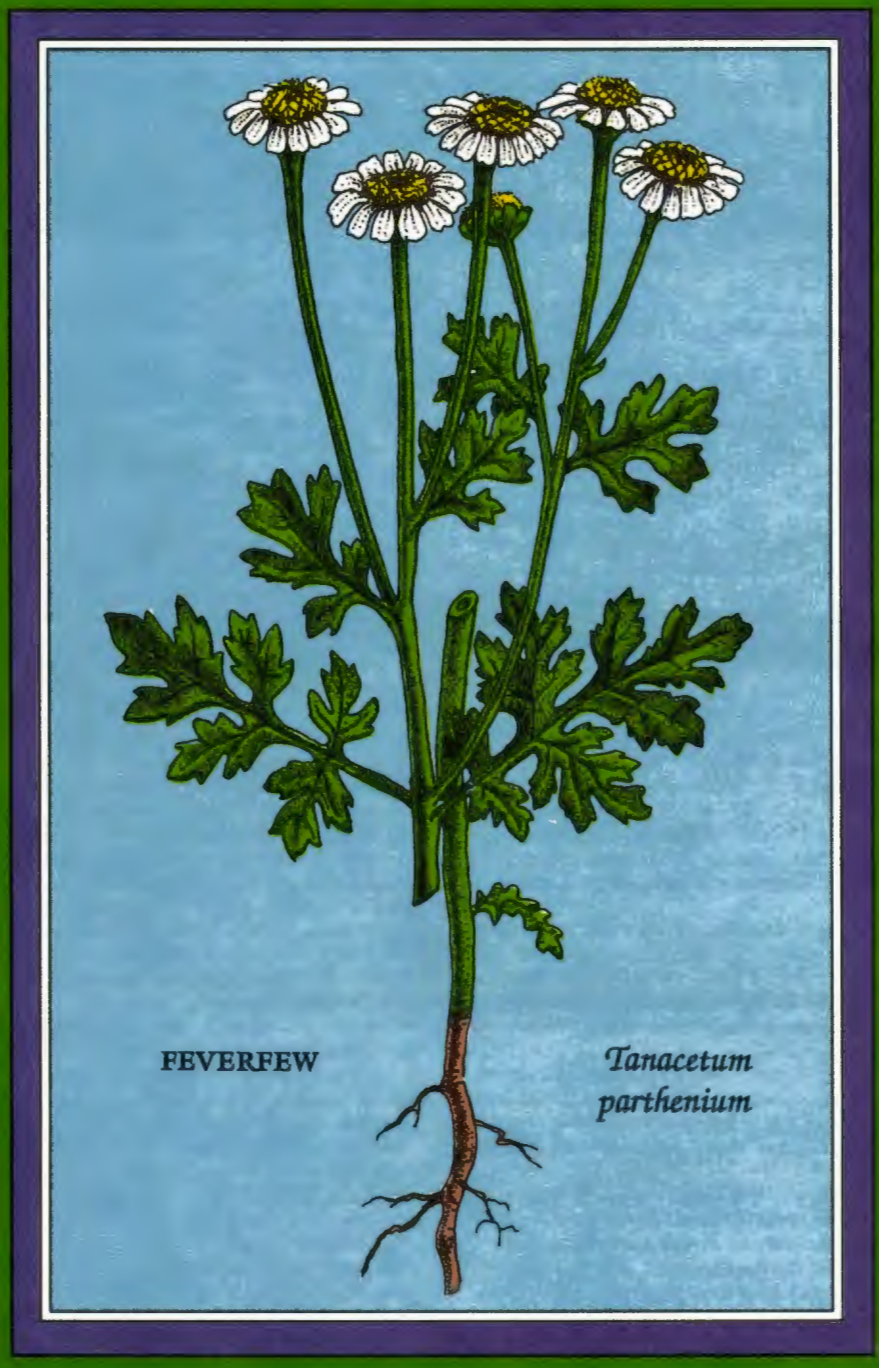
No. 20 — Spring 1989

HERBALGRAM

The Journal of the AMERICAN BOTANICAL COUNCIL and the HERB RESEARCH FOUNDATION



Special Report:
Compound Q from *Tricosanthes kirilowii*
Feverfew — A Review
Endangered Species Act Revised

HERBALGRAM

Summary of Back Issues

Ongoing ***Market Report, Research Reviews*** *(glimpses of studies published in over a dozen scientific and technical journals),* ***Access, Book Reviews, Calendar, Legal and Regulatory, Herb Blurbs*** *and* ***Potpourri*** *columns.*

#1 — Summer 83 (4 pp.) Eucalyptus Repels Fleas, Stones Koalas; FDA OTC Panel Reviews Menstrual & Aphrodisiac Herbs; Tabasco Toxicity?; Garlic Odor Repels Deer; and more.

#2 — Fall/Winter 83-84 (8 pp.) Appeals Court Overrules FDA on Food Safety; FDA Magazine Pans Herbs; Beware of Bay Leaves; Tiny Tree: Cancer Cure?; Comfrey Tea Recall; plus.

#3 — Spring 84 (8 pp.) Celestial Sells to Kraft; Flowers and Dinosaurs Demise?; Citrus Peels for Kitty Litter; Saffron; Antibacterial Sassafras; WHO Studies Anti-fertility Plants; Chinese Herbal Drugs; Feverfew Migraines; Ginseng as Cash Crop; and more.

#4 — November 84 (Vol. 1, #4). (12 pp.) Rebuttal to FDA Article; Medicinal Effects of Eggplant Leaves; Ayurvedic Medicine for Sciatica & Arthritis; Coffee and Iron Absorption; Synthetic Garlic; Lethal Chocolate Chips; Alternative Approaches to Gout; plus.

#5 — Spring 85 (Vol. 2, #1). (12 pp.) FDA Sues GNC; Herbalife vs. FDA; Herb Traders Beware; Onions & Hypoglycemic Compound; Fenugreek Reduces Insulin Need?; Black Walnut Repels Fleas; Psyllium Allergy; Willow Tree Rooting Compound; Yohimbine for Sexual Therapy; Parsley Reviewed; The Sciences of Herbs; Soothing Chamomile; Eleuthero & the Liver; and more.

#6 — Summer 85 (Vol. 2, #2). (12 pp.) Desert Plants for Future Foods?; Hispanic Folk Medicines; Ginger for Motion Sickness; Ipecac Abuse; Toxic Clove Cigarettes; New Herbal Sweetener; Chilies & Ulcers; Milk Thistle Extracts; Ginseng for Liver Damage; plus.

