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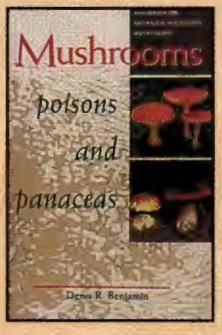

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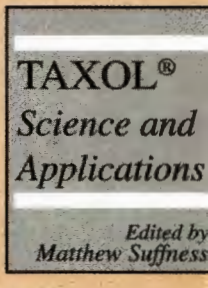

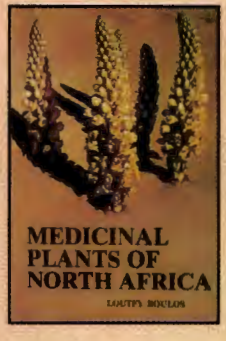

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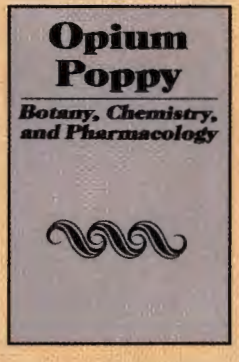

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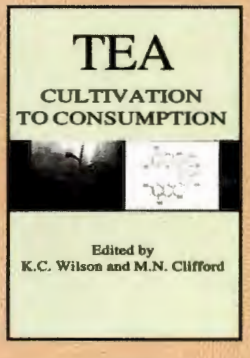

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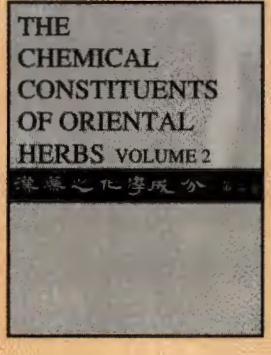

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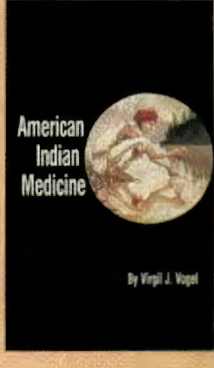

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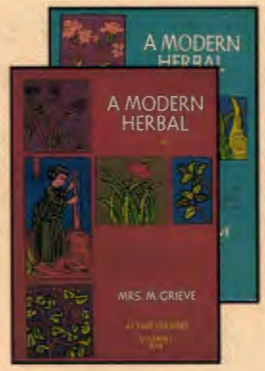

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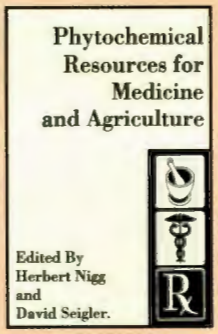

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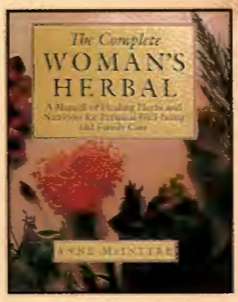

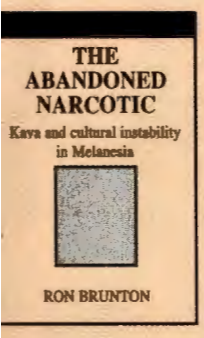

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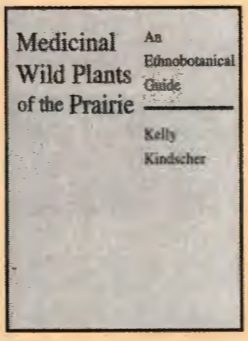

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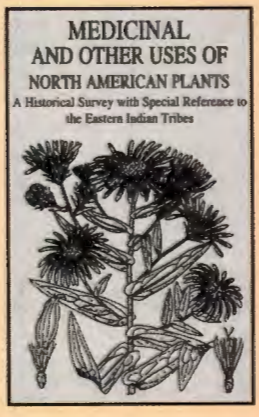

THE USEFUL WILD PLANTS OF TEXAS, THE SOUTHEASTERN AND SOUTHWESTERN UNITED STATES, THE SOUTHERN PLAINS AND NORTHERN MEXICO VOL. I
by Scooter Cheatham, Marshall Johnston, and Lynn Marshall. 1995. This first of a 12-volume set includes 268 species in 86 plant genera from *Abronia* to *Arundo*. Each species is illustrated with color photographs, a range map, and description. Widely divergent economic uses are covered: from food, medicine, and cosmetics to building materials, ritual and religious, and agricultural equipment. Hardcover. $125. #B135 (See review on pages 66-69 of this issue.)

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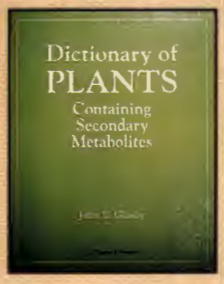
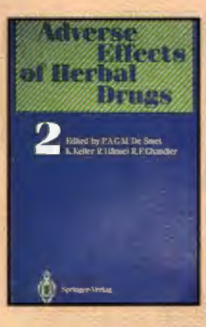


DICTIONARY OF PLANTS CONTAINING SECONDARY METABOLITES
by John S. Glasby. 1991. Lists plants in alphabetical order of genera that have been examined for the presence of chemical compounds. Compounds are listed according to type, such as alkaloids, terpenoids, and coumarins. Hardcover, 488 pp. $220. #B072



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Ed. by P. A. G. M. De Smet, K. Keller, R. Hansel, R. F. Chandler. 1992. From an international group of researchers. Reports side effects of herbs in a responsible scientific manner. Review of herbs' legal status in many countries. Softcover, 275 pp. $79. #B049

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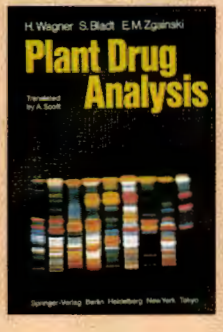
PLANT DRUG ANALYSIS
by H. Wagner, S. Bladt, E. M. Zgainski. 1995. 2nd edition. Invaluable and unique aid for all involved with herb production and analysis. 165 color plates, each showing 6 TLC chromatograms. Essential for every analytical lab. Hardcover, 320 pp. $198. #B083



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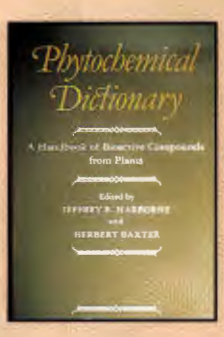

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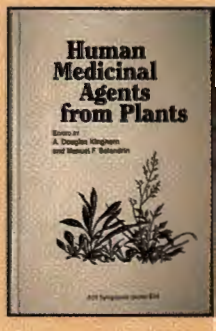

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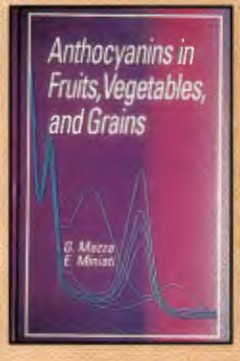

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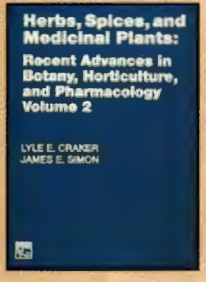

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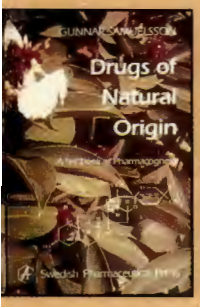

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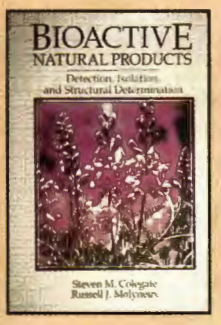

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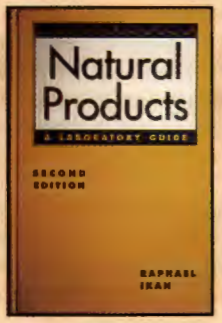

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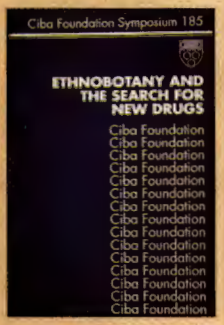

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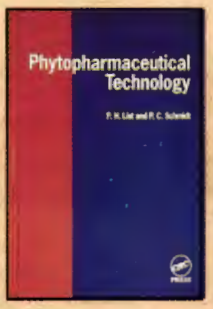

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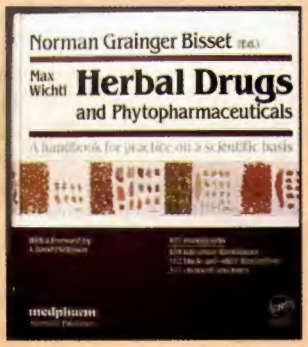
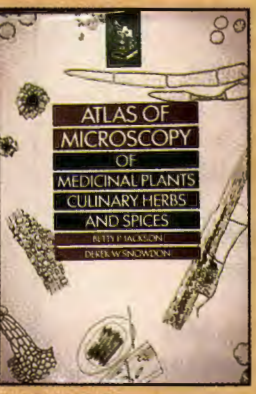
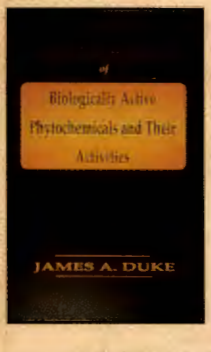




ATLAS OF MICROSCOPY OF MEDICINAL PLANTS, CULINARY HERBS, AND SPICES
by Betty Jackson and Derek Snowden. 1990. This reference book shows microscopic shapes of powders or fragments of plant materials that are commonly used as drugs, flavorings, or additions to food. Hardcover, 257 pp. $71. #B090



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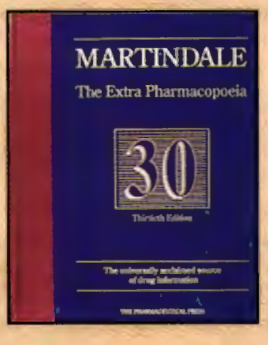

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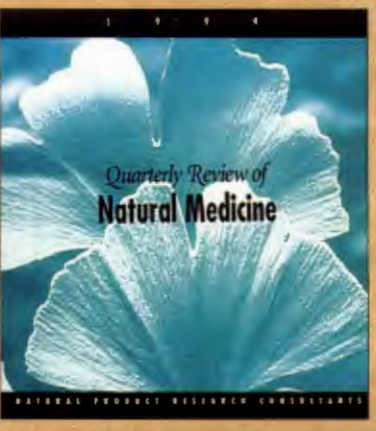
Ed. by James Reynolds. 1993. First published in 1883. 5,132 monographs organized by uses and actions. Contains a list of countries where monographed herbs are currently official. Lists toxicity of numerous international drugs. Includes a section describing 46,000 proprietary medicines from 14 countries, the active ingredients, a summary of information, and much more! Indexed, full cross reference. Hardcover, 2,363 pp. $275. #B065



1994 QUARTERLY REVIEW OF NATURAL MEDICINE
Ed. by Donald Brown, N.D. 1994. Set.
A comprehensive guide to current information in natural healthcare. Includes research summaries of clinical studies in the fields of nutrition, herbal medicine and natural healthcare, from over 3,000 professional journals. Binder. $85. #B122

For select book reviews, see pages 66-74.
For other book topics, see pages 80-85.
To order, see page 87.

Dear Reader

As we go to press, the FDA still has not yet issued its proposed regulations to implement the Dietary Supplement Health and Education Act of 1994 (DSHEA). FDA had previously indicated that the rules would be published for public review and comment by midyear. Depending on when the proposed rules are published, there will be little time for interested consumers and industry to respond with comment before the final rules are published. Presumably, Congress will have to grant FDA an extension to meet the terms specified in the Act. This leaves manufacturers in a quandary as to how the Agency intends to regulate the growing number of "structure and function" statements being made on herb and other dietary supplement labels as well as the many other issues FDA must address in this rulemaking.

FDA has lifted its import alert on the herb stevia, which some manufacturers had previously marketed as a non-caloric, natural sweetener in herbal teas. In accordance with DSHEA, which says that herbal dietary supplements cannot be regulated as food additives requiring prior approval from FDA, stevia can now be legally imported *so long as it is labeled for an intended use as a dietary supplement.*

In the meantime, marketers of European phytomedicines have continued petitioning the FDA to review foreign data as part of the OTC drug review process. We present the latest development in this area in our article on the two citizen petitions requesting OTC drug status for valerian as a nighttime sleep aid and ginger as an anti-emetic. FDA has now taken over three years without responding to the original request for acceptance of foreign data; sources indicate that a response from FDA may be coming soon.

Herbs and medicinal plants play many roles in our culture and history. In this issue we present Mark Packer and James Brandt's fascinating article on the ethnobotanical basis for a number of drugs previously and/or currently used in ophthalmology. We also feature Rosa Towne's beautiful paintings of the medicinal plants mentioned in the works of Shakespeare.

We have a report on the traditional herb neem from India and the recent controversy regarding intellectual property rights and attempts to patent compounds from this versatile plant. We are happy to report on the publication of an exciting new encyclopedia of useful plants in Texas, efforts to help conserve native American plants, and our recent Pharmacy from the Rainforest Ecotour in Belize, and much more.

Mark Blumenthal

HERBALGRAM

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Number 35 • Fall 1995

Departments

Features

Above: **Frangipani**, *Plumeria rubra* in Belize.
Photo by Mark Blumenthal
Cover: **Alyssa Doolittle** a participant in ABC's Ethnobotanical Eco-tour to Belize. Photo by Donna White.
For more on the Belize eco-tour, see page 34.

HERBALGRAM is printed on recycled paper.

COSTA RICAN ODYSSEY

On August 4, 1995, as part of a continuing series of expeditions sponsored by ABC, the Texas Pharmacy Foundation, and International Expeditions, 26 travelers departed for Costa Rica on a work-study trip, "Pharmacy from the Rainforest."

Of the 26 participants, there were eight pharmacists (who received up to 10 continuing education credits for the workshops), three medical doctors, three pharmacy students, and one university professor.

Presenters were Dr. Jim Duke, "Rainforest Remedies," and "Nutrition and the Tropical 'Food Farmacy'," Dr. Ana Sittenfeld (Institutio Nacional de Biodiversidad): "Chemical Prospecting in Costa Rica," and Mark Blumenthal: "Herbal Remedies & Natural Products in Today's Pharmacy."

Classroom workshops included field trips into the rainforests to observe firsthand the green pharmacy provided by nature. In addition to attending workshops, the group visited Ark Herb Farm and heard Tommy Thomas describe some of the local uses of his terraced garden which contains 500 medicinal plants.

Other highlights of the trip included the Tortuguero National Park to see nesting sea turtles, Poas Volcanic National Park and Monteverde Cloud Forest Reserve.

One more rainforest trip is scheduled for 1995—the Peruvian Amazon, October 21-28. For details on the ethnobotanical trips scheduled for 1996, see page 39 of this issue. For a review of the 1994 trip to the Peruvian Amazon, see the special Pharmacy From the Rainforest section in *HerbalGram* #33. To order a copy of this special review, see page 75 of this issue. — *Penny King*

ABC ONLINE

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ABC through America Online

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http://www.herbalgram.org
Our service provider is OuterNet of Austin, Texas.

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Use your personal computer to access our Web Page directly through your Internet service provider or through online services such as AmericaOnline and eworld. Check with your online service provider. Access to the Web requires software called Web Browsers—programs such as NetScape or Mosaic.

The *HerbalGram* "page" features current information on topics such as legal and regulatory news, the latest in medicinal plant research and profiles of herbs and herbalists. Writer's and artist's guidelines will also be posted.

Other topics ABC has on the Web include ABC Mission, Educational and Research Projects, Back Packs (including *HerbalGram* indices), ABC Bookstore and Book Reviews. We are also planning an information "page" on ABC's Ethnobotanical EcoTours.

As soon as security software becomes available, browsers will be able to order *HerbalGram* and books with credit cards directly through the Web.

America Online addresses:
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Book information: Herbbooks@aol.com
Executive Director of ABC, Mark Blumenthal: HerbCowboy@aol.com
HerbalGram: HerbalGram@aol.com (send your E-mail here)
Ethnobotanical Eco-tour information: PennyKing1@aol.com

TOP FIFTEEN SELLERS IN ABC BOOKSTORE APRIL THROUGH AUGUST, 1995

Last quarter standing shown in ( ).

1. *Herbs of Choice*: Tyler (1)
2. *Herbal Drugs and Phytopharmaceuticals:* Wichtl & Bisset (2)
3. *Herbal Medicine*: Weiss (7)
4. *The Complete Medicinal Herbal*: Ody (3)
5. *The Honest Herbal*: Tyler (6)
6. *Herbal Renaissance*: Foster (new listing)
7. *Botanical Influences on Illness*: Werbach & Murray (8)
8. *Adverse Effects of Herbal Drugs, Vol. 2*: DeSmet, Keller, Hansel, & Chandler (5)
9. *Rainforest Remedies*: Arvigo & Balick (new listing)
10. *Phytopharmaceutical Technology:* List & Schmidt (10)
11. *Medicinal Mushrooms*: Hobbs (new listing)
12. *Forest Pharmacy*: Foster (new listing)
13. *Pau d'Arco*: Jones (new listing)
14. *American Ginseng*: Persons (new listing)
15. *1994 Quarterly Reviews of Natural Medicine*: NPRC (new listing)

To orderbooks from the ABC BookStore, see page 87.

PRESIDENTAL APPOINTMENT FOR FARNSWORTH AND MCCALEB

An October 2, 1995 press release from the White House, Office of the Press Secretary, announced the formation of the Commission on Dietary Supplement Labels.

The Dietary Supplement Health and Education Act of 1994 (DSHEA) authorizes the establishment of a seven-member, Presidentially appointed commission to conduct a study and issue a report to the White House and Congress within two years of enactment. The commission is authorized to hold hearings, take testimony, receive evidence, and secure information directly from any federal agency. The report issued by the commission will include recommendations on regulation and legislation related to label claims for dietary supplements.

President Clinton announced his intent to appoint the following people to the commission:

Norman R. Farnsworth of Illinois is Research professor of Pharmacognosy, Senior University Scholar and director of the World Health Organization Collaborating Centre for Traditional Medicine at the College of Pharmacy, University of Illinois at Chicago. Dr. Farnsworth is an expert in pharmacognosy, medical botany and related sciences. He received his undergraduate and master's degrees in pharmacy studies from the University of Massachusetts, and his Ph.D. from the University of Pittsburgh. Dr. Farnsworth is an ABC Trustee and a member of the HRF Professional Advisory Board.

Robert S. McCaleb of Colorado is the president and founder of the Herb Research Foundation, a nonprofit research and education organization. He was Research Director of Celestial Seasonings for 14 years and chaired the Research Committee of the American Herbal Products Association (1977 to 1989) and the American Herbal Products Association (1983 to 1989). Mr. McCaleb is considered an expert in both the scientific and industrial aspects of dietary supplements. He studied cellular biology and botany at the University of Texas and the University of Colorado, and is a Ph.D. candidate in Ethnobotany. McCaleb is *HerbalGram*'s Technical Editor.

Malden Nesheim of New York is internationally respected for his knowledge of nutritional issues and is one of the leading nutritional scientists of the country. He retired this year as Provost of Cornell University, a position he has held since 1989. He is a professor of nutrition and served as the director of the Division of Nutritional Sciences at Cornell from 1974 to 1987. Dr. Nesheim is a member of the Food and Nutrition Board of the Institute of Medicine, National Research Council and has served on the Board of Scientific Councilors for the U.S. Department of Agriculture. He is a member of the American Academy of Arts and Sciences. Dr. Nesheim received his B.S. and M.S. degrees from the University of Illinois at Urbana, and his Ph.D. in Nutrition from Cornell University. Dr. Nesheim will serve as chair of the commission.

Annette Dickinson of Maryland is the director of Scientific and Regulatory Affairs for the Council for Responsible Nutrition, an association of nutritional supplement manufacturers. She is an expert in the area of dietary supplement manufacture, distribution, and use. Dr. Dickinson earned both her M.S. in Food Science and Ph.D. in Nutritional Sciences from the University of Maryland.

Shiriki K. Kumanyika of Pennsylvania is a professor and associate director for epidemiology at the Penn State University School of Medicine. She is an expert in nutritional science, epidemiology, and public health. Dr. Kumanyika received her M.P.H. from Johns Hopkins University and her Ph.D. in Human Nutrition from Cornell University.

Margaret Gilhooley of New Jersey is a professor at the Seton Hall Law School who teaches Food and Drug Law, in addition to Tort and Administrative Law. Prior to teaching at Seton Hall, she developed expertise in the food and drug field as an attorney for the Food and Drug Administration. Ms. Gilhooley received her B.S. from Fordham University and her J.D. from Columbia School of Law.

Anthony T. Podesta of Washington, D.C., is the chairman of Podesta Associates, Inc., a national public policy consulting and public affairs firm. Mr. Podesta is an attorney and a legislative expert on issues regarding food and drug law. Mr. Podesta is the founding president of The People for the American Way and remains active on its board of directors. He is a member of the Community and Friends Board of the John F. Kennedy Center for the Performing Arts and a board member of the National Organization on Fetal Alcohol Syndrome.

OTHER HRF NEWS

STRUCTURE / FUNCTION PROJECT

The latest major project of the Herb Research Foundation is researching and documenting structure/function claims for herbal products as dietary supplements. Under DSHEA, companies may now state what effect herbal ingredients have on the structure and/or function of the body. These claims must be backed by substantiating documentation in the form of scientific studies, and the products for which claims are made must deliver an appropriate quantity and quality of the herb for the research to support a claim. HRF's information services provide scientific documentation and evaluation, and utilize marketing and legal consultants to draft and review appropriate label copy to assist companies who are redesigning products and labeling.

HRF WELCOMES MINDY GREEN

We welcome new staff member Mindy Green. Mindy is the former director of the California School of Herbal Studies, and is on the staff of the Rocky Mountain School for Botanical Studies. She is co-author of the recently published *Aromatherapy, a Complete Guide to the Healing Art*. Mindy brings her remarkable background of herbal expertise as director of Member and Customer Services.

LATEST ADDITION TO OUR ADVISORY BOARD

Dr. Robert Rountree, M.D., was recently named to HRF's Professional Advisory Board. Dr. Rountree is the founder of Helios Health Center in Boulder, Colorado and co-author of Smart Medicine for a Healthier Child.

INTERNATIONAL ASSISTANCE

HRF recently completed a report for the country of Mali, West Africa, on the botanicals industry, and began a research project to assist this, one of the world's most impoverished countries. The Foundation is working to develop sustainable herb agriculture in Mali for domestic, regional, and international use. This summer, Rob McCaleb was on the faculty of Purdue University's International Training Program in New Crops: Aromatic and Medicinal Plants, speaking on regional and international marketing of herbs.

HRF WORLD WIDE WEB ADDRESS:

http://sunsite.unc.edu/herbs/

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Dandelion	Pau d'arco	Women's herbs

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Tea tree, *Melaleuca alternifolia*. Photo courtesy of Thursday Plantation, Inc.

TOPICAL TEA TREE OIL FOR NAIL FUNGUS

Summary: 117 patients with distal subungual onychomycosis (fungal infection of the nails) were entered in a double-blind, multicenter, randomized controlled trial for six months. Participants received twice-daily applications of either 1 percent clotrimazole (CL) solution (topical antifungal drug) or 100 percent tea tree (TT) oil. Debridement (removal of foreign material and dead or damaged tissue) and clinical assessment were performed at 0, 1, 3, and 6 months. Cultures were obtained at 0 and 6 months. After 6 months, the two treatment groups were comparable based on culture cure (CL = 11 percent ,TT = 18 percent) and clinical assessment documenting partial or full resolution (CL = 61 percent, TT = 60 percent). At three month follow-up, approximately 50 percent of each group reported continued improvement or resolution (CL = 55 percent ,TT = 56 percent).

Commentary: A previous study has looked at the topical treatment of tinea pedis (fungal skin infection of the foot) with a 10 percent tea tree oil preparation. The results were comparable to those noted for tolnaftate, an approved antifungal OTC drug used for athlete's foot. Most alternative practitioners prescribe tea tree oil for fungal infections usually use a higher concentration than 10 percent.

This new study, comparing tea tree oil to clotrimazole in the treatment of onychomycosis, reinforces the need to use a rather potent (in this case 100 percent) concentration of tea tree oil. As indicated by the study conclusions, this produces better short-term and long-term efficacy. With younger children and those with sensitive skin, a 70 percent solution may be better tolerated.

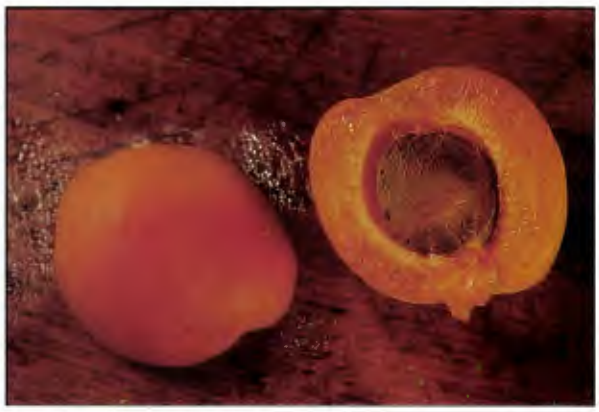
Tea tree oil certainly appears to be one herbal-derived compound that has great potential for OTC status in both the topical treatment of fungal infections and also acne vulgaris. — *Don Brown, N. D.*

References

Buck, D. S., Nidorf, D. M. & Addino, J.G. 1994 Comparison of two topical preparations for the treatment of onychomycosis: *Melaleuca alternifolia* (Tea tree) oil and clotrimazole. *Journal of Family Practice* 38: 601-5.

Tong, M. M., Altman, P. M., Barneston, R. S. *Australian Journal of Dermatology* 33:145-149.

ALTERNATIVE CANCER THERAPY FOLLOW-UP



Apricot seed, *Prunus* spp. Photo by David Baker for *HerbalGram*

Three naturopaths at the National College of Naturopathic Medicine (NCNM) have published a follow-up study evaluating the success rates of three alternative cancer therapies. The team, led by Professor of Nutrition Steve Austin, N.D., noted that, despite billions of dollars spent on research, both cancer incidence and cancer mortality continue to rise in the U.S. The editor of *The New England Journal of Medicine* puts it more bluntly: "We are losing the war against cancer."

The NCNM study evaluated the results of three alternative approaches: Gerson, Contreras, and Hoxsey. Gerson therapy prohibits smoking, alcohol, and animal fat, and includes a diet of fruits, vegetables, and anti-oxidant rich foods. The Contreras therapy includes Laetrile (the controversial cyanide-containing substance derived from apricot seeds), a vegan diet, proteolytic enzymes, and anti-oxidant supplements. Hoxsey therapy is based on botanical medicines.

The results were disappointing for Gerson and Contreras, with all Contreras patients dying in an average of seven months, and all but one of the Gerson patients dying in an average of nine months. The authors comment, "We have shown that both Gerson and Contreras therapies, like their conventional counterparts, were unable to cure a wide variety of advanced cancers."

However, the Hoxsey treatment fared a bit better. Ten of the 16 patients died, with an average survival of 15.4 months. The survival time cannot be compared to the other therapies because many of these had less serious cancers than those in the Contreras and Gerson groups.

The other six of the 16 Hoxsey patients survived and claim to be disease-free with an average follow-up time of 58 months. These included two lung cancer patients, one of whom had advanced disease; two melanoma patients, one of whom had level 5 disease; a patient with recurrent bladder cancer; and a labial cancer patient. The study's authors were cautiously optimistic about the results. After cautioning that their results are uncertain due to the "preliminary nature of their study," they note, "several long-term survivors had very poor initial prognoses. Possible explanations [for their survival] might include misdiagnosis, small sample size, and erroneous information from patients. However, we believe any apparently successful treatment of late stage lung cancer and melanoma should provoke interest." The authors note that though the American Cancer Society has condemned the Hoxsey formula as useless, their condemnation includes no clinical trials, leaving this study as the only known study to evaluate clinically the effectiveness of the Hoxsey treatment. — *Rob McCaleb*

[Austin, S., Baumgartner, Dale, E., DeKadt, S. "Long term follow-up of cancer patients using Contreras, Hoxsey and Gerson therapies." *Journal of Naturopathic Medicine*. 1994: 5(1), 74-76.]

ESSENTIAL OILS FOR FAST RELIEF OF HEADACHE PAIN

External applications of mixed essential oils have long been used for relieving stress and headaches. Numerous brands and formulae of analgesic oils and balms are available, some dating back thousands of years. Long valued and recognized for relieving sore muscles and joints, their traditional use for relieving headaches has not been researched previously. Such preparations, usually containing peppermint, eucalyptus, and other oils, are rubbed on the temples, forehead and other areas to relieve headache pain. Researchers at Germany's Neurological Clinic of the University of Kiel conducted a randomized, double-blind clinical trial of peppermint and eucalyptus oils against headache. Thirty-two healthy subjects tried four different test preparations: a placebo with traces of peppermint eucalyptus oils, a preparation containing both peppermint and eucalyptus oils, and preparations containing peppermint or eucalyptus oil with traces of the other oil to elude detection of the test preparation. Both preparations containing peppermint oil were effective in some measurements, while that containing only eucalyptus performed no better than the placebo. The preparation containing nearly pure peppermint oil was the most effective of the four preparations tried. The study provides fairly strong substantiation for the use of essential plant oil preparations against headaches, at least "experimental" headaches. — *Rob McCaleb*

[Gobel, H., Schmidt, G., Soyka, D. 1994. Effect of peppermint and eucalyptus oil preparations on neurophysiological and experimental algesimetric headache parameters. *Cephalalgia*. 14, 228-234.]

CHINESE HERBAL COMBINATION FOR ACUTE BRONCHIOLITIS IN CHILDREN

Summary: Ninety-six children with acute bronchiolitis were randomized into three groups to receive one of three treatments: the Chinese herbal combination *Shuang Huang Lian* alone, the herbal combination with antibiotics (lincimycin or cephazolin), or antibiotics alone. [Ed. note - The antibiotic dosages used were the same whether administered alone or in herbal combination.] The herbs were prepared by the school pharmacy and administered by intravenous infusion for seven days. The main outcomes were symptomatic improvement in cough, fever, wheezing, chest signs, and duration of stay in hospital. The average duration of symptoms from the beginning of treatment was 6.2 days in the two groups treated with herbs versus 8.6 days in the antibiotic-only group. The average reductions in symptoms for herb treatment versus antibiotics were 3.1 to 1.5 days for fever, 9.1 to 6.1 days for cough, 6.5 to 4.1 days for wheezing, and 7.2 to 4.9 days for chest crackles. No adverse reactions to the herbal treatment were noted.

Comments/Opinions: The following study was completed at the First Hospital of Harbin in conjunction with the Medical University of Harbin, China. *Shuang Huang Lian* is a combination of the flower buds of *Lonicera japonica*, the root of *Scutellaria baicalensis*, and the fruit of *Forsythia suspensa*. The delivery form is a 20 ml ampoule which is diluted in 100–200 ml of 10% dextrose. The dosage varies according to age: 20 ml for children under 6 months, 40 ml for 7–36 months, and 60 ml for children over 36 months.

Respiratory syncytial virus infections in young children, one of the causes of bronchiolitis, are a major cause of acute, reactive airway disease in young children and a major source of hospital admissions in this age group. One of the researchers is now studying a nebulized preparation of *Shuang Huang Lian* at the Beijing Children's Hospital. Preliminary results suggest that it is equally effective in this form.

Not being an expert in traditional Chinese herbal combinations, I recommend that readers interested in exploring this area further refer to Dr. Dan Bensky's fine books on Chinese herbalism, *Chinese Herbal Materia Medica* and *Chinese Herbal Medicine—Formulas and Strategies* [both available from ABC Bookstore]. — *Don Brown, N.D.*

[Kong X. T., Fang H. T., Jiang, G. Q. *et al.* 1993. Treatment of acute bronchiolitis with Chinese herbs. *Archives of Disease in Childhood* 68: 468–71.]

