing Workshop and American Ginseng Conference, Ithaca, NY. Sponsored by the North American Ginseng Association. Seminars, workshops, exhibits, and panel discussions on ginseng's history, uses and cultivation, and its economic potential as an agricultural crop. Contact North American Ginseng Association, P.O. Box 127, Roxbury, NY 12474. Ph: 607/326-3234. Fax: 607/432-3293.

September 13-16: Biologically Active Polysaccharides, Oslo, Norway. Role of polysaccharides in plants, pathology, pharmacology, and more. Phytochemical Society of Europe. Contact Professor B.S. Paulsen, Farmasøytisk, Ph: 47 2285 6572, Fax: 47 2285 4402, Email <b.s.paulsen@farmasi.uio.no>.

September 14-16: Green Pharmaceuticals 98, Vancouver, Canada. This international conference will examine the opportunities and obstacles for herbal medicines, and provide a forum to discuss global strategies for the successful manufacture and marketing of herbal medicines. Bringing together pharmaceutical executives, venture capitalists, researchers, pharmaceutical technologists, medical practitioners, regulators, manufacturers, and more. Contact Intertech Corp., Ph. 207/781-9800. Fax: 207/781-2150. Email <info@intertechusa.com>. Website <www.intertechusa.com>.

September 17-19: 3rd Annual Pacific Women's Herbal Gathering: Celebrating Women and Plants, Weaving Yesterday and Today, Seattle, WA. Workshops, herb walks, herbal marketplace, and more. Contact: Sally King, P.O. Box C, Startup, WA 98293. Ph: 360/794-7974.

September 22-25: 7th International Symposium on Ginseng, Seoul, Korea. Organized by the Society for Korean Ginseng. Contact Professor Young Kim, General Secretary, #804 Seocho World Officetel, Seocho-Dong, Seoul 137-070, Korea. Ph: 82 2 880 7842. Fax 82 2 888 2933. Email <youngkim@plaza.snu.ac.kr>.

September 24-27: 21st Century Well-Being: Discovering Your Personal Medicine, Lenox, MA, sponsored by the Kripalu Center for Yoga and Health, the largest non-profit holistic educational and retreat center in the Northeast. Keynote speakers: Dr. Dean Ornish, Joan Borysenko, and Mark Blumenthal. Explore new paradigms of wellness pioneered by outstanding teachers and care givers in both complementary and conventional medicine, in a serene, retreat-center setting. Contact: Jo Ann Levitt, Kripalu Center, Box 793, Lenox, MA 01240-0793. Ph: 800/741-7252 or 413/448-3134. Website <www.kripalu.org>.

September 25-27: 10th Annual Green Nations Gathering. Long weekend includes herbal emporium, sweat lodges, and workshops by leading herbalists and Native Americans including David Hoffmann, Kathi Keville, Susun Weed, Ryan Drum, Keewaydinoquay, Janice Longboat, David Winston, and many more. Celebrating a decade of rekindling the art of herbalism. Honoring Rosemary Gladstar for her dedicated service to the world of herbs. Contact: Pam Montgomery, P.O. Box 266, Milton, NY 12547. Ph: 914/795-5238.

September 25-28: World of Aromatherapy II International Conference and Trade Show, St. Louis, MO. Presented by the National Association for Holistic Aromatherapy, and *Aromatherapy Quarterly*. Speakers, panel discussions, workshops, and more. Contact NAHA, Ph: 888/ASK-NAHA or 314/963-2071. Fax: 314/963-4454. Email <info@naha.org>. Website <www.naha.org>.

September 25-October 18: Health Expo at the State Fair of Texas, Dallas. The largest interactive consumer health event in the world will be part of the State Fair of Texas this year, with a percentage of its proceeds going to charity. Contact: HealthQuest 1, Ph: 212/779-6611. Fax: 212/685-0797. Website <www.healthquest.com>.

September 26-27: 2nd Annual Appalachian Herb Festival, Cottageville, W. Virginia. "Our Future is Our Past" is this year's theme. Two days of seminars, workshops and demonstrations on growing, harvesting, and using herbs. Contact: Debbie Alderfer, Ph: 888/483-4083 or 304/273-5421.