#7 — Fall 85 (Vol. 2, #3). (12 pp.) Fund for Herb Safety Review; Scullcap Substitution; Therapeutic Gingko Trees; Ginseng & Potency; Dahlia as New Sweetener; Herbal Cures for Heroin & Opium; American Ginseng Harvest; Jojoba vs. IRS; Aromatherapy for Stress; Bloodroot in Oral Hygiene; and more.

#8 — Winter 86 (Vol. 2, #4). (12 pp.) Call for Government-sponsored Natural Drug Research, by Dr. Jim Duke; Ginseng & Ageing; Chinese Herbs Treat Altitude Sickness; Sweet Wormwood for Malaria; Feverfew for Arthritis?; Coca Leaf Tea; and more.

#9 — Spring 86 (Vol. 3, #1). (12 pp.) Canadian Expert Panel Makes Herb Use Recommendations; Herbal Bibliographic Service; Methods in Phytochemistry; Valerian's Value; Feverfew Fever; Faulty Herbal "Scare" Articles; Juicy Jaborandi; and more. Recommended Reading Reprints: "Medicinal Plants in Therapy": by Professor Norman R. Farnsworth; "Herbal Water Purification?" by Dr. Jim Duke.

#10 — Summer/Fall 86 (Vol. 3, #2). (16 pp.) Major FDA Policy Shift on Herbs; Chemobyl Limits Supplies, Raises Prices; Garlic Studied for Obesity & Meningitis; Guar Gum for Diabetes; Tumor Inhibitor in Licorice; Anticancer Effect of Mistletoe and Turmeric; and more. Special Report: Overview of Spice Marketing.

#11 — Winter 87 (Number 11). (16 pp.) Plant Drugs in the 21st Century; Biologists Race to Save Tropical Rain Forests; Natural Blood Thinners; Chinese Antitumor Plants; Herbal Gout Remedy for Severe Cirrhosis; Banana Peel for Plantar's Warts; $2.68 Million for Plant Cancer Cures; and more.

#12 — Spring 87 (Number 12). (16 pp.) Ayurveda, the Traditional Herbal Medicine of India; Thai Medicinal Plants; Herbal Dream Inducer; Mexican Vanilla Revisited; Eleuthero and Soviet Athletes; Ginseng Growing Grows; and more.

#13 — Summer 87 (Number 13). (16 pp.) The Economic Significance of Herbs; Swedish Court Ruling in Evening Primrose Oil; Court Nixes FDA DALS; Society for Economic Botany Symposium on the Investigation of Folk Medicine; Ginseng Anti-aging Effect; Immune-enhancing Effects of Ginseng; Anti-ulcer Activity of Germander; Saikosaponin For Kidney Disease; Native Plant Survey Being Conducted; Mesquite Pods: Future Food?; and more.

#14 — Fall 87 (Number 14). (16 pp.) Celestial Seasonings Sold to Lipton, Inc.; Anti-diabetic Effect of Ginseng; NOVA Airs "The Hidden Power of Plants"; Botanist Duke Profiled in Washington Post; Chaparral and Mosquito Longevity; Mood-elevating Bananas; Special Report on Herbal Data Bases; Ethnobiology Update; An Emerging Science of Varying Specialities; and more.

#15 — Winter 88 (Number 15). (24 pp.) Major Herb Conference in Thailand; Export control of Ladyslipper; Canada Bans Comfrey Leaf; Tea Tannins Reduce Cholesterol; Feverfew for Physicians; Gingko Makes Big News; Licorice Retards Tooth Decay; Lomatium - Herbal Viricide?; Neem Extract - Natural Pesticide; Search for Anti-Cancer Plants Funded by NCI; Digitalis Depressing?; EPA Permits Use of Herbicide Alachlor; APHA Establishes OTC Committee; and more.

#16 — Spring 88 (Number 16). (24 pp.) Farnsworth Joins HRF Advisory Board; AHPA Standards Committee Making Progress; FDA Rules on GRAS Substances; Fresh Ginger Juice in Treatment of Kitchen Burns; King Tut and the Spice of Afterlife; "CocoDent"; Ginseng/Ethnobiology Conference Reports; Interview - Dr. I. I. Brekhman ; Rain Forest Update; New Tool in Antibiotic Arsenal; Valerian Effectiveness; Fungal Studies; More Polysaccharides; Recent Research on Ginseng; Heart Peppers; Yew Continues to Amaze; Licorice O.D. Prevention; Ginseng in Perspective; Poisonous Plants Update; Medicinal Plant Conservation Project; 1989 Oberly Award Nominations; Trends in Self-Care Conference; License Plates to Fund Native Plant Manual; and more.

#17 — Fall 88 (Number 17). (24 pp.) **Sarsaparilla, A Literature Review by Christopher Hobbs;** Hops May Help Metabolize Toxins; Herbal Roach Killer; Epazote Getting More Popular; Aloe Market Levels Off; Herbal Tick Repellent?; Chinese Herb Products Regulated; Celestial Seasonings Independent Again; Texas Botanical Garden; Plant Invaders; Interview with Professor H. Wagner; Research on Herbal Cancer Remedies; New Tool in Antibiotic Arsenal; Antiviral Alkaloids Inhibit AIDS Virus; Neurological Disease from Plant Seeds; All About Indoles; Huh? Lizard's Tale?; Sedative Peanut Leaves; Cardiac Benefits of Tienchi Ginseng; Antitumor Effects of Sophora; Anti-aging Formula; Chinese Arthritis Treatment; Kava Covered in Two Newspapers; Gin Ads Reveal Herbal Ingredients; High Flying Wild Flowers; Traditional Medicine of China, Vietnam Covered; Forest Watch; Herb Industry Adopts Lady's Slipper Resolution; and more.

#18/19 Double issue — Fall 1988/Winter 1989. (Numbers 18/19) (48 pp.) American Botanical Council Formed; How Did Van Gogh?; Can Wintergreen Light Up Your Smile?; What's In A Name? - Flax Facts; Tobacco Headed Down Primrose Path in Canada; Chaparral: One of Oldest Plants on Earth; Did You Read Your Morning Kenaf?; Epazote: An Herbal Cure for the Greenhouse Effect?; Pepped-Up Potency in Herbs; Nobel Laureate Supports Natural Products Research; Maté Production Rises in Argentina; Northwest Herbalists of Note; Japanese Herbalists on Northwest Walk; "Marijuana, Cranberries: Gaining Respect"; African Herbal Medicine; Herbs Becoming "Big Business" in China; The Hoxsey Film: Can Healing Become a Crime?; The Synthetic Silver Bullet vs. The Herbal Shotgun Shell; Benefits of Garlic; New Clinical Test of Garlic; AIDS News: St. John's Wort Inhibits Retrovirus; New Feverfew Headache Research; Souped-up Polysaccharide Against HIV; Spirulina Returns to the News; Guar Gum for the Heart; Cranberry Juice for Urinary Infections; Huperzia: Hype or Hope?; Huperzia: The China/Pittsburgh Connection; **St. John's Wort: A Review by Christopher Hobbs;** Native American Medicinal Plant Stamps; Flora of China Translation Becomes International Effort; Crop Diversification Essential; Herbal Seeker to Merge with Digest; and more.