GINKGO USE FOR TINNITUS QUESTIONED

Tinnitus, or ringing of the ears, is a common problem among the elderly, but can result from a number of different causes. Deficient blood supply to the inner ear is one possible cause of tinnitus symptoms and has resulted in the use of circulatory stimulants like ginkgo for treatment. At least three studies have shown standardized extract of ginkgo leaf to be effective against tinnitus while at least two others have shown no effects.

A recent study reported in the journal *Audiology* failed to substantiate the effectiveness of ginkgo for treating this troublesome condition. Eighty patients were given Ginkgo biloba extract (GBE) in an open trial; that is, one in which all patients and researchers knew they were using ginkgo. Of the 80, 21 patients reported improvements. Twenty of those who believed they were helped by the ginkgo were then included in a double-blind placebo-controlled crossover study, which showed discouraging results. Seven patients believed ginkgo was effective, while seven preferred placebo. The other six patients found no difference between ginkgo and placebo. "Statistical group analysis in this study gives no support for the hypothesis that GBE has any effect on tinnitus." The authors noted that there were some similarities in some of the patients for whom GBE was effective, indicating that tinnitus from certain causes may respond better than the overall results indicated: "We feel that it is not possible to exclude the hypothesis that GBE has an effect on some patients." — *Rob McCaleb*

[Holgers, K., Axelsson, A., Pringle, I. Ginkgo biloba Extract for the Treatment of Tinnitus. *Audiology*. 1994: 33, 85-92.]

PLANTAGO SEEDS FOR WEIGHT LOSS

The husks of *Plantago ovata* seeds are well known as psyllium, widely used as a bulk fiber laxative. Recent research shows that granules of the whole seeds consumed with water prior to a meal can cause a spontaneous reduction in the consumption of fat and calories and a significant increase in the feeling of satisfaction, measured as "fullness," as much as three hours after the meal. A study conducted at the University of London has clearly upped the ante for double-blind clinical trial enthusiasts. Investigators used triple-blind (subjects, investigators, and statisticians) cross-over design. Seventeen female subjects were carefully chosen to eliminate those with "dieting" behavior. All were qualified as "non-restrained" eaters. Subjects consumed 20 grams of *Plantago ovata* seed granules with 200 ml of water three hours before the meal and the same quantity immediately before the meal. Two placebos were used, one consisting simply of 200 ml of water, and the other 20 grams of granules not made with plantago seeds, but instead, prepared from hart wheat semolina. Those taking the plantago preparation felt significantly fuller one hour after the meal than those using either placebo or water. They also consumed an average of 15 g less fat per day when using the plantago preparation, than the placebos. The authors admit that the number of subjects in the study is small and recommend further research using more subjects and longer test periods. — *Rob McCaleb*

[Turnbull, W. H., and Thomas, H. G. 1995. The effect of a Plantago ovata seed containing preparation on appetite variables, nutrient and energy intake. *International Journal of Obesity*. 19:338-342.]

HUPERZIA LOOKS PROMISING FOR IMPROVING MEMORY

Beijing's Institute of Mental Health investigated the active component of Huperzia, a compound called huperzine A, or fordine, in 101 patients with "benign senescent forgetfulness" (age-associated memory impairment). At the beginning of the four-week study, none of the patients were within the normal range for memory. After four weeks of treatment, over 70 percent of those in the huperzine-treated group had improved to within normal limits as measured by "memory quotient" (MQ). An additional 111 patients with Alzheimer's Disease were also tested, but with only a 10 percent improvement in MQ. The authors note, however, that there was a significant increase in another measurement of cognitive function in the Alzheimer's patients. In both tests, the onset of action appeared in two to four weeks, and side-effects reported included dizziness and gastrointestinal symptoms. These occurred in only about three percent of subjects and the side-effects were "transient and tolerable." The mechanism of action for this alkaloid is similar to that of the highly toxic alkaloid physostigmine with the exception that huperzine A is much less toxic. Huperzine acts as a "reversible central acetylcholine esterase inhibitor." This ponderous explanation means that huperzine A extends the duration of a memory nerve impulse. Current memory theory holds that this may be the key to improving memory in aging brains by strengthening the memory signal.

Long term clinical research with physostigmine in Alzheimer's patients has produced very promising results, as reported in *HerbalGram* Vol. No. 18/19. Physostigmine has shown benefits in enhancing learning in young mice as well, hence huperzine may also have general memory and cognitive function benefits. For those interested in the details, the theory is this: Acetylcholine is a neurotransmitter which is released at the synapse between two nerve cells. It stimulates the impulse from the originating cell (the one which released the acetylcholine) to be carried on by the adjacent cell. An enzyme called acetylcholine esterase then destroys the acetylcholine and terminates the nerve signal (after it has been transmitted). Scientists believe that in some memory disorders, the acetylcholine is destroyed too soon, amd the nerve impulse is too weak to be received. By inhibiting the enzyme which destroys the acetylcholine, the nerve impulse would be strengthened, or lengthened in duration. This could make the difference between something we can almost remember and a clear recollection. — *Rob McCaleb*

[Wang, Zu-xin, Ren, Qui-ying, and Shen, Yu-cun. 1994. A Double-Blind Control Study of Huperzine A and Piracetam in Patients with Age-Associated Memory Impairment and Alzheimer's Disease. *Neuropschychopharmacology*. 10:3S/part I. 763S.]

COUMARIN CORRECTION

In "Perspective on Ephedra, Ephedrine, and Caffeine Products," *HerbalGram* 34, page 27, I erroneously claimed that vanilla extract contains coumarin. Coumarin (a toxic fragrant organic compound, $C_9H_6O_2$, present in many plants) was present in some Mexican vanilla extracts which were adulterated by tonka bean extract, a natural source of coumarin, but does not occur naturally in vanilla. My example was faulty, but my point was that concentrates—like almond extract, a source of benzaldehyde—contain elevated levels of potentially toxic compounds. Toxicity is the result of total intake of a toxic compound, not concentration of the compound in a food. — *Rob McCaleb*

Seventy-five Percent of Rural Mississippi Residents Report Use of Plant Remedies

By Barbara Johnston

The findings of a survey to assess the prevalence of use of plant-derived remedies (excluding prescription drugs) conducted in 1993 by researchers at the University of Mississippi show that of the 251 persons responding, nearly three-fourths reported having used plant-derived remedies during the previous year.

A two percent random cluster sample of households (11,671) was selected from detailed transportation maps for two geographic areas in rural central Mississippi. The survey collected information on demographic, socioeconomic, and health variables; medicinal use and knowledge of 25 specific plants or plant-derived substances. The remedies include aloe vera, asafetida, briar root/blackberry, castor/castor oil, catnip, chinaberry, corn shucks/corn silks, dock/yellow dock, garlic, American ginseng, Jimson weed, lemon, life everlasting/rabbit tobacco/rabbit grass, mayapple/bitter apple, milkweed, mistletoe, nutmeg, oak, peach/peach seed/peach pit, pine/pinetop, poke/poke salad, sassafras, sage/horsemint, tobacco, and turpentine and diseases or symptoms treated with these plants. In addition, respondents were asked about their knowledge or use of any other plant-derived remedies to treat specific diseases or symptoms.

The prevalence of reported use varied among age groups and was significantly higher among persons aged 45-64 years than among those aged 18-44 years, and among those aged greater/less than 65 years.

In comparison, in a previous study of herbal remedy use among a national sample of US. residents, only three percent of respondents indicated that they had used such remedies during the preceding year. (Eisenberg, *et al.*) However, the definition of plant-derived remedies was more inclusive in this report than the definition of herbal remedies used in the national survey. In addition, higher use in the population surveyed in Mississippi may be associated with socioeconomic and cultural influences in this population, where self-treatment is an important adjunct to receiving formal health care. For example, in rural central Mississippi, only 51 percent of persons aged greater/less than 25 years had a high school diploma or higher education compared with 64 percent for the state. Although utilization rates of the health-care system in the survey area are similar to national rates, self-treatment is an important adjunct to receiving formal care in this area. (Banahan & Frate)

In addition, the term "plant-derived remedies" used in this report was broadly defined. Those remedies most frequently used were lemon, aloe, castor oil, turpentine, tobacco, and garlic. Use of poke and sassafras was also reported.

The most common reasons for using plant-derived remedies included treatments associated with the respiratory system, the skin, insect bites or parasite infestations, the cardiovascular system, and the gastrointestinal system.

According to the article, some of the remedies reported, e.g., poke and sassafras, contain pharmacologically active and potentially toxic compounds; others, e.g., turpentine and castor oil, may produce adverse effects if used inappropriately.

The reference to sassafras is somewhat controversial. In the early 1960s, FDA banned sassafras oil from root beer and other soft drinks due to its concern that the safrole in the oil was carcinogenic. In the 1970s, FDA took action against an herbal tea company's sassafras over similar concerns. However, safrole is only slightly

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Top left: **Longleaf pine**, *Pinus palustris.* One species of pine from which turpentine is derived. Photo ©1995 Steven Foster.
Center: **Sassafras**, *Sassafras albidum.* Photo ©1995 Steven Foster.
Above: **Lemon**, *Citrus limon.* Photo by David Baker. ©1995 *HerbalGram.*

FDA Lifts Import Alert on Stevia

Herb Can Be Imported Only as Dietary Supplement; Future Use as a Sweetener is Still Unclear

by Mark Blumenthal

The Food and Drug Administration (FDA) has withdrawn its import alert banning the importation of the herb stevia, as long as it is labeled for use as a dietary supplement. On September 18, 1995, Dennis K. Linsley, Acting Director, Division of Import Operations and Policy, issued a revision of the stevia alert previously imposed in May 1991.

According to a news release issued by the American Herbal Products Association (AHPA), "The revision states that stevia leaves, or the extract of stevia leaves, or stevioside are allowable for import if they are explicitly labeled as a dietary supplement, or for use as a dietary ingredient of a dietary supplement." (Sadler 1995)

Interestingly and somewhat confusingly, the revised import alert follows some of the baffling logic of the original 1991 alert, stating that stevia leaves, stevioside and foods containing stevia may still be an unapproved food additive and not affirmed as GRAS (Generally Recognized As Safe) in the U.S. if:

"Stevia is to be used in a dietary supplement for a technical effect, such as use as a sweetener or flavoring agent, and is labeled as such, it is considered an unsafe food additive. However, in the absence of labeling specifying that stevia is being or will be used for a technical effect, use of stevia as a dietary ingredient in a dietary supplement is not subject to the food additive provisions" of the Food Drug and Cosmetic Act (FDA 1995).

Stevia (*Stevia rebaudiana*) is an herbaceous member of the Compositae family and is native to Brazil and Paraguay. The leaves have been used by native peoples in this area for hundreds of years as both a tea and food ingredient. Stevia leaves became a popular ingredient in herbal teas in the U.S. during the 1980s due to their sweet, pleasant taste. The leaves are extremely sweet-tasting, many times sweeter than sucrose; one of stevia's chemical components, stevioside, is reported to be about 200 times sweeter than sucrose. Another important sweet constituent of the leaves is rebaudioside A (about 300 times sweeter than sucrose).

In May 1991 FDA issued an import alert against stevia leaves, extracts, and stevioside, thereby virtually banning its use in foods in the U.S. FDA's actions were based on its classification of stevia as a *food additive*—food additives are considered to be unsafe until proven safe—thereby requiring extensive toxicological data to be submitted by industry to satisfy FDA prior to market approval. Foods, on the other hand, are presumed to be safe and do not require premarket approval.

"The FDA may have painted themselves into a corner on this one. Their policy simply makes no sense."

On April 23, 1992, AHPA submitted a petition to FDA containing extensive data to document the safe historical use of stevia and challenging the agency's food additive classification. AHPA contended that stevia was a food, not a food additive, claiming that it had a prior safe use as a food and should be exempt from food additive status. The AHPA petition contained an extensive peer-reviewed safety review authored by Dr. A. Douglas Kinghorn of the University of Illinois at Chicago, prepared for the Herb Research Foundation. Professor Kinghorn is acknowledged as one of the world's leading authorities on plant-derived sweeteners. His review concluded that, according to the preponderance of historical and toxicological data, stevia was safe in normal food use.

AHPA later submitted additional historical use data, as requested by FDA. However, FDA never filed the stevia petition for public comment, thereby adding fuel to critics' arguments that the Agency somehow held an unreasonable bias against the herb and/or the herb industry—a point of frustration for the industry.

Under section three of the Dietary Supplement Health and Education Act of 1994 (DSHEA), FDA is prohibited from classifying dietary supplements as food additives. Thus, in response to a petition from a member of the herb industry claiming intention to use stevia as a dietary supplement, FDA has accordingly lifted its alert for stevia, *when intended as a dietary supplement*. However, if stevia were to be im-

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STEVIA

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ported into the U.S. for use as an ingredient in a conventional food, the FDA would still consider the herb potentially unsafe and thus the import alert would still stand.

This puts FDA in a somewhat difficult situation. How can it justify allowing stevia to be sold as a dietary supplement and yet at the same time hold the position that when the herb is added as an ingredient to conventional foods, it suddenly becomes unsafe? There appears to be a logical inconsistency here that will undoubtedly surface in future debate on this issue. In the words of Rob McCaleb, President of the Herb Research Foundation and a newly-appointed member of the President's Commission on Dietary Supplement Labels, "The FDA may have painted themselves into a corner on this one. Their policy simply makes no sense." (McCaleb 1995).

The stevia situation may have implications for other herbs. According to attorney Loren Israelsen, Executive Director of the Utah Natural Products Alliance, "If a dietary ingredient like stevia is recognized by FDA for use and sale as a dietary ingredient–and apparently they do not have evidence to object to it in terms of safety–why cannot that dietary ingredient be sold as part of a conventional food? Does it suddenly become unsafe as part of a conventional food?

"The whole food additive theory is based on the policy that new chemicals added to foods for a technical purpose require careful review to ensure that they are safe. But if stevia is an old dietary ingredient [i.e. "grandfathered," since it was sold prior to October 15, 1994] or a new ingredient that is being widely consumed, obviously it answers that question: No, it does not become unsafe."

Israelsen continued, "There needs to be a policy revision at FDA to explicitly state that if a dietary ingredient can be sold as a dietary supplement, it should also be allowed to be sold as a component of a conventional food unless there is compelling evidence that such use would be unsafe. It's a very important issue not just for stevia. It's the broader principle of access to safe dietary substances."

Many industry and regulatory observers suggest that this may be a way for the FDA to "save face" by allowing stevia into the U.S. as a dietary supplement under DSHEA without once again having to deal with its safety issues. Is it possible that FDA will "look the other way" if stevia once again is marketed as an ingredient in herbal teas (i.e. in a non-dietary supplement form) rather than raise an issue about its safety? The Agency will have a very difficult time proving stevia is unsafe, especially without any evidence of adverse reactions. Will the FDA continue enforcing its ban on stevia unless it is labeled and sold in supplement form? In the meantime, AHPA's Stevia Committee is preparing a revised plan asserting stevia's safety as a food.

The stevia issue may be resolved and commercial use of the herb may resume far beyond the levels of 1991. However, if FDA decides to enforce its ban on stevia as a food component, some elements of the industry may use this case as an example of their charge of FDA's irrational and incoherent policy towards herbs. Currently, there exists a spirit of communication and cooperation between FDA and the herb industry. Hopefully, the stevia issue will not disrupt the progress being made so far.

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soluble in water and consumption of sassafras tea (especially in the southeastern U. S.) has never been directly linked to any forms of cancer.

THE STUDY CITES TWO CASE STUDIES

Case 1. A 55-year-old man who had completed 11 years of education reported using turpentine during the year preceding the survey to rid himself of "seed ticks." The man purchased turpentine at a local drug store and, based on the advice of a friend, poured approximately four ounces of turpentine onto a sponge and applied the sponge over all surfaces of his body below the neck. He then bathed in a tub of hot water and had onset of a severe burning sensation. To alleviate the burning, he soaked in a tub of cold water. The man subsequently developed blistering on all body surfaces to which he had applied turpentine. He also reported having used aloe as a topical remedy during the preceding year and reported previous use of briar root, castor, garlic, lemon, and sassafras.

Case 2. A 46-year-old woman who had completed seven years of education reported using castor oil routinely as a laxative and to treat "colds." She purchased castor oil at a discount department store, kept it readily available in her home, and had used castor oil and acetaminophen to treat a cold in her 18-month-old grandchild. She fed the child one teaspoon of castor oil mixed with one half of a baby bottle of orange juice. The symptoms resolved. She also reported using aloe, asafetida, catnip, garlic, lemon, and turpentine as remedies during the preceding year and recalled previous use of briar root, chinaberry, corn shucks, and pine as remedies.

The authors of the survey commented, "The survey findings also underscore the need for physicians, pharmacists, and other health-care providers to actively elicit this information when taking a clinical history. In addition, health-care providers should be aware of potential drug interactions, toxicity, and adverse reactions *as well as possible treatment benefits* [emphasis ours] that may be associated with plant-derived therapies."

According to Dr. Ed Croom of the Research Institute of Pharmaceutical Sciences of the University of Mississippi, one of the authors of the report, the initial survey indicated a higher level of use among African Americans, but the *MMWR* editors at the Center for Disease Control and Prevention removed this data despite the fact the information showing racial and/or ethnic uses of folk medicines may be of interest to demographers, epidemiologists, and public health officials. ❑

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EAPC Files Petitions for OTC Drug Use For Valerian and Ginger

by Mark Blumenthal

"...the bad news is that, before it becomes available, it must be approved by the Food and Drug Administration (motto: 'We Haven't Even Approved Our Motto Yet')"
—nationally syndicated humor columnist Dave Barry

The European-American Phytomedicines Coalition (EAPC) has filed two citizens' petitions with the U.S. Food and Drug Administration (FDA) to allow the sale of two popular herbal remedies as over-the-counter (OTC) drugs. The petition for valerian as a nighttime sleep aid was filed June 7, 1994; the petition for ginger to prevent nausea and vomiting was filed May 26, 1995. Both petitions stress that the two herbs are recognized as safe and effective OTC drugs for the petitioned uses in various western European countries.

EAPC is comprised of phytomedicine manufacturers in France, Germany, Italy, and Switzerland, as well as the U.S. The coalition was formed in 1991 in order to promote rational regulatory policy regarding the sale of phytomedicines as OTC drugs.

The EAPC filed its first citizens' petition with FDA on July 24, 1992, requesting that the agency change its extralegal policy that refuses to recognize foreign marketing histories of well known botanical drug ingredients. (Pinco and Israelsen, 1992; Blumenthal, 1993) Commenting on the significance of this first petition, EAPC co-counsel Robert Pinco said, "EAPC stated that many botanical ingredients that its member companies market are cleared by health authorities abroad as nonprescription drug ingredients, and have been used for a material time and a material extent by consumers in foreign countries. EAPC asked FDA to recognize foreign marketing histories for such ingredients to fulfill a threshold requirement under the law so as to permit inclusion of the ingredients in the OTC Review and their ultimate classification as generally recognized as safe and effective drugs." (Pinco, 1995)

Pinco continued, "The initial EAPC petition was exclusively designed to offer legal and policy reasons for FDA to change its view on foreign market histories. It did not offer data and information on a specific botanical ingredient to FDA for review." Such data and much scientific information were subsequently offered in both the valerian and ginger petitions.

According to Pinco, the valerian petition "was filed prior to an FDA decision on the policy change requested in the initial petition because FDA signaled that such a policy change may take some time. The filing of the second petition [valerian] was a decision by EAPC to force FDA to deal with a specific request and thus motivate the agency to address the policy change more quickly. Valerian was chosen because it fit squarely into an existing OTC drug monograph category and because significant substantive evidence of its safety and effectiveness exists in the scientific literature." (Pinco, 1995)

"There is a paucity of safe and effective insomnia remedies that are available over-the-counter."

THE VALERIAN PETITION

Valerian root (*Valeriana officinalis* L.) is an herbal remedy with several thousand years of safe and effective use as a sedative and sleep aid (Hobbs, 1989). The 24-page EAPC petition to include valerian in the OTC sleep-aid monograph is predicated on several key assertions.

First, the public interest would be best served by expanding access to safe and effective sleep-aids. According to research cited in the petition, approximately 40 million Americans suffer from chronic sleep disorders, with an additional 20 to 30 million experiencing intermittent problems resulting from lifestyle factors. According to a nationwide survey of 1,000 people, this insomnia produces a host of additional daytime problems, including impaired concentration, memory, ability to accomplish daily tasks, enjoyment of relationships, ability to handle stress,and physical well-being when compared to persons without sleep disorders. The petition thus asserts that insomnia is a significant complaint for a large portion of the U.S. population.

The petition also cites the well-known facts that current prescription drugs for insomnia like hypnotic agents and tranquilizers (e.g. benzodiazepines like diazepam [Valium ®]) are controlled substances because, unlike valerian, they can cause habituation or addiction. (A sedative is defined as an agent that produces a quieting effect accompanied by relaxation and rest, but not necessarily sleep. A hypnotic is a substance that directly produces sleep. Tranquilizers are sedatives but not hypnotics.) The term "sedative" in the EAPC petition is synonymous with "sleep-aid" but is not to be confused with "daytime sedative," a substance which according to FDA is intended to "relieve simple nervous tension" without causing drowsiness.)

A further drawback of these prescription drugs is that they actually reduce REM sleep and can cause significant residual drowsiness. In contrast, valerian is both a sleep-aid and mild sedative but, because it is not a hypnotic agent or psychotropic tranquilizer, it does not have their side effects and limitations.

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Because of the safety problems associated with these drugs, FDA's Advisory Review Panel on OTC Sedative, Tranquilizer and Sleep-Aid Drug Products did not approve them for nonprescription use. Instead, the Panel considered a variety of antihistamines, bromides, scopolamine compounds and several other ingredients including aspirin, eventually concluding that none were appropriate as daytime sedatives and only the antihistamine, diphen-hydramine, was approved as a nighttime sleep-aid.

Thus, according to the petition, "There is a paucity of safe and effective insomnia remedies that are available over-the-counter. Existing OTC remedies, which contain antihistamine, cause sleepiness but like prescription drugs often leave the user with residual drowsiness upon waking. Such drowsiness is an [sic] significant drawback for many people who take sleep-aids. The scarcity of safe and effective OTC drug products is especially troubling in view of the fact that a significant number of persons experiencing insomnia do not seek a physician's advice. A safe and effective OTC sleep aid that will permit a restful sleep without residual drowsiness is needed. Valerian, with its long history of safe use and its proven efficacy, can meet this need."

The petition emphasizes three fundamental considerations about valerian: 1. Valerian has been marketed for a material time and to a material extent, having been used in Europe for centuries and even marketed as an official drug in the U.S., with the Eli Lilly Company offering it in tincture form until 1985. In Germany between 1974 and 1993, over 100 million units of valerian preparations were sold in pharmacies alone. Sales in Germany for 1991 were 24.7 million DM (equal to approximately $15 million US). Sales in France from 1985 to 1993 were 70,417,300 units of valerian products (either valerian alone or in combination with other herbs) with an estimated total value over $250 million US (in 1994 dollars).

The German Commission E approves valerian as a sleep aid with no adverse side effects or contraindications noted. Similar use is approved in both France and the UK. Valerian is also listed in the European Pharmacopeia since 1973 and in other pharmacopeias in European countries. Thus, according to the logic of the petitioners, valerian should qualify as an "old drug" under the OTC drug review, not a "new drug" requiring a formal new drug application (NDA) as is current FDA policy.

2. The petitioners also claim that chemical and pharmacological evidence support the safety and efficacy of valerian as a nighttime sleep-aid. Considerable data demonstrate that valerian is generally recognized as safe and effective for its intended use, according to toxicological and pharmacological studies on numerous test animals.

The petition provides an excellent review of much of this scientific literature, complete with citations; copies of original research accompanied the petition.

"Unlike other anti-nausea medications that act centrally, ginger appears to act directly on the digestive system, and therefore has none of the troubling central nervous system side effects found with conventional antiemetic drugs."

3. The petition claims that the approval and marketing of valerian are justifiable according to scientifically conducted human clinical studies. Reviews of varous clinical studies are provided showing the safe and effective activity of various valerian preparations in humans.

A thorough reading of this petition and its numerous footnotes provides a compelling legal and scientific case for the immediate approval of valerian for the petitioned claim. It will be interesting to see how reviewers within the FDA will deal with this petition.

THE GINGER PETITION

The 31-page ginger petition follows some of the same format and logic as that for valerian. The petition specifically requests that the FDA commissioner amend the Antiemetic Monograph which was finalized in April 1987 to "include ginger as an OTC antiemetic drug product that is generally recognized as safe and effective for the prevention of nausea and vomiting." EAPC also requests that the FDA commissioner "accept the filing of foreign marketing data to support this petition."

As in the valerian petition, EAPC declares that the public interest would be served by expanding access to a safe and effective phytomedicine that can prevent nausea and vomiting associated with motion sickness as well as nausea and vomiting in general. This is an expansion of the increasingly well-known popular belief that ginger can be used to prevent motion sickness, based on the study by Mowrey and Clayson published in *The Lancet* in 1982, in which patients consuming one gram of ginger powder (two capsules) fared better than patients using either placebo or the antihistamine dimenhydrinate (Dramamine®) when placed in a rotating chair (Mowrey and Clayson, 1982).

This petition stresses that FDA's Antiemetic Monograph does not currently list any OTC ingredients that have been found to be safe and effective for the prevention of nausea and vomiting in general." Since the four OTC ingredients currently approved by FDA all "act on the central nervous system, all of the drugs currently listed in the Antiemetic Monograph are limited by side effects." Such side effects can include dizziness, tinnitus (ringing in the inner ear), lassitude (weariness, fatigue), incoordination, fatigue, blurred vision, diplopia (double vision), euphoria, nervousness, insomnia, and tremors. In addition, these approved OTC ingredients are contraindicated in asthma, glaucoma, emphysema, chronic pulmonary disease, short-

ness of breath, difficulty in breathing, or difficulty in urination due to enlarged prostate. They may cause drowsiness and may be affected by the concomitant use of alcohol, sedatives, and tranquilizers, none of which should be used while taking these drugs.

The petition stresses that "Unlike other anti-nausea medications that act centrally, ginger appears to act directly on the digestive system, and therefore has none of the troubling central nervous system side effects found with conventional antiemetic drugs." The petition cites a 1975 *Federal Register* notice of the FDA's Advisory Review Panel on OTC Laxative, Antidiarrheal, Emetic and Antiemetic Drug Products which acknowledges ginger's historical efficacy in calming the stomach, an acknowledged carminative use in both human and veterinary medicine.

A central point of the petition is that ginger has been marketed to a material extent and a material time, thus satisfying one of the main requirements for qualification as an "old drug." Used for millenia as a food, spice, and medicine, an estimated 100,000 tons of dried ginger are produced each year, corresponding to about 500,000 tons fresh weight. About 50% of the world's ginger is used fresh in the countries in which it is grown. The remainder is dried and used as a spice or the oleoresin is used for flavoring consumer products, including ginger ales.

Ginger is extensively used in Asia as a digestive aid, to prevent nausea, vomiting, constipation, dyspepsia, poor appetite and poor absorption, as well as to treat colds, coughs, fevers, and food poisoning, and serves as an adjuvant and absorption aid in many traditional herbal formulas.

The medicinal uses of ginger are mentioned prominently "in all of the main indigenous medical texts, and lists of traditional remedies, both ancient and modern, in China, India, and other Asian countries. Western culture has long been aware of ginger's positive effects; ginger was referred to by ancient Greek physicians, including Dioscorides and Galen." It was also used by Queen Elizabeth I as a digestive aid.

The petition distinguishes ginger from other herbal carminatives like aniseed,

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MA HUANG UPDATE

INDUSTRY GROUP SUBMITS MA HUANG SAFETY DATA TO TEXAS DEPARTMENT OF HEALTH

by Mark Blumenthal, Ginger Webb, and Penny King

In a detailed 18-page letter to Cynthia Culmo of the Texas Department of Health, the Ad Hoc Committee on the Safety of Ma Huang, a body which represents companies involved in the importation, processing, manufacturing and/or distribution of Ma huang in Texas, addressed the Texas Department of Health's proposal to ban the sale of herbal dietary supplements containing Ma huang. TDH has made this proposal despite the fact that neither FDA nor the Secretary of Health and Human Services, both of which have been expressly assigned by Congress the responsibility of removing hazardous dietary supplements from the market, has taken regulatory action itself against Ma huang. In fact, the Center for Food Safety and Applied Nutrition has recently removed restrictions on Ma huang's importation.

This is not the first time TDH has sought to ban Ma huang herbal products from the market. Earlier, in May 1994, TDH issued an Emergency Order attempting to ban the sale and distribution of an herbal product called Formula One which contained Ma huang and Kola nut, an herbal source of caffeine; at that time, a Texas District Court refused to enforce the ban, and TDH voluntarily withdrew its order. Of the five complaints registered before TDH issued the order, two involved overdoses, and none of the reactions reported were characterized as serious. Nevertheless, with its recent proposal, TDH is once again targeting herbal dietary supplements containing both Ma huang and plant-derived caffeine. The TDH is also seeking to prohibit "the sale of foods and dietary supplements containing ephedrine in amounts other than that which occurs in nature...[i.e.] not to exceed 2.5%," "any reformulation of genus ephedra or botanical products...which increases the ephedrine alkaloid content above naturally occuring levels," as well as structure and function claims, which are in fact expressly allowed for dietary supplements by DSHEA of 1994.

The Ad Hoc Committee on the Safety of Ma Huang maintains that TDH's proposed regulation on Ma huang products completely lacks any scientific basis. This assertion is based on commissioned studies and reviews of scientific literature. Two such reviews, both commissioned by the Committee: one led by British scientist Dr. Dennis Jones and the other conducted under the auspices of the Herb Research Foundation, represent combined the most comprehensive studies on Ma huang and ephedrine ever conducted. After reviewing approximately 150 relevant articles, more than 20 from prestigious scientific journals, Dr. Jones concludes:

Dietary Supplements containing genuine Ephedra herb (Ma huang), correctly formulated, are safe, provided that they are used in accordance with appropriate directions for use and with due observance of any cautionary statements on the label.

According to a TDH spokesperson, the TDH takes the position suggesting that the information in the committee's letter deals more with the efficacy of ma huang but does not make a reasonable case for its safety.

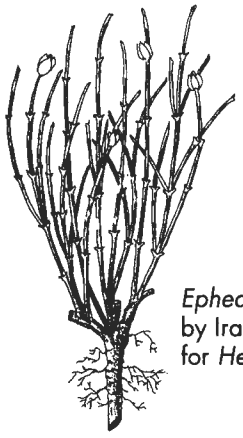
In its review, the Herb Research Foundation likewise found that "[c]ompliance with industry guidelines should provide

customers with products as safe or safer than non-Ephedra ephedrine-containing products available over the counter" and that most "[a]dverse effects [are] associated with ephedrine abuse," and not with the use of Ma huang products at the doses typically recommended.

In addition to these two scientific literature reviews, the Ad Hoc Committee commissioned further examinations of relevant studies. A series of animal studies, which used a typical Ma huang dietary supplement product named Nepegen, was reviewed by Dr. Wayne Snodgrass, M.D., Ph. D., Chairman [sic] for the Poison Center Coordinating Committee for the state of Texas and a specialist in acute responses to various substances. Based on the results of the animal testing, Dr. Snodgrass concluded that Nepegen "does not pose any known unreasonable health risks to the general population in its availability as an herbal product." Dr. Joseph Borzelleca of the Medical College of Virginia and his associate Dr. Graham Patrick reviewed the scientific literature on Formula One, its labeling and formulation, and the FDA Health Hazard Analysis, and concluded that "there is virtually no basis ... to conclude that Formula One or a comparable product would cause any serious adverse effect in human beings." Dr. Patrick focused on one specific death which had been described by FDA as linked to Formula One use. His report noted that the autopsy of the deceased showed "not even a trace of ephedrine in his blood or tissue" and he agreed, with the Medical Examiner, that there was "no basis for believing that Formula One was a contributing factor in the death of this individual."