October 1-4: American Herbalists Guild Ninth Annual Meeting, "Clinical Herbalism—The Emerging Profession," Seattle, WA. For a registration packet, contact AHG '98, 24609 12th Avenue S., Des Moines, WA 98198. Ph: 206/233-8044. Fax: 425/486-9479. Website <www.healthy.net/herbalists/ahg98.htm>.

October 2-4: 4th Annual International Congress on Alternative & Complementary Therapies, Arlington, VA. Sponsored by the Society for Integrative Medicine and *Alternative & Complementary Therapies*. Contact: BioConferences International, 2 Madison Ave., Larchmont, NY 10538. Ph: 914/834-3100. Fax: 914/834-4329.

October 2-4: United Plant Savers Planting the Future: The Cultivation and Preservation of Medicinal Herbs, Athens, OH. This is the first Member Meeting and Working Conference to be held at the UpS Model Farm in Southeastern Ohio. Non-Members welcome. Hands-on participatory learning and practical information on the cultivation and conservation of native medicinal plants. Workshops, herb walks, herbal market, and more. Speakers include noted herbalists, plant conservationists, and herb farmers. Contact: Nancy Scarzello, UpS, P.O. Box 420, E. Barre, VT 05649. Ph: 802/479-9825. Fax: 802/476-3722. Email <rscarz@wcvt.com>. Website <http://www.plantsavers.org>.

October 3: Annual Herb Festival, Zilker Botanical Garden Center, Austin, TX, sponsored by the Austin Herb Society. Fundraiser, herbal plants, herbal products, books, information, lectures, music, and more. Contact: Cathy Slaughter, 130 Jonah Mill Rd., Georgetown, TX 78626. Ph: 512/930-0923. Fax: 512/863-2936.

October 4-7: North American Conference on Enterprise Development Through Agroforestry: Farming the Agroforest for Specialty Products, Minneapolis, MN. Sessions will focus on three major areas of specialty forest products intentionally produced through forest farming: Botanicals and Medicinals, Decorative and Handicraft Products, and Forest-Based Food Products. Contact Scott Josiah, CINRAM, University of Minnesota. Ph: 612/624-7418. Fax: 612/625-5212. Email <CINRAM@forestry.umn.edu>.

October 15-16: Phytomedicine and Consumer Protection: 5th International ESCOP Symposium, London. The symposium will discuss, in the context of consumer education, the growing use of herbs or phytomedicines across Europe and their legal status as medicinal products. Speakers will address current progress in establishing clear scientific standards of quality, safety and efficacy and the regulatory implications of these developments, including an authoritative market review of herbal medicinal products used in Europe. Contact ESCOP Secretariat, Argyle House, Gandy Street, Exeter, Devon UK, EX4 3LS. Ph: 44 1392 424626. Fax: 44 1392 424864. Email <phytonet@exeter.ac.uk>. Website <www.exeter.ac.uk/phytonet>.

October 16-18: A Medical Botany Course on the Top Ten Herbs, University of Maryland, College Park. Taught by noted ethnobotanist Dr. James Duke and Clinical Herbalist Michael Tims. Medical botany, crude herbs, clinical herbalism, and the start of tinctures. Tour Dr. Duke's farmette, and be introduced to the computer database as it relates to the Top Ten Herbs. Contact: Dr. Lucinda Jack, Ph: 301/405-7941, Fax: 301/405-8390.

October 17: New York Botanical Garden Book and Print Sale, Bronx, NY. Find a book bargain or literary treasure among the thousands of volumes on gardening and horticulture, landscape design and architecture, the environment and conservation, and much more. Botanical prints will also be featured. Contact: NYBG, Ph: 718/817-8700.

October 19-20: Dietary Supplements: Strategies to Support the Regulatory Process, sponsored by NMHCC/Biotech, Philadelphia PA. Learn strategies to promote products and navigate regulatory pathways. Design clinical studies efficiently and with a higher probability of efficacy. Incorporate European data into U.S. product claims, and much more. In U.S. call 888/670-8700. Outside U.S. call 941/373-1290. Fax 941/373-1638. Email <register@nmhcc.com>. Website <www.biotech.nmhcc.org>.