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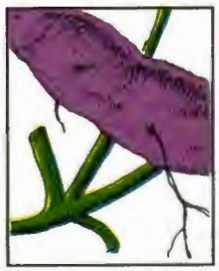

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The Education Publication of the American Botanical Council and the Herb Research Foundation
No. 20 — Spring 1989

Editor - Mark Blumenthal
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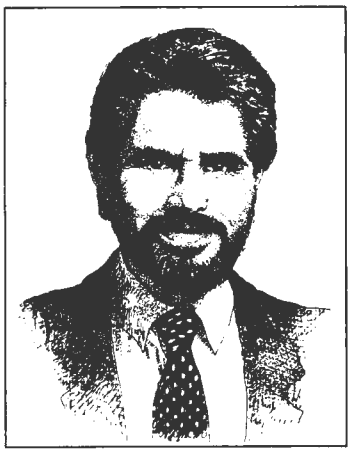
Looking Forward

The feedback we received from our readers after we published our last issue was overwhelmingly positive. Designed as a "double issue," *HerbalGram* #18/19 had 48 pages, and included a new format and color.

With this issue we continue our expansion of the graphic direction created by our artist Ira Kennedy. And, we have now grown in size where 48 pages no longer constitutes a double issue, but one edition. Future editions may be even larger. We are not lacking for editorial copy; the only thing holding us back is the financial resources to afford the production, printing, and mailing of a larger version.

Speaking of finances, we have recently had to review our subscription rates to determine whether they adequately cover our costs. We have always known that subscriptions alone do not provide us with sufficient capital to meet our needs. The formation of the American Botanical Council was stimulated partly by the need to address the financial costs of paying for the growth



Mark Blumenthal

of *HerbalGram*. ABC receives some financial support from the Herb Research Foundation for the publication of *HerbalGram*. Additionally, numerous herb industry members and organizations have made donations to ABC to support its work.

However, ABC's mission involves much more than producing *HerbalGram*. There are various educational projects (like article reprints, radio programs, etc.) that ABC is working on at present. In addition, we have maintained our editorial policy of accepting only classified advertising for education-related groups, publications, and seminars advertising in *HerbalGram*.

What this all means is that we find it necessary to raise our subscription fees. Many of our long-time readers will remember that we initially published an 8-page newsletter, then we grew to 12 pages and then to 16. At that time our subscriptions cost $15.00, then later were raised to $18.00, where they have stayed for several years. Obviously, we cannot continue to charge that amount and at the same time produce a publication that is three times larger, with added colors!

Consequently, starting with this issue, our new subscription rates will be as follows: $25 for 4 issues; $45 for 8 issues; and $60 for 12 issues. Herb Research Foundation members, please note that the membership fee for HRF has also risen accordingly: HRF memberships will now cost $35 per year. ❐

About This Issue

We continue to publish a major literature review on a single herb. Once again, botanist Christopher Hobbs has combed the available literature, this time to produce a review of Feverfew. We received universally positive comments on his previous reviews of Sarsaparilla and St. John's Wort. We were pleased to note a brief review of Hobb's Sarsaparilla review (*HerbalGram* 17) in the journal *Pharmacy in History*, published by the American Institute of the History of Pharmacy at the University of Wisconsin.

Jim Duke and Steven Foster write about *Trichosanthes kirilowii*, referred to as "Chinese Cucumber Root" in recent press accounts which report on its anti-HIV activity. The isolated drug extracted from this Chinese herb is making headlines, but there is little written about its potential toxicity. Duke and Foster outline the various risks and benefits of this potential new plant drug.

Foster further writes about the need forpreservation of botanical species that are becoming increasingly threatened or endangered.

Finally, in addition to our usual departments and book reviews, Rob McCaleb and Terry Willard attempt to put the recent Canadian government's rulings on herb safety into a historical and cultural context.

On the Cover

Feverfew (*Tanacetum parthenium*), for *HerbalGram* by Ira Kennedy, 1989

NEW ADDRESS

We ask our readers to note that ABC and *HerbalGram* now share a new address and phone number: P.O. Box 201660, Austin, Texas, USA 78720. Phone 512/331-8868. FAX 512/331-1924.

ADDRESS CHANGES

Our mail permit does not allow *HerbalGram* to be forwarded. If you move or change your mailing address, please notify us immediately so you will not miss any copies.

Thank you for the copy of *HerbalGram*. I have examined it and am pleased and surprised with its contents. For the last 20 years, I have purposely avoided contact with herbalist magazines, as they were always top-heavy with unsubstantiated claims, few reference sources, and woven in with an amalgam of mumbo-jumbo essays on crystal power, astrology, etc. As well, my blood would boil when I read some herbalist articles urging readers to dig indigenous rhizomes, bulbs, roots, and other parts of species that were publically known to be on endangered species lists. Until now I had thought the entire herbalist movement was living in a time warp; totally unconnected with ecological principles or the scientific method. *HerbalGram* is a beacon of light and is doing immense credit to the herbalist/environmental/botanical movement in North America with your well-researched and excellently illustrated articles and news on herbal medicine and food.

James L. Hodgins
Editor, Wildflower
Toronto, Canada

Did I miss something? "New Feverfew Headache Research."...excellent study of Feverfew...Feverfew what? Feverfew root: Feverfew leaf: Feverfew herb? Feverfew flower: If this is a scientific article, then it should be mentioned what part of the plant is used and how much. If this is an herbal article, the same criteria applies! Is *Lancet* at fault or was there a lapse on the part of the reporter? If the herb world is going double-blind then act the part.

Jeanne Rose
Herbal Studies Course
San Francisco, CA

(The research is about Feverfew leaf. See review on page 24 of this issue.)

Congratulations on the *HerbalGram* double issue! I know only too well how much you must have put into it. It is looking fantastic. By the way, pinene is a terpene, but thujone and camphor are ketones. Pinene, like most terpenes, is not regarded as toxic, while many ketones are toxic, especially thujone.