The Ad Hoc Committee asserts that, even if all the complaints registered were indeed to have been associated in some way with Formula One consumption, the incidence of adverse reaction would still be negligible, approximately 1 in 40,000, or .0025% — a level far below the incidence of similar responses to over-the-counter diet aids, aspirin, and caffeine. Such a figure hardly warrants a TDH Emergency Order nor characterization of Formula One or Ma huang as health hazards. Even one of the TDH's own experts in the Alliance litigation stated that most adverse reactions "appeared to be unpredictable and indicative of excessive exposure instead of supersensitivity" to the herb.

Dr. Jones was also commissioned by



Ephedra sinica by Ira Kennedy for *HerbalGram*.

the Ad Hoc Committee to review the FDA's Health Hazard Analysis on Formula One. It became clear to him that the data on Formula One consumption could not be used to substantiate claims of adverse side effects. Incredibly, he found that some of the literature cited in the report, including one leading article by Dr. Paul Pentel, "Toxicity of Over-the-Counter Stimulants" (JAMA, Vol. 252: 1898-1903), appears not to have even been read by the FDA; if it had been, FDA most certainly would have noted that it does not support any connection between Ma huang and the adverse side effects. Moreover, the Health Hazard Analysis fails to acknowledge the existence of dozens of investigations on ephedrine, all of which conclude that there are no serious side effects, even for doses higher than that of Formula One. The Committee's experts found the HHA document to be scientifically lacking; indeed, the Committee reports, "[e]very one of our experts who has reviewed this document has felt that it was prepared to support a predetermined conclusion," and concludes that "the HHA provides no basis for adopting the proposed regulation."

Another concern voiced by TDH regards possible utilization of Ma huang in the illicit drug trade. David Litell, co-chair of the Ad Hoc Committee, contacted the Drug Enforcement Agency, and found this fear to be unsubstantiated by the facts. He writes:

"Ephedra extracts [the most concentrated form of Ma huang] are not often used in clandestine laboratories as the production of methamphetamines from the material is a labor-intensive process...

It is unlikely that [ephedra in any form] will be used in clandestine laboratories to synthesize methamphetamine."

The Ad Hoc Committee asserts that the only possible conclusion that can be drawn from the literature compiled by the Committee is that "there is not the slightest evidence or expectation that Ma huang products would be harmful in customary doses, so long as exclusionary warnings are followed...." The American Herbal Products Association can provide an example of an appropriate exclusionary label. The Committee maintains that the proposed regulation is irresponsible in that it has no basis whatsoever in scientific fact, and that, far from protecting the public from a health hazard, adoption of the proposal would deny the public of perfectly safe and useful Ma huang dietary supplement products, and would expressly remove the obligation for distributors of Ma huang to appropriately label their products, possibly creating a situation wherein the risk of abuse or misuse of the herb would be increased.

The Ad Hoc Committee believes that such a regulation as that proposed by TDH would be enjoined by a court for many reasons. Congress certainly did not intend, in its passage of DSHEA of 1994, for the State of Texas to be able to regulate dietary supplements or to review in advance any "structure and function" claims when the FDA was expressly prohibited from so doing. TDH's proposal does not offer any substantial basis for its adoption, and it is in fact illogical. Finally, there was virtually no support for TDH's proposal at the public hearing; on the contrary, many scientists are strongly opposed to it, and not a single one present at the hearing spoke in its favor. "For all of these reasons, the Ad Hoc Committee urges TDH to withdraw its proposed regulation."

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[Ed. note - As *HerbalGram* goes to press we were informed that the newly appointed FDA Expert Advisory Committee on Ma huang which includes several industry representatives met in Washington, D. C., October 11-12, 1995, to discuss several mahuang issues.]

LEGAL AND REGULATORY

AHPA RESCINDS CHAPARRAL BAN:
CREATES HOTLINE FOR ADVERSE EFFECTS

At its annual winter planning meeting in late January, the Board of Trustees of the American Herbal Products Association (AHPA) voted to rescind its December 1992 recommendation that members voluntarily suspend sales of the herb chaparral. This decision was based upon the findings of an investigation by a panel of medical experts with specialties in gastroenterology and hepatitis research from respected universities, after meeting with FDA to present the investigators' report and after inviting and considering member input.

The coordinator of the report, Clark Watts, M.D., J.D., summarized in his September 1994 report as follows, "The unanimous findings are that, since the patients were ingesting chaparral during the time each developed acute hepatitis, most likely of a hepatocellular nature, it is reasonable to conclude a relationship exists between the ingestion and the disease. However, no clinical data were found in the medical records to indicate that chaparral is inherently a hepatic toxin. Moreover, each patient had a medical history not incompatible with prior liver disease. A fair conclusion is that the disease in each patient was the result of an individual idiosyncratic reaction to the herb, possibly the result of an autoimmunologic reaction, which given the quantity of chaparral ingested in this country, must be exceedingly rare."

In the interest of consumer education and well-being, the AHPA Board further recommends that, if member companies should choose to sell chaparral, all consumer labeling contain the following informational language, as well as providing the phone number shown below for reporting unusual conditions associated with the ingestion of chaparral.

"Seek advice from a health care practitioner before use if you have had, or may have had, liver disease. Discontinue use if nausea, fever, fatigue, or jaundice (e. g., dark urine, yellow discoloration of the eyes) should occur. (To report unusual conditions, call 512/469-6344)."

The establishment of this special phone line for reporting unusual conditions noticed in conjunction with the ingestion of an herb is the first step in the herbal industry's plan to establish a model for post market surveillance for herbal products. The intention of the board is to capture reports of unusual conditions as they are reported by consumer and health care practitioners and to have them reviewed by medical investigators.

An article in the February 8, 1995, issue of the *Journal of the American Medical Association*, which describes a case of presumed chaparral-induced liver toxicity that was one of the cases reviewed by the panel in the spring of 1994, is timely, in that it points to a need for physicians and other health care practitioners to have more information about the actions of herbal preparations. In addressing this issue, AHPA, over the past twelve months, after conversations with FDA officials, has taken steps not only to investigate the specific cases as presented by FDA, but also to create a plan for monitoring reported reactions. As noted above, a dedicated phone line has been established to which consumers and health care practitioners can report unusual conditions directly. The industry will share this information with manufacturers, practitioners, consumers, and FDA. ❑

[Source: AHPA Press Release February 1995.]

Ophthalmology's Botanical Heritage

by Mark Packer, M.D.,[1] and James D. Brandt, M.D.[2]

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History of Ophthalmology, Daniel M . Albert, Editor

Many of today's important ophthalmic pharmaceuticals have a rich ethnobotanical history. Solanaceous plants, the source of atropine, have contributed to medical therapy since the beginning of Western civilization. The botanical source of physostigmine played a pivotal role as an ordeal poison in the culture of Old Calabar, West Africa. Native peoples of Amazonia treasured plants containing pilocarpine as panaceas because of their impressive diaphoretic effect. Nineteenth century scientists examining these plants because of their folkloric reputations discovered their active compounds and documented their physiological effects. Ophthalmologists such as Argyll Robertson, Laqueur, and Weber built upon this research to bring these pharmaceuticals into therapeutic use. The ongoing loss of the world's tropical rain forests threatens to destroy a vast storehouse of untested biological compounds.

Photo montage by Michele Vrentas. Thanks to L. Shawn Wong, M.D., and the Austin Eye Clinic for the eye photo. Thanks to Steven Foster for the use of **Calendula**, *Calendula officinalis.*

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Indigenous societies have discovered and employed useful plants through millennia of observation, trial and error. Particular plant species have often become key items in socioeconomic and cultural structures. Such species offer a pharmacologic action so prized that they become the focus of ritual, taboo, and power. These plants contain compounds with great potential for medical use, either as therapy or a research tool. Many of the advances of 19th century pharmacology were made by ophthalmologists, who were eager to explore the function of the autonomic nervous system through its easily observable effects on the pupil. This article will touch on highlights of the ethnobotanical origins of three important ophthalmic pharmaceuticals: atropine, physostigmine, and pilocarpine.

THE SOLANACEAE

The order Solanacae contains many commercially important species, such as tobacco, the potato, and the tomato. Other solanums have become famous as poisons and drugs, and their common names remain rich with folkloric connotations: deadly nightshade (*Atropa belladonna*), henbane (*Hyoscyamus*), thorn apple or jimson weed (*Datura*), and mandrake (*Mandragora*). Their formal botanical names are also rich with history: Atropa derives from Atropos, one of the three Fates, who was fabled to cut the thread of life, and the name belladonna apparently arose from the cosmetic use of the berries of the deadly nightshade in Renaissance Italy and its use as a mydriatic in Spain. Each of these species contains atropine or scopolamine, closely related tertiary ammonium alkaloid esters of tropic acid, which competitively antagonize the action of acetylcholine at muscarinic synapses. Besides producing the expected alterations in the cardiovascular, respiratory, gastrointestinal, urinary, and thermoregulatory systems, these drugs block the action of the pupillary sphincter, causing mydriasis. This effect has been recognized for millennia by both the medical profession and lay people. Only later were the solanums found to produce cycloplegia. That the solanaceous herbs can also produce significant central effects, including hallucinations, agitation, and coma, was well known in medieval times. Because they grow widely throughout both hemispheres they have figured in the development of many cultures, and their influence has been especially strong in the story of European civilization.

The medical record of the Solanaceae parallels a significant folkloric record. The earliest written notice, in the *Papyrus Ebers* of 1550 B.C., captures this theme when it indicates henbane "to expel magic in the belly."[5] Galen employed these plants in his practice, and, following him, the Arabic court physician and translator of the ninth century, Hunain Ibn Ishâq, wrote in his *Ten Treatises on the Eye*:

"*Atropa belladonna* (*mandragora*) is cold in the third degree, and in its fruit (*luffah*) there is heat with moisture by which (two qualities) it causes lethargy; its bark is stronger and drier."[16]

Hunain categorized *Atropa belladonna* as a narcotic, presumably because it can relieve the pain of ciliary spasm when applied topically, and wrote of these drugs:

"They are used when the pain is so overwhelming that the death of the sufferer is to be feared, in particular when this [acute pain] is present in [cases of] corrosion, rupture and ulcers. It is necessary to apply these remedies with caution, as they weaken and sometimes destroy the vision; therefore it is best to use them sparingly and to put them aside for cases of urgent necessity, and even then not to apply them continuously but only for a short time, until the pain has been assuaged."[16]

This treatise, regarded as the first systematic text of ophthalmology, thus included deadly nightshade as an important ophthalmic medicament.

Figs. 1 & 2. Printed in 1524, one of the most beautiful "herbals" of the renaissance was *Matthioli* by Casparo Bauhino, Professor of Medicine in Basel. Comprising some 800 pages, the book cataloged animals, plants, and minerals according to their purported medicinal properties. *Atropa belladonna* (left), the source of atropine, and *Hyoscyamus niger* (right), the source of scopolamine, are prominently depicted in the section cataloging plant materials. (Reproduced courtesy of the Department of Special Collections, University of California Library, Davis, California.)

The hallucinogenic properties of the nightshades no doubt contributed mystery and power to their reputation.

FROM MYSTICISM TO SCIENCE

The famous herbals of the Renaissance (Figs. 1 & 2) gave a prominent position to the medicinal Solanaceae, and, in particular, to the mandrake. This species attained a status unrivaled in European folklore. Its mystique drew strength from the widely held Doctrine of Signatures, which portrayed the root of the mandrake as a little man or woman, and it enjoyed a medical reputation as a sedative-hypnotic, anesthetic, analgesic, and aphrodisiac.

Recent scholarship has suggested that the Solanaceae also found employment as hallucinogens during this period, and contributed to charges of witchcraft by the Church.[8] Alleged witches used these plants in ointments, which were absorbed through the skin. Andres Laguna, physician to Pope Julius III, described the arrest of a married couple accused of witchcraft in 1545:

"Among the other things found in the hermitage of the said witches was a jar half-filled with a certain green unguent, like that of Populeon [white poplar], with which they were anointing themselves: whose odor was so heavy and offensive that it showed that it was composed of herbs cold and soporiferous in the ultimate degree, which are hemlock, nightshade, henbane and mandrake . . ."[13]

Another account described a woman who attempted a demonstration of her powers of witchcraft before a priest:

"Then, rubbing ointment on herself to the accompaniment of magic incantations she lay her head back and immediately fell asleep. With the labor of the devil she dreamed of Mistress Venus and other superstitions so vividly that, crying out with a shout and striking her hands about, she jarred the bowl in which she was sitting..."[17]

The hallucinogenic properties of the nightshades no doubt contributed mystery and power to their reputation.

An interesting monograph on belladonna, *Strychnomania*, appeared in 1677. Written by Johannes Faber, Imperial Primary City Physician of Heilbronn, the work comprised a thorough study of belladonna inspired by fourteen cases of poisoning. Faber's astrological perspective pervades his writing: he called belladonna the child of Saturn and the companion of Mars. His frontispiece depicts rays of light shining from the signs of the zodiac onto a garden of nightshade. Thus the Solanaceae continued to inspire and reflect the union of medicine and mysticism which characterized the prescientific era.

By the dawn of the nineteenth century, scientific reports reflected a logic closer to our own (Figs. 3-4). On July 4, 1811, William Wells read a report before the Royal Society of London which established the cycloplegic effect of the juice of belladonna. Experimenting on the eye of one Dr. Cutting, Wells reported,

"He now applied the juice of Belladonna to his left eye. Half an hour after, when his pupil was but little dilated, perfect vision commenced at the distance of seven inches; in fifteen minutes more, it began at the distance of three feet and a half. When his pupil had acquired its greatest enlargement, the rays from the image of the flame of a candle, in the bulb of a small thermometer at the distance of eight feet, could not be prevented from converging to a point behind the retina. The rays from lamps still more distant, and from stars, had their focuses at the same time on the retina. This state of vision continued, in its greatest extent, to the following day; and it was not until the ninth day after the application of the Belladonna, that he completely recovered the power of adapting his eye to near objects."[24]

Wells also dismissed the notions that either the extraocular muscles or the cornea play a role in accommodation:

"Shortly after, he repeated the experiments, while, in consequence of the application of Belladonna, he was without the power of adapting his eye to different distances, and found, that the strength of [the extraocular] muscles was not diminished. It follows, therefore, not only that the external muscles have little or no concern in fitting the eye to see distinctly at different distances, but that the same is true with respect to the cornea, as we cannot suppose, that its mechanical

Fig. 3. By the mid-19th century, the medicinal properties of *Atropa belladonna* were well known. This plate appears in *Medicinal Plants,*[1] a four-volume work published in 1880. The authors state "Belladonna . . . like some other plants of the natural order to which it belongs, dilates the pupil of the eye, whether taken internally, or applied locally.... Belladonna and atropia are also of great value to the ophthalmic surgeon to produce dilatation of the pupil of the eye for ophthalmoscopic examination . . . and also to diminish the morbid sensibility of this organ to the influence of light." (Reproduced courtesy of the Department of Special Collections, University of California Library, Davis, California.)

The Solanaceae continued to inspire and reflect the union of medicine and mysticism which characterized the prescientific era.

properties were altered by the Belladonna, or at least, that it became more inflexible from the application to it of the juice of that herb . . .

"The only other part of the eye, or its appendages, which remains for enabling us to see equally well at very different distances, is the crystalline [lens] . . . But in what way this important office is performed by it seems still unknown." [24]

With the work of Wells and others the study of the Solanaceae had entered the modern scientific era.

THE FIRST MIOTIC

To find a mydriatic [a drug that produces dilatation of the eyes] and cycloplegic [an agent that produces paralysis of the ciliary muscles of the eye] with the ability to drug, nineteenth century ophthalmologists thus had only to study the lore of the most famous medicinal plants of their own culture. Possessing the ability to dilate the pupil led naturally to a desire to gain the ability to constrict the pupil. However, the plants which would eventually provide ophthalmologists with this power would not be found in Europe.

The story of the first miotic [an agent that causes contraction of the pupil of the eye] begins with the Efik, a tribe of fisherfolk living on the Cross River in what is today the Calabar Province of Nigeria. In the eighteenth and nineteenth centuries these people traded with Europeans. For slaves and palm oil, they received salt, rum, guns, powder and shot, as well as cotton cloth, knives, iron bars, and even china and umbrellas. A complex socioeconomic structure developed, weaving together the Efik's traditional lineages and powerful Egbo, or Leopard, Society with African slaves, European sailors, Scottish missionaries, and the British consul.

Among the first European chroniclers of Old Calabar was James Holman, a lieutenant in the British Navy, who lost his sight in 1810 and was appointed a royal knight of Windsor. Subsequently, he journeyed through Asia and sailed around the world. He published the tales of his voyages and became known as the "Blinde Traveler." In 1828 he arrived in Old Calabar and later published his observations in *A Voyage Round the World*:

"The laws of the country are worthy of attention, being, perhaps, the most curious, as well as the most prompt, and effectual, of any that we are acquainted with amongst the African nations. The whole of the Old Calabar country is governed by what are termed the 'Egbo laws.' These are laws, enacted by a secret meeting, called the Egbo assembly, which is held in a house set apart for that purpose, called the Palaver house; of this assembly, the Duke, by virtue of his sovereignty, officiates as the chief; with the title of Eyamba. There are different degrees of rank in the subordinate Egbo members, and each step must be purchased successively. They sometimes admit Englishmen into this assembly: Captain Burrell of the Ship Haywood of Liverpool, held the rank of Yampai, which is one of considerable importance and he found it exceedingly to his advantage, as it enabled him to recover all debts due to him by the natives."[22]

Fig. 4. Henbane *(Hyoscyamus niger)*, one natural source of scopolamine. In *Medicinal Plants*,[1] from which this plate is reproduced, the authors note that in comparison to belladonna, "...the influence of henbane on the cerebrum and motor centres is somewhat greater, while its stimulant action on the sympathetic is less...[it] may prove valuable in certain diseases of the eye." (Reproduced courtesy of the Department of Special Collections, University of California Library, Davis, California.)

Holman then described the Egbo method of recovering a debt:

"The Egbo man—that is the executive person, wears a complete disguise, consisting of a black network close to the skin from head to foot, a hat with a long feather, horns projecting from forehead, a large whip in his right hand, with a bell fastened to the lower part of his back, and several smaller ones round his ankles. Thus equiped (sic) he starts from the Egbo-house, runs through the streets with his bells ringing, to the house of the offender, followed by half a dozen subordinate personages fantastically dressed, each carrying either a sword or stick."[22]

In another passage, Holman referred to the use of a poison by the Efik in Calabar:

"About eight in the evening, a Calabar man was brought on board from the Kent's oil-house; he wanted to be secreted until we sailed, as he wished to make his escape; for, he said, his master wanted to cut his head off, or to make him chop nut, i.e., to oblige

Through most of man's history, botany and medicine were, for all practical purposes, synonymous fields of knowledge, and the shaman, or witch-doctor—

him to eat a poisonous nut, which produces speedy death, because he had free-mason (meaning witchcraft), and that his master had been sick ever since he had last flogged him."[22]

Belief in divination, omen, and trial by ordeal marked the culture of the Efik in Old Calabar. Accusations of witchcraft had to be answered by esere, the chop-nut ordeal, which often followed the funeral rites of a great man.

"Ordinary folk might believe in the genuineness of these witchcraft accusations; the more knowledgeable recognized them as a deliberate method of removing dangerous rivals, weakening powerful houses, and settling old scores."[12]

Thomas Hutchinson, British Consul for the Bight of Biafra during the 1850s, wrote:

"Together with the widows and slaves, who in former times were sacrificed at the death of a gentleman, there were added to the list a number of persons who were accused by the friends of the deceased as being accessory to his death, and obliged to undergo what is called the "chop-nut" test. They cannot believe, or at least they will not try to understand how natural causes create disaster; but attribute them and subsequent death to "ifod," or witchcraft. Hence a plan is adopted to find out the perpetrator by fixing on a number of persons, and compelling them, as the alternative of the Egbo law of decapitation, to take a quantity of a poisonous nut, which is supposed to be innocuous if the accused be innocent, and to be fatal if he be guilty."[11]

William Freeman Daniell, a medical officer in the British Army with an interest in native plants, witnessed the ordeal and described it for the Ethnological Society of Edinburgh in 1846:

"The poison is obtained by pounding the seeds and macerating them in water, which acquires a milky colour. The condemned person, after swallowing a certain portion of the liquid, is ordered to walk around until its effects become palpable. If, however, after the lapse of a definite period, the accused should be so fortunate as to throw the poison from off the stomach, he is considered as innocent, and allowed to depart unmolested."[4]

Hutchinson quoted a native source on the symptoms of esere:

" 'Him do disk,' said one of the Kalabar gentlemen, describing to me its effects; and in the words, as well as the action suited to them, there was a graphic power impossible for me to transfer to paper—'him do dis, soap come out of him mout, and all him body walk,'—a most perfect description of the frothing from the mouth, and the convulsive energy of the whole frame."[11]

The ordeal bean of Old Calabar captured the imagination of Europeans who brought home tales of its power and soon thereafter the infamous bean itself.

The Reverend Hope Masterton Waddell, of the Scottish Missionary Society, initiated Christian activities in Old Calabar in 1846. These coincided with the suppression of the slave trade and the desire of Efik elders to learn agricultural techniques and become educated in the European manner. The missionaries "started schools, produced a written version of the Efik language, and eventually suppressed various Efik customs particularly repugnant to Europeans."[9] Waddell and other missionaries delivered samples of the Calabar bean to Edinburgh, where they were planted by John Hutton Balfour, Professor of Botany and Keeper of the Royal Botanic Gardens. He published the first description of the plant in 1861, placing it in the Leguminosae and naming it *Physostigma venenosum* (Fig. 5).

In the spirit of self-experimentation which epitomized nineteenth century medical research, Robert Christison, Professor of Medical Jurisprudence in Edinburgh and author of *A Treatise of Poisons*, having injected a rabbit with an emulsion of the bean and watched the animal slowly die from respiratory fail-

Fig. 5. Physostigma venenosum, from which physostigmine was derived in 1863. It was further purified in 1865 and named "Eserine." Bentley and Trimen[1] report that the plant's fruit (the Calabar Bean) "... is a powerful sedative of the spinal cord, producing in over-doses paralysis of the lower extremities and death by asphyxia, or in still larger doses, death by paralysis of the heart. The principal use of the Calabar Bean is as a local application to the eye, to cause contraction of the pupil, in certain diseases and injuries of that organ." (Reproduced courtesy of the Department of Special Collections, University of California Library, Davis, California.)

usually an accomplished botanist—represents probably the oldest professional man in the evolution of human culture.

ure, proceeded to try the poison on himself. An eighth of a seed having had no effect other than "a certain pleasant feeling of slight numbness in the limbs," Christison went on the next morning to carefully chew and swallow a fourth of a seed.

"A slight giddiness, which occurred in fifteen minutes, was ascribed to the force of the imagination; and I proceeded to take a warm shower bath; which process, with the subsequent scrubbing, might take up five or six minutes more. The giddiness was then very decided, and was attended with the peculiar indescribable torpidity over the whole frame which attends the action of opium and Indian hemp in medicinal doses. Being now quite satisfied that I had got hold of a very energetic poison, I took immediate means for getting quit of it, by swallowing the shaving water I had just been using, by which the stomach was effectually emptied. Nevertheless I presently became so giddy, weak and faint, that I was glad to lie down supine in bed. The faintness continuing great, but without any uneasy feeling, I rung for my son, told him distinctly my state, the cause, and my remedy—that I had no feeling of alarm, but that for his satisfaction he had better send for a medical friend."[2]

The doctors who attended Christison found his pulse weak, rapid, and irregular, but his mental faculties intact. He became chilled, and was relieved by warmth to the feet and a mustard plaster over the whole abdomen. Two hours after eating the quarter of a Calabar bean Christison briefly slept, then "took a cup of strong coffee," which corrected the action of his heart. He remained in bed until a meal at noon, then rested on the sofa for the rest of the day. After a good night's sleep he felt himself completely recovered.

After the experience, Christison described poisoning by *Physostigma* as a most humane way to execute criminals:

"Philosophers have thought it not unworthy of inquiry, how in criminal executions death may be completed without physical suffering to the criminal. Governments have even consulted science on the subject. Meanwhile, I suspect it has been accidentally solved by the Negroes of Old Calabar. "[2]

Thomas Fraser, Christison's assistant, was the first to note the activity of an extract of the Calabar bean applied to the eye. He related the finding to a friend, Douglas Argyll Robertson, an ophthalmic physician whom he knew to be interested in finding a miotic to counter the action of atropine. Argyll Robertson experimented on his own eyes and proved to his satisfaction that *Physostigma* produced both contraction of the pupil and a condition of shortsightedness. These he attributed, with great foresight, to stimulation of the ciliary nerves.

MIOTICS AND GLAUCOMA

Ludwig Laqueur, a student of Albrecht von Graefe, made the first connection between eserine and glaucoma. He himself suffered from glaucoma, although he carefully hid this fact from his colleagues until after his death. Laqueur discovered the effect of eserine on the intraocular pressure in 1876, and used it consistently to treat his own attacks. He later wrote of eserine, "I made use of this remedy; it did not fail me in a single instance, and I do not remember that more than a single instillation was ever necessary. But I soon learned that it did not prevent the return of new attacks."[14]

Adolf Weber, like Laqueur, studied under von Graefe, and in 1877 he introduced the second medical treatment for glaucoma, the cholinergic agent pilocarpine. Hardy and Gerrard had isolated this agent in 1875 from a plant recently brought to Europe from Brazil, the jaborandi. The Tupi word jaborandi translates as "what causes slobbering," and Brazilian native peoples knew by this term many plants of the rue and pepper families (Rutaceae and Piperaceae) which increase salivation and produce diaphoresis. The multiplicity of plants called jaborandi caused confusion among importers, pharmacists, and physicians in Europe, who could not be quite sure of the potency of any particular sample. The most important medical species, however, have included *Pilocarpus pinnatifolius*, *Pilocarpus jaborandi* (Fig. 6), and *Pilocarpus microphyllus*.

The first European observer to write of jaborandi, Gabriel Soares de Souza, journeyed from Portugal to Bahia in 1570 and remained for 17 years. He noted that the Guarani used the plant to treat ulcers of the mouth, and he found a personal use for a decoction of jaborandi and laurel leaves as an aftershave.[23]

The next two chroniclers of jaborandi, William Piso and Georg Marcgrave, studied medicine at Leyden and traveled to Brazil in the 1630s as members of the Dutch West Indian Company's scientific expedition. Piso, arriving in the New World at age 26, held the titles of scientific chief and personal physician to the governor, Prince Moritz. Marcgrave, age 27, held the degree, "Medicinz et Mathesos candidatos," i.e., a student of medicine and astrology.

Piso remained in Brazil for eight years. Among his other contributions, he treated the poor who suffered from nystalopia by prescribing fish liver. He wrote about two types of jaborandi, one apparently a species of *Pilocarpus* (Rutaceae), the other a species of *Piper* (Piperaceae):

"The Indians praise the properties of both plants, as they revealed both to the Portuguese and to me, and they are accepted today as panaceas. They do have good medicinal applications, oftentimes serving as an antidote. A handful at least of the root, ground up and added to a generous serving of wine, counteracts the effects of poison through sweating and urination. I saw an Indian prove this, in the presence of His Excellency, the Count of Nassau.

"Finally, their sharp acidity produces beneficial effects as a sternutatory. Furthermore, this special attractive property enables them to be used as a substitute for a strong masticatory to remove phlegm from the head by way of the mouth, thus relieving the eyes from the effects of chronic colds."[18]

Here, then, stands a clear description of the salivation, urination, and diaphoresis brought about by the cholinergic activity of thejaborandi. Marcgrave, describing three types of jaborandi,

extended the list of indications:

"The root is used to counteract poisons which the Poio use when toxic mushrooms have been eaten.... It draws out quantities of phlegm from the tongue, thus clearing the head of colds, and relieves toothache. Macerated, soaked in water, then boiled and drunk in the morning, the root is a rapid cure for gonorrhea. It is good against poison, faulty urination and for stones."[15]

The indication for toothache suggests that this particular jaborandi belonged to the Piperaceae, for an analgesic activity has been found in some of these plants. The purported efficacy as an antidote probably springs from no true pharmacologic activity, but rather from the general impression that anything which increases excretion must somehow purify the body. The native peoples prized the diaphoretic properties of the jaborandi in particular, since they viewed sweating as a treatment for many diseases.

Not until the nineteenth century did the jaborandi arrive in Europe. Symphronio Olympio Cezar Coutinho, a graduate of the Faculty of Medicine of Bahia, brought samples of *Pilocarpus pinnatifolius* to Paris in 1873 when he began studies for a doctoral degree. Coutinho apparently learned of the jaborandi from native peoples during his extensive travels in the interior of the state of Pernambuco, and he did not hesitate to employ the jaborandi leaves as a sialagogue and diaphoretic in his own practice. Once in Europe, he demonstrated their efficacy to Adolph Gubler and the two published their findings the next year.[3,7] A flurry of activity followed, including commercial importation, scientific research and therapeutic adventures. By 1876 the striking effects of jaborandi leaves had found use in the treatment of such diverse ailments as "fever, stomatitis, enterocolitis, laryngitis and bronchitis, bronchiectasis, influenza, pneumonia, hydropericarditis, hydropsy, psoriasis, intoxications, neurosis and renal disease—to mention only a few of the conditions for which they were valued."[10]

The first study to discern an effect of jaborandi on the eye appeared in *The Lancet* on January 30, 1875. Sydney Ringer and Alfred Gould "made thirty-seven careful observations: twenty on adults, whose ages varied from twenty to forty-five; and seventeen on children, between three and ten years of age."[20] They gave the adults 60 grains of jaborandi leaves infused in boiling water; to the children they gave sometimes 30 grains and sometimes 60 grains. They wrote,

"In several cases the sight was decidedly affected. Mr. Martindale drew our attention to this fact...[He] prepared for us an extract dissolved in glycerine, which we introduced into one eye of thirty-one persons. In nineteen cases the pupil became decidedly contracted, the amount of contraction varying, in some being slight, in others reduced by one third, in two instances by one half."[20]

Ringer and Gould did not fail to notice the antagonism of jaborandi and belladonna:

"Belladonna checks the secretion from the skin, the salivary glands, the mucous membranes of the nose, bronchial tubes, stomach, and intestines, and dilates the pupil and contracts the arterioles; jaborandi, on the other hand, increases enormously the perspiration and saliva, and, in a much less degree, the secretion from the mucous membranes of the nose, the bronchial tubes, and the stomach and intestines."[20]

In a postscript to their article, John Tweedy described an experiment he undertook on his own eye to determine the effects of an extract of jaborandi on accommodation:

"At 1:45 I placed within the conjunctiva a drop of the extract of jaborandi, which produced smart pain for about five minutes."[20]

After two hours of recording the changes in his near and far visual acuity and the size of his pupil, as well as making observations as to the quality of his vision, he concluded that:

"...jaborandi locally applied to the eye causes, (1) contraction of the pupil; (2) tension of the accommodative apparatus of the eye, with approximation of the nearest and furthest points of distinct vision; (3) amblyopic impairment of vision from diminished sensibility of the retina. These effects, however, do not last long. In my own case the approximation of the near and far points of distinct vision had declared itself in a quarter of an hour, and reached its maximum in about forty minutes. It then gradually subsided, and had entirely passed off and the eye resumed its normal state in about an hour and a half. "[20]

Martindale's and Tweedy's experiments marked the beginning of ophthalmologic interest in *Pilocarpus*, an interest which continues to this day in the clinical use of pilocarpine. Thus the jaborandi had made the transition from Amazonian folklore to modern European science.

Fig. 6. Curtis's Botanical Magazine, published in London in the late 19th century, cataloged the plants in botanical gardens throughout Great Britain. This plate of *Pilocarpus jaborandi*, the natural source of pilocarpine, is of a specimen sent to the Royal Gardens of Kew from Cambridge, where it had "flowered in a stove in January, 1896."