October 24: Third Annual Commercial Herb Growing Conference, Richmond Hill, Ontario, Canada. This year's topics include industry trends, field production, greenhouse production, processing, value-added products, research, marketing, and government regulations. Crops to be discussed include echinacea, St. John's wort, basil, burdock, valerian, fresh-cut herbs, Chinese herbs, and more. Contact Richters Herbs, Goodwood, Ontario. Ph: 905/640-6677. Fax: 905/640-6641. Email <orderdesk@richters.com>.

October 31 - November 7: 5th Annual Peruvian Amazon Pharmacy from the Rainforest Workshop. Expedition includes accredited Continuing Education workshops and field excursions led by prominent experts in fields of phytomedicine, pharmacognosy, and ethnobotanical and ethnobiomedicinal research, including Dr. James Duke, Mark Blumenthal, and others. Explore the 1/4-mile Canopy Walkway over 115 feet above the rainforest floor. Contact Ginger Webb, American Botanical Council. Ph: 512/331-8868. Fax: 512/331-1924. Email <gingerw@herbalgram.org>.

November 8-11: New Crops & New Uses: Biodiversity & Agricultural Sustainability, Phoenix, AZ. Sponsored by the Association for the Advancement of Industrial Crops (AAIC), Purdue University Center for New Crops & Plant Products (PUCNC), and New Uses Council, Inc. (NUC). Contact: David Dierig, AAIC, c/o U.S. Water Conservation Laboratory, 4331 East Broadway Rd., Phoenix, AZ 85040-8807. Ph: 602/379-4356, ext. 265. Fax: 602/379-4355. Email <ddierig@uswcl.ars.ag.gov>. Website <www.aaic.org>.

November 12-14: The Florida Health Show, Disney's Coronado Springs, Lake Buena Vista, FL. This year's focus is Living Longer and Quality of Life. Speakers include Dr. Ruth Westheimer, Bernie Siegel, Michael Murray, and many more. Contact InterShow, 1258 N. Palm Ave., Sarasota, FL 34236. Ph: 800/226-0323 or 941/955-0323. Fax: 941/366-5755.

November 20-22: A New Holistic Medicine for the 21st Century—Toward an Integrative, Cross-Disciplinary Healthcare Ecosystem, New York, NY. With Tibetan, Chinese, Ayurvedic, and Native American practitioners, prominent holistic MD's, nurses, homeopaths, naturopaths, and more. Contact New York Open Center. Ph: 212/219-2527. Fax: 212/226-4056. Email <nyocreg@aol.com>. Website <www.opencenter.org>.

November 23-28: Sixth International Conference of Ethnobiology, "Ethnobiology: Dialogue Between Cultures Forging Meaningful Partnerships," New Zealand. Topics include cultural perspectives on conservation, use of the Internet, trade industry, sustainable development, intellectual property rights, and ethnobotanical research methodologies. Field trips/working sessions to Maori communities. Contact: Tom Carlson, 213 E. Grand Ave., South San Francisco, CA 94080. Email <tcarlson@shaman.com>. Or contact Maurice Iwu, c/o BDCP-ICE, 11303 Amherst Ave., Suite 2, Silver Spring, MD 20902. Ph: 301/962-6201. Email <ICE_6@msn.com>.

December 6-11: 1st European Ginseng Congress, Marburg, Germany. Topics include agriculture, agribusiness, biology, biochemistry, medicine, and pharmacy. Contact Prof. Dr. Hans Christian Weber, Morphologie und Systematik der Pflanzen, Fachbereich Biologie, Philipps-Universität Marburg, 35032 Marburg, Germany. Ph. 49 6421 282091. Fax: 49 6421 282057. Email <weberh@mailer.uni-marburg.de>. Website <http://staff-www.uni-marburg.de/~b_morpho/tagung.html>.

December 10-12: 5th Annual Symposium on Complementary Health Care, Exeter, UK. Topics include acupuncture, homeopathy, phytotherapy, placebo, safety, spinal manipulation, therapeutic relationship, and more. Contact Symposium Secretariat, Dept. of Complementary Medicine, Division of Community Health Science, Postgraduate Medical School, University of Exeter, 25 Victoria Park Road, Exeter, Devon EX2 4NT, UK.