Robert Tisserand
Aromatherapy Publications
London, England

Errata from HerbalGram #18/19:

Re: Chris Hobbs's Literature Review on St. John's Wort - page 29: Table 2. Clinical Indications for St. John's Wort. Dosage schedule reads, "Average daily dose recommended is 2-4 grams of the powdered herb as a powdered extract, equivalent to .02 - 1.0 g hypericin." This is correct, but to be more appropriate, the table should have read, "20 to 100 mg. of hypericin." However, on page 30, column two, paragraph three, we erred in our dosage: line five should read, "240 *milligrams* of the 1:5 powdered extract per day (standardized to 1.25% hypericin)..." The original text reads 240 *grams* which is obviously incorrect! *HerbalGram* regrets the error. Thanks to Ed Smith and Paul Bergner for bringing this error to our attention.

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.*

Common Scents — Newsletter of the American Aromatherapy Association. Articles on quality of essential oils, differences between essential oils and synthetics, calendar, etc. Regular membership $50. P.O. Box 1222, Fair Oaks, CA 95628.

Chakpori Institute of Medicine — For the practice and study of Tibetan Medicine. Membership $25 or more. P.O. Box 956, Boulder, CO 80306.

Mushroom Intoxication Wall Chart — This 8" x 10" laminated wall chart lists differential evaluation of mushroom intoxications by symptoms. *Lawrence Review of Natural Products*, 922 Woodbourne Rd., # 324, Levittown, PA 19056.

Summary of Federally listed endangered and threatened species in Texas and Oklahoma — For Texas species, contact: Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, TX 78744. 512/389-4800. For Oklahoma species, contact: Oklahoma Department of Wildlife Conservation, 1801 N. Lincoln, P.O. Box 53465, Oklahoma City, OK 73152. 405/521-3851.

Wild Cards — A deck of 52 standard playing cards showing 4-color photos of wild edible plants. $10 plus $2.50 postage & handling from Wild Foods Co., P.O. Box 450, Warrensburg, NY 12885. 518/251-3267.

See page 48

Many thanks for sending me the Fall/Winter issue of *HerbalGram*. It is a splendid publication, full of interest for me. You should be very proud of it.

The only room for criticism which I've spotted so far occurs on page 18, in Rob McCaleb's "Garlic Review." His second paragraph opens with a somewhat misleading sentence: "Anti-microbial effects of garlic protected French priests from the bubonic plague; and British, German, and Russian soldiers from battlefield infections." Of course the careful reader will know that "R.M." is merely paraphrasing the anecdotal claims which were included in Abdullah's review article. Nonetheless, as it stands, this sentence appears to make claims that are historically unproven and unproveable. I would have opened it with "It was believed that..." or some such qualifying phrase, to be sure that readers could distinguish between proven claims an anecdotal "evidence."

When I've met my horrendous deadlines, I'll treat myself to a thorough reading of the entire issue. I consider it so valuable that I will keep it with my little collection of books and articles about medicinal plants.

Patricia Spain Ward
Campus Historian
The University of Illinois at Chicago

I was very interested in the *HerbalGram* and I am going to send for early editions. I found it not only interesting, but useful in terms of both practical information as well as the more scientific material. I will also be joining the Herb Research Foundation.

Norman B. Hirt, M.D.
Vancouver, B.C., Canada

Fantastic! Eye-catching! Colorful! Artistic! Informative! You did the impossible—the best periodical of herbal information has been made better. Easier to read. More fun to delve into.

Kudos to you, your staff, and Ira Kennedy for producing an interesting, exciting format change that succeeds on every level. I am already looking forward to my next issue!

David P. Mastroianni, Director of Technical Services
Solgar Company, Inc.
Lynnbrook, NY

Congratulations on the wonderful double issue of *HerbalGram*! As always, the information was terrific, but the redesign is a major step forward, especially the use of color and all the illustrations. I tip my hat.

Michael Castleman
Editor, Medical Self Care
San Francisco, Cal.

Timothy Charles Plowman

November 17, 1944 - January 7, 1989

"Now cracks a noble heart. Good night, sweet prince,
and flights of angels sing thee to thy rest."

William Shakespeare, *Hamlet*

Timothy Plowman with his dog, Pogo, in the Peruvian Highlands, 1975.
Photo courtesy of Wade Davis.

Ethnobotany has lost one of its most devoted disciples and beloved practitioners with the tragic passing of Timothy Plowman. A man of generosity and kindness, modesty and honour, his untimely death has cut short a remarkable career of immense promise. Already far on the way as one of the most discerning, original and effective naturalists of our century, Tim was a gentleman, a friend of everyone, an understanding and devoted teacher, a scholar of extraordinary depth, a tireless and demanding researcher happy to share his experience and counsel with whoever sought his advice.

Tim Plowman's interest in and love of plants developed as a child growing up in the temperate woodlands surrounding Harrisburg, Pennsylvania. An avid collector even as a boy, his passion for plants grew into the central metaphor of his life. After attending college at Cornell University he went as a graduate student to the Botanical Museum of Harvard University where he worked under the direction of Richard Evans Schultes. Such was his promise that even before enrolling in the graduate school, Tim was dispatched by Professor Schultes to the Amazon on an expedition that would define the course of his professional life. In the fall of 1966 Tim returned from Brazil flushed with excitement and fully committed to spending the rest of his life in pursuit of the mysteries of the tropical rainforest. Having received his Master's Degree in 1970, he undertook for his doctoral dissertation a revision of the genus *Brunfelsia* (*Solanaceae*). His thesis, which included a comprehensive chapter on the ethnobotany of the genus, was based on over 15 months of continuous fieldwork in Central and South America and the Caribbean.

By the time his Ph.D. was officially conferred in 1974, Tim was already deeply involved in the project for which he will always be remembered—a 15-year effort to decipher the complex taxonomy of *Erythroxylum* and to study the ethnobotany of coca, the sacred leaf of the Andes and the notorious source of cocaine. Of Tim's 80 published scientific papers, 46 are related to his work on *Erythroxylum* and his position as the world's authority on the genus enabled him to speak eloquently and powerfully in defense of the traditional use of coca by beleaguered indigenous peoples of the Andes and Northwest Amazon.

Tim left Harvard for the Field Museum of Natural History in 1978 where he became tenured in 1983 and was appointed curator in 1988. If Tim grew up at the Botanical Museum at Harvard, he came into his own at the Field Museum and his years there were both the happiest and most productive of his remarkable career. His interdisciplinary interests in systematics, ethnobotany and ethnopharmacology led him to interact with an increasingly diverse group of scholars which included not only fellow botanists but also archaeologists, phytochemists, ethnographers and pharmacologists. In addition to carrying out an active scientific research program as co-principal investigator of the National Science Foundation Projeto Flora Amazonica, he served on the editorial boards of numerous journals, including *Flora Neotropical Monographs*, *Advances in Economic Botany*, *Journal of Psychoactive Drugs* and *Journal of Ethnopharmacology*. Between 1984-1988 he was Co-Editor-in-Chief of the *Journal of Ethnopharmacology* and the Scientific Editor of *Fieldiana*. He was vice president of the Beneficial Plant Research Association, a Fellow of the Linnean Society, and a member of many professional societies, including the American Society of Plant Taxonomists, Society of Economic Botany, Council of Biology Editors, Society of Ethnobiology and the New England Botanical Club. As chairman of the Botany Department of the Field Museum of Natural History (1986-1988) Tim secured a substantial increase in National Science Foundation funding for the herbarium and developed a new facility for the curation of economic collections. His enthusiasm, spirit of cooperation, professional rigor and passionate commitment to botany proved infectious and under his leadership, morale at the Botany Department soared.