THE FUTURE OF ETHNOBOTANICAL INVESTIGATION

The stories of atropine, physostigmine, and pilocarpine illustrate what has historically been the most important method of research in the discovery of new plant medicines, ethnobotanical investigation. Norman Farnsworth of the College of Pharmacy at the University of Illinois commented in 1983,

"Virtually all of the currently useful drugs derived from plants were discovered through scientific investigation of folkloric claims of human efficacy. The discovery of reserpine and related useful alkaloids is perhaps the

most recent success story that was based on a pursuit of folklore. However, quinine, digoxin, digitoxin, tubocurarine, morphine codeine, and a majority of other useful drugs were also derived from plants in a similar fashion."[6]

Also recently added to this list, vincristine and vinblastine were isolated from the rosy periwinkle, *Catharanthus roseus*, a plant investigated by the Eli Lilly Company because of its folkloric use in Madagascar as a hypoglycemic agent. Continuing research today holds promise for the future, but contains an added element of urgency. Mark Plotkin, Director of Plant Conservation for the World Wildlife Fund, wrote in 1988,

"Why should the medical community in the United States be concerned about the destruction of distant tropical rain forests? Because rain forest plants are complex chemical storehouses that contain many undiscovered biodynamic compounds with unrealized potential for use in modern medicine. We can gain access to these materials only if we study and conserve the species that contain them."[19]

Richard Evans Schultes, the last to hold the title of Director of the Botanical Museum of Harvard University, once wrote,

"Through most of man's history, botany and medicine were, for all practical purposes, synonymous fields of knowledge, and the shaman, or witch-doctor— usually an accomplished botanist— represents probably the oldest professional man in the evolution of human culture."[21]

Today's physician must wonder whether we have learned all we can from those who have known nature for the longest time, just as we must wonder whether we will have time to learn all we can before the chance is forever lost.

Supported in part by an unrestricted departmental grant from Research to Prevent Blindness, Inc., New York, New York. The authors wish to thank John Skarstadt of the Department of Special Collections of the University of California Library for his assistance in locating the botanical plates reproduced here, and Holly Forbes, Assistant Curator of the Botanical Gardens at the University of California, Berkeley for her assistance in identifying specimens of Atropa belladonna to photograph. *Reprint address: James D. Brandt, M.D., Department of Ophthalmology, University of California, Davis, 1603 Alhambra Boulevard, Sacramento, CA 95816-7051.* ❑

Editor's Note

The authors of this article mention *Pilocarpus* and its application on ophthalmology. They may wish to know that a second drug has been developed from that same plant, the same compound, pilocarpine, utilized to induce salivation in patients who have undergone chemotherapy or other treatments that cause the dry mouth syndrome. The plant name in Tupi is "the slobber mouth plant." Had scientists or investigators earlier paid attention to the indigenous classification and name of this plant, they may have discovered that particular application much sooner than they did.

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The Patenting of Neem: Modern Piracy or Political Correctness?

by Barbara Johnston

U. S. NEEM-BASED PATENTS ISSUED IN 1994

by Karen Dean

W.R. Grace & Co./Connecticut, New York;
Storage-stable pesticide composition contains neem seed extract solution.
(5,281,618)

W.R. Grace & Co./Connecticut, New York;
Fungicide compositions derived from neem oil and neem wax fractions.
(5,298,251)

Godrej Soaps, Bombay, India;
Neem oil fatty acid distillation residue-based pesticide.
(5,298,247)

FMC, Philadelphia, Pennsylvania;
Acaricidal combinations of neem seed extract and bifenthrin. (5,352,672)

Agridyne Technologies, Salt Lake City, Utah;
Storage-stable pesticide compositions comprising azadirachtin and epoxide.
(5,352,697)

W. T. Grace & Co./New York and U. S. Department of Agriculture;
Hydrophobic extracted neem oil; a novel fungicide.
(5,356,628)

PPG Industries, Pittsburgh, Pennsylvania;
Concentrated water-in-oil microemulsion that forms a storage-stable oil-in-water emulsion consisting of 50% to 90% by weight of neem oil containing the pesticide azadirachtin, among other ingredients.
(5,110,591 [1991])

Native Plants Inc. (NPI), Salt Lake City, Utah;
Chemically pure compound derived from naturally occurring insect repellants.
(5,047,242)

The neem tree (*Azadirachta indica*) is native to the Indian subcontinent. Its seeds, leaves, bark, and oil have dozens of traditional uses in India—as a spermicide, to make antiseptic toothpicks, and as a treatment for leprosy. The tree grows to the height and width of an oak, thrives in hot, dry weather and has a root system which reaches deep into the soil, making it an ideal tree for reforestation. According to scientists, over 200 species of insects are vulnerable to compounds from neem, including Mexican bean beetles, cabbage loopers, gypsy moths, cockroaches, fleas, head lice, mosquitoes, and many pests which infest food crops. Azadirachtin, the active ingredient derived from neem seed, disrupts the metamorphosis of insect larvae, inhibiting molting and pupation, thus preventing formation of a new generation of pests.

Indian farmers extract the insecticide, azadirachtin, from neem seeds by smashing the seeds, soaking them in water, and scooping the emulsion off the top. This they pour over crops to repel common pests, including locusts, mosquito larvae, Colorado beetles, and boll weevils.

The neem tree was a favorite of Gandhi and is so versatile that it is called the "miracle tree."[1] Neem twigs are used by natives of India to clean teeth; neem leaves as poultices to treat ulcers and eczema; oil from the seeds to kill ringworm; neem leaves stuck in grain bins and cupboards to prevent insect infestation; and neem cake, left after the oil has been expressed, is a longtime favorite for fertilizing fields.[2,3] Other long-held uses for the branches, leaves, and seeds are in the treatment of leprosy, diabetes, ulcers, skin disorders, and constipation.[4] According to the National Research Council, Indian scientists were studying the fact that neem trees could withstand locust plagues in the 1920s.[5]

Neem has become the focus of an argument on political correctness and intellectual property rights. Since neem products apparently pose little risk to human health and the environment, many organic growers have enthusiastically embraced their use. Neem has attracted the attention of biotechnology and pharmaceutical corporations outside of India.

The potential of azadirachtin as a biopesticide led to a rush of commercialization and exploitation with almost three dozen U.S. patents granted. W. R. Grace & Co., the leading U.S. producer of neem products, was licensed to process a stable form of azadirachtin, produced in India and marketed under the name Margosan-O. The patent was issued to cover an innovation which increased the shelf-life of the product.[4] However, the extraction process itself is little different from the one that Indian farmers developed and have been using for thousands of years.[3] This compound has been in use for about 10 years in professional greenhouses.

According to the social activist group, The Neem Campaign, the patent is an attack on the intellectual contribution of a Third

Neem, *Azadirachta indica*.
Photo by Penny King

World country—India—where neem seeds have a long-standing traditional use in insect control. The Neem Campaign planned to fight the patent in U.S. and Indian courts. In fact, patenting of this type of intellectual property rights is looked upon by some as "a sophisticated name for modern piracy." [6]

Under laws being negotiated under the General Agreement on Tariffs and Trade (GATT), Indian farmers could be required to pay royalties—payment for use of a botanical which is a rich part of their agricultural tradition. The Foundation of Economic Trends, the organization handling the legal fight in the U.S., claims that patenting neem may cause "acute seed shortages" for the traditional farmers "who have used the neem for generations as a biopesticide."[7]

W. R. Grace representatives refute this claim, estimating that the company will use just two percent of the seeds collected each year in India. The company denies that any royalty will be required from Indian farmers to use neem. The patents awarded to W. R. Grace & Company cover the extraction and formulation of azadirachtin, not the use of seeds, and only apply in the U.S.

Jeremy Rifkin, president of the Foundation on Economic Trends, says, "The real battle is whether the genetic resources of the planet will be maintained as a shared commons or whether this common inheritance will be commercially enclosed and become the intellectual property of a few big corporations. We're talking here of something that is critical to future generations."[3]

In response to *HerbalGram*'s inquiry regarding the Neem Campaign actions, W. R. Grace & Co. spokesperson James Walter said that, at the time the protest originated, its sponsor was in a hotly contested political battle, was using this subject for political advantage, and the claims outlined in the protest were of little merit. The politician in question has since lost his seat in the legislature. According to Walter the protest has been dropped.[8] ❑

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See pages 87 and 88 for other products and order form.

The coast of Belize at sunrise. Courtesy of International Expeditions. Photo by Kimberly Hawkins.

PHARMACY FROM THE RAINFOREST

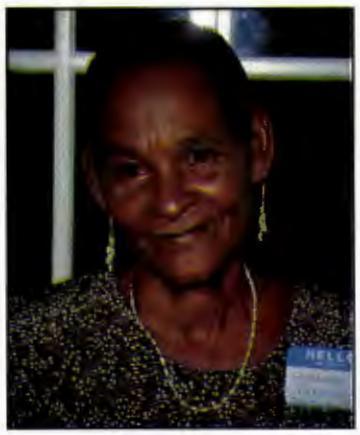
BEAUTIFUL BELIZE: TRADITIONAL MAYAN AND CARIBBEAN MEDICINE

by Mark Blumenthal

In May 1995 the American Botanical Council and the Texas Pharmacy Foundation cosponsored the second of its "Pharmacy from the Rainforest" ethnobotanical ecotours. The first tour took place October 1994 in the Peruvian Amazon (see special section in HerbalGram *#33). On the May trip, 32 people visited the beautiful Caribbean coastal country of Belize (formerly British Honduras), a small country of 200,000 people roughly the size of the state of Massachussetts. In fact, Belize is so small that the entire country has only three traffic lights!*

Thirteen pharmacists participated, seven of whom were alumni of the October trip to the Amazon—people who apparently could not get their fill of heat, humidity, insects, and an abundance of plant life and biodiversity, as well as intriguing instruction from native healers. The pharmacists received continuing education credits for their participation in the workshops.

Participants spent the first night in Belize City where a reception was held in association with the Belize Traditional Healers Association and the Belize Pharmacy Association, several representatives of which made presentations to the group. Also present was Dr. Michael Balick, Director of the Institute for Economic Botany at the New York Botanical Garden. Dr. Balick has been working on a program with Dr. Rosita Arvigo and her husband Dr. Gregory Shropshire, two naprapaths who came to Belize in 1978 to




Left to right: Hortence Robinson, traditional healer, midwife and mother of 22 children and step-children; Thomas Green, traditional healer; Dionisios, brother of Nurse Nuñez; and Leopoldo Romero. Photos by Mark Blumenthal.

pursue health care freedom and eventually established the Ix Chel Tropical Research Centre. Balick has been coming to Belize to study Mayan medicinal plants and to instruct Arvigo, Shropshire, and local indigenous healers in the techniques for collecting and identifying plants for research at the NCI for possible cancer and AIDS drug development.

Dr. Balick brought some interesting facts to light about Belizean biodiversity while extolling the philosopher's statement that "Nature reveals her secrets only once." According to Balick, there are 3,500 higher plants in Belize; since 1987 his program has collected 1,500 species, of which more than 800 were collected with the assistance of local collectors. According to an article he has co-authored with Dr. Robert Mendelsohn, 47 pharmaceutical products have already been discovered from plants living in forests and their calculations predict that at least 328 additional pharmaceuticals await discovery from rainforest plants. The methodology and calculations for this projection were published in a seminal article in the June 1995 issue of *Economic Botany*.

During one of her several presentations Rosita Arvigo explained that Belize is a country of many cultures: three types of Maya Indians, people of both African and East Indian descent, various mestizos and creoles, mixtures of European and Indian and African-Indian respectively, and an increasing flow of Chinese who are leaving Hong Kong. Because it was a former British colony, virtually everyone speaks English, except for some Mayan spoken in the far west near the Guatemalan border.

The workshop participants spent the next three days at Ix Chel Tropical Research Centre in the Cayo district of Belize. Ix Chel is the Maya goddess of medicine, her name literally meaning goddess of the rainbow. In Maya mythology she was the queen of all Maya gods and goddesses and the mother of all Maya people.

Rosita and her husband established this center in 1983 by clearing five acres of a 35-acre farm. When Rosita and Gregory first arrived at their farm, their neighbors, who have 15 children, were clearing land for cultivation by burning rainforest, something that is not unfamiliar in tropical rainforests. Thus, Ix Chel's primary mission and focus is conservation of native plant habitat and preservation of knowledge of the traditional medicine of Belize. (For more about Rosita Arvigo and Ix Chel, see sidebar on page 40.)

Ix Chel is also the site of the Rainforest Medicine Trail, dedicated to Don Elijio Ponti, with 35 useful, edible, and medicinal plant species being identified. Thousands of ecotourists, botanists, and Belizean students visit the trail each year. Ix Chel is also the base for a commercial herb business, Rainforest Remedies, which makes tinctures from local medicinal plants—primarily from plants harvested just before bulldozers clear rainforest land for development. In a recent case, they were able to harvest plants from 1,400 acres being cleared to build a community for Taiwanese refugees. Medicinal plant and tree seedlings are rescued and housed in a nursery to await transplanting into safe areas.

Left: Nurse Nuñez, traditional healer. Photo by Mark Blumenthal.

TRADITIONAL HEALERS

Arvigo explained an interesting facet of ethnobotany in which the occurrence of various common names for the same plant implies the probable economic utility of that plant. That is, some plants in Belize are known by a variety of names: Mayan (sometimes in several dialects), Spanish, English, etc.—all of this suggesting that it has been used by every culture in the area. "When we find a plant with five to seven common names, we know it is a useful medicinal plant," she said. As an example she mentioned Jackass bitters (*Neurolaena lobata*), which is also known as Tres Puntas, Mano de Lagarto (Spanish names) and Kayabim (Mayan name). Golden Bitters (English name) is used for parasitic ailments such as malaria, fungi, ringworm, amoebas, and screw worms.

Rosita explained that there are several distinct levels of healers in Belize:

The doctor priest or priestess deals with both physical and spiritual ailments. There is a very knowledgeable village healer, and the granny healer—responsible for healing within the extended family (which can be up to 200 people). There is also the bush master, someone who is a professional at jungle survival. Also, snake doctors who limit their practices to treatment of snake and serious bites. The partera or midwife limits her practice to the assistance of pregnant women, childbirth, babies, and post partum therapies. An area bonesetter usually deals with broken bones or joint problems. Finally, almost every village has a massage therapist who practices a form of traditional massage, or folk chiropractic.

Probably the oldest traditional healer we met was Mr. Thomas Green, an 88-year-old bush master and healer. One of his more unusual accomplishments is that he carved a dory (boat) from a large log at the 1987 Worlds Fair in New Orleans. Ms. Hortense Robinson, 65, is a village healer and midwife and has birthed thousands of babies in her village and adopted 14 of these babies to add to her own brood of 8. Juana Xix (pronounced Shish), a Maya woman of 65, learned midwifery from her mother-in-law; she has given birth to 18 children (15 of whom are alive) and is the primary healthcare provider for an entire family, including 39 grandchildren. Polo Romero, a local bush master and snake doctor, also assists in the collection of medicinal plants for Dr. Balick for screening at the National Cancer Institute (NCI).

NCI PLANT COLLECTION PROGRAM

Rosita and Greg are field supervisors of the NCI plant collection program in Belize. Their goal is to collect any plant that has been considered beneficial for virtually any medicinal property by local healers. The collection program was set up by a cooperative agreement between NCI and the New York Botanical Garden's Balick. So far this program has found twelve plants with possible anti-HIV or anti-tumor activity, according to preliminary studies at NCI. This NCI work has funded an ethnobotanical survey of Belize so a complete inventory of all plants can be conducted before too many more become extinct. (See sidebar, "Collecting Experiences," on page 38.)

As an example of how important it is to employ this ethnobotanical approach utilizing traditional healers, Dr. James Duke and I worked with Juana Xix, the Maya midwife. According to Rosita, Juana is the only person who remembered the Maya name of a plant that we collected, chichipol ojo (a member of the Euphorbiaceae). This ancient Mayan as well as the English and Spanish names were apparently lost to most contemporary Belizeans.

Our trip included a half-day seminar with Juana Xix and Hortense Robinson dealing with the role of women in traditional medicine and an engaging workshop on herbal practices in local midwifery. There was also a visit to Belentina Nuñez, local Garifuna healer on the Caribbean coast and a visit to her herb garden. The Garifuna are descendants of former African slaves who

Cassava, *Manihot esculenta*. Photo by Donna White.

Red Gumbolimbo, *Bursera simaruba* on the useful plant trail. Photo by Mark Blumenthal.




Left to right: Keel bill Toucan, Photo by R. Medora; Healing Hut photo by Mark Blumenthal; Great Heron, photo ©1995 Peggy Hansen; Cockscomb Basin, Jaguar Preserve, courtesy International Expeditions, photo by Kimberly Hawkins.

intermarried with the women of the indigenous Indian tribes of the Carribean. They are concentrated in several small settlements in Belize where they speak their own language dialect and practice their own style of religious worship. To round out the cultural, anthropological, and archeological aspects of our trip, we also traveled to Tikal in Guatemala and visited the impressive Mayan ruins there, many of which have yet to be excavated.

USDA botanist Dr. Jim Duke delivered one of his characteristically informative, fascinating and entertaining workshops on "Food Pharmacy"—focusing on edible plants and some of their healthful properties. For example, he extolled the value of common lemon grass (*Cymbopogon citratus*), also known as fevergrass because of its reputation for helping to alleviate fevers. According to Duke's computer database, lemongrass is a good source of beta carotene/vitamin A. He also noted that the government in Peru is using lemongrass as an economic crop with hopefully enough financial incentives to replace production of coca leaf (*Erythoxylum coca*).

With respect to the common herb thyme, Duke noted that a study by Turkish scientists studied aromatic compounds in individual plants and found a 40,000 times variation in chemicals like thymol. He says this is good reason for standardization of herbs, even though he is not usually a proponent of standardization.

Purslane (*Portulaca oleracea*) contains, according to Duke, high levels of noradrenaline, but it is not active orally, unless put under tongue for sublingual absorption. He believes it may be useful for anaphylaxis in cases of bee stings and related insect stings and bites. He also noted that purslane is high in betacarotene, tocopherol (vitamin E), and vitamin C.

Regarding the prospect of using plants for the basis for conventional drugs, Duke noted that only four percent of drugs from plants are cheaper to synthesize than to get directly from the plants. For example, the xanthine alkaloids caffeine, theophylline, and theobromine are less costly to extract and produce from plant sources than they are to synthesize. This is yet another reason why it is so important to conserve native plant habitats.

Putting the distinction between medicine in North America and medicine in the tropics, Duke mused, "In the Amazon, if I were hit with a North American disease, I'd go with the medicines from a North American doctor; but if I were hit with a local disease, I'd probably go with the remedies from the local shaman." ❑

ABC's "Pharmacy in the Rainforest" ethnobotany ecotours are available to the general public. For more information, contact Penny King at ABC, P.O. Box 201660, Austin, TX 78720-1660. Phone 512-331-8868; fax 512-331-1924.

HerbalGram *would like to thank all the trip participants who took the time to enter our "Pharmacy From the Rainforest" photo contest. Entries can be seen throughout this article and on the cover of this issue.*

Heliconia, *Heliconia bihai* at Chaa Creek. Photo ©1995 Peggy Hansen.

COLLECTING EXPERIENCES: NCI Plant collection in Belize

by Penny King

Part of the Belize trip involved a field collection project for the National Cancer Institute (NCI). Along with twenty-seven other participants I received final instructions about proper collection methods from Rosita Arvigo. The main object was to find plants with antibacterial and antibiotic properties.

Botanists keep a log of plants they have collected in the field by number and location. (Rosita's collection book lists 1,000 plants; Dr. Jim Duke's lists 19,247, and, according to the Missouri Botanical Gardens Herbarium, the late Dr. Alwyn Gentry's plant collection log contains 80,994, and Dr. Julian Steyermark's lists an astounding 132,223 numbered in sequence with an additional 6,000 not in numbered sequence.) Our group was split into six smaller groups, each one led by one of the native healers. Rosita assigned numbers from her book for the specimens to each group of collectors.

Left: Plant collecting. Photo by Russ Medora

Right: Plant collecting, courtesy of International Expeditions, photo by Kimberly Hawkins.

Each plant was given a special number, information on all of the known common names, Latin name and family (if known), and exact location of the plants, as well as traditional uses. The posology (dosage and method of preparation) would also be recorded from the healers.

We were armed with plenty of insect repellent, both conventional/chemical and herbal, our notebook in which to record findings, pruning shears, a tolerant traditional healer who was barraged with many plant questions, and special net bags for collection of bulk specimens. These bags allow air to flow through in order to keep the plants from degrading until they can be removed for proper drying within a few days. Fortified with this equipment and feeling very professional, we proceeded with our botanical challenge.

Each specimen required a particular protocol for preservation and identification for use in an herbarium. The plant press consisted of two pieces of cardboard approximately 15 by 18 inches, five pieces of newspaper for five specimen samples to put inside the cardboard with the assigned number on the bottom right vertical side, and two wide rubber bands for each set of cardboard. The five specimen samples would include flowers, knobby stems, seeds—if possible—and leaves. Of the five samples collected by each group, one sample would be sent to NCI, one retained at Ix Chel, and the others sent to various herbariums.

We collected three samples per group of five participants. Rosita told us to collect one random specimen in flower and a selective sample of a plant that the healer knew had a medicinal use. Our mission, as directed by Dr. Michael Balick of the New York Botanical Garden's NCI project, was to focus on antimicrobial plants (for treatment of fungus, ringworm, or infections of the skin). The healer assigned to each group would give us information about the plant's efficacy for these conditions.

Several groups collected plants along the roadside with the rest assigned to a rolling hillside. Each of us had a specific responsibility in the plant collection process. One person recorded the traditional healer's data on each plant, a description, common names, uses, dosages and forms of medication, contraindications, location of the find, rarity of the botanical, and names of the collectors. The specimen collector collected the plants, made sure they were numbered correctly, and pressed them. The healer was the guiding force who directed us to the plants to collect.

The traditional healer for our group was Mr. Percival Reynolds. Although he was not a resident of the immediate area and did not use some of the plants we questioned him about, he was most generous in sharing his knowledge of those plants he used in his healing practice. One of Mr. Percy's many impressive aspects was the fact that, if he did not know the name of a plant, he was quick to say so and seemed most honest about the degree of his expertise.

We collected for two hours in the morning and another two in the afternoon. It didn't take long for us to determine that plant collecting was not glamorous, but was just plain hard work, especially in the heat and high humidity of Belize. Our group had some difficulty in finding flowering plants. In order to find the required three pounds of each plant, we sometimes had to locate a number of specimens to fulfill the necessary amount of plant material. Of course, we had to take care not to take an entire stand to meet our quota.

We brought the plant samples back to Ix Chel Farm to be checked and dried by Ix Chel staff in the drying shed, then shipped to NYBG for proper botanical identification. According to Rosita, this was the first time "non-botanists" had collected plants in a group for NCI. Plant collecting for NCI by the pharmacy workshop appears to have been a success as it will be included in the 1996 Pharmacy from the Rain Forest workshop agenda.

It is interesting to speculate and will certainly be gratifying if some of the plants we collected might be a "hit" (show some antimicrobial activity) through testing at NCI. ❑

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Sponsored by the American Botanical Council, The Texas Pharmacy Foundation, International Expeditions, Inc., and ACEER Foundation

For more information contact

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American Botanical Council
P.O. Box 201660
Austin, TX 78720-1660
Ph: 512/331-8868
FAX 512/331-1924
e-mail: PennyKing1@aol.com

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Discover new rainforest ecosystem knowledge through workshops and field excursions conducted by leading naturalists and expert local guides.

See HerbalGram *#33 for an extensive review of the 1994 tour to the Peruvian Amazon in the special section "Pharmacy From the Rainforest." To order a reprint of "Pharmacy From the Rainforest," see page 75. To order a back issue of* HerbalGram *#33, see page 87.*

Profile
ROSITA ARVIGO

Belize is located on the eastern tip of the Yucatan Peninsula, just east of Guatemala and south of Mexico. Many of the natives of this beautiful tropical area are descendants of the Maya, a complex and powerful people who inhabited the area around 900 C.E. The Mayan culture included the medicinal uses of a variety of plants in the area. Unfortunately much of the Mayan ethnobotany is being lost as the accumulated wisdom of generations is not being passed down to a new generation.

Shortly after getting situated in Belize (see Pharmacy from the Rainforest" on page 34), Rosita Arvigo was able to gain the confidence and friendship of Don Elijio Ponti, a Maya medicine man then in his nineties. The next ten years of Rosita's life was dedicated to absorbing his botanical knowledge. She has written a book about her experience, *Sastun: My Apprenticeship* (Harper Collins 1994, available from ABC Books, #B087). *Sastun* chronicles the events of her learning and provides a testament to the wisdom and humor of this beautiful old man. Don Elijio is now 103 years old and is virtually "hammock ridden" (he prefers the traditional Mayan hammock to a European style bed). His 16-year-old great grandson is now caring for him and learning his ways. When Don Elijio expires, says Rosita, the great-grandson will work with Rosita and Gregory to learn the secrets of Mayan medicine she learned from Don Elijio.

She is saving Don Elijio's knowledge in several ways, including the establishment of the Ix Chel Tropical Research Centre where visiting tourists and scientists can come to Belize to learn about native medicinal plants. ABC's "Pharmacy in the Rainforest" tour to Belize this May used Arvigo's farm as one of the base camps and learning centers.

Arvigo and Shropshire have also established Terra Nova (New Earth), the first tropical reserve specifically dedicated to the preservation of medicinal plants. Whenever an area is threatened by development, Arvigo and her associates gain permission to enter the area prior to destruction of wildlife and remove those plants of a medicinal nature, transplanting them for growth in Terra Nova.

Terra Nova is sharing knowledge of Mayan medicinal plants with the New York Botanical Garden (NYBG) and the National Cancer Institute. NYBG's Dr. Michael Balick, director of its Institute for Economic Botany, continues to make numerous trips to Belize to search for interesting medicinal plants for NCI, where they are extracted and screened for their potential anticancer and/or anti-HIV properties.

Arvigo and her co-workers have developed a small business selling herbal extracts from Belizean plants. Known as "Rainforest Remedies," the company provides a small income for Ix Chel and a number of local healers and their communities. Many of the herbs used by Don Elijio and the Mayans in Belize are described in Arvigo and Balick's recent book, *Rainforest Remedies: One Hundred Healing Herbs of Belize* (Lotus Press, 1993, available from ABC Books, #B053). — *HerbalGram* staff. Background photo by Penny King. Photo of Rosita Arvigo by Mark Blumenthal.

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Medicinal Plants of Shakespeare

Paintings by Rosa M. Towne

In 1888, a friend presented me with a copy of the Rev. Henry N. Ellacombe's interesting book, Plant Lore and Garden Craft of Shakespeare. *While reading the most delightfully written pages of the first part, I felt moved to try to delineate the plants etc., mentioned therein. As far as possible I made drawings from living plants and trees. When I could not procure these, I copied illustrations from such works as Curtis's* Londonensis [sic],* *Woodvill's* Medical Botany, *and others, a number of them from works in the library of the Academy of Natural Sciences of Philadelphia.*

Rev. Mr. Ellacombe in his introduction says: "I do not propose to make a selection of his plants form that would not give a proper idea of the extent of his knowledge, but to note every tree and plant and flower that he has noted."

I have followed those he has enumerated.

Rosa M. Towne

Philadelphia, January, 1898.

Plate 1 (Anemone, Bilberry)

(*See Editor's Note, page 48)

Plate 7 (Aloe, Hemp)

Plate 66 (Rhubarb, Senna)

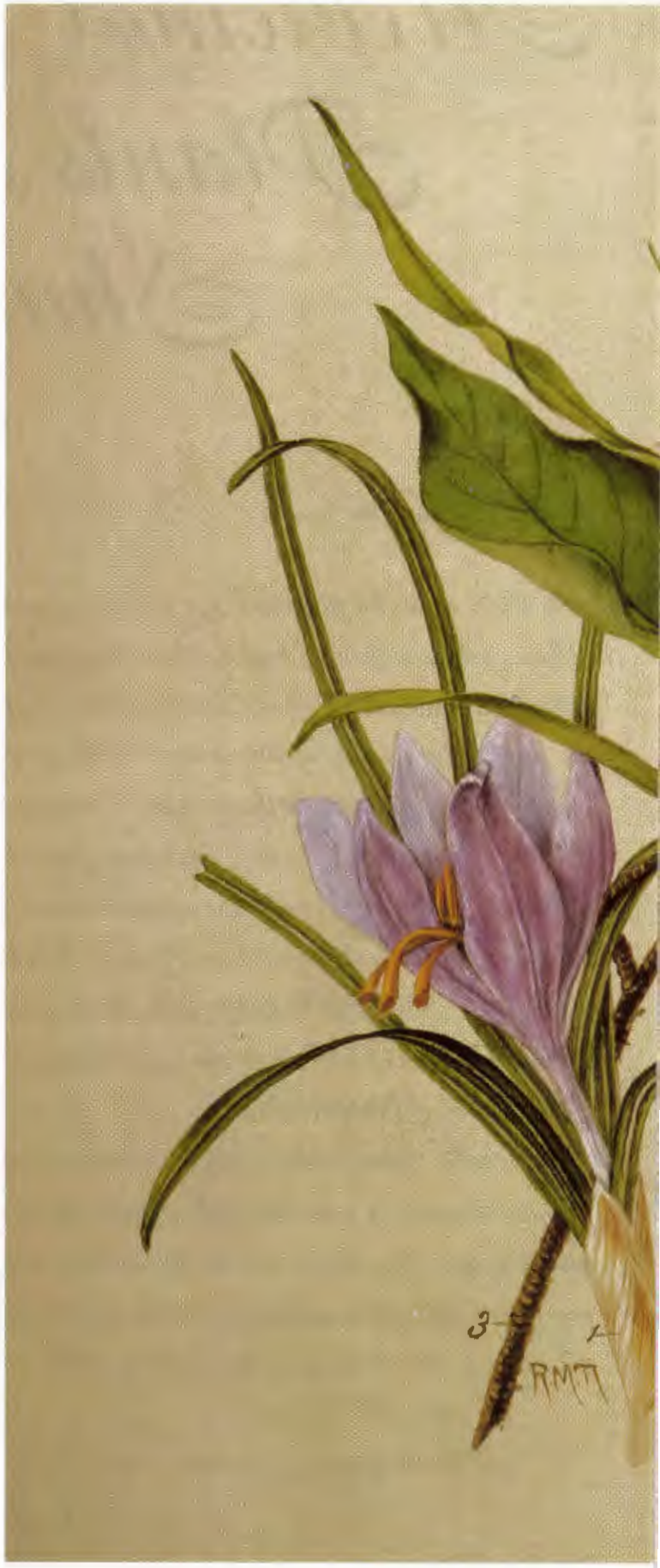

Plate 69 (Saffron, Mace, Nutmeg, Ginger)

Plate 51 (Plantain, Mustard, Radish)

Plate 29 (Hyssop, Lettuce, Leek)

Plate 8 (Burdock, Hemlock, Cuckoo-flowers)

Plate 41 (Lark's Heels, Onions, Garlic)

For purposes of ordering (see information at end of feature), we have used the Botanical Museum plate numbers in the descriptions. The plant's common and botanical name is followed with the quote from the appropriate Shakespearean writing.

Plate 7 (Page 42)
Aloe, *Aquilaria socotrina* or *A.vulgaris*; Hemp, *Cannabis* spp.

The woeful teres that they leten falle
As bittre weren, out of teres dynde,
For peyne as is ligne Aloes or galle.
Troilus and Cressida, st. 159

Pistol. Let gallows gape for dog; let man go free,
And let not Hemp his windpipe suffocate.
2 Henry IV., II. i. 64; *Henry V.*, III, vi. 45

Plate 1
Anemone, *Ranunculaceae*; Bilberry, *Vaccinium myrtillus* L.

Pistol. Where fires thou find'st unraked and hearths unswept,
There pinch the maids as blue as Bilberry—
Our radiant Queen hates sluts and sluttery.
Merry Wives, V. v. 47

Plate 66
Rhubarb, *Rheum officinale;* Senna, *Cassia senna* L.