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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 144345, Austin, TX 78714-4345. 512/926-4900. Fax 512/926-2345.

CORRESPONDENCE COURSES AND SEMINARS

Aromatherapy Studies Course/Jeanne Rose. Correspondence, certification, in-person intensives. 160 CEU provided, California Board of RN Provider #CEP11659. Info: 219 Carl St., San Francisco, CA 94117 or FAX 415/564-6799.

Green Terrestrial offers herbal and earth awareness workshops, quality herbal products, and apprenticeships in an atmosphere of co-creative partnering with the Earth. Brenda Nicholson & Marina Nelson, 328 Lake Ave., Greenwich, CT 06830. 203/862-8690.

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.

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.

Medical Botany, the Top Ten Herbs: A course taught by noted ethnobotanist Dr. James Duke and Clinical Herbalist Mr. Michael Tims at the University of Maryland College Park, Oct. 16-18. Introduction to medical botany, crude herbs, clinical herbalism and the start of tinctures. Learn about growing the herbs, take a tour of Dr. Duke's farmette, and be introduced to the computer database as it relates to the Top Ten Herbs. Cost $400. Call Dr. Lucinda Jack at 301/405-7941; fax 301/405-8390; email <evening@life.umd.edu>; http://www.life.umd.edu/evening/medicalbotany.html.

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 21 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 21 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 or <www.school of naturalhealing.org> or <snh@qi3.com>

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SCHOOLS

Academy of Oriental Medicine - Austin. Accredited three-year, 2,800-hour Oriental medicine program: includes extensive training in Oriental herbs (600 hours); AOBTA, 1 year; 600-hour Oriental body work programs. Financial aid is available. Approved for all states. 800/824-9987.

Australasian College of Herbal Studies offers internationally recognized Distance Learning Diploma & Certificate Programs in 13 natural therapy modalities, including Aromatherapy and Herbal Medicine. The College is a Continuing Education Provider with the California Board of Registered Nursing, CEP #12115, and AMTA. Personal tutoring accompanies all programs. Call for a free Prospectus: 800/48-STUDY (78839). <achs@herbed.com> <http://www.herbed.com>

Brigid's Academy of Healing Arts: Study herbalism and Celtic mysticism in Ireland! Directed by Gina McGarry, founder of the Oregon School of Herbal Studies. 3-month residential programs in spring and fall. 2-week residential programs in summer. For further info., write or e-mail stateside contact: Kate Marden, PO 191, Lagunitas, CA 94938. email <bridgid33@aol.com>

Clinical Chinese herbology - medical, health professionals' training/certification since 1987. Case emphasis, residential intensives, international distance/Internet learning. Rocky Mountain Herbal Institute, P. O. Box 579-C, Hot Springs, MT 59845. 406/741-3811. <rmhi@rmhiherbal.org> — <www.rmhiherbal.org>

Goddard College, a leader in progressive education since 1938. Goddard offers graduate and undergraduate study in Health Arts Education: Nature, Culture & Healing. Health Arts Education is an interdisciplinary degree. The program builds links between natural and ecological sciences. Western and non-Western medicine, alternative systems of healing, and community health promotion and education. Study modes available: campus-based undergraduate program or a low-residency, off-campus BA or MA. For more information write, call, or email: Office of Admissions, Goddard College, Plainfield, VT 05667; 802/454-8311; email <admissions@earth.goddard.edu> Home page: http://www.goddard.edu

Homeopathic College of Canada and Humber College offer a three-year full-time Homeopathic Medicine and Sciences Programme with extensive Clinical Externship. Accelerated Heath Professionals Programme and Introductory Correspondence courses and Seminars available. Accepting applications for Sept. 1998. Inquire Office of the Registrar, 280 Eglinton Ave. East, Toronto, ONT. M4P 1L4. 416/481-8816. 1/888/Dr. Homeo (374-6636).
email<info@homeopath.org>
website:www.homeopath.org

The Institute of Dynamic Aromatherapy - Correspondence, certification, in-class training programs. Contact: IDA 800/260-7401 or write 2000 2nd Ave., #206, Seattle, WA 98121.