Credentials alone, however, present but a shadow of the man who affected so many lives in such profound ways. For Tim, life was but a vehicle for seeking understanding and for expressing freedom. If there is a word to describe Timothy Plowman it would be freedom, and he lived with the conviction that every person had the right to pursue his or her own path unshackled of the burdens of social convention. Equally at ease in the tranquil world of plants or amidst the society of people, Tim had a charisma hot to the touch, and those privileged to have spent time with him often developed a respect that bordered on reverence. For he was a true Renaissance scholar, a man out of time, whose breadth of interests and passions went far beyond the boundaries of his beloved field of botany.

But it is as a botanist and intrepid plant explorer that Tim will be best remembered. He spent over five years of his life in the most remote and inhospitable regions of the Andes and Amazon, making over 15,000 collections of unsurpassed quality. Typically he always considered his time in the field as a privilege, and he never failed to remember his fellow botanists toiling away in the less romantic confines of the herbaria. Tim seemed to have a rolodex in his head that recorded the name of every specialist in every group of plants, and he constantly was on the lookout for specimens that might prove useful to a distant colleague. He collected everything. His voucher specimens were not only complete, but aesthetically beautiful and whenever possible he augmented them with invaluable collections of live material. Living plants, many new to science and collected first by Tim, may be found in botanical gardens throughout the world.

In the rainforests of the Amazon Tim felt the fullness of life. He marvelled at the thousand themes, the infinitude of form, shape and texture that so clearly mocked the terminology of temperate botany. He always travelled in the forest as a student and his commitment to ethnobotany grew in part from his direct experience with the indigenous peoples who understood the plants in ways that he believed he could only hope to emulate. To be in the forest, he said, was to be in Eden, and to say the names of the plants was to recite the names of the Gods. He believed that all forms of life were manifestations of the sacred.

To be in the forest...was to be in Eden, and to say the names of the plants was to recite the names of the Gods

Hence, for Tim, biological and cultural diversity represented far more than the foundation of stability, they were articles of faith, fundamental truths that indicated the way things were supposed to be.

Tim had a special affinity for Indians, and his uncanny ability to gain their trust and confidence was one measure of the deep respect he had for their way of life. He empathized with their worldview, which defined man as but one element inextricably linked to the whole of creation. It was this unique cosmological perspective, he believed, that enabled the Indians to comprehend implicitly the intricate ecological balance of the forest he loved so dearly. Tim viewed with pain, dismay and increasing anger this other worldview, one in which man stands apart, that now threatens the forest with devastation. It was one of his fondest hopes that the lessons of ethnobotany might ultimately facilitate a dialogue between these two worldviews such that folk wisdom might temper and guide the inevitable development processes that today ride roughshod over much of the earth. The many of us who loved him as a brother and respected him as a colleague can do no better service to his memory than to continue our own struggles to make this dream of his a reality. ❐

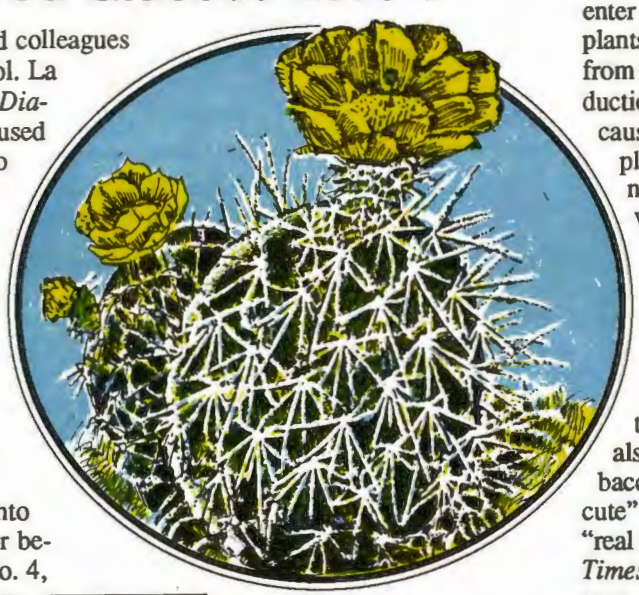
Thanks to Wade Davis, Ph.D., who holds a doctorate in ethnobotany from Harvard University. He is the author of The Serpent and the Rainbow, *and* Passage of Darkness. *His new book, now in progress, recounts his year with Dr. Plowman in the South American rain forests. Dr. Davis is a research associate at the New York Botanical Garden.*

Scientists Develop Anti-cancer Tobacco

A group of California scientists have developed a way to subvert the genetic machinery of tobacco plants so that the plants produce anti-cancer agents and other biological drugs. Researchers from Biosource Genetics Corp. of Vacaville, CA say that they have developed an artificial virus that can be sprayed on fully grown tobacco plants to convert them into "minifactories" producing immune system stimulants, also called immunostimulants. Such agents would include interleukin-2, tumor-killing agents such as tumor necrosis factor, and sunblocking agents such as melanin. The plants would then be harvested and the products purified from their leaves. According to geneticist Robert Irwin, president of the company, field tests will begin within 12 months. He also said that other potential uses of the genetically altered tobacco include an insecticide, a substance that allows time-release of flavors in foods and fragrances in perfumes, enzymes to help make paper and reduce cholesterol levels in foods, and other cancer drugs such as interferon and vincristine. Researchers combined genes from several viruses that normally infect plants to form a "super virus." Even when the cost of extraction from the plant and purification of the product are added, Erwin said, the technique would be cost-competitive with conventional techniques, in which the drugs are produced in engineered bacteria. The virus would be sprayed in combination with an abrasive that would scratch the leaves' surface, allowing the viruses to enter the host plant. Weeds and other plants accidentally infected would die from the effects of the high protein production caused by the virus. And, because the virus does not attack the plant's genetic information, it would not be passed along in seeds and would produce no long-term threat. Cancer specialist Vincent DeVita of the Sloan-Kettering Cancer Center noted that one of the failings of congressmen from tobacco states is that they have failed to give farmers an alternative to growing tobacco. He also added that the irony of using tobacco to combat cancer was "kind of cute" and that Biosource's success was "real enough to pursue." (*Los Angeles Times Service, Austin-American Statesman*, April 4, 89)