Macbeth. What Rhubarb, Senna, or what purgative drug
Would scour these English hence?
Macbeth, V., iii. 55

Plate 51
Plantain, *Plantago lanceolata*, *P. major*, or *P. media;* Mustard, *Brassica nigra;* Radish, *Raphanus sativus*

Romeo. Your Plantain leaf is excellent for that.
Benvolio. For what, I pray thee?
Romeo. For your broken skin.
Romeo and Juliet, I. ii. 52

Plate 69
Saffron, *Crocus sativus;* Mace, *Myristica fragrans;* Nutmeg, *Myristica officinalis;* Ginger, *Zingiber officinale* L.

Orleans. He's of the colour of the Nutmeg.
Dauphin. And of the heat of Ginger.
Merchant of Venice, III. i. 9; *Twelfth Night,* II. iii. 125

Plate 29
Hyssop, *Hyssopus officinalis* L.; Lettuce, *Lactuca sativa;* Leek, *Corydalis cava* or *Sempervivum tectorum*

Iago. 'Tis in ourselves that we are thus or thus. Our bodies are our gardens, to the which our wills are gardeners; so that if we will plant Nettles or sow Lettuce, set Hyssop, and weed up Thyme, supply it with one gender of herbs or distract it wih many, either to have it sterile with idleness, or maimed with industry, why, the power and corrigible authority of this lies in our wills.
Othello, I. iii. 324

Plate 8
Burdock, *Arctium lappa* L.; Hemlock, *Conium maculatum;* Cuckoo-flowers (wild geraniums), *Geranium dissectum*

Celia. They are but Burs, cousin, thrown upon thee in holiday foolery; if we walk not in the trodden paths our very petticoats will catch them.
As You Like It, I. iii. 13; *Midsummer-Night's Dream*, III. ii. 260

Plate 41
Lark's Heels, Onions, *Allium cepa* L.; Garlic, *Allium sativum* L.

Bottom. And, most dear actors, eat no Onions nor Garlic, for we are to utter sweet breath.
Midsummer's Night's Dream, IV., ii.; *Henry IV.*, III. i. 161

Plate 70
Strawberry, *Fragaria vesca* L.; Nettle, *Urtica dioica* L.

King Richard. Yield stinging Nettles to my enemies.
Richard II, III.ii. 18

Plate 30
Hawthorn, *Crataegus oxyacantha* L.; Brambles, *Rubus* spp., Wheat, *Triticum vulgare* (albespoine, hawthorn [sic] quickset, whitethorn, thorn) *Crataegus oxyacantha* L.

Rosalind. There's a man hangs odes upon Hawthorns and elegies on Brambles.
As You Like It, III. ii. 379

Plate 70 (Strawberry, Nettle)

Plate 30 (Hawthorn, Brambles, Wheat)

Plate 59

Palm Tree, *Palmae*; Rosemary *Rosmarinus officinalis* L.; Rue, *Ruta graveolens*

Ophelia. There's Rosemary, that's for remembrance: pray, love, remember.
Hamlet, IV. v. 175

Plate 50

Peony, *Paeonia corallina*; Camomile, *Chamaemelum noblile (Anthemis nobilis* L.)

Falstaff. Though the Camomile, the more it is trodden on the faster it grows, yet youth, the more it is wasted the sooner it wears.
1st Henry IV., II. iv. 443

Quince. This green plot shall be our stage, this Hawthornbrake our tiring house.
Midsummer Night's Dream, III. i. 4

THE ARTIST

Rosalba (Rosa) M. Towne (1827-1909) was reared in an affluent and cultured Pennsylvania household, known for refined tastes and excellent judgment in matters relating to horticulture and the fine arts. She was a student at the Pennsylvania Academy of the Fine Arts and exhibited at the Academy from 1877 to 1883. Devoting most of her life to botanical painting, Miss Towne also produced a five-volume series entitled *Studies of Wildflowers and Shrubs, 1859-1890.*

From 1888 to 1898, Miss Towne devoted her energy and talent to painting all the flowers, trees, and plants mentioned in the works of Shakespeare, meticulously following the organization found in Rev. Henry N. Ellacombe's scholarly treatise, *The Plant-Lore and Garden-Craft of Shakespeare* (London, 1884).

PUBLICATION OF THE WORK

Years after Miss Towne's death, the paintings were donated to the Botanical Museum of Harvard University. The Museum's director, Professor Richard Evans Schultes, sought a publisher willing to reproduce the art work with exacting standards. Frame House Gallery of Louisville, Kentucky was chosen to publish the work and the re-creation of the prints in book form was completed in June, 1974. It was introduced at the Pennsylvania Academy of the Fine Arts in the fall of 1974.

HOW THE PRINTS WERE PRODUCED

These illustrations are part of a collection of 73 full-color lithographs re-created from the original watercolors painted by the 19th century botanical artist, Rosa M. Towne, depicting the 181 trees, plants, and flowers mentioned in the works of Shakespeare. The prints were originally offered only in book form for the discriminating collector at $750.

Each of the 73 Plant Lore of Shakespeare color plates is printed on a special formula paper to assure perfect reproduction and long life. With each print is included a separate plate giving the quotation from Shakespeare's works in which the name of the plant appears. The quotations are exact reproductions of Miss Towne's delicate calligraphy and are printed on 100% rag paper.

Prints may be ordered from the Publications Secretary, The Botanical Museum, Harvard University, 26 Oxford St., Cambridge, MA 02138. The cost per print is $7.50; for ten or more the cost is $5 each. Postage and handling charges are $4 plus 25¢ for each print. Twelve or more prints are sent by UPS for $10 plus 25¢ per print. Please make checks payable to the Botanical Museum. ❑

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(*Ed. note - The Cambridge University Library received the book, *Flora Londinensis*, by William Curtis in 72 numbers from 1775-1798. These were ultimately bound in two volumes.)

Left: Plate 59 (Palm Tree, Rosemary, Rue)
Facing page: Plate 50 (Peony, Camomile)


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R.M.T.

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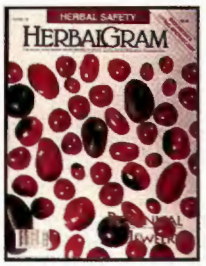

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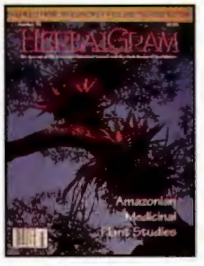

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THE SILPHION PROJECT

by Paul Denham, B. A. (Hons.), L.R.A.M.

Silphion refers to a North African herb in the Ferula or Giant fennel genus of the carrot family (Apiaceae) which was valued medicinally by the ancient Greeks and subsequently picked to extinction, according to John R. Riddle, Professor of History at North Carolina State University in Raleigh, NC.

The American influence on British medical herbalism began in 1838 when an herbal practitioner, Dr. Albert Coffin, arrived in England.[1] The Thomsonian system he advocated was based on an unacknowledged awareness and observation of North American Indian medical, i. e., herbal, practice. It was practical, highly effective, and became hugely popular here, especially in industrial centers. Many of the American herbs introduced by Coffin have been used by British herbal practitioners ever since. Although less are used now than 30 years ago, the 300 or so members of the National Institute of Medical Herbalists still regularly use them and thus have kept alive a tradition which dates from early contacts between European settlers and the North American Indians.[2]

It was from a Seneca Indian that Coffin gained his initial realization of the efficacy of North American plants, for at the age of 19, "Had we not been cured by a poor Indian woman, [from a serious lung disease] when all other means had failed, we should never have turned our attention to the vast resources in which nature abounds throughout the whole of her ample dominions, nor should we have dared to attempt such cures as have been performed."[3]

The "dominions" of nature are not as "ample" now as they were in the early 19th century. In all countries, the major threat to plants is through loss of habitat—the polite term for the destruction of any living thing in the area. Many of the plants which we use are from the deciduous forests of the Eastern States where urbanization, logging, industry, and the spreading tentacles of the leisure industry are a constant threat. Many North American plants which could be cultivated are still collected in the wild.[4] The Silphion Project was established to bring these plants into cultivation in Britain.

Taking plants for medicinal purposes may have a small impact on the overall distribution of a species but can have a devastating impact on the species in a particular locality. This has been studied in detail in the case of Echinacea spp.[5,6] Extinction is the irreversible end of a species but whenever a colony is destroyed, the genetic material contained within it is similarly lost forever and the overall gene pool is reduced. The size of the gene pool affects the ability of the plant to survive any future changes in climate or environment; evolution is happening now.[7]

North American medicinal plants are being cultivated in Britain to alleviate the pressure on the genetic diversity and thus robustness of the wild population. We are obtaining seed from as many states and sites as possible. There is no evidence to suggest that cultivated plants are less effective as medicines; seed collected in the wild can be used to maintain the vigor of cultivated colonies. Large-scale schemes are underway in India, Sri Lanka, China, and Japan to bring medicinal plants into cultivation. The Chinese Institute of Medicinal Plant Development has initiated a huge program of cultivation and certain Botanical Gardens have set up programs to study the cultivation of woodland medicinal plants.[8]

Although wild-collected materials are generally lower cost because the people who collect for commercial dealers are paid so little,[9] and this applies worldwide, cultivation removes certain variables that exist when plants are taken from the wild:

1. Misidentification cannot occur unless wilful. Most incidents involving poisoning or possible toxic effects of herbs have been traced to problems of misidentification.
2. A constant supply is possible, i.e,. not dependent on fluctuations in the labor market or climatic variability.
3. Greater control is available over yield and quality, e.g., small, immature plants need not be collected to make up quotas. Current research for the French and German Herbal Pharmacopeias is demonstrating the importance of time of collection and other factors on quality and on chemical composition of the plant material.
4. Selection of specific and desirable genetic qualities can be sought and obtained as occurs in agriculture.
5. We ensure a supply of the plant for future generations. By so doing, one does not destroy the wild gene pool but gains and learns from it.[10,11]

SILPHION PROJECT REFERENCE COLLECTION

This plan includes the establishment of a reference collection of North American medicinal plants with public access. Such a collection does not exist in the U.K. at present and would provide an important educational resource.

We are obtaining accurately identified seed, of known provenance, of the North American plants included in the *British Herbal Pharmacopaeia*. Correct taxonomic identification of each species is of the utmost importance.

North American Medicinal Plants in regular use in UK

Woodlanders, roots

Aletris farinosa
Aralia spp. incl *racemosa*
Caulophyllum thalictroides
Chamaelirium luteum
Cimicifuga racemosa
Hydrastis canadensis
Panax quinquefolius
Podophyllum peltatum
Sanguinaria canadensis
Trillium spp. incl *erectum*

Trees/shrubs, bark

Chionanthus virginicus
Euonymus atropurpurea
Hydrangea arborescens
Juglans cinerea
Mahonia spp. incl *aquifolium*
Myrica spp. incl *cerifera*
Populus tremuloides
Prunus serotina
Rhamnus purshiana
Rhus aromatica
Thuja occidentalis
Tsuga canadensis
Ulmus rubra

Herbaceous perennials, aerial parts

Chelone glabra clava-herculis
Chimaphila umbellata
Eupatorium perfoliatum
Grindelia spp. incl *camporum, robusta*
Hamamelis virginiana, leaf
Lycopus virginicus
Populus candicans, buds
Scutellaria lateriflora
Viburnum prunifolium
Zanthoxylum americana

Herbaceous perennials, roots

Asclepias tuberosa
Baptisia spp. incl *tinctoria*
Collinsonia canadensis
Dioscorea villosa
Echinacea spp. incl *angustifolia, pallida, purpurea*
Eupatorium purpureum
Geranium maculatum
Iris versicolor
Passiflora incarnata
Phytolacca americana
Stillingia sylvatica
Symplocarpus foetidus
Veronicastrum virginicum

Evergreen perennials

Gaultheria procumbens
Gelsemium sempervirens
Mitchella repens
Serenoa repens

CULTIVATION OF NORTH AMERICAN MEDICINAL PLANTS

1. Pilot program to cultivate a small number of species on a larger scale. This will include some woodland rhizomatous plants.
2. Seeds need to be obtained from as many sources as possible to maintain the genetic diversity of stock. Any donations of wild-collected seed of any species on the list with a note of its source site would be most appreciated. North Carolina Botanical Gardens have sent a generous donation of seed and have promised to collect more. A program of propagation has been started.
3. "Adopt- a-plant," i.e., grow one or more species and get to know them well. This program has been started with Members of the National Institute of Medical Herbalists to learn about the best methods of growing to suit this country and to maintain the purity of different strains.
4. The most appropriate techniques of cultivation and of propagation, particularly for some woodland plants which need specialized methods, are being studied. Many of these plants take some years to mature and are commercially unattractive for this reason. Input from anyone working in the United States would be welcome.

INFORMATION GATHERING

We are developing a database of information on the habitat, conservation status, and collection in the wild of each species. Any information which you could send about the situation in your State or County would be most helpful.

We intend to publish a Newsletter and act as an information source on the conservation and cultivation of temperate medicinal plants. We have made a detailed study of international, European, and American conservation legislation and its effects on international trade in medicinal plants.

We have been in contact with the following organizations, all of which have responded positively: Economic and Conservation Section, Royal Botanic Gardens, Kew, London, Botanic Gardens Conservation International, TRAFFIC International, and the USA Center for Plant Conservation, Missouri Botanical Garden.

The Plants Conservation Officer of the World Wildlife Fund for Nature has given our Project his backing, stating, "Over-harvesting of wild plants for medicinal purposes is a major global conservation problem. Your project can contribute through making the lessons which you learn more widely available to other concerned parties." The IUCN, the International Union for the Conservation of Nature, has recently issued Guidelines for the Conservation of Medicinal Plants.[12] It is aimed at helping countries to develop an appropriate strategy to integrate development and conservation; in practice, our work is very much in accordance with their proposals.

We are concerned for the future of medicinal plants because we have seen the benefits of these plants to our patients. As one prescribes plants, one grows to appreciate them ever more. It is fundamental to North American Indian belief that the land, the plants and the animals are all sacred; we are free to use their knowledge but we are not at liberty to take plants from their land. ❑

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CONFERENCE REPORT

AUSTRALIAN HERBALIST INTERNATIONAL PHYTOMEDICINES CONFERENCE

by Amanda McQuade Crawford, MNIMH

The Second International Conference on Phytotherapeutics took place in March, 1995, in Sidney, Australia. March is late summer in Australia yet there was an abundance of native plants still in flower.

The roster of speakers was almost a perfect combination of hard-edged science, ebullient laughter, and sweet healing arts. A sell-out crowd of 350 expressed the diversity of a global movement in support of traditional roots.

The festivity began with field trips to splendid botanical gardens and a weekend dedicated to sharing herbal information from around the globe.

Dr. Hans Reuter of Germany delivered results of recent pharmacological clinical studies using *Hypericum perforatum* as a psychotropic. His paper, "Psychotropic herbal drugs," will enlighten you about the anti-depressant effects of St. John's Wort.

Hein Zeylstra, Dean of the School of Phytotherapy in Hailsham, England, delivering his paper, "The latest aspects of treating carcinoma," spoke of nutritional and herbal therapeutics for carcinoma, emphasizing quality of life and dignity in death.

Dr. Robert Buist told more jokes during his speech on phytochemicals and micronutrients than one would think possible. Medicinal foods covered in his paper, "Phytochemicals or micronutrients," included millet and hazelnuts, rich in magnesium to dilate bronchi in asthma and to potentiate ventolin-type drugs. The medicinal bioflavonoids in grapefruit lower a raised hematocrit, and the leukotrines in cold-water fish are anti-inflammatory.

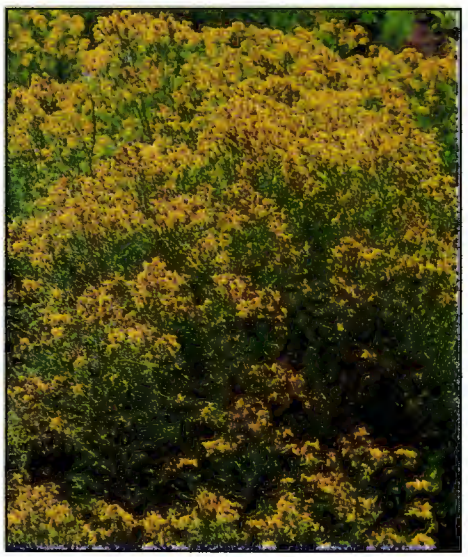
Most important to many herbalists' work with women was Dr. Buist's explanation of the anti-cancer effects of genistein in soy, as well as cautions regarding excess isoflavonoids in soy, red clover, and other natural sources of phytosterols.

Michael McIntyre, past President of the National Institute of Medical Herbalists in the U.K., and currently the editor of the *European Journal of Herbal Medicine*, gave an exhilarating talk, "Treatment of skin conditions with Chinese and European herbs." He managed to interweave an update on British and European legislative victories for herbalism, and the essence of Traditional Chinese Medical Theory.

One of two U.S. speakers, Ed Alstat, N.D., R. Ph., spoke on antiviral *Lomatium dissectum* and its place in treating Chronic Fatigue Syndrome, as well as the role of *Zea mays* in treating interstitial cystitis ("*Lomatium dissectum* and fresh corn silk"). I delivered a case study with blood tests to show the effectiveness of western herbal therapy for HIV/AIDS ("Wholistic western herbalism and HIV/AIDS").

In total, thirty presentations were available to registrants. All these presentations will be published in the *Conference Proceedings*. To purchase a copy or for information on the next NHAA International Conference, please contact the National Herbalists Association of Australia, Anne Cowper, Conference Coordinator, Post Office Box 403, Morisset, New South Wales 2264, Australia. Phone (049)734107. FAX (02)5543459.

Audio and video tapes of any topic(s) are available from Hawkesbury Herbal and Health Services, Post Office Box 397, Richmond, NSW 2753, Australia. ❐



Left: **Millet** photo by David Baker for *HerbalGram*.
Top center: **Grapefruit**, *Citrus X paradisi* Macfad. Photo by David Baker for *HerbalGram*.
Right: **St. John's Wort**, *Hypericum perforatum*. Photo © 1995 Steven Foster

CONFERENCE REPORT

SMITHSONIAN AND ABC SPONSOR HERBAL MEDICINE CONFERENCE

By Mark Blumenthal

"Nature's Pharmacy: The Power to Heal," a conference on herbal medicine and drug discovery from medicinal plants, was held at the Smithsonian Institution in Washington, D.C. on May 5 and 6, 1995. The conference was organized by Smithsonian Associates, the non-profit educational division of the Smithsonian Institution, and the American Botanical Council.

Presenters included Rosita Arvigo, D. N., herbalist/traditional healer from Belize; Dr. James A. Duke, ethnobotanist at the U.S. Department of Agriculture's Agricultural Research Service (USDA/ARS); Dr. Gordon Cragg, chemist from the National Cancer Institute; Dr. James D. McChesney, biochemist/pharmacognosist at the University of Mississippi; Loren Israelsen, attorney in the herbal industry; Dr. Peter Goldman, physician from the Harvard School of Public Health; Dr. John Riddle, professor of medical history at North Carolina State University; Freddie Ann Hoffman, M.D., deputy director of the Office of Health Affairs at the Food and Drug Administration (FDA); and myself. The conference was organized and moderated by Dr. Andrew Parfitt, biologist conducting neurochemistry research at NIH.

This conference marks the second time in less than six months that an agency of the federal government has sponsored an educational event focused on herbs and medicinal plants—an example of the growing public interest in herbal medicine. In December 1994 the Office of Alternative Medicine (OAM) of the National Institutes of Health (NIH) and the FDA cosponsored a two-and-a-half day conference on "Botanicals: Role in U.S. Healthcare?"

MEDICAL MIRACLES OF THE JUNGLE

The first evening's events focused on "Medical Miracles of the Jungle." Presenters Rosita Arvigo and Dr. Jim Duke have extensive experience in studying the ethnobotany of tropical plants, from both scientific and traditional perspectives.

Rosita Arvigo has a doctorate in naprapathy. She and her husband, Gregory Shropshire, moved to Belize in order to experience the freedom to practice this form of therapy. Shortly after getting situated in Belize, Rosita was able to gain the confidence and friendship of Don Elijio Ponti, a Maya medicine man in his nineties. [See sidebar on page 40) Rosita Arvigo's experience with Don Elijio is an excellent example of how important it is for ethnobotanists and other scientists to save the vanishing botanical knowledge of traditional peoples. As ethnobotanist Dr. Mark Plotkin (who also attended the conference and participated in the closing panel discussion) has said repeatedly, "When one of these old medicine men dies, it's like a whole library burning down!"

This conference marks the second time in less than six months that an agency of the federal government has sponsored an educational event focused on herbs and medicinal plants.

THE DUKE OF HERBS

Dr. James A. Duke, the leading medicinal plant expert in the federal government, in his own inimitable way, showed the audience that herbs and medicinal plants still have not yet had their full "day in court" as far as the scientific studies needed to prove their safety and efficacy, at least from a modern drug development perspective.

He referred to the botanical knowledge of one of his primary mentors, Don Antonio Montero, a traditional healer and shaman in the Peruvian Amazon. Don Antonio provides Duke with many traditional ethnobotanical secrets each time Duke travels to the Amazon. One of these ethnobotanical gems concerned the use of a liana bark in the genus *Bauhinia* in a tea which can be used several times during a woman's period as a contraceptive for the next month, but, according to Don Antonio, if used for six periods repeatedly, can render a woman permanently sterile. Duke later corroborated this assertion with evidence from Balick and Arvigo's book—testimony that they have observed the use of a similar species of *Bauhinia* in Belize for the same purposes. According to Duke, this type of ethnobotanical correlation from seemingly disparate cultures, although not scientific proof of an herb's medicinal properties, does indicate a possible rational basis for exploring the plant's possible contribution to modern medicine.

Dr. James A. Duke

The highlight of Duke's presentation came when he doffed his coat, tie and shirt to reveal his t-shirt which he had taken to a previous trip in the Amazon; the shirt contained the outline of a pattern he had made with the red sap from the rainforest tree *sangre de drago* (dragon's blood, *Croton lechleria*) a material that creates an indelible stain on cloth, although Don Antonio uses it primarily for its antiseptic uses. Shaman Pharmaceuticals, a San Francisco-based pharmaceutical company, is currently conducting clinical trials on a new drug from this sap for viral lung infections. Professor Walter Lewis, his wife Memory Elvin-Lewis, and colleagues at Washington University in St. Louis have applied for a patent on a compound from the sap for its wound healing properties. According to Lewis, the new compound accelerates wound healing by 70%.

Always one to call for more research in the area of botanicals, Duke pointed out that he would prefer to use the evolutionarily developed botanical medicines rather than synthetic pharmaceuticals, but wants to see more studies to prove/disprove that herbs and phytomedicines are safer/less safe and/or more/less effective than conventional pharmaceutical drug counterparts.

NCI REPRESENTED

Dr. Gordon Cragg, Chief of the Natural Products Branch, NCI, presented "Prospecting for Phytopharmaceuticals." Dr. Cragg heads the Developmental Therapeutics Program at NCI. He discussed the differences between rational drug design using computers to create new drug models versus large-scale screening of crude extracts made from plants. The latter has been more successful thus far. The major emphasis of this program is in drug discovery from natural compounds. "Nature is a better designer of new molecules than humans, said Cragg. "Also, the natural method has a longer history of use."

Showing a slide of a traditional herb seller in Madagascar, Cragg said that, according to the World Health Organization, 80 percent of the world employs traditional medicine, much of which is herbal based. He also mentioned Professor Norman Farnsworth's survey of 1976 concluding that 25 percent of prescription drugs sold in community pharmacies in the U.S. are derived directly from plants or contain some type of plant products.

Cragg mused on the chemical diversity of the natural world. "Nature is still the best source of new drugs," he said,. agreeing with Duke. Then, speaking as a chemist, "Vincristine has beautiful molecular architecture."

He discussed a number of antitumor drugs derived from plants including etoposide/teniposide from the American mayapple (*Podophyllum peltatum*) although commercial sourcing is now coming from an Asian variety (*P. hexandrum*) that is threatened by overharvesting. Etoposide is now approved by FDA for small cell lung cancer and testicular cancer. A semisynthetic compound invented by Sandoz in Switzerland, it is derived from podophyllotoxin, a compound in the mayapple root's resin. The use of mayapple for cancer was identified by Jonathan Hartwell in his now famous collection of articles published in the book *Plants Used Against Cancer*. Hartwell mentions over 3,000 species of plants, noting anticancer uses in folk medicine for mainly external growths as well as undefined cancers and tumors.

Another plant-derived antitumor drug is much heralded taxol which Cragg terms "another tremendously complex molecule." Although a small amount of taxol is being synthesized, the majority of the drug for ovarian cancer is still being derived from the bark of the western yew tree—formerly destroyed as a trash tree in logging operations in the Pacific northwest until its value as a source of taxol became known.

Putting the health and social benefits of chemotherapeutic drugs into perspective, Cragg noted that "We don't talk about *cures* with cancer, but drugs like taxol can contribute to improving the quality of life."

While NCI formerly focused its attention in the natural product area towards plants, it is now also looking at marine organisms (e.g., sea slugs) which Cragg says are "full of toxic chemicals." Plants and animals make toxic compounds as a form of defense. "In cancer what we are looking for is toxins—toxins that we can use to kill cancer cells. Unfortunately, selectivity cannot be 100 percent with cancer agents; thus there is production of adverse side effects."

Plant collecting for NCI occurs mostly in the tropics due to the vast genetic richness or biodiversity of these areas, although most of these plants have not been reviewed chemically. The NCI collections are carried out through contracts with institutions such as the Missouri Botanical Gardens and the New York Botanical Gardens (e.g., Belize plants) in major collaborative efforts.

An important point about the NCI program is the focus on maintaining the biodiversity and the ecology of any area as well as the cultures of indigenous peoples. Cragg used a Malaysian case study on the compound calanolide A, derived from a latex from a tree (*Calyphyllum lanigerum*) in the state of Sarawak in Malaysia. Calanolide A was found active against the HIV-1 virus. Consequently, it became a good drug development candidate for further research.

Unfortunately, botanists working for NCI cannot find any more of this particular species of tree in the area where it was originally discovered. They have searched other areas, but they have not found this species. A program to review related species proved

negative, as chemists could not find the specific compound calanolide A. Fortunately, they've been able to synthesize calanolide A, recovering 10-15 grams anti-HIV compound calanolide A substitute from 100 grams of latex. However, Cragg pointed out one of the problems associated with chemical synthesis—this often requires 20-30 steps where part of the original organic material is lost in each step. "So it takes a lot of material to start with, only to end up with a small amount of final product."

Rosita Arvigo. Photo by Penny King

FITTING CHEMISTRY OF NATURAL PRODUCTS INTO THE LAW

"Molecular Mechanisms and the Law" was the general topic addressed by the next two presenters. **James D. McChesney**, Ph.D., Director of the Research Institute of Pharmaceutical Sciences at the University of Mississippi College of Pharmacy, addressed the arbitrary distinction between natural products consumed as foods that may also have physiological benefits similar to those which may be provided by drugs. "Where we draw lines may not be rational, such as between food versus drug. We should look as these perhaps as a continuum, but the law does not work this way."

Foods provide macronutrients, e.g., carbohydrates, proteins, nucleic acids, fats, and lipids—all of which are polymers (large molecules) of less complex sub-units. Dr. McChesney presented a primer on the biological role of various macronutrients. To sustain life we need to harness energy and transform and lay down substances into body tissues via a complex interconnecting web of biochemical reactions linked by cofactors e.g., micronutrients, such as vitamins. For example, the role of ascorbic acid (vitamin C) is to aid in the change of procollagen to collagen and dopamine to norepinephrine.

However, also needed to sustain life are agents for occasional use to suppress pathogen infection and restore biochemical order (homeostasis) by reversing elevated response and replacing depleted production capacity. This is part of the role of drugs. McChesney defined a drug as a substance that modifies biological, psychological, or social behavior. Such modification can enhance, inhibit, or distort the functioning of the body. Obviously, there are certain requirements for a drug to take effect: absorption, distribution in the body, drug action on various receptors at the cellular level, and elimination—either direct excretion or metabolism and subsequent excretion.

Factors modifying drug effects include body weight and size, age and sex, genetic factors, general conditions of health, and psychological factors (e.g., placebo effect), multiple dosing, interactions with other drugs, foods, and environmental issues (e.g., smoking, exposure to second hand smoke).

"We don't talk about cures with cancer, but drugs like taxol can contribute to improving the quality of life."

Loren Israelsen, attorney and Executive Director of Utah Natural Products Alliance, Salt Lake City, Utah, put his explanation of nutrients and drug actions into a lucid legal and regulatory perspective.

The primary question, he said, is "What is a food and what is a drug?" World Health Organization (WHO) surveys show that botanicals are the basis of almost 80 percent of the world's medicine—except in the U.S. How did this happen?

Before World War II, many plants were found in the *United States Pharmacopeia* (USP). Israelsen noted that there are patent problems associated with herbals; herbal medicines are simply not patentable. He noted that the pharmaceutical industry is the most profitable industry in the U.S. and that the relatively high cost of pharmaceutical drugs is one of the primary factors influencing consumer interest in herbal medicine. Like many experts in the academic discipline of pharmacognosy (the study of drugs of natural origins), he lamented the decline in pharmacognosy courses in U.S. pharmacy schools as an example of declining interest by the profession.

However, he pointed out that since the early 1970s there has been a change in interest and a renaissance in botanicals. Many people are looking for a natural medicine where conventional medicine has failed. An example of this explosive growth is the rise of the $1 billion natural products industry in Utah, where herb and natural product manufacturing has become bigger than skiing and tourism. The only industry economically larger in Utah is software.

Senator Orrin Hatch (R-UT) is deeply interested in natural products. Israelsen believes this reflects the increased interest among the American public. As an example, he said that more people use herbs than experts have previously imagined. Although the now famous report on alternative medicine by Dr. David Eisenberg and colleagues at Harvard (*New England Journal of Medicine*, January 1993) indicated that only three percent of the public used herbal remedies, Israelsen referred to a study published in March by researchers at the University of Mississippi that suggests that 75 percent of the people surveyed in rural Mississippi used

plant medicines. (See article on page 16 of this issue.)

Israelsen then gave some of the historical background behind both the Nutrition Labeling and Education Act of 1990 (NLEA) and the Dietary Supplement Health and Education Act of 1994 (DSHEA), starting with the Kellogg's All-Bran case in 1984 in which the cereal giant made a claim that its high fiber cereal helped to prevent certain types of cancer. Previously, FDA had persecuted evening primrose oil and ginseng products with no logical reason—all coming to a head in the Kellogg's All Bran issue when FDA objected to Kellogg's claims.

Eventually, NLEA was passed. NLEA does two things: First, it requires disclosure with a nutritional facts panel on all conventional foods, listing fats, carbohydrates, proteins, and essential vitamins and minerals. This has changed the way consumers are eating and the way manufacturers are producing their products, e.g., serving sizes being more realistic. Second, NLEA allows health claims on food products with preapproval by FDA to their standard, which FDA later set as "significant scientific agreement." Based on 1990-1992 FDA rules for industry health claims, it was virtually impossible for dietary supplements to qualify—it was explicitly impossible for supplements to make claims. New legislation was introduced by Senator Hatch and others to help remedy this situation, the result being the DSHEA.

According to Israelsen, Congress got more mail on this issue than any other in 1993-1994. "Congress learned that there are two lobbies that you cannot ignore: guns and vitamins.

"This bill is an exciting and important piece of legislation because it moved the boundary lines so herbs can now be protected as grandfathered dietary supplements. There is now a legal definition for dietary supplements. Third party literature is now allowed. Structure and function claims are now allowed which describe how an herb affects the structure and function of the body or how the mechanism of action works for an herb." As an example, he cited cranberry juice or capsules and maintenance of a healthy urinary tract.

Israelsen gave other examples of leading European phytomedicines he thought should be included in modern healthcare in the U.S., citing the health benefits of standardized extract of milk thistle seed (*Silybum marianum*) supported by 195 scientific studies. He said, "This herbal preparation should be in every hospital and poison control center for *Amanita* poisoning," a reference to the usually fatal poisoning by the poison deathcap mushroom, *A. phalloides*, which is treatable and/or preventable with milk thistle preparations.