New Mexico College of Natural Healing's 400+-hour, nine month Herbal Medicine Program is to bring people to plants, honor the earth, and to prepare competent, caring, intuitive herbalists for tomorrow. Our curriculum is designed as a real-life hands-on experience in the natural world of medicinal plants. Desert and forest environments play host to the ancient oral tradition, where our students receive the unique experience of 100+ hours of field instruction. Classroom hours range from essential science to shamanism. Students learn the practical application of Herbal Medicine as they intern at Bear Creek Herb Store and their Herbal Gardens. Classes begin September 1998. Free catalog. Phone 1/505/538-0050.

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.

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.

Sweetgrass School of Herbalism—Six-day classes: Plant Identification for Herbalists and Phytopharmacy Methods. See http://www.wtp.net/~rrr/schedule.html. SSH, 6101 Shadow Circle Dr., Bozeman, MT 59715.

Wild Rose College of Natural Healing — established 1975, offering correspondence and part-time classroom courses in Herbology, Pharmacognosy, Nutrition, Vitamins & Minerals, Biology, Physiology, Iridology, and many other fields. Diploma programs for Master Herbalist (two years), and Wholistic Therapist (three years). Call or write for a detailed brochure. #400, 1228 Kensington Rd. NW, Calgary, Alberta, CANADA T2N 4P9. Ph: 888/WLD-ROSE.

PUBLICATIONS

American Herb Association Quarterly Newsletter — $20/yr. AHA, P.O. Box 1673, Nevada City, CA 95959.

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 Business of Herbs — Comprehensive reporting, business news, marketing hints, sources, and resources. Subscription $24/yr. Brochure/SASE from Northwind Publications, 439 Ponderosa Way, Jemez Springs, NM 87025.

Directory of 2001 unique and popular free catalogs. Gardening, crafts, and many more. Send $7.95 + $2.00 S&H to: Timely Solutions, Box 190H, Wyandotte, MI 48192.

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. email <custserv@herbalgram.org> website: http://www.herbalgram.org.

HerbalVoices: The Journal of Self-Reliant Herbalism. Sample Issue $3. Yearly subscription $12. Published Quarterly. 3936 Mt. Bliss Rd., East Jordan, MI 49727.

Herb Growing and Marketing Network— Trade association and information service for herb-related businesses. Publishes *The Herbal Connection*, a 40-page bimonthly trade journal and *The Herbal Green Pages*, an annual resource guide with over 6,000 listings; free classified advertising for members; website for herbal information and business web pages; annual Herb Business

Winter Getaway Conference; liability insurance and many more benefits. Membership $75/yr. Sample journal $6. HGMN, P.O. Box 245, Silver Spring, PA 17575; 717/393-3295; email <HERBWORLD@aol.com>.

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 Aromatherapy 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.

Journal of Herbs, Spices & Medicinal Plants— A comprehensive quarterly forum filled with recent research and valuable information about herbs, spices, and medicinal plants. Special rates: $36/1 volume (save $4); $64/2 volumes (save $16); $84/3 volumes (save $36) (4 issues per volume; U.S. individual subs only). Pharmaceutical Products Press, 10 Alice Street, Binghamton, NY 13904-1580, Tel: 800/HAWORTH, Fax: 800/895-0582. Free sample issue also available.

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.

Robyn's Recommended Reading— Book reviews, notable journal articles, and phytotherapy contents. $15/yr, 4 issues; $20/yr international. U.S. funds. RRR, 1627 W. Main, Ste. 116, Bozeman, MT 59715. Sample issue at http://www.wtp.net/~rrr.

Washington Insight — A quarterly newsletter designed to keep natural products scientists abreast of important happenings in Washington, D.C., that may affect them and their institutions. Read interviews with Congressmen, Senators and government officials; reports on key Congressional hearings, FDA, NIH, HIH Offices of Alternative Medicine, Dietary Supplements; "Update on Promising New Compounds" — what's hot from marine organisms, plants, fermentation products. In addition to the newsletter, subscribers receive Funding Alert, pre-advertised information on funding opportunities. Annual subscription, U.S. personal/$45; institutional/$85. Foreign: personal/$52; institutional/$95. Contact: Washington Insight, 11000 Waycroft Way, North Bethesda, MD 20852. 301/881-6720, Fax: 301/984-7372.

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