Cactus Lowers Blood Glucose Levels

A study by Alberto C. Frati-Munari and colleagues at the Hospital De Especialidades in Col. La Raza published in the January issue of *Diabetes Care* found that a cactus species used as a food and herbal remedy in Mexico (*Opuntia steptacantha*), commonly known as "Nopal," actually helped lower blood glucose levels in diabetes patients. The broiled stems of the cactus were used in the study, decreasing blood glucose and insulin levels. The mechanism of action was not understood, but the researcher hypothesized that the cactus treatment may improve the ability of insulin to stimulate the movement of glucose from the blood into body cells where it is used as energy or becomes fat. (*Science News*, Vol. 133 No. 4, Jan 23, 1988)



Porcupine Prickly Pear, *Opuntia erinacea* for *HerbalGram*, Ira Kennedy, 1989

Put a Cassava in Your Tank

Cars in Brazil, 90% of them at least, have been running on a mixture of gasoline and ethanol since the 1930s. Up until now, all that ethanol (the same kind of alcohol used in beverages) has been made from sugarcane. This crop requires extensive use of fertilizers, pesticides, expensive mechanization and produces stillage, a serious pollutant of waterways, as a by-product from the fermentation process.

A serious shift to the use of cassava (*Manihot esculenta*), a versatile tuber cultivated throughout much of South America, and familiar to North Americans as the source of tapioca, is in progress. "Growing cassava requires much less fertilizer and mechanization than sugarcane," says economist Milton Campanario of the University of São Paulo, "and it's grown in all types of climates and soils." Substituting cassava could help the economy and the environment at the same time. (*Discover*, Feb. 89)

What's In a Name?

Fuchsia, that strong, vivid, reddish-purple color, is named after Leonhard Fuchs, a doctor and botanist who was known in the 1500s for medicines he concocted from plants and herbs (valerian, thyme, St. John's Wort, chamomile, among others). In the early 1700s, French botanist Charles Plumier named a genus of shrubs after Fuchs. The shrubs lent their name to the color. (From Michael Gartner's "About Words," *Austin-American Statesman*, Jan. 25, 1989)

Spicy Food and Stomach Distress

Does spicy food upset your stomach? Is it damaging to the walls of the stomach? According to a recent article in the *Journal of the American Medical Association* (Dec. 16, 88), the answer is "no." A team of researchers led by David Y. Graham at the Digestive Disease Section of the Veterans Administration Medical Center at the Baylor College of Medicine, in Houston, Texas tested 12 subjects with four different meals. The first meal was a bland meal of unpeppered steak and french fries (the negative control); the second was the bland meal with 1950 mg. of aspirin (six tablets) (positive control); the third was a spicy Mexican meal (with 30 mg. of jalapeno peppers) and the fourth was a pepperoni pizza.

The study was a randomized crossover trial. The stomach wall was monitored for gastric disturbance by using a videoendoscope, a fiber optic tube. Each subject ate two of the test meals each day, at noon and in the evening. The only meal producing multiple gastric erosions was the meal with the aspirin. In an additional experiment, fresh jalapeno peppers were ground up and placed directly into the stomach with no visible mucosal damage. Another experiment with "Tabasco Sauce" sprayed directly onto the stomach lining showed a large mucosal hemorrhage 24 hours later, not due to the presence of the capsaicin from the peppers, but due to the concentration of vinegar (acetic acid) in the preparation.

The bottom line of the entire study: "The ingestion of highly spiced meals by normal individuals is not associated with endoscopically demonstrable gastroduodenal mucosal damage." (Graham *et al.*, *JAMA* 1988: 260:3473-3475)

To the contrary, traditional medicine in China indicates that spices can, in fact, be used to treat gastric ulcer. HRF Advisory Board member Subhuti Dharmananda, Ph.D., sent us the following information: "The Chinese have been using spicy herbs for a long time in the treatment of gastric ulcer. For example, the traditional formula Clove and Hoelen Combination (Chinese: Dingxiang Fuling Tang), contains clove, ginger, cinnamon, cardamom, and citrus peel and is used today in Japan by medical doctors for treatment of gastric ulcer. Another formula, first recorded around 1100 A.D., is Cardamom and Fennel Formula (Chinese: An Zhong San), with cardamom, fennel, cinnamon, and galanga (a very spicy herb related to ginger). It is also used for gastric ulcer even today." *(See Ginger in Research Reviews, page 23.)* ❐

Sex Change in Dwarf Ginseng

Who would have ever guessed that the "sexist's aphrodisiac" could change sex? In a fascinating paper, M. A. Schlessman (Gender Modification in North American Ginsengs, *BioScience* 37(7):460-475, 1987) showed that the dwarf ginseng plant (*Panax trifolius*), which can live 30 years or more, may change its gender several times, from male to female hermaphrodite.

The dwarf ginseng has globose edible pea-like roots, hence one of the common names, groundnuts. An ephemeral perennial, in Maryland at least, it usually flowers in April, fruits in May, then quickly retreats to its subterranean hideaway for 9-10 months.

Only 2-10 inches tall, the dwarf ginseng has 3-5 leaflets, with no or very short petiolules. By contrast, the more familiar American ginseng (*Panax quinquefolius*), is 4-20 inches tall, usually with five stalked toothed leaflets, and an elongate, sometimes forked root. *Panax quinquefolius* has all hermaphrodite (bisexual) flowers. Rare triovulate flowers could be accordingly classed more "femalish" if not "superfemales."

For further observations, Jim Duke has transplanted several males and females from the 1989 flush of dwarf ginseng. He has volunteered to cooperate with chemists or pharmacologists wishing to compare the levels of ginsenosides in the males and females.

Dwarf ginseng
Panax trifolius
by Peggy Duke
for *Ginseng: A Concise Handbook*, James A. Duke, 1989

Industry Loses Two Pioneer Herbal Marketers

Willard Magee

Willard Magee, 69, died in December, 1988. Mr. Magee (or just "Willard" as he preferred to be called) was one of the last of the old timers who made the domestic botanical industry what it is today. Starting out in the 1950s in Missouri, Magee started the Magee Root Company, which became the largest dealer of domestically harvested wild botanicals. Many of Magee's herbs were initially exported; later, as interest grew in the domestic market for American medicinal plants, Magee became one of the primary bulk suppliers to herb and tea companies in the U.S.