"Ginkgo is the most well researched herb in the world," he continued. "There are over 400 scientific studies. But this is a highly sophisticated preparation, requiring fifty pounds of ginkgo leaves to produce one pound of the standardized extract." He noted European research that shows ginkgo's utility for tinnitus and vertigo, two conditions common to the elderly. "If ginkgo were more available to older people, how many falls would that prevent, and thus possible premature deaths associated with conditions resulting from injuries sustained in the fall?" He noted the increased interest in pine bark extract (pycnogenol) for tennis elbow and connective tissue repair. He also noted that it takes 5,000 evening primrose seeds to make just one capsule of evening primrose oil.

Israelsen noted that the pharmaceutical industry is the most profitable industry in the U.S. and that the relatively high cost of pharmaceutical drugs is one of the primary factors influencing consumer interest in herbal medicine.

Peter Goldman, M.D., of the Harvard School of Public Health, spoke on "Complex Chemistry: Assessing the Benefits." Dr. Goldman compared the effects and advantages of complex plant mixtures to the isolated components, the so-called "active ingredients."

He told of William Withering, an eighteenth century English physician who is credited with the introduction of digitalis from foxglove leaf (*Digitalis purpurea*) to modern medicine. Withering made meticulous notes of his patients with congestive heart failure using foxglove leaf, although he originally got the idea from an old woman herbalist in Shropshire who used foxglove in an herbal mixture for dropsy, edema of the lower limbs.

Goldman used this example to discuss the therapeutic index of a drug. That is, what are the risk-benefit relationships of the desirable dose? What is the relationship between the therapeutic benefit and dose-dependent side effects? Whether to use a higher dose that will provide therapeutic benefit, or go to a lower dose due to concerns over safety is often a subjective judgement.

Digitalis (foxglove) leaf has a low margin of safety; a therapeutic dose is only about one-half of a potentially fatal dose, as the glycosides in the leaf can cause cardiac arrythmias. Thus the teas that Withering used may not have been adequate to ensure safety. According to Goldman, this is a primary reason that pharmacy and medicine witnessed the movement toward standardization of drugs and pure compounds.

He explained the different methods employed in medical science and the pharmaceutical industry to assay the potency and safety of a drug. For example, bioassays have been used where many experimental animals (e.g., frog, pigeon, cat) were killed in laboratory conditions to ensure the proper dose of digitalis for human cardiac therapy. This bioassay was used to purify the active principle and standardize the digitalis leaf preparations. Today, pigeon mortality is still the bioassay used in USP XXI monograph for digitalis leaf.

Goldman said that drugs were often modified to increase their bioavailability. For example, a standard test is to periodically measure the concentration of drug in blood to see how long the drug stays active before it is excreted or changed into a metabolite. Some drugs may be modified to keep them in the bloodstream for a longer period of time. Another reason to modify a drug is not only to increase bioavailability but also to increase therapeutic index, i.e., lower toxicity or increase therapeutic activity. Scientists can look at urinary excretion to determine bioavailability. The rate of disintegration of tablets is an important factor. Compared to tablets and capsules, herbal ingredients in tea and liquid extract forms are already in solution.

Goldman reviewed the history of drug regulation in the U.S. and the types of preclinical and clinical trials necessary to bring a new drug to market with FDA approval. He made an interesting point, "There's a great advantage to herbal medicines since they don't really need all of the preclinical work described above; they are already being used by many people. All we need to do is test for safety and efficacy to see how safe they are and how well they really work."

The final formal presentation was by **John Riddle, Ph.D.**, Professor of History at North Carolina State University, in his talk, "A Checkered History: The rise of the pharmaceutical industry." Dr. Riddle has conducted considerable research on ancient Greco-Roman medicine, is the author of numerous articles and co-author of a fascinating book, *Contraceptives and Abortifacients from the Ancient World to the Renaissance* (Harvard University Press, 1992).

Riddle has researched the *Hippocratic Corpus*, the collection of medical writings still extant from Hippocrates (ca. 4th century B.C.E.), the famous Greek physician who is called the Father of Medicine. Less than 20 percent of the 160 treatises of *Hippocratic Corpus* have been translated into any modern language with 257 herbal drugs mentioned. Riddle's research reveals

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MARKET REPORT

by Peter Landes

Spices: The big news in spices this time around is the virtual lack of anything exciting—very unusual for these active markets at this time of year. Crop development in all soon-to-be-harvested Mediterranean crops seems to be "normal" and so prices are also "normal," *i.e.*, rather cheap. Markets entered the usual summer doldrums early this year and have yet to awaken.

The North African Mediterranean herbs like **Basil** and **Marjoram**, while somewhat higher than last year's rock bottom prices, are still pretty inexpensive and coverage should be extended. **Paprika** may be interesting—Spain reports a very small crop due to poor growing conditions there.

White Pepper is thoroughly controlled by one big shipper in Indonesia and, what with a reported crop of only approximately 15,000 tons this year, there should be no problem maintaining a high price for this commodity. **Black Pepper**, on the other hand, is dull and featureless at the moment. The Indonesian and Malaysian crops were normal (there's that word again) and the Brazilian and large Indian crops are yet to come, so upward pressure on prices is definitely lacking.

Nutmeg has receded, while **Mace** (made from the same fruit) has advanced in price. **Garlic** was incredibly cheap this year and remains so even with a slight recent price increase. **Sage** could be a problem—quality (and price) vary greatly depending on source from absolutely awful to excellent for the Dalmatian, but continuing problems (like an astoundingly savage war in the Balkans) may make that origin a thing of the past.

Botanicals: The amazing proliferation of new "exporters" in some producing (formerly communist) countries continues. Qualities from some of these are pretty abysmal and caution is urged. In addition, most items must be pre-contracted or they will not even be harvested due to the prevailing low prices of the last few years, which were o.k. in a totally artificial socialist economy, where a loaf of bread, for instance, was two cents and rent was $10 a month. With the collapse of communism prices for necessities have increased to more normal European levels and if people cannot achieve a workable price for an item, they simply won't harvest it. If it is not pre-sold, they simply won't have it.

Early attention to all requirements is necessary this year (and maybe forever) since the large state-owned entities that used to stock these items for the foreign buyers like the U.S. no longer exist. Their sole purpose in the old days was to generate hard currency for their economies anyway and, therefore, they could "afford" to sell very cheaply and they, at least, knew the items. Now, unless you exercise due diligence, you (and probably your shipper) have no idea what you'll be getting and in what amount. Everything may go the way of **Red Clover,** which is almost totally unavailable.

As predicted, **Rosehips** are very expensive this year and **Hibiscus**, **Chamomile**, and **Calendula** have increased somewhat in price. Otherwise there is interest developing in South American botanicals, especially **Cat's Claw/Uña da Gato** (*Uncaria tomentosa*). North American botanicals are also very firm and somewhat scarce. This trend is expected to continue as less and less people look to wildcrafting as a way to make a decent income.

Of course, if the weakness of the U.S. dollar continues, prices for all imported items will rise accordingly. This autumn should be interesting—stay tuned to this column! ❑

Peter Landes is vice president of Market Reports at KHL Flavors, Maspeth, New York.

VIETNAM "OFFICIALLY" SOURCE FOR U.S. ESSENTIAL OILS

As practically the only producer besides China, Vietnam could have a corner on supplying the U.S. with cassia, sassafras, and ylang ylang oils now that diplomatic relations have been restored. The U.S. has probably been dealing with Vietnamese oils all along, just under different names.

"Essential oils are hard to identify," says one dealer. "We have probably already seen their contributions at some point. Vietnamese lemongrass routed to Burma, citronella from Vietnam shipped to India, or cassia could have gone to China. At those stops they were restamped and then sent to the U.S. Only the U.S. had an embargo against Vietnam, everyone else has been dealing with them."

In the long run, Vietnam's entry into the market will probably have a modest impact. Consultants are saying that there could be a 10-, 20-, or 50-percent drop per pound for all essential oils over the next 5 to 10 years, but, compared to the wide fluctuations in price that essential oils normally endure, this is almost nothing. The one area where Vietnam may flourish is in the subtleties of taste. If it can produce an oil that is superior to, say, Chinese cassia, it may find Coca-Cola looking at its products. [*Chemical Marketing Reporter*, July 7, 1995] ❑

TYLER RECEIVES SOCIETY'S HIGHEST AWARD

The Society for Economic Botany, an organization devoted to the various uses of plants by people, designated Professor Varro E. Tyler of Purdue University the 1995 "Distinguished Economic Botanist of the Year" at its annual meeting held in June at Cornell University. This recognition is granted annually to a single individual who has made outstanding contributions to any specialty area in the field of economic botany; it is the Society's highest award.

Dr. Tyler, the Lilly Distinguished Professor of Pharmacognosy in Purdue's School of Pharmacy and Pharmacal Sciences, was cited for his numerous contributions to the study of medicinal agents derived from plants. It was noted that he has been the senior author of *Pharmacognosy*, the only American textbook in the field, for five editions beginning in 1965. His more recent efforts to provide factual information on herbal medicine to both the public and health professionals through such books as *Hoosier Home Remedies, The Honest Herbal* (3 editions), and *Herbs of Choice* were also praised. The author of 16 books, Tyler has also published more than 240 scientific and educational papers in the periodical literature.

In addition to his scientific contributions, Tyler served as Dean of the School of Pharmacy and Pharmacal Sciences at Purdue from 1966 to 1986 and as Executive Vice President for Academic Affairs from 1986 to 1991. Among many professional affiliations, Dr. Tyler is a member of the Herb Research Foundation Professional Advisory Board and a frequent contributor to *HerbalGram*. ❑

Dr. Varro Tyler

JIM DUKE RETIRES FROM USDA AFTER 30 YEARS

After 30 years with the Agricultural Research Service (ARS), Dr. Jim Duke retired from the U. S. Department of Agriculture (USDA) payroll when his position was abolished on September 30, 1995. Jim will stay on with USDA as an unpaid volunteer, advising several programs with which he has been officially involved in the past, especially his phytochemical database.

Dr. Duke is at the pinnacle of his profession of outstanding public service. Authorship of over 300 educational and scientific articles (many of which are peer-reviewed) and 15 books reflects only a portion of his work as the leading medicinal plant expert in the federal government. At his innumerable lectures and workshops he is always responsive to queries from individuals, government agencies, industry leaders, health professionals, as well as hospital, poison control, and research centers.

Dr. James A. Duke in Belize. Photo by Mark Blumenthal

Duke plans to devote his "sunrise years" to two elusive objectives, 1) getting a fair shake for the herbal alternative in modern medicine and 2) saving one 250,000-acre sector of Amazonian Rainforest for Peruvian and North American grandchildren, including Duke's five grandchildren, to enjoy.

Towards that second objective, Duke shamelessly urges that tax-deductible donations be sent to support an ethnobotanical research fund he established for the nonprofit Amazonian Center for Environmental Education and Research (ACEER). ACEER is the site of the highest reported phytodiversity in the world, with 300 woody species per hectare. Make checks payable to ACEER Ethnobotany Research Fund, One Environs Park, Helena, AL 35080. All funds will be used to support research by Amazonian and North American student scientists (not professional ethnobotanists like Duke) involved in ethnobotanical research. Over the last couple of years at Duke's request, contributions in lieu of honoraria sent to ACEER for seed money accrued $6,000 in the Ethnobotany Fund. He hopes to match that one more time as a result of a retirement slide presentation about the ACEER rainforest, Green Farmacy, held in the USDA auditorium, October 20, 1995.

Duke will be participating in workshops in Belize, Costa Rica, and Peru next year. Special tours with him can be arranged for travel groups of 35 or more. For details, call 1/800/633-4734.

Dr. Duke expresses thanks for an interesting three decades with USDA, treasuring his thirty years, and claiming, rightly or wrongly, that no one has had a more interesting career, with an aggregate of five years in Latin America (during a seven-year stint leave of absence from USDA). His fascinating USDA trips range from A to Z; Argentina, Bolivia, Brazil, China, Colombia, Costa Rica, Ecuador, Egypt, Honduras, India, Indonesia, Iran, Jamaica, Laos, Madagascar, Panama, Peru, Sao Tome, Syria, Thailand, Vietnam, and Zambia.

In his retirement Dr. Duke is launching *Green Pharmacy*, a new book with Rodale Press, and hopes that *HerbalGram* readers will share with him any interesting anecdotes about herbs or other tame or wild plants that have helped or hurt the reader's health.

But most of all, he hopes all will contribute generously to the ACEER Ethnobotany Fund. Eighty percent of the people who have been to Peru with him have wanted to become active and return to Peru and 23 percent have done so, according to records provided by ACEER.

A. K. Stoner, Research Leader, National Germplasm Research Lab, USDA (with additional material by Barbara Johnston). ❑

GINGER/VALERIAN

Continued from page 21

caraway, and verbena, by noting that ginger is a "stimulating carminative"—i.e., it "stimulates digestive function, especially the absorption and passage of stomach contents." The digestive and antimotion sickness effects of ginger are recognized and approved by the German Commission E; 400,000 tablets are sold in Germany annually for motion sickness. It is currently monographed in the *British Pharmacopoeia* and the Swiss Pharmacopoeia. It is an OTC remedy on the General Sales List in the United Kingdom. In Denmark ginger tablets are indicated for "rheumatism and travel sickness" with more than 14 million tablets sold annually.

Nine pages of the petition are devoted to a review of the chemical, toxicological, and pharmacological evidence that supports the safety and efficacy of ginger. Its safe history of use is noted by showing that it is mentioned in the pharmacopeias of 12 nations without any mention of adverse side effects or interactions with other drugs.

The efficacy of ginger in preventing nausea and vomiting associated with motion sickness is established by four primary clinical studies, including the *Lancet* study noted above. One study conducted on sailors at sea (i.e. not in a controlled laboratory environment) showed that ginger was significantly more effective than a plac,ebo in reducing the frequency of vomiting and cold sweating. Another study by the same researchers showed a decrease in vertigo with no nausea experienced by the members of the ginger group.

The most positive recent study, published in 1994 on 1,489 volunteers on a boat, compared ginger with seven commonly used antiemetic drugs (both OTC and prescription) and concluded that ginger root was effective, and as "potent an agent" as the other drugs.

The petition also notes that two clinical studies have not confirmed the antinauseant effect of ginger, but the petition notes that these two focused on the central nervous system dimension of nausea, not the gastric aspects. The petition cites other clinical studies confirming ginger's action on the digestive system in allaying nausea.

NO RESPONSE FROM FDA

In addition EAPC included hundreds of pages of scientific studies and literature reviews and legal documents supporting the validity of the claims made in each petition. Despite the apparent self-evident logic of the petitions, questions remain whether FDA will respond in a timely and appropriate manner.

As noted earlier, FDA had indicated to EAPC counsel that the policy change requested by the initial petition would take some time. However, over three years have now elapsed since its filing in July 1992, with no response from FDA. And yet, during this time, FDA published an Advance Notice of Public Rulemaking (ref) and senior FDA officials testified to Congressional committees during the legislative process concerning the Dietary Supplement Health and Education Act of 1994 (DSHEA) suggesting that many herbs and herbal products were actually drugs and should be regulated as such. Thus, it is ironic that a coalition of consumers and industry groups were able to get DSHEA passed through Congress in less time than it has taken the FDA to respond to the EAPC's initial petition! It has been observed that FDA's lack of a timely response in this matter suggests that the agency is not genuinely committed to the development of meaningful, rational rules and regulations regarding the accurate and responsible labeling of selected herbal products as OTC drugs.

According to Loren Israelsen, a Utah-based attorney involved with the herb industry and EAPC co-counsel, "The issues raised by the EAPC are important policy considerations which deserve a thoughtful and affirmative response from FDA. We have tried to frame the problem and the solution squarely and FDA's silence is not only disappointing but gives support to the industry's belief that the Agency remains inflexible and unresponsive."

The DSHEA allows manufacurers to make limited "structure and function" claims which indicate certain actions of an herb when sold as a dietary supplement. However, drug claims are not allowed despite the fact that many consumers use herbs in the same manner as FDA-approved OTC medicines. If the FDA continues to delay its response to the three EAPC petitions, the only options left for EAPC may be to: 1. file a lawsuit against FDA in an attempt to force a response (this may drag the process out even longer); or 2. go to Congress to attempt legislative relief (this is likely, especially considering the strong consumer response to DSHEA and a Congressional attitude that appears to be increasingly impatient with FDA).

The ball is squarely in the FDA's court, but it is unknown when it is going to play. FDA spokesperson Ivy Kupec told *HerbalGram* that the Agency is in the process of developing an *overall* policy with respect to foreign data; that is, the Agency is attempting to include the issue of foreign data submitted to support an OTC drug claim into a larger context, presumably for prescription drugs as well (Kupec, 1995).

According to another FDA spokesperson, FDA indicated that EAPC had demonstrated adequate market history for both ginger and valerian and both petitioins are currently under medical review.

In the meantime, whatever health benefits of herbs and phytomedicines that can be communicated by industry to consumers via the DSHEA's structure and function claims labeling policy will have to suffice. However, this avenue of communication is limited and cannot include many well documented and widely recognized *therapeutic* or *druglike* actions of these herbs.

As consumers and a growing number of health professionals continue to employ more herbs and phytomedicines for a variety of short-term conditions as well as long-term prevention purposes, FDA's inaction on the EAPC petitions further frustrates the public's need for more information on the responsible use of these products. A primary FDA responsibility is to serve the public need for properly labeled foods and drugs. Its delays and lack of a positive response in this area are clearly a disservice to the American public. ❑

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Both the EAPC valerian and ginger petitions are available from the American Botanical Council for $10.00 each, plus postage and handling. For valerian, order #412; for ginger, order #413. Contact ABC, P.O. Box 201660, Austin, TX 7872-1660. Phone 512-331-8868; fax 512-331-1924.

In Memoriam

John Bastyr
1912 - 1995

John Bastyr, medical pioneer and life-long advocate of naturopathic medicine, was more than a physician. "His way with patients, his ability to stimulate in them their ability to get better, he had that way with patients," commented Dr. Joe Pizzorno, president and co-founder of Seattle's Bastyr University.

Dr. Bastyr found his inspiration early, watching his father, a pharmacist, mix various herbs. He is regarded by many as the man who single-handedly worked to protect and preserve the "nature cure" approach to health care during the decades when it was under attack by organized medicine as quackery and fraud.

"He was never bitter about that," said Dan Labriola, a Seattle naturopathic doctor who once studied under Bastyr. "He kept getting clobbered trying to keep the profession alive, but he just felt it was an educational process and people would eventually come around."

Labriola feels that it was Bastyr's gentle persistence in promoting naturopathy in Washington state that likely saved the profession from extinction in the U.S.

"Naturopathy is a system of diagnosis and treatment of the prevention and cure of disease using natural methods," Bastyr once said. "You're not treating a disease. You're treating an individual."

At age 80 he was still practicing, commuting between his Seattle office and his four-acre farm in Kent, south of the city.

Dr. Les Griffith of Seattle found in Bastyr his inspiration for switching from a career as a medical doctor to one as a naturopathic physician. Griffith's idea of naturopathic medicine was that it was the sort of snake oil that was sold off the back of a buggy. Then he was introduced to Bastyr.

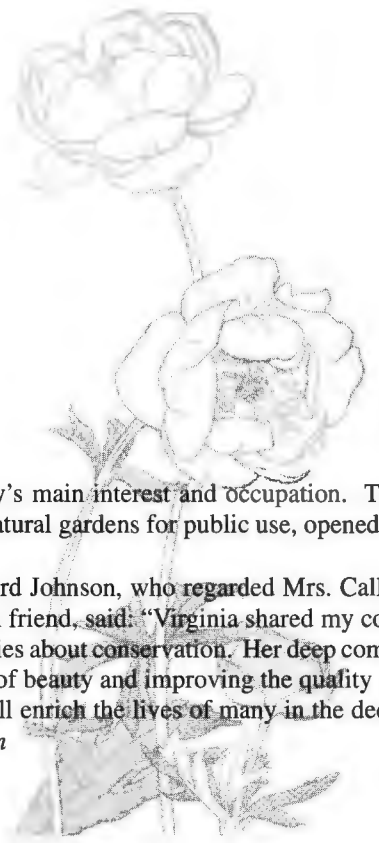
"I liked the way he dealt with people, the whole ambiance of making caring a part of the healing process. It was almost as if his caring had a will of its own to make people better," Griffith said. He is glad that he and co-founders Pizzorno and Dr. Bill Mitchell named the school after Dr. Bastyr while he was still alive.

"We wanted to make a monument to him while he was still alive. We wanted him to know how much we cared."

Dr. Bastyr died from complications of congestive heart failure. — *B. Johnston*

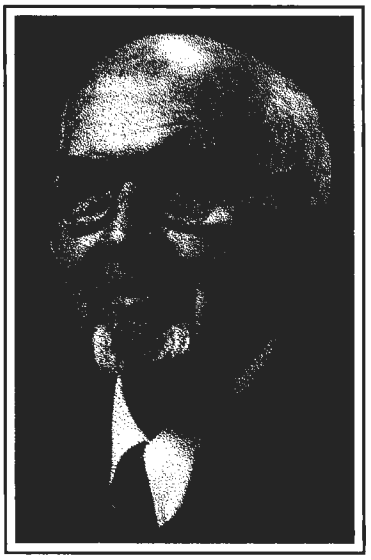
Virginia Hand Callaway
1900 - 1995

Nationally acclaimed conservationist, educator, and self-taught horticulturist Virginia Callaway, 94, died in February. Ms. Callaway and her husband, Carson J. Callaway, were co-founders and co-donors of the 14,000-acre Callaway Gardens in Pine Mountain, Georgia. This recreational and public garden was begun in 1930 with the purchase of 2,500 acres of land around Blue Springs, Georgia. As the years progressed, the land around the Blue Springs site became Mrs. Callaway's main interest and occupation. The location, established as natural gardens for public use, opened under a trust in 1952.



Lady Bird Johnson, who regarded Mrs. Callaway as a treasured personal friend, said: "Virginia shared my concerns, beliefs, and philosophies about conservation. Her deep commitment to creating a world of beauty and improving the quality of life has left a legacy that will enrich the lives of many in the decades to come." — *B. Johnston*

In Memoriam



Russell Earl Marker
1903 - 1995

In spite of the fact that he never bothered to earn a doctorate, Russell Marker had a distinguished scientific career as an expert botanist and pharmacologist who was convinced that the plant kingdom was the place to look for abundant, inexpensive raw materials for steroids. He spent years studying sapogenin, a white crystalline compound obtained by chemically degrading the saponin occurring in many plants.

Marker puzzled out the precise molecular structure of many sapogenins and devised a method called Marker degradation for converting and reshaping a sapogenin molecule into one identical in structure to progesterone, an important step in mass production of all steroidal hormones, including cortisone and the birth control pill.

Marker searched woodlands from Canada to Mexico and focused on a sapogeninn called diosgenen, because it required the fewest conversion steps. After analyzing and experimenting with hundreds of specimens, he finally found his horn of plenty in the gnarled black tubers of a wild yam (*Dioscorea* spp.) in eastern coastal Mexico.

He approached two large American pharmaceutical companies for funding his process of conversion which used only four steps. His request was considered too risky and no funds were forthcoming. He quit his teaching post at Penn State University, returned to Mexico with his modest savings, collected nearly 10 tons of roots, and, in a borrowed laboratory, produced almost seven pounds of top-quality progesterone, then priced at $36,000 per pound.

He contacted Laboratorios Hormona, a lab in Mexico City, and brought to it two bundles of progesterone, an amount that equaled roughly half of the world's production at the time. His 40 percent stake in the subsequently formed partnership was granted on the basis of his expertise and four and one-half pounds of progesterone. The company, Syntex, formed in 1944, rapidly prospered. Marker set it on the road to mass production of synthetic progesterone and then left for other ventures.

While working for the Ethyl Corporation, he helped develop the octane rating system for gasoline. At the Rockefeller Institute he worked out the development of a procedure used to study molecular structures. He then accepted an appointment as professor of organic chemistry at Penn State.

According to his family, Dr. Marker died as a result of complications from a broken hip. — *B. Johnston*

Matthew Suffness
1942 - 1995

Matthew Suffness, a manager of cancer therapies research at the National Cancer Institute, died of pneumonia June 14 at Holy Cross Hospital, Washington, D.C.

He received a bachelor's degree in pharmacy from Howard University and a doctorate in pharmaceutical chemistry from the University of Wisconsin. He went to work for the NCI in 1976 as head of the plant and animal products section. In 1981 he became chief of the natural products branch and in 1989 became natural products grants program coordinator. In addition to editing and contributing to the 1995 textbook, *Taxol, Science and Applications*, he was the author of more than 60 articles on the discovery and development of cancer drugs.

Dr. Suffness was a past president of the American Society of Pharmacognosy and a member of the American Chemical Society, the American Association for the Advancement of Science, the American Association for Cancer Research, and the Society of Economic Botany.

"Matthew Suffness played a major role in the evolution of the National Cancer Institute natural products program as we know it today, and particularly in the development of drugs such as taxol. I feel that the appearance of the CRC book, *Taxol, Science and Applications*, just before his death is a testimony to his dedication to the discovery of more effective treatments for cancer. It is sad that complications from a treatment for cancer was to bring about his untimely death at a stage in his life when many feel that he was at the height of his productivity." — Gordon Cragg, Chief, Natural Products Branch, National Cancer Institute

Dr. Suffness's wife, Rita, and his family suggest that contributions to the Young Investigator's Symposium at the annual conference of the American Society of Pharmacognosy would be a most appropriate and worthy tribute to his life and work. Tax-deductible contributions, with the stipulation that the money is to be placed, in his name, in a memorial fund for the Young Investigator's Symposium, should be sent to Robert J. Krueger, Ph.D., Treasurer, ASP Foundation, College of Pharmacy, 901 S. State Street, Big Rapids, MI 49307. 616/ 592-2236. — *B. Johnston*

USEFUL WILD PLANTS of Texas

Review by Mark Blumenthal

After 24 Years of Research the First Volume of a Twelve-Volume Encyclopedia Is Now Available

BOOK REVIEWS

One of the most unusual and valuable books on the economically useful plants has just been published. With over 24 years of research behind it, *Useful Wild Plants of Texas, the Southeastern and Southwestern United States, the Southern Plains, and Northern Mexico*, the first volume of the massive encyclopedia with the long name, is now available.

This ambitious project has resulted in the collection of an exhaustive amount of data about the plants of this huge region. It encompasses a wide variety of plants and many uses normally not mentioned in books dealing with medicinal plants as well as many that treat the economic utility of plants.

Botanists estimate that there are approximately 250,000 kinds of plants in the world, with 20,000 in North America. The state of Texas alone, due to its size, covers at least eleven different types of environmental zones which includes at least 5,000 native and naturalized plants. The UWPT covers over 3,000 of these, i.e., any plants with reported economically useful applications. This first volume covers 86 plant genera, including 264 species in 42 families.

Genera include *Abronia* (sand verbena; native, use: landscape & edible root starch for native Americans; it is not really a verbena, it is a Nyctaginaceae) through *Arundo* (saxophone reed; family Gramineae, naturalized from the Middle East). Genera with commonly recognizable species employed as current or former medicinal plants include *Achillea, Acorus, Agave, Agrimonia, Allium, Aloe, Amaranthus, Ammi, Anthemis, Apium, Aralia, Arbutus, Arctostaphylos, Aristolochia*, and *Artemisia*.

Although the plants covered are limited to this geographical region, various uses from all over the world are cited, including data showing folklore, chemistry, nutritional, pharmacological, and clinical uses, and much more. According to project director and lead co-author Scooter Cheatham, the *Encyclopedia* is "intended to be the most comprehensive treatment ever for the uses of each species."

These economic uses are extensive if not exhaustive with over 5,000 categories listed. The survey of uses cited includes food, medicine, wax, fiber, dye, ornamental, rifle stock, kapok substitute filling, insecticide, soap, fragrance, shoe dressing, wines, sodas, ritual and superstition and religious, paper, essential oils, livestock and wild animal feed, poisons, flooring/building materials, thatch, cosmetics, food preservatives, cookware and utensils, agricultural equipment, furniture, cloth and clothing, and myriad others.

Musing on the role plants can play in our culture, Cheatham said, "Our society in general has a vast void on how plants can offer potential benefits. This is not part of our fundamental education. Little about plants is communicated. We have to learn to change the way we think—especially

Facing page:
Sotol, *Dasylirion texanum*

This page from top:
Wild potato, *Solanum fendleri;*
Chili pequin, *Capsicum annuum;*
Bloodroot, *Sanguinaria canadensis;*
Guayule, *Parthenium argentatum;*
Wild Onion, *Allium canadense* var. *canadense*.
Photos by Scooter Cheatham.

about the potential uses of plants that are growing right under our own feet. We don't have to get excited only about exotic rainforest plants.

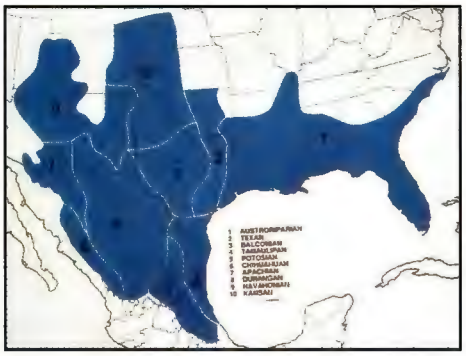
"We need to begin to take inventory about plant resources, that's what we've done and we hope other people will do so as well," said Cheatham. The project deals with various areas of plant research: medical advances from plants, new and unusual foods for both humans and animals, alternative economic ideas from novel uses of plants and plant materials, assistance in helping stem the loss in species diversity, and ways to improve and diversify the uses of public and private lands.

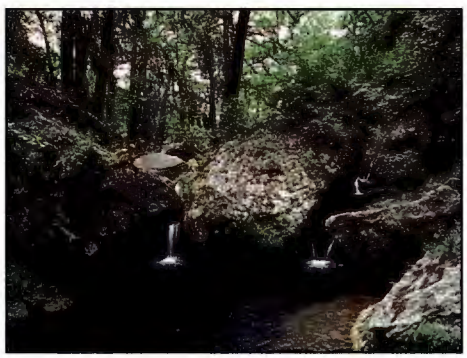
The monographs are extremely well laid out and easy to access. Each monograph on each genus includes color photography of each species of plants in the genus and range maps showing the distribution of the species within North America. The "Economic Uses" section contains margin notes explaining the general use detailed in each paragraph of text. This user-friendliness makes for quick and easy ability to go straight to the information that one is seeking.

The encyclopedia manuscripts have been peer-reviewed by numerous botanists, anthropologists, historians, chemists, landowners, and physicians.

OVER 24 YEARS OF RESEARCH

Cheatham has been actively involved in the project of developing this monumental compilation of information for over 24 years. He has been ably assisted by Lynn Marshall for the past 18 years. Both have sacrificed countless hours, weekends, months, and years, usually foregoing any salary or financial support. In 1991 Cheatham and Marshall and a group of their supporters founded the Useful Wild Plants of Texas, Inc., a non-profit organization established to provide a vehicle to complete the research and editorial tasks necessary to publish the encyclopedia. The Useful Wild Plants of Texas project is supported by contributions and grants from foundations and individuals as well as memberships.





The project originally began as a collaboration between Cheatham and Marshall Johnston, Ph.D., then professor of botany at the University of Texas and co-author of the *Manual of Vascular Plants of Texas* (with Donovan Correll). Dr. E. Arthur Bell, Director Emeritus of the Royal Botanical Gardens at Kew, England, has written an extensive foreword to Volume 1.

The UWPT publishes a quarterly newsletter that informs the public about the progress on the publication of the volumes of the encyclopedia, plus lots of information on the utility of various plants, profiles of botanists and their work, and more.

According to Lynn Marshall, project co-author, those who can benefit from the *Encyclopedia* include not only researchers and botanists but ranchers, farmers, or any landowner, small to large businesses, as well as pharmaceutical, chemical, cosmetic, and food manufacturers.

Cheatham offers more perspective on the potential economic uses that are listed in Volume 1. "There are many uses presented in the Encyclopedia but turning them into commercially feasible projects and/or products is always a more difficult task." He continued, "This is a project that needs to be embraced by everyone in this region. It has potential to impact the regional economy on numerous levels and ways." He was quick to point out that commercial applications for the plants listed in the *Encyclopedia* are certainly not limited to Texas and surrounding areas. Because Texas is so geographically diverse, the implications for commercial potential impact many other parts of the U.S.

The vast amount and sheer scope of information in this work is a product developer's dream! ❑

From top:
Texas covers eleven environmental zones;
Aransas Refuge, central coast of Texas;
Fall Weedfeed™ program at Chisos Basin, Big Bend, Texas;
Typical Central Texas creek near the Pedernales River;
High Plains west of Gruver, Texas.
Photos by Scooter Cheatham.

How you can Sponsor a Species

In order to raise funds for Volumes 2-12 of the Useful Wild Plants of Texas, sponsorships of particular species are available to anyone in the general public. A donation to species sponsorship helps UWPT continue its unique work to produce the remaining volumes in the 12-volume encyclopedia. To find out more about how you can be a species sponsor as well as other ways in which you can help, contact UWPTX, 2612 Sweeney Lane, Austin, TX 78723. Phone and Fax: 512/928- 4441

Photo by John Smithers

Upper right: *Plantago* spp. Photo by Scooter Cheatham.

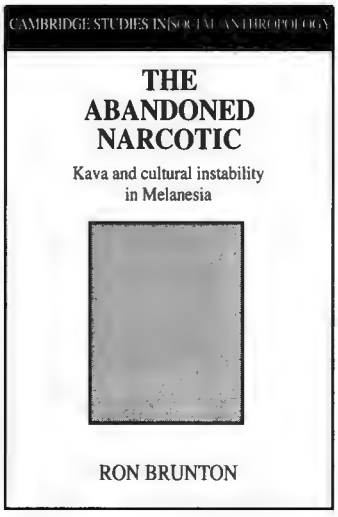
Lower right: **Antelope horns**, *Asclepias asperula*. Photo © 1995 by Stan Kearl.

How to order Volume 1

The Useful Wild Plants of Texas, the Southeastern and Southwestern United States, the Southern Plains and Northern Mexico: Volume I

is available from ABC BookStore, item #B135. $125. Credit card orders call toll free: 800/373-7105 or fax: 512/331-1924. See page 87 for other products and order form. Contact ABC BookStore, P.O. Box 201660, Austin, TX 78720-1660, or call 512/331-8868. email: Herbbooks@aol.com

Photo by Stan Kearl for Useful Wild Plants of Texas.

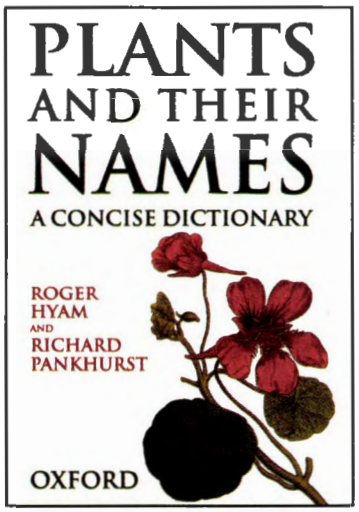


The Abandoned Narcotic: Kava and Cultural Instability in Melanesia *by Ron Brunton. New York: Cambridge University Press, 1989. Hardcover. 216 pp. $49.95. ISBN 0-521-37375-1. Available from ABC Books Item #B134.*

Kava kava (*Piper methysticum*) is becoming an increasingly popular herb in the U.S,. where it enjoys a well-deserved reputation as a relatively safe and natural sedative and sleep aid. Kava has been used for centuries as a ritual sedative in the numerous islands of the South Pacific, particularly Fiji. This book is the result of a Ph.D. dissertation dealing with the question of whether kava ingestion in numerous island cultures was subsequently replaced by betel chewing—the practice of chewing the nuts of betel (*Areca catechu*), a natural stimulant which has the unpleasant side effect of staining the chewer's teeth. The author spends extensive space in discussing various geographical distribution of kava dealing with the question as to which areas kava is native and to which areas it may have been introduced. Also, extensive explanations are given for various types of social orders on different islands and the possibilities that cultural instability in certain areas partially influenced the decline in kava chewing or was it the reverse? The author's main thrust is that previously, before European contact in the 1600s, the ingestion of kava was much more widely distributed throughout areas of the South Pacific among people speaking Oceanic languages.

This book is primarily a sociological/historical/anthropological inquiry and will be of interest to only a few botanists, ethnobotanists, and other researchers who have sufficient interest in kava and/or Oceanic societies to delve into what might be considered an arcane subject. Nevertheless, as the popularity of kava in the U.S. as a dietary supplement continues to grow, more than a few people may find this information of interest.

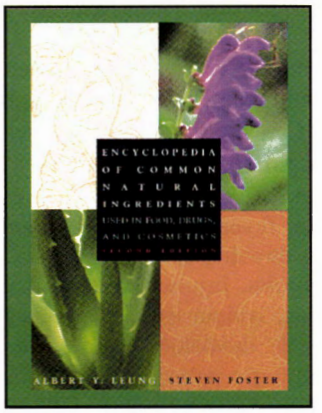
One final point: It is unfortunate that the book is entitled *The Abandoned Narcotic*. The term narcotic is being used literally here to denote kava's sedative, sleep-inducing activity. It does not build dependence or cause withdrawal symptoms after prolonged use like the so-called narcotic drugs. Any association of kava to illicit narcotics is inappropriate and erroneous. Kava's long history of safe use provides a strong basis for its responsible contemporary herbal use.— *Mark Blumenthal*



Plants and Their Names — A Concise Dictionary, *by Roger Hyam and Richard Pankhurst. Oxford University Press, 198 Madison Avenue, New York, NY 10016. 1995. 545 pp. Hardcover. $29.95. ISBN 0-19-866189-4. Available from ABC Books Item #B146.*

Plants and Their Names is promoted as a complete reference source to 16,000 of the more commonly occurring scientific and vernacular plant names. In an alphabetical format, it provides information on family names, genus names, and species names, as well as common names, their origins and characteristics. Under scientific family names, we are given the common family name, the number of genera and species that are associated with it, and a basic description of the key features of the family. This provides excellent quick reference information on the essential details a non-botanist may wish to know about a plant group. Names used as specific epithets (the second word of a Latin binomial or scientific name) are defined in short, clear terms. "Aperifera," for example, means "bee bearing: the flowers resemble bees." These wonderful short definitions help bring scientific names down to earth, making them accessible not only to the lay reader but the harried scientist as well. This useful guide brings the names into context, taking them out of archaic little used classical languages into meaningful words for the modern user. Under genus entries, we are given information on the number of species in the group, short descriptive phrases, their general distribution, and the family to which they belong. The generic entries often begin with the word origin of the name, which is perhaps the most fascinating feature of the book. Unfortunately, however, the authors have been inconsistent in providing definitions. Some genera have word origins, others don't.

Those who use plant names as a daily part of their life will find this a helpful, useful, even entertaining volume, worth having as a general reference alongside other dictionaries. — *Steven Foster*



Encyclopedia of Common Ingredients Used in Foods Drugs, and Cosmetics. *By Albert Leung & Steven Foster. John Wiley, New York. Hardcover $150. ISBN 0471-12294-7. Available from ABC Books Item #B136.*

One of the most often used books in my reference library; one that is conveniently situated on a shelf just over my computer for easy reach, is Albert Leung's *Encyclopedia of Common Ingredients Used in Food, Drugs, and Cosmetics* published in 1980. For the past 15 years, this reference book has been one of the most frequently used and appreciated volumes in my library and I am sure in the libraries of several thousands of other botanical and herb enthusiasts. Unfortunately, this reference does not contain a number of the herbs that have become increasingly popular in the last 15 years: herbs like echinacea, milk thistle, ginkgo, feverfew, and a whole slew of Chinese and Ayurvedic herbs.

It is, therefore, with much longing and anticipation, that we welcome the publication of the second edition of this important volume. Dr. Leung, a Chinese-born, Western-trained Ph.D. pharmacognosist has teamed up with noted botanical author Steven Foster to produce a much expanded and much more detailed version. The new book is at least twice as large as its predecessor, now covering over 500 common natural ingredients including 45 Chinese herbs many of which are beginning to be employed in cosmetic products here in the U.S. Twenty-three of these are treated in a separate section, "Chinese Cosmetic Ingredients," which follows the main entries.

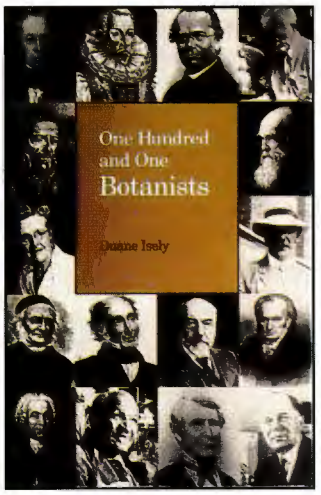
Consistent with the earlier version, each ingredient is monographed in the same manner. Each monograph includes the Latin name and family name; common name synonyms; a general botanical description of the plant; an extensive section on chemical composition (an area of increasing interest in the industry); pharmacology or biological activities; uses, which include medicinal, pharmaceutical, and cosmetics; common food use, health food and herb tea usage (if any), uses in traditional medicine, as well as other ancillary uses; commercial preparations, including references to USP and National Formulary monographs, if the herb had ever been official in the U.S.; and regulatory status which now includes not only the GRAS status with USFDA (if listed), but also draws heavily on the soon-to-be published translations of the German Commission E monographs fromABC. In fact, the references to the German Commission E monographs are found throughout many of the monographs listed in this volume, an apparent attempt by the authors to underscore the presumed safe and effective utility of many of these ingredients when sold and properly labeled as over-the-counter medicines.

As one would imagine from these two authors, the list of references is extensive. Dr. Leung has been able to draw upon his ability to read original Chinese, thus including references from dozens of major Chinese classic works as well as numerous modern Chinese texts. In addition, references are made to over 50 journals dealing with Chinese traditional and herbal medicine, many of which are not translated into English and are thus not available in many of the standard computer databases. Each monograph cites many of the general references which include most of the important and seminal publications that are part of Western pharmacognosy. In addition, each monograph also has a list of references that are specific to that particular monograph.

BOOK REVIEWS

The plants that have been added to this second edition include: *Astragalus,* blessed thistle, *Calendula,* chaparral, chickweed, *Codonopsis,* cranberry, devil's claw, *Eleuthero, Ephedra, Epimedium,* evening primrose, feverfew, "fo-ti," *Ganoderma, Ginkgo,* hawthorn, horse chesnut, Job's tears, jojoba, jujube, kava, kudzu root, *Ligustrum,* lycium fruit, magnolia flower, milk thistle, mistletoe, *Poria, Rehmmania,* royal jelly, saw palmetto, *Schisandra,* sour jujube kernel, *Stevia,* tarragon, tienchi ginseng, and yohimbe.

Herb enthusiasts, whether from the industry, those who act as lay herbalists, or those who are drawn from the health professions and/or the scientific community, will find this reference to be an invaluable tool. With so much literature being produced in the herb, ethnobotany, and pharmacognosy fields these days, one can become quickly overwhelmed by the explosion of titles and the many choices that are offered. One need only look at the everexpanding ABC Book Store catalog as an indicator of this growth. Nevertheless, this reference book merits the attention of anyone seriously interested in the medicinal uses of herbs, whether it be for an industry research purpose or in the applications from a clinical perspective. Therefore, this reference receives our highest recommendation.—*Mark Blumenthal*



One Hundred and One Botanists *by Duane Isely. Iowa State University Press, P.O. Box 4852, Hampden Station, Baltimore, MD 21211. 1993. 341 pp. Softcover, $32.95. ISBN 0-915825-89-9. Available from ABC Books #B119.*

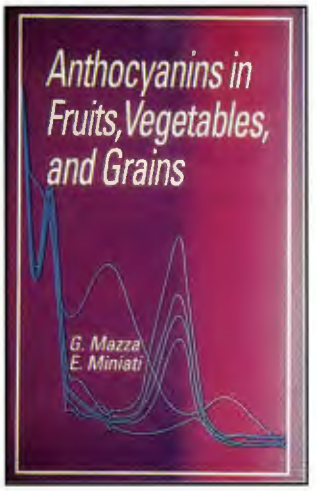
The author, Duane Isely, is distinguished professor emeritus at Iowa State University in Ames. What makes the botanical field so interesting to this reader? It is the people. More than any other reason, I choose to work in this field because of the people I met early in my career. Dr. Isely, in many years of teaching, sought to bring the historical personalities, often eccentric pioneers in science and humanities, to life. This book is a compilation of essays arranged chronologically (beginning with Aristotle), ending with the late Winona Hazel Welsh. It is a survey of the careers and achievements of the people who made great contributions to the botanical field over the past two millennia. This rich, fascinating parade of personalities provides a short biography, usually 2,000 words or less, on the important individuals who shaped the field of botany, their achievements as well as blemishes.

Those of us who delve into botanical pursuits on a daily basis know the names Torrey, de Candolle, Engelmann, Gray, Hooker, Engler, Bessey, Bailey, Gleason, and Arber. Then there are the more eccentric names like Luther Burbank and George Washington Carver. Their names and the titles of the many books they created roll off our tongues.

But what do we know about the people behind the title page? This book is the place to find out who these people were. As Dr. Isley writes in the preface, "These botanists, indeed not disembodied spirits, were individuals who lived busy and usually impassioned lives. Their existence included suffering as well as the joys of living and accomplishment."

Any good teacher can bring a subject to life, providing excitement and enthusiasm to the most bored of students. Isely brings the personalities of botany to life in this highly readable, entertaining text, written to inform the botanically minded, as well as enlighten those of a non-botanical bent, interested in what makes people tick.

This is an excellent book for the student, professional, or non-botanist. Highly recommended for bringing a human twist to understanding the plant world. — *Steven Foster*



Anthocyanins in Fruits, Vegetables, and Grains, *by G. Mazza and E. Minlati. 1993. Boca Raton, Florida. CRC Press. Hardcover. 384 pp. $207.00 ISBN 0-8493-0172-6. Available from ABC Books #B117.*

If you don't have a background or interest in chemistry, this book may not be for you. However, if you are interested in a class of chemicals called the flavonoids, of which anthocyanins are a subset—then read on. Flavonoids, particularly anthocyanins, are ubiquitous compounds found in many different species of plants. They are the pigments that give characteristic color and some of the biological properties to such common items as blueberries and red wine. This volume includes extensive tables of all the anthocyanins which have been identified to date, plus their chemotaxonomic distribution, i. e., where they are found in all major and minor fruits, vegetables, cereals, legumes, oil seeds, herbs, species, and even minor crops, with special emphasis on the development and presence of anthocyanins in grapes. Aside from the obvious chemical structural information given in this volume, other relevant data include physiology, chemotaxonomy, inheritance, pharmacology, biotechnology, and the food technology aspects of anthocyanins.

Common herbs and foods that are discussed in this list include: hawthorn, cherries, olives, peaches, plums, blueberries, bilberries, cranberries, mangoes, elderberry, and fig, as well as carrots, celery, chicory, garlic, ginseng, onions, cruciferous vegetables, and a host of other miscellaneous

plants from peanut and pistachio to tamarind and tomato.

Research in the last twenty years has indicated an increased role in cardiovascular health played by anthocyanins, as evidenced by research on bilberry (*Vaccinium myrtillus*) and hawthorn (*Crataegus* spp.). — *Mark Blumenthal*

The Alkaloids: Chemistry and Pharmacology. Volume 41. *A. Brossi and G. A. Cordell. Academic Press, 1250 6th Ave., San Diego, CA 92101. 1992. 252 pp. $95 (cloth). ISBN 0-12-469541-8.Available from ABC Books Item #B147.*

The Alkaloids, Volume 41 features four chapters by international experts from four different countries. Chapter 1, by B. Tantisewie and S. Ruchirawats, is devoted to alkaloids from the plants of Thailand, isoquinoline and their derived alkaloids, indole alkaloids, and miscellaneous alkaloids. The main focus is chemistry, with data on native uses of several species of alkaloid-containing plants.

Chapter 2, by J. Kobayashi and M. Ishibashi, focuses on Marine Alkaloids II. The 83-page chapter contains 408 references—one of the most complete reviews I have seen recently. Most of the alkaloids are from marine plants and several from unique animals (e.g., puffer fish, sponges, tunicates, etc.) These authors describe alkaloids from several classes including guanidine, indole, pyrrole, beta-carbolene, polycyclic, polyketides, peptides, and miscellaneous types. Some emphasis is given to unique pharmacological activities (e. g., antifungal, immunosuppressive, anti-viral, etc.), biosynthesis, and structural determination. Many unique chemical structures are also provided.

Chapter 3, written by O. Boyé and A. Brossi, features tropolonic *Colchicum* alkaloids and allo congeners including an introduction, new alkaloids from *Colchicum* species, physical properties, chemistry, marking the biological activities of these compounds, and clinical data—a must for all researchers in the use of autumn crocus compounds in medicine, particularly the newer application of their use in the treatment of Familial Mediterranean Fever (FMF), amyloidosis, cirrhosis, and inhibition of HIV replication.

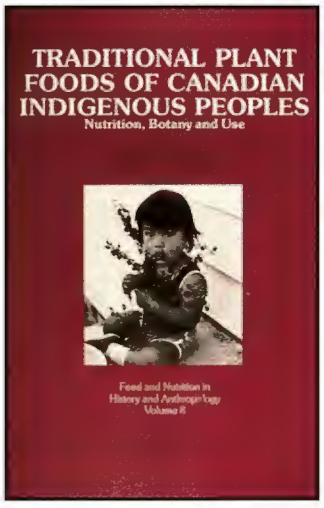
Chapter 4, by J. Greenhill and P. Grayshan, covers the cevane group of *Veratrum* alkaloids providing an introduction, recent synthetic methods, and tabulations of *Veratrum* alkaloids reported in the literature. The focus is on structures, preparation, melting points, and related physical data which will be of value to those doing isolation studies of this class of alkaloids. The authors have categorized the *Veratrum* alkaloids into at least 20 different groups.

This is readable valuable data on new alkaloids and their activities from many sources otherwise difficult to obtain in one book. (Newer volumes in this series have been published with #47 being the most recent. Contact ABC Book Store for details.) — *Ara Der Marderosian, Ph.D., Philadelphia College of Pharmacy & Science, Philadelphia, PA.*

Traditional Plant Foods of Canadian Indigenous Peoples: Nutrition, Botany, and Use *by Harriot V. Kuhnlein and Nancy J. Turner. Gordon and Breech. 1991. Hardcover. 633 pp. $88. ISBN 2-88124-465-3. Available from ABC Books. #B030.*

This book is Volume 8 in a series, "Food and Nutrition in History and Anthropology." The authors are experts in the area of ethnonutrition. Dr. Kuhnlein is a professor at McGill University in Montreal, Dr. Turner, professor of ethnobotany at the University of Victoria in British Columbia, Canada. Throughout their careers both have published extensively in the areas of aboriginal Canadian appropriation of plants for food, fiber, and medicine, as well as a host of other uses.

The primary purpose of this volume is to describe and reference published literature on the nutritional properties, botanical characteristics, and ethnic uses of traditional food plants of Canadian indigenous



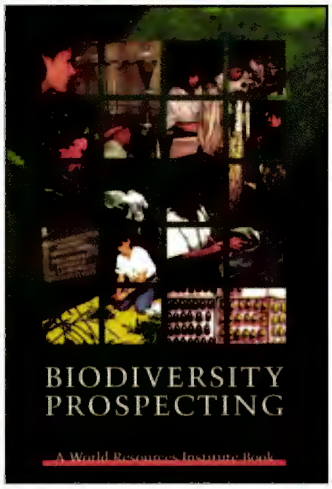
peoples. Although many of the plants described are also found in Northern Europe, the United States, and Alaska, the authors maintain their ethnographic focus only on the use by Canadian indigenous peoples and states immediately bordering Canada, i.e., Alaska and states in the Northern U.S. This volume covers about 1,050 species that were identified as edible available within Canada. The book is extensively referenced and contains lengthy tables and descriptions of edible species. The authors provide as much information as is available on the potential toxicity of some of the edible plants, many of which the readers will recognize as "medicinal" plants. The pages are replete with tables, grouping edible plants by families, as well as black and white photographs of numerous plants.

A typical treatment of a plant will include the common and botanical name, a fairly simple and lucid botanical description, the habitat occurrence, food use, and the food use of related species as well as a "warning" about potential toxicity when appropriate.

Chapter 5 provides an outline overview of all the plants by Latin name, common name, the plants listed in other parts of the text with their Latin name, common name, ethnic use described in Chapter 4, any toxicity that might be noted, a "tea" if the plant has any noted toxicity, as well as distinguishing whether the plant is native or introduced, rare or endangered.

Chapter 6, "Nutrient Values of Traditional Plant Foods," provides over 140 pages of information in table format which gives the published nutrients (when available) of the species covered in this book, plus an extensive bibliography.

Although admittedly this book is not good bedside reading, it is primarily intended as a resource for native peoples, botanists, nutritionists, and other health care professionals who may be working with native peoples, or other people living in rural areas. In addition, this book has extensive value for researchers in the area of human nutrition, health professionals, and even members of the natural food and herb industries who are looking for novel food ingredients as well as the nutritional composition of wild foods. The authors are to be commended for an important contribution in the area of the ethnonutrition of wild edible plants. — *Mark Blumenthal*



Biodiversity Prospecting—Using Genetic Resources for Sustainable Development *by Walter V. Reid, et al. World Resources Institutes Publications. 1993. 341 pp. Softcover, $29.95. ISBN 0-915825-89-9.*

Biodiversity Prospecting is about "doing right" through bolstering both economic and conservation goals while underpinning the medical and agricultural advances needed to combat disease and sustaining growing human numbers, to paraphrase the foreword of this book by Jonathan Lash, President of the World Resources Institute.

Given that over half of the world's biodiversity is concentrated in tropical rain forests, the focus is the potential for conserving and utilizing the genetic resources of the world in a manner that is of benefit to all concerned—the indigenous peoples who hold knowledge and live in rain forests, the biodiversity of the forest itself, and humankind in general. This collection comprises seven major essays by leading experts in tropical rain forest product conservation and utilization. The first chapter, "A New Lease on Life," explores the general awareness of coupling conservation with utilization that has emerged in the corporate mind, and scientific issues regarding biodiversity prospecting, indigenous people's rights, third world country rights and responsibilities, and industrial plant utilization. The volume weaves a tapestry of all of these issues into one package, where the subject can be understood in its entirety from a diverse human perspective. Certainly, this book is required reading for anyone interested in a definitive understanding of tropical plant utilization. — *Steven Foster*

Moving?

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ERRATA

There is an error in translation in *HerbalGram* 32, page 44, paragraph 9, in the Hernádez translation of Pliny. "mas anchas" means wider, not narrower. I wonder if it is mistakes like these that compound the problem of poisonings from misidentification.

Amir Arberman, D.C.
Eugene, Oregon

The photo on page 28 in *HerbalGram* #34, was incorrectly credited. The Ginger bottle photo was provided courtesy of John Morgan, Ph.D.

continued from page 59

that an astonishing 89.5 percent of these drugs are still found in modern drug guides! The *Hippocratic Corpus* is the first systematic writing on herbal drugs in the West. (The Chinese *Ben Cao* is at least one thousand years older.)

To better understand the vast knowledge of the ancients regarding the actions of herbs and medicinal plants and what contribution they have made to modern medicine and pharmacy, Riddle reverses this process by looking at a modern textbook of plant drugs (*Pharmacognosy* by Tyler, Brady and Robbers, 9th edition, Lea & Febiger, 1988). This book lists 18 resins, less eight of the New World and East Africa (i.e., plants not known to the Greeks), leaving 10 that were mentioned in the *Hippocratic Corpus*.

Of 24 alkaloids mentioned in Tyler *et al.*, less New World, microorganisms, etc., all the balance were in the *Corpus*. The bottom line, says Riddle, "Of those things we know to be drugs, all appear in the *Hippocratic Corpus*. All the things to be discovered, they had discovered."

Riddle reviewed some types of information found in ancient medieval herbals. This includes the following categories of data, not unlike many modern texts and pharmacopeias:

name of plant, sometimes a synonym, often with a picture; habitats; botanical description; drug properties or types of actions; medicinal uses; harmful side effects; quantities and dosages; harvesting, preparation, and storage instructions; adulteration methods and tests for detection; veterinary usages; magical and nonmedical usages; specific geographical locations or habitats

Showing how information from the ancients is passed down to us, Riddle noted the case of a fourth century transcriber of the work of the famous first century Greek herbalist Dioscorides, who, when writing on the effects of autumn crocus (*Colchicum autumnale*), inserted the phrase "cures gout" into the original text, even though Dioscorides did not write this. Of course, today colchicine, a highly toxic alkaloid derived from this plant's bulb, is the drug of choice for this condition.

Further expounding on the wisdom of the ancients, Riddle said that of the plant-derived drugs used in chemotherapy 10 years ago, five were used by the ancient Greeks in sufficiently high quantities to indicate that hair would fall out as a side effect! There was rationality behind the use of these plants, said Riddle. There was human experience behind them. To put his presentation in a more universal context, Riddle claimed, "What we are really talking about is not natural product drugs but the sum of human knowledge."

Of particular interest to Riddle is the use of Queen Anne's lace seed or wild carrot (*Daucus carota*) as a contraceptive. The seeds prevent implantation or can dislodge a fetus when used directly after intercourse. Although this information is found in several ancient texts, this knowledge dropped out after the 16th century. According to Riddle, the seeds must be crushed or they may go right through a person. An Appalachian woman in North Carolina told him that she used the crushed seeds. He checked his ancient texts but could not find any information on crushed seed versus whole. He concludes that this is an example of poorly transmitted information.

"Many of us look to the ancients for religion, literature, much of our philosophy, and much of our esthetics," he declared. "We say that they do not have anything in science that we can gain from, but they do. They have much accumulated experience. Isn't it time that we acknowledge that we have something to learn from the ancients and that we can learn from them about what drugs to test for the future? To cut ourselves off from the past is just damn foolish!"

The close of the conference focused on a panel discussion, "Challenges of the Future," featuring Freddie Ann Hoffmann, M.D., and myself, along with Dr. Cragg, Dr. Riddle, and Dr. Mark Plotkin, ethnobotanist and author of *Tales of a Shaman's Apprentice* (Penguin USA, 1993, available from ABC books # B086). The panel dealt with future prospects for the development and success of herbs and phytomedicines in the U.S. As I noted in my brief comments in the panel, a new era of communication and cooperation is beginning to characterize relations between the FDA and the herb industry, as evidenced by the presence of Dr. Hoffman at the conference. Dr. Hoffman is chiefly responsible for alternative medicine issues at FDA and is heading up an internal FDA working group which meets bimonthly to research and discuss subjects dealing with botanicals and related products. How this will affect future regulations on herbs, only time will tell. ❑

The following companies provided financial support so that ABC could co-sponsor the conference with Smithsonian Associates:

Celestial Seasonings of Boulder, Colorado;
Enzymatic Therapy of Green Bay, Wisconsin;
Indena of Seattle, Washington;
Nature's Way of Springville, Utah;
Shaperite Concepts of Salt Lake City, Utah; and
Sunsource Health Products of Kihei, Hawaii.

LETTERS

PLANT TANNINS AND TEETH

Are plant tannins generally carcinogenic? I think not. I would ask if the epidemiological studies of the high tannin-containing Venezuelan beverage using *Krameria ixina* that is purportedly the cause of esophageal cancer and is the basis of all this controversy be carefully scrutinized according to today's criteria. I have always wondered if there might be another carcinogen or co-carcinogen present that has yet to be detected. Not all tannins are the same, and tea chemists really would not call the catechins present in *Camellia sinensis* leaves true tannins. There is no evidence to suggest that black tea drinking areas of the world have a disproportionately higher incidence of esophageal cancer any more than green or herbal tea drinking (if there is a region) have less. Even the claims of the carcinogenicity associated with tannin-containing *Piper betel* and *Areca catechu* (betel nut) chewing cannot be correlated with the use of these plants except when tobacco is added to the quid.

Let us examine the beneficial effects of plant tannins since they are so valuable in medicine and dentistry. Condensed catechins found in black tea or other tannins are highly complex molecules. They have the ability to bind to mucosal and tooth surfaces alike. This binding prevents plaque accumulation and buildup of plaque organisms on the tooth surface, and inhibits the enzyme responsible for the formation of sticky glucans, the matrix of plaque. In folk medicine, high tannin-containing plants are frequently used to treat intestinal bacterial, viral, and parasitic infections. The common denominator is the ability of these compounds to block adherence of these parasites to the mucosal lining, or in some instances, cause their dissociation from it. Tannins are also astringent and styptic.

I've studied the tannin content of non-*Camellia sinensis* -containing herbal teas and can attest that, overall, their "tannin" content is generally low. However, if I was to select a tea that would strengthen my bones and teeth because of its natural fluoride content and prevent unnecessary plaque build-up because of its condensed catechin (tannin) content, real tea would win hands down. Hot infusions of other plants can be beneficial, innocuous, or harmful, but certainly the general public doesn't have the knowledge to determine if packaging claims associated with exotic herbal teas are meaningful or not. There is more danger in experimenting with these than drinking a good cup of real tea! Until chemists really understand tannins—and that is clearly a technical challenge for the 21st century—I believe that concerns regarding tannin in teas are highly exaggerated.

Memory Elvin-Lewis, Ph. D., FISHM
Washington University, St. Louis, MO

Autumn crocus
Colchicum autumnale

STD STUDIES IN AFRICA

As a cultural anthropologist working with indigenous healers in public health programs, I find your materials very useful. African healers love this stuff as well; it makes them realize that Western civilization has come up with more than toxic drugs and painful needles. I have worked for years in collaborative programs involving traditional healers in Africa and elsewhere, but I have until recently paid little attention to the local *materia medica*, more because of my lack of training in botany than because of any reticence on the part of African healers to reveal their secrets.

I am growing ever more interested in ethnobotany for many reasons, including that I am an advisor to the Mozambique Health Ministry's Department of Traditional Medicine and ethnobotany is a major activity of this government unit. I have also recently worked designing a quick study in Zambia to see if indigenous botanical medicines can actually cure a bacterial sexually transmitted disease (STD) such as gonorrhea or syphilis. STDs ought to be increasing there due to the potentiating effect of widespread HIV seropositivity (some 25 percent of sexually active Zambians). Yet statistics show a marked decrease in incidence, and there is some evidence from traditional healers—who are probably the main providers of STD treatment in Zambia—that they are also seeing fewer cases in the past year. If STD incidence is indeed declining, it may be that fidelity to one (or at least fewer) sexual partners is an important contributing factor. It's not condoms: only two percent of Zambian men claim to use them. It may also be that Zambian healers are treating more STD cases successfully with effective herbal decoctions and poultices.

The proposed study will answer the simple question: Do traditional medicines (ever) cure sexually transmitted diseases, at least bacterial STDs? We need not ask *how* or *why* they work—that is a question that can be explored later by phytochemists and ethnopharmcologists—only *do* they work. I mention this because I thought you might be interested. You may have heard about the new study coming out tomorrow in *The Lancet*. It shows that treatment of STDs in Tanzania—in the absence of condom use or changes in sexual behavior—results in 40 percent fewer cases of HIV infection. It appears likely that even more resources will be directed toward STD treatment in Africa in the future, therefore the role of traditional healers—who are known to see and treat the great majority of STD cases—and their botanical medicines will become even more important.

Edward C. Green, Ph.D.
Washington, D.C.

Send your letters to the editor via e-mail: herbalgram@aol.com.

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.

"A Consumer's Guide to Ginseng" is a 24-page well-researched and documented magazine format on "everything you wanted to know or tell someone about ginseng." $5.00. Contact the New York State Ginseng Association, P.O. Box 127, Roxbury, NY 12474, Ph. 607/326-3005.