Nathan Podhurst

Also, as we neared press time, we were saddened by the news of the passing of Nathan Podhurst, 96, one of the pioneers of the herb business in America. Mr. Podhurst had owned and operated Nature's Herb Company on Ellis Street in San Francisco since 1922. He was a teacher and inspiration to many people in the herb industry. Herbalist/author Jeanne Rose is writing a tribute to Mr. Podhurst, which will appear in our next issue.

Medical Students Introduced to Native Cures

Lane Johnson, M.D., director of Arizona's United Communities Health Center, recently took fourth-year medical students on a guided tour through Arizona's plentiful herbs, the traditional medicine chest of local Indian tribes. While Dr. Johnson doesn't advocate the use of herbs, the physician-plant lover wants to give students an idea of what they would find in the Third World. The students, enrolled in a three-week summer course—International Health for the Third World—next traveled to India, Kenya, Peru and other countries where patients are more likely to ask for a plant than a pill. "Modern medicine makes light of herbal stuff; it says it doesn't work," says Johnson. "It says if it does work it just has a placebo effect. Then why are so many medicines—digitalis, morphine, quinine—based on plants?... Plants are synthesized [by pharmaceutical companies] because they work very well. A plant is no more poisonous than the drugs you learn about in school. On the other hand, there's the myth that if it comes from nature it's always safe. The fact is you can die just as easily from nature as synthetics."

"Herbal medicine restores you to a sense of place and roots—if that helps you to get better, then that is important."

The tour, which began at the U. of Ariz. University Medical Clinic, proceeded through the Sonoran desert into the foothills of the Catalina Mountains to the ski lodge at the crest of 9,100-foot Mount Lemmon, the highest in Southern Arizona. At stops along the way, Dr. Johnson gathered and described traditional native Papago Indian uses for wormwood (tonic to stimulate sweating), jimson weed (Indian ritual narcotic use), creosote bush (pulmonary problems and arthritis), manzanita (urinary tract infections), penstemon (external salve), cleavers (problems of the urinary tract and skin), pine (expectorant for upper respiratory infections), rosehips (mild astringent/eyewash), cottonwood and willow (aspirin), black-eyed susan (cardiac stimulant and diuretic), purple vervain (anti-viral agent), mullein (anti-asthmatic), and sage (decreases sweating, salivation, and breast milk).

Dr. Johnson feels that herbal medicine is a tool to help people assist their own natural healing process. He told the students, "Herbal medicine restores you to a sense of place and roots—if that helps you to get better, then that is important."

Student Portia Tatlonhari, a Filipino-American who will soon be working in the Philippines, agreed. "You've got to respect the traditions of other people. Sometimes doctors tend to think there is only one right way of doing things, and that's not always true. Herbal medicine is just a different way of looking at how medicines are used and how we can use natural things to help the body." (*American Medical News*, Oct. 7, 1988)

Common mullein
Verbascum thapsus L.
from *Common Weeds of the United States*,
U. S. Department of Agriculture, 1970

"Secrets of the Rain Forest"

Extracting secrets from the jungle is no easy task. Ethnobotanist Dr. Walter Lewis and his wife/co-researcher, Dr. Elvin-Memory Lewis, find this out firsthand when they venture deep into the Peruvian Amazon in search of the ancient botanical wisdom of the Jivaro people. Legendarily fierce, the Jivaro use plants to control fertility, heal skin infections, parasites, and fever, and even mend broken bones. National Geographic's "Explorer" series (TBS on April 9) featured a segment titled "Secrets of the Rain Forest" about this area of the Amazon and its potential for medicinal plant research. The segment focused on the work of this husband and wife team of Washington University in St. Louis.

Walter Lewis is a biologist and member of the HRF Professional Advisory Board. Memory Elvin-Lewis is a microbiologist with particular expertise in botanically derived products for oral hygiene, a field in which she is considered an international authority. They are co-authors of *Medical Botany: Plants Affecting Man's Health* (Wiley, 1977), the best college-level introduction to this field.

The film is about the Lewis's studies of the ethnobotany of the Jivaro, a tribe of natives living in the Amazon rain forest in Peru. This is the seventh time the Lewises have visited this area to study medicinal plants. The producers have helped to capture some of the essential areas of the human aspects of ethnobotany: the trust that is established between the researchers and the tribes people before ancient secrets can be revealed. In this film, natives discuss through an interpreter some of their rationale for using various barks, leaves and roots as medicines.

The Lewises have taken numerous samples from the jungle to their greenhouses and research laboratories in St. Louis. Here the herbs are being analyzed to reveal their chemical components. For example, there is the root of a palm tree that may contain compounds useful in the treatment of hepatitis-B. The Jivaro are still developing their herbal knowledge, researching an herbal cure for hepatitis-B-delta, recently discovered in their territory.

Drs. Walter and Memory-Elvin Lewis
Photo courtesy of National Geographic Television. © J. Stephen Fairchild

Memory Elvin-Lewis is particularly interested in the Jivaro practice of teeth blackening, and its possible anti-plaque properties. It is this practice that first brought the Lewises to Peru six years earlier. The Jivaro use an immature fruit from *Ginepa* to blacken their hair, presumably to make a man more attractive, but the practice also has the added benefit of repelling head lice.

The film also discusses the use of *Clibadium* leaves to stun fish, due to the presence of a strong neurotoxin which may have medical potential. After all, it was the fierce Jivaro Indians who were first observed to use curare (which has been used as a muscle relaxant in surgery since the 1930s) as a poison for the tips of their arrows.

The film notes that women are curators of the herb gardens and usually archive most of the knowledge about medicinal plants in the Jivaro culture. The only problems with this film are that the names of the plants and closeup photos were not shown. Also, since so many hours of footage were taken, it is a shame that the entire segment was condensed to less than thirty minutes. Surely, there was enough material and general viewer interest to make a full hour show! ❐

Foster Studies Herbals in China

Steven Foster, contributing editor and book reviewer for *HerbalGram*, spent two weeks in Beijing last fall where his primary interest was in looking at Chinese medicinal plants. Foster, who speaks no Chinese, was a guest of the Academy of Traditional Chinese Medicine in Beijing. The Academy, he says, is the major research institute for herbal medicine with 3,300 workers in 16 departments. While on this trip, Foster visited Dr. Yue, a Chinese scientist who spent eight months in the Foster home in Arkansas studying American plants and herbs. The Yue family, prior to the communist takeover in 1949, had owned the oldest drug store in China and had served as pharmacists to the royal families in the Ming and Ching dynasties. (*The Joplin Globe*, March 5, 1989)

In a recent telephone interview, Foster was asked, considering recent events in China, whether or not he would make a similar visit in the near future.

"I'd go to China tomorrow," Foster said. " Medical plant research is beyond politics. In terms of people-to-people cultural exchange, nothing is different, yet everything has changed."