Alternative Medicine: Expanding Medical Horizons — Comprehensive 420-page report to the National Institutes of Health (NIH) contains contributions from more than 200 researchers and practitioners of alternative medicine and includes references and appendixes. $25 ($31.25 foreign), #017-040-00537-7. Contact Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954, Ph. 202/512-2250, Fax 202/512-1800.

Directory of Herbal Education Programs, 1995 — listing compiled by the American Herbalists Guild (AHG) of herbal residency programs, correspondence programs, apprenticeships, and lecturers. Contact AHG, Box 1683, Soquel, CA 95073, Ph./Fax, 408/464-2441, E-mail, herbs@got.net.

The Entheogen Law Reporter — newsletter providing up-to-date information and commentary on the intersection of entheogens (psychoactive substances) and the law. Published seasonally, $25/yr (US) and $30/yr all other destinations. Contact Richard Glen Boire, Esq., *The Entheogen Law Reporter*, P.O. Box 73481, Davis, CA 95617-3481. Fax 916/753-9662.

Environmental Media designs, produces, and distributes videos to support environmental education. Contact Environmental Media, P.O. Box 1016, Chapel Hill NC. Ph. 800/ENV-EDUC. Fax 919/942-8785 for free catalog.

Future World Trends in the Supply, Utilization and Marketing of Endangered Medicinal Plants, a proposal for a Multiclient Study sponsored by McAlpine, Thorpe & Warrier, Ltd., in association with The Herbal Medical Database, Ltd., and Agros Associates. Study will describe predicted trends in world trade of a number of endangered medicinal plant species based on forecast usage of these plants as ingredients in allopathic and herbal medicines. Publication expected in November, 1995. Contact Amy Corzine, McAlpine, Thorpe & Warrier, Ltd., 50 Ponywarn Road, London, England SWS 9SX, Ph. 071-370 2255/8, 071-370 1371/2, Fax 071-370 5157.

HealthInform — twice monthly FAX digest on alternative and complementary medicine designed specifically to deliver timely, vital "need-to-know" information to healthcare and medical research professionals. Contact *HealthInform*, P.O. Box 306, 31 Albany Post Road, Montrose, NY 10548, Ph. 914/736-1565, Fax 914/736-3806.

Herbal Green Pages: An Herbal Resource Guide — Comprehensive listing of over 4,000 herb-related businesses worldwide. $25. Contact Maureen Rogers, *The Herbal Connection*, P.O. Box 245, Silver Spring, PA 17575, Ph. 717/393-3295.

Intellectual Property for Indigenous Peoples: A Source Book — Consolidated source of current information on rights of indigenous peoples with respect to the use of their cultural knowledge. Fifteen chapters, various appended documents, names and addresses of organizations and sources related to IPR, extensive bibliographies, and index. $10.25. Contact The Society for Applied Anthropology, P.O. Box 24083, Oklahoma City, OK 73124. Ph.405/843-5713.

International Council for Medicinal and Aromatic Plants (ICMAP) — Organization with objective of promoting international understanding and cooperation between national and international organizations on the role of medicinal and aromatic plants in science, medicine and industry, and improvement of exchange of information between them, sponsorship of conferences and newsletter. Contact H. H. van der Borg, Secretary-General, Hijlekamp 11, 6585 XT, Mook, Netherlands. Ph. 31/24/696-2016, Fax 31/24/696-2865.

CALENDAR

November 4-6: Wholistic Aromatherapy Conference, San Francisco, CA. Sponsored by Pacific Institute of Aromatherapy (PAC). International speakers, provocative topics, and alternative medicine. Contact PAC, P.O. Box 6723, San Rafael, CA 94903. Ph. 425/479-9121, Fax 415/479-0119.

November 15-16: Fifth Nutraceutical Conference, "Nutraceutical Update from Washington," Washington, D.C. Sponsored by Foundation for Innovation in Medicine. Contact Patricia Park, Foundation for Innovation in Medicine, 411 North Ave. East, Cranford, NJ 07016, Ph. 908/272-2967, Fax, 908/272-4583.

November 15-17: Primer Simposio Plantas, Medicinales y Aromaticas, Tlaxcala, Tlax. Contact Biol. Miguel Angel Gutierrez Dominguez, UAT, Secretaria de Investigación Cientifica, Jardin Botanico Universitario, Av. Universidad, No 1, 90070, Tlaxcala, Tlax. Telefax (246) 2 23 13.

1996

January 5-7: Sixth World Congress on Holistic Life and Medicine. organized by Arya Vaidya Sala and University of Calicut. Emphasis on issues of life and its varied aspects in an holistic

manner. Topics include acupuncture, Oriental Medicines, Ayurveda, Siddha and Unani, Naturopathy, pharmacology. $250. Contact Mr. G.F. Barabino, General Secretary, World Federation for Holistic Life, Via Rusca 31R, 17100, Savona, Italy. Ph. 00-39-19-822803, 00-39-19-856140, Fax 00-39-19-853928, 00-39-2-900029.

January 18-21: First Annual Alternative Therapies Symposium; Creating Integrated Healthcare, San Diego, California sponsored by *Alternative Therapies in Health and Medicine* and Planetree. Goal is to improve patient outcomes by integrating use of alternative therapies with conventional Western medicine and encouraging collaborative practice between alternative and conventional practitioners. Contact Alternative Therapies Symposium Registration, c/o InnoVision Mgt. Services, 101 Columbia, Aliso Viejo, CA 92656-1491. Ph. 800/899-0573, Fax 714/362-2020.

January 28-February 4: In the Footsteps of Francisco Hernandez: The World of Renaissance Mexico — sponsored by UCLA Center for Medieval & Renaissance Studies. Visit botanical gardens, universities, museums, religious centers and medical institutions critical to development of medicine in New World. Contact Paul Moore or Frank Harper, Crown International Travel Inc., Ph. 800/421-9537 or 310/475-5661, Fax 310/475-6881.

January 31-February 4: Herb Business Winter Getaway Conference, Albuquerque, New Mexico. First day program designed for herb business beginners; main conference offers three tracks of speakers covering medicinal herbs, commercial production and various business aspects. Contact The Herb Growing & Marketing Network, P.O. Box 245, Silver Spring, PA 17575. Ph. 717/393-3295, Fax 717/393-9261.

June 2-5: The Monroe Wall Symposium on Natural Products- "Harnessing Biodiversity for Therapeutic Drugs and Foods," Rutgers University and Xechem, Inc. to honor discoverer of Paclitaxel (Taxol), Dr. Monroe Wall. Contact Keith Wilson, Office of Continuing Professional Education, Rutgers University, Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231. Ph 908/932-9271, Fax 908/932-1187.

June 26-30: Primer Congreso Nacional Plantas Medicinales de Mexico, Tlaxcala, Tlax. Contact Biol. Miguel Angel Gutierrez Dominguez, UAT, Secretaria de Investigacion Cientifica, Jardin Botanico Universitario, Av. Universidad No. 1, 90070 Tlaxcala, Tlax. Telefax (246) 2 23 13 y 2 40 13.

June 30-July 4: International Symposium on Breeding Research on Medicinal and Aromatic Plants, Quedlinburg, Germany. Sponsored by Federal Centre for Breeding Research on Cultivated Plants (BAZ) and Federal Ministry of Food, Agriculture and Forestry (BML). Contact Herr Dr. F. Pank, Bundesanstalt fur Zuchtungsforschung an Kulturpflanzen, Neuer Weg 22/23, D - 06484 Quedlinburg, Germany.

July 1-6: Plants For Food And Medicine. Joint meeting of Society for Economic Botany and International Society for Ethnopharmacology, London, England. Contact The Linnean Society, Burlington House, Piccadilly, London W1V 0LQ, United Kingdom. Ph. 44 0/171/434 4479, Fax 44 0/171/287 9364, E-mail: marquita@linnean.demon.co.uk.

July 18-21: 11th Annual International Herb Conference, San Diego, CA, sponsored by International Herb Association with over 50 educational sessions, wholesale trade show, tours and industry awards. Contact International Herb Association, 1202 Allanson Rd., Mundelein, IL 60060. Ph. 708/959-4372.

September 11-14: 2nd International Congress on Phytomedicine in cooperation with ESCOP (European Scientific Coooperative for Phytotherapy). Topics: "Phytochemical and Phytopharmacological Research" and "Phytotherapeutics in Practical and Clinical Application." Contact: Institute of Pharmaceutical Biology, Karlstrabe 29, D-80333 Munchen, Germany. Ph. 49/89/59 02-379, Fax 49/89/59 02-237.

CLASSIFIED

A listing in this classified section does not constitute any endorsement or approval by *HerbalGram*, the American Botanical Council, the Herb Research Foundation, or the HRF Professional Advisory Board. *HerbalGram* Classified ad rates: $1.25 per word; $35 minimum. Contact Margaret Wright, P.O. Box 201660, Austin, TX 78720. 512/331-8868. Fax 512/331-1924.

BOOKS

Egyptian Herbal. Medical/religious/culinary herb uses in ancient Egypt. Female Egyptologist draws from ancient/modern sources. Egyptian/Latin/English nomenclature. $21.95 + $2.95 S&H. Optimum Health, 172-B Dowe Road, Ellenville, NY 12428.

FREE ADVERTISING available in *THE HERBALISTS' COOKBOOK*, Herbalists share their Favorite Recipes. DON'T BE LEFT OUT! Write by 4/96: Risa Mornis, HCR 71 Box 4A-HG, Reading, VT 05062. 802-484-9283.

HerBiblio - Antiquarian, out-of-print Herbals, Eclectic Medicine, Homeopathy, Plant Lore, etc. Search service and catalogs. For search or Catalog #1, send request to Noreen Lucey, HerBiblio, P.O. Box 4891, Holyoke, MA 01041-4891. Tel. 413 /533-6635.

Send your letters to the editor via e-mail: herbalgram@aol.com.

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 Bu$iness of Herbs — Comprehensive reporting, business news, marketing hints, sources, and resources. Subscription $20/yr. Brochure/SASE from Northwind Farm, Rt. 2, Box 246(G), Shevlin, MN 56676.

Foster's Botanical and Herb Reviews— Information resources, book reviews, new periodicals, etc. Quarterly, $10/yr from Steven Foster, P.O. Box 1343, Fayetteville, AR 72702. 501/521-5887. Fax 501/521-6369.

HerbalGram — Quarterly journal published by the American Botanical Council and the Herb Research Foundation. $25/yr., $45/2 yrs, $60/3 yrs. P.O. Box 201660, Austin, TX 78720. See pages 86-87 for ordering information.

The Herb Growing and Marketing Network— An information service for herb businesses and serious hobbyists. Includes *The Herbal Connection*, a 36-page bimonthly trade journal, *The Herbal Green Pages*, annual resource guide with over 5,000 listings, free classified advertising for subscribers, and more. Entire package $60/yr. (Higher outside North America) Sample newsletter, $4. The Herbal Connection, P. O. Box 245, Silver Spring, PA 17575. 717/393-3295. MC/Visa accepted.

Herb Network and Newsletter — P. O. Box 12937-C, Albuquerque, NM 87194. Free information, SASE or $20/yr membership. Seasonal newsletter, cooperative herbal buying program. Free classified ad and more.

HerbalVoices —A network of amateur and professional herbalists sharing the medicinal, culinary, wildcrafting, and organic growing arts of herbs. Members write in their experiences, receive support and feedback, and seek assistance. Our quarterly publication is $12/yr. Sample $3. 3936 Mt. Bliss Rd., East Jordan, MI 49727.

Herban Lifestyles — Bimonthly newsletter with entertaining, eclectic, and sometimes esoteric reports on how we live, work, and play with herbs. Money-back guarantee. Sample $3. $18/yr. Free brochure. Stone Acre Press, 84 Carpenter Rd., Apt. 78711-1, New Hartford, CT 06057.

The Herb 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.

International Journal of Aromatherapy — Edited by aromatherapy author Robert Tisserand. Articles and information on uses of essential oils in well-being. Designed for practitioners, teachers, suppliers, writers, etc. $30/yr. *International Journal of Aromatherapy*, 1129 Industrial Ave. #200, Petaluma, CA 94952. 707/769-5120.

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.

Nature's Field — Contemporary journal of herbs and natural healing. Free sample. 1/800/41-NATUR.

Herbal animal care, offering safe alternatives to drugs and chemicals. Six issues annually, $20. *Natural Pet Magazine*, PO Box 351, Trilby, FL 33593. 904/583-2770.

Washington Insight — a quarterly newsletter designed to keep natural products scientists abreast of funding opportunities and other important happenings in Washington, D.C., including interviews with Congressmen, Senators, or other government officials, that may affect them and their institution. In addition to the newsletter, subscribers receive Funding Alert, which provides pre-advertised information on funding opportunities, and Compound Alert, listing of compounds of interest to the National Cancer Institute which need research to insure adequate supplies—another opportunity for research grants. Annual subscription, U.S. personal/$43; institutional/$85. Foreign: personal/$50; institutional/$95. Contact: Washington Insight, 11000 Waycroft Way, North Bethesda, MD 20852. 301/881-6720, Fax 301/984-7372.

Wildflower — North America's only popular magazine devoted solely to the study, conservation, and cultivation of our continent's native flora. Offering an appealing blend of art and science, this 48-page quarterly examines all aspects of popular botany in North America from the rain forests of Panama to the micro-mosses of the Arctic tundra; from gardening with native trees, shrubs, wildflowers, and ferns to the latest projects in habitat and native plant conservation. The green revolution begins in our own backyard. Wildflower is published by the Canadian Wildflower Society, 90 Wolfrey Ave., Toronto, Ontario, Canada M4K 1K8. Tel: 416/466-6428. Subscriptions and membership are $25/1 yr., $45/2 yrs. Sample copy $5.

CORRESPONDENCE COURSES AND SEMINARS

Green Terrestrial offers herbal and earth awareness workshops, quality herbal products, and apprenticeships in an atmosphere of co-creative partnering with the Earth. Pam Montgomery, P.O. Box 266, Milton, NY 12547. 914/795-5238.

Medicinal Mushroom Seminars. Join us for an intensive two-day seminar on the *in vitro* cultivation of medicinal and gourmet mushrooms. Required textbook *Growing Gourmet & Medicinal Mushrooms*. Taught by author, Paul Stamets. For information, write, call, fax, or e-mail to Fungi Perfecti, P.O. Box 7634HG, Olympia, WA 98507. Ph 800/780-9126. Fax 360/425-9377. E-mail MycoMedia@aol.com.

Natural Healing Home Study — Australasian College of Herbal Studies offers dynamic, written, audio & video course materials. Diploma & Certificate curriculum. Free Prospectus. 800/48-STUDY.

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 14 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 14 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.

Wild Rose College of Natural Healing — established 1975, offering classroom and correspondence courses in Herbology, Pharmacognosy, Nutrition, Wholistic Health, Biology, Physiology, Iridology, and many other fields. Programs for Master Herbalist (two years), Wholistic Health Therapist (three years), Clinical Herbalist (three years), Practical Herbalist (8 months), Counseling (one and three years). Send $3 for detailed calendar, #400, 1228 Kensington Rd. NW, Calgary, Alberta, CANADA T2N 4P9. 403/270-0936.

POSITIONS

Sales person for botanical extracts–Major producer of plant extracts seeks self-motivated experienced sales person preferably with knowledge of herbal products and industry. Position will involve national travel, attendance at trade shows and communication with international supplier. Competitive salary, bonus and conditions. Send resume to Ref. ASRM, Paragon Personnel, 107 Kilmayne Drive, Suite D, Cary, NC 27511.

OTHER

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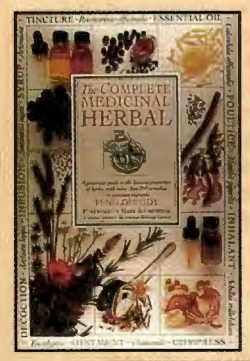

THE COMPLETE MEDICINAL HERBAL
by Penelope Ody, foreword by Mark Blumenthal. 1993. Practical guide to the healing properties of herbs. Historical uses, therapeutic uses, parts used, chemical constituents, 250 remedies, safety precautions. 120 color photos. Hardcover, 192 pp. $29.95 #B039

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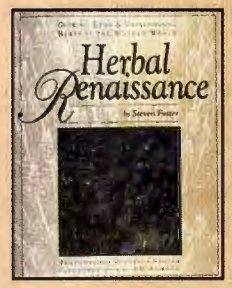

HERBAL RENAISSANCE
by Steven Foster. 1994. Covers propagation, harvesting, drying, growing, phytochemistry, folklore, and usage. 124 plant species covered. 45 line drawings, color illustrations, B/W photos, color photos. A classified resources list for sources of seeds or plants. Softcover, 234 pp. $16.95 #B052

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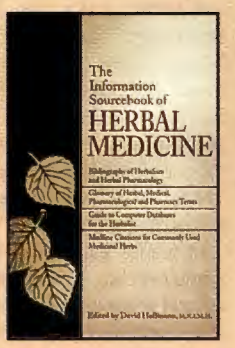
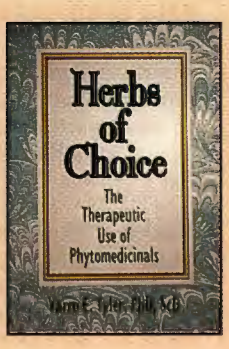
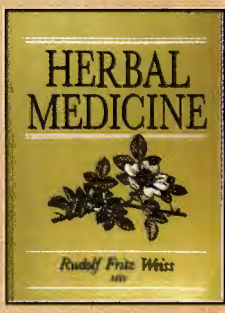
by David Hoffmann. 1994. A comprehensive guide to information on Western herbal medicine, providing resources on all topics including on-line and database sources. Hardcover, 308 pp. $40. #B077

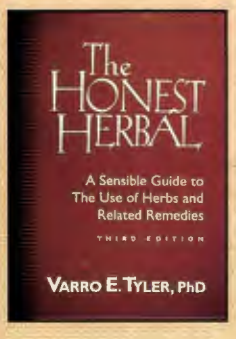


HERBS OF CHOICE
by Varro E. Tyler. 1994. Authoritative text providing information of traditional use, regulatory history, current status, bioactive constituents, pharmacology, current clinical applications, safety precautions, and dosages. Arranged by therapeutic indication. Hardcover, 209 pp. $24.95 #B079



HERBAL MEDICINE
by Rudolf Fritz Weiss, M.D. 1985. The now classic text used by M.D.s in Germany. An indispensable modern text in medical herbalism. Many herbs are illustrated. Plant drugs are arranged by clinical diagnoses relating to particular systems. Softcover, 362 pp. $55. #B006





THE HONEST HERBAL
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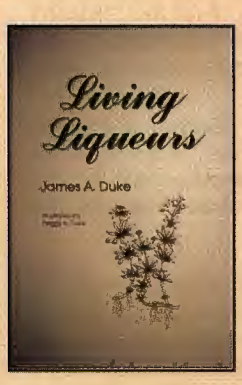

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HANDBOOK OF MEDICINAL HERBS
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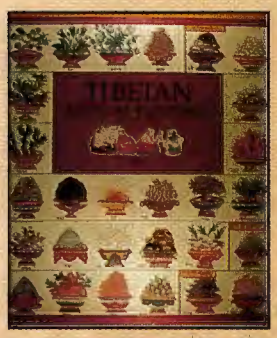

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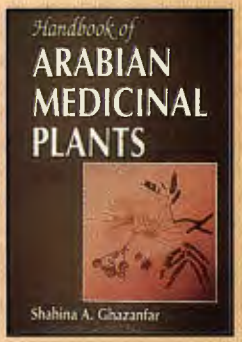

HANDBOOK OF ARABIAN MEDICINAL PLANTS
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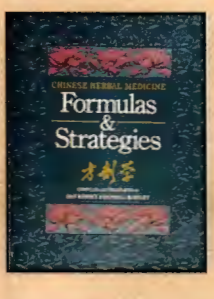

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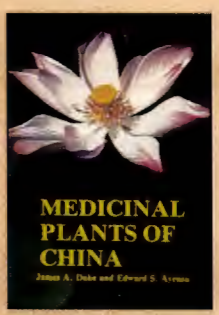

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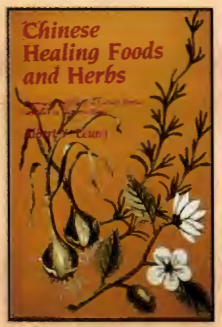

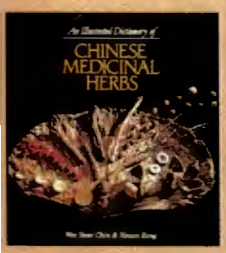

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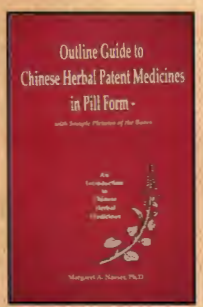

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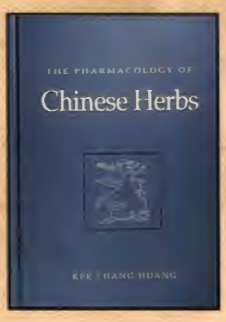

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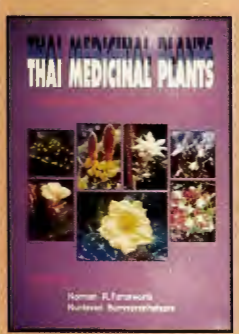

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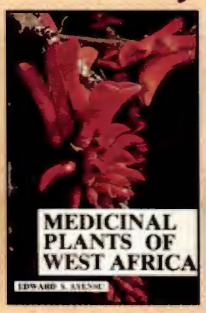

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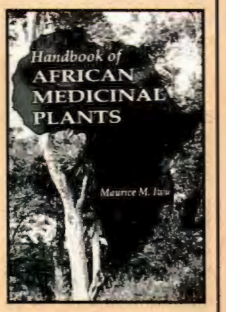

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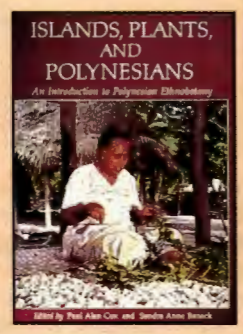

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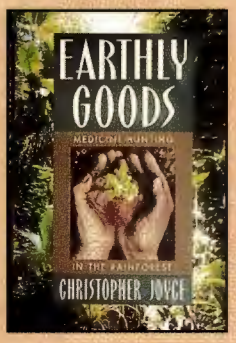

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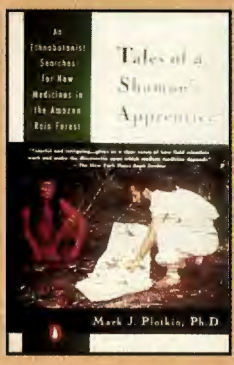

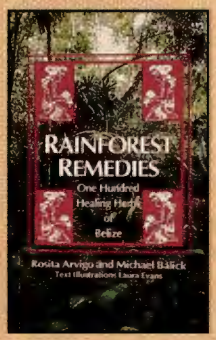

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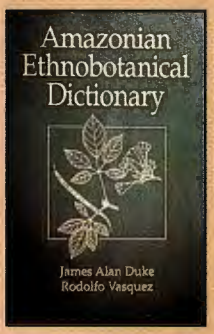

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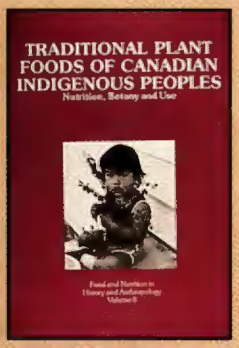

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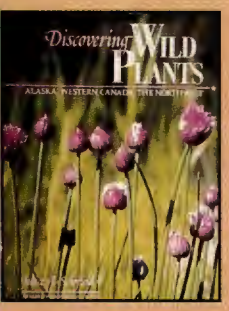

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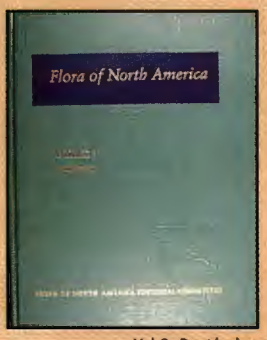
by Janice Schofield. 1989. Describes 147 plants. Over 190 color photographs. Common name, species, other names, family, habitat, growing pattern, calendar, food use, medicinal use, historical use, recipes, and cautions. B/W illus. Softcover. 354 pp. $26.95. #B109



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MEDICINAL USES OF PLANTS BY INDIAN TRIBES OF NEVADA
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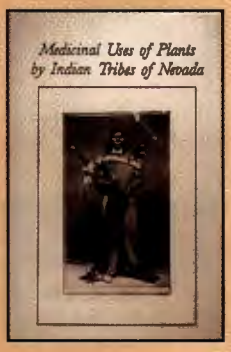

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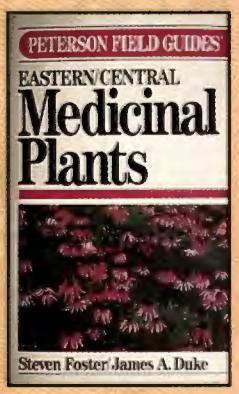

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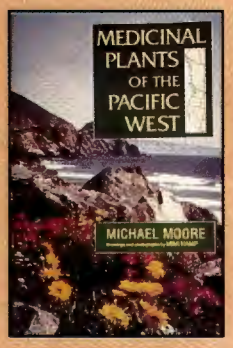

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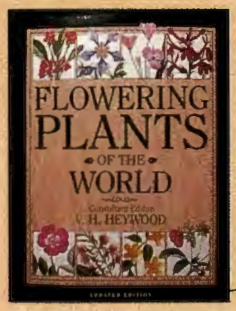

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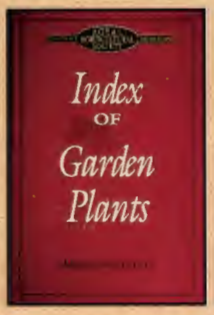

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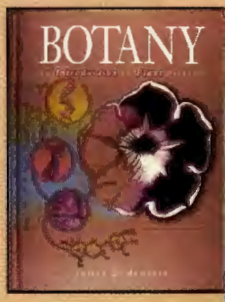

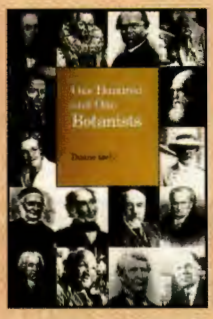

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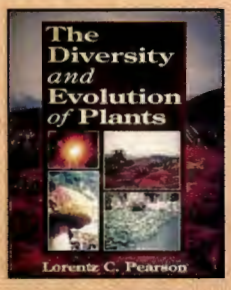

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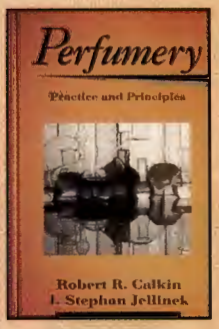

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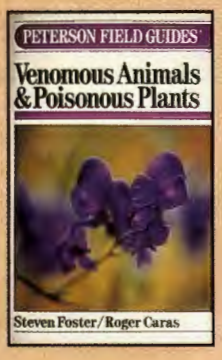

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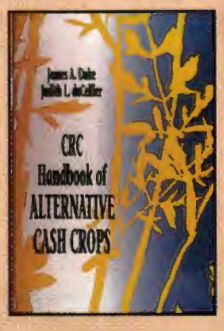

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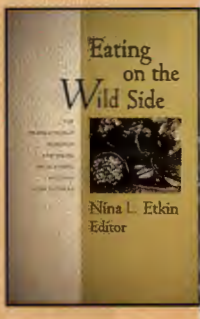

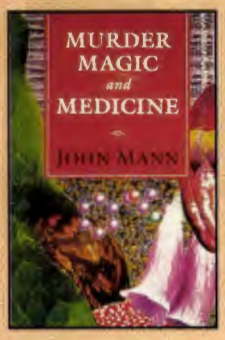

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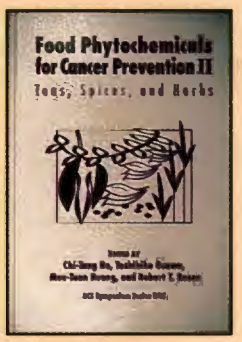

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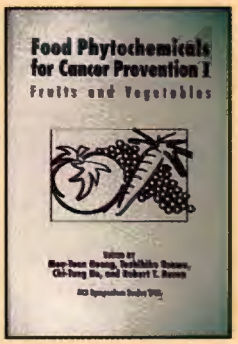

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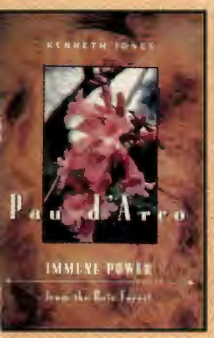

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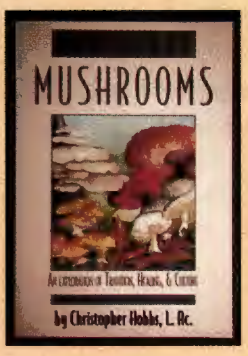

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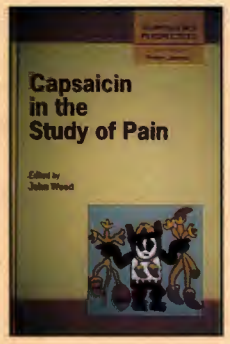

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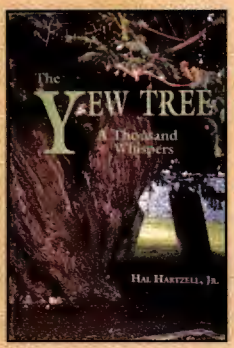

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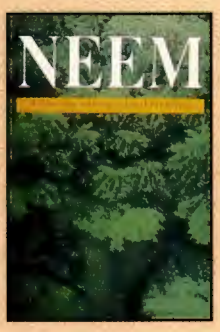

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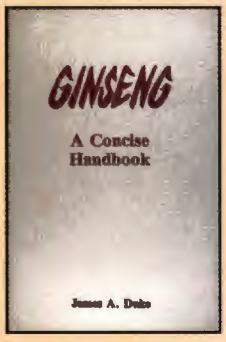

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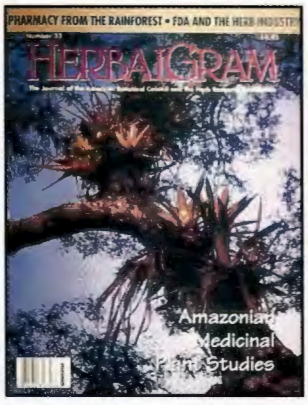

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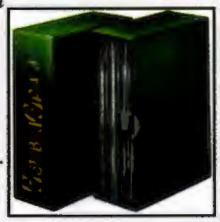

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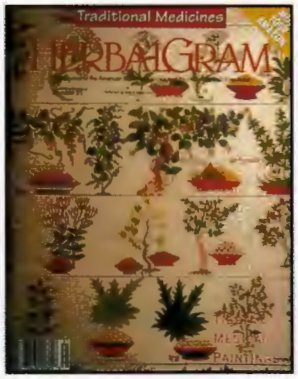

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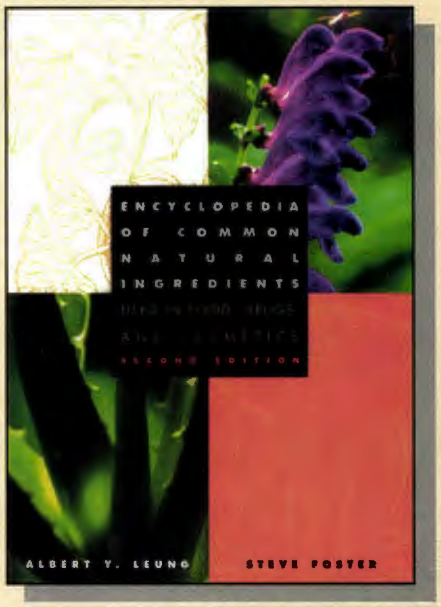

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