Medical plant research is beyond politics. In terms of people-to-people cultural exchange, nothing is different, yet everything has changed.

Steven Foster

Plant Medicine's Importance Stressed by CSU Professor

Frank Stermitz, professor at Colorado State University, believes that plant medicine has become important again, and, although some plant study is a random process, many leads to potentially useful plants come from folklore. Stermitz says,"A number of pharmaceutical companies now have groups of researchers looking at the medicinal potential of various plants in endangered areas of the tropical rain forest." He concentrates on folklore plants found in Costa Rica and Peru.

"The Incas have described thousands of plants," he says. "One book I read claims 30% of the plants are still actively in use in Peru. It's a poor country, there are few doctors there and people use plants for human medicine."

Among the plants Stermitz and his colleagues recently identified which showed promise as medicinal tools are *Lepidium meyenii*, a tuber from the high Peruvian Andes that the Indians recommended as a fertility aid for humans and animals; *Tecoma arequipensis*, the bark of which is used in Inca medicine, mainly for hypoglycemia and diabetes; and *Mussatia hyacinthina*, a tree of the high upper Amazon and Bolivia, whose bark is chewed alone or with coca leaves to fight fatigue. (*Rocky Mountain News Sunday Magazine*, Nov. 6, 1988)

Producer of Ginseng Extract Profiled

Long Island Monthly recently ran a profile of the Long Island-based Institute for Self Development/Wholistic Health Center, which distributes Ginsana, capsules of ginseng (*Panax ginseng*) processed in Switzerland.

Ginsana plans to expand their product line with ginseng soft drinks, candy, sports beverages, and multivitamins. There is talk of a tonic for thoroughbreds, because Ginsana has been shown to improve the recovery time of injured horses.

Mark Blumenthal, editor of *HerbalGram*, was quoted in the article as saying, "The claims Ginsana makes for energy and mental performance are probably valid. There's proof that it builds up the body against non-specific stress, builds up resistance." (*Long Island Monthly*, Oct. 1988)

Garlic May Reduce Bad Cholesterol

Until a few years ago, garlic was recognized only as a "folklore prescription." During the last 15 years more than a thousand scientific papers have been published on the nutritional and medicinal aspects of garlic.

Benjamin Lau, M.D., Ph.D., a professor at Loma Linda University School of Medicine, builds on this previous worldwide research in his own studies to demonstrate that garlic is effective against viruses, bacteria, spirochetes, molds, yeasts, and parasites.

He now has clinical evidence that garlic may reduce the levels of "bad" cholesterol (LDLs) while increasing the levels of "good" cholesterol (HDLs); may be useful in controlling blood pressure; increases blood coagulation time, reduces triglyceride levels, platelet aggregation and plaque on the arterial walls—for overall benefits to cardiovascular health.

(Paul Harvey, *Los Angeles Times Syndicate*, Feb. 1 1989, quoting from Dr. Lau's *Garlic for Health*, published by Lotus Light Publications, Wilmot, WI)

Aromatherapy in *Vogue*

The practice of aromatherapy, the treatment of skin problems through the application—and at times inhalation—of natural plant oils on the face and body, has been going strong in Europe and particularly the Far East for two thousand years. In France, prescribed by doctors, aromatherapy is even covered by health insurance.

In the United States, aromatherapy is becoming accepted—and sought after—as a viable, more soothing alternative to mainstream skin care. Extracts of wild pansies, marigolds, white nettles, sage, horse chestnut, juniper, mint, and ivy are being reevaluated for their soothing, healing, or stimulating properties, and are finding their way into sophisticated skin-care formulas. Chamomile and rosemary are everywhere.

The art of the aromatherapist is to know which oil is best for the skin. The natural oils used for massage are chosen to act either as sedatives or stimulants—and are often personalized for individual clients.

Kurt Schnaubelt, Ph.D., of the Pacific Institute of Aromatherapy, sees aromatherapy as a grassroots movement that has become increasingly popular here during the last five years. Many essential oil suppliers who distill the therapeutic oils note that their aromatherapy business has increased one hundred percent in the last year.

America may not be ready to embrace aromatherapy as a medicine or even as an adjunct to it, but its growing use as a beauty treatment reflects a trend toward natural products. (*Vogue*, March 1989)

(*Ed Note: Although the term "aromatherapy" is usually used in U.S. media as pertaining to skin treatments with essential oils, the term has a broader meaning in Europe. There it means employment of essential oils as remedies in a clinical setting for a variety of conditions or diseases. Thus, in Europe, "aromatherapy" can refer to the judicious internal as well as external use of small quantities of essential oils.*)

Marigold
Calendula officinalis,
from *Handbook of Plant and Floral Ornament,*
Richard G. Hatton, 1960

Organic Herbs Grow in Scenic Setting

Many people have jumped on the organic food and herb bandwagon recently, especially since the Chilean grape scare and the Alar apple revelations. It is nice to know, however, that there are some conscientious farmers who have been growing foods without pesticides and other chemical supports for many years. One such farmer is Lon Johnson, the owner of Trout Lake Farms in Washington, who started growing herbs in 1973 at the foot of snow-peaked Mount Adams. By 1979, according to an article in the *Oregonian* (April 3, 89), Johnson was shipping large quantities of herbs to herb tea manufacturers.

Trout Lake is one of the largest, if not the largest, suppliers of organically grown herbs in the U.S. Johnson and his foreman, David Roche, who holds a masters degree in horticulture and formerly managed a plantation for Lipton Tea in Mexico, now manage over 250 acres, all of it farmed according to strict organic agricultural standards. Additionally, Trout Lake subcontracts to other farmers who grow according to standards set up by an organic growers' organization.

Trout Lake is currently growing peppermint and spearmint, catnip, echinacea, comfrey, lemon thyme, sage, chervil, yellow dock, raspberry leaf, anise hyssop, oats, and alfalfa among other herbs.

Herbalist Keville Featured, but...

California Life magazine, a supplement to the *Sacramento Bee*, featured herbalist Kathi Keville in a three-page spread on herbs and herbalism in its January 21, 1989 issue. The article made little mention of her extensive writing talents (she's been writing articles for *Vegetarian Times* and the predecessor *Well-Being* for over 13 years and is editor of the American Herb Association's *Newsletter*, a 16-page publication that contains a cornucopia of information that *HerbalGram* readers would surely appreciate), but focused instead on her abilities as a formulator of Aromatherapy products. Citing Keville's statement that she has tended to most of her own medical needs over the past 20 years, the article quotes her as saying, "I appreciate what medical science has done, but I'm also a great advocate for herbology. My dream is the two disciplines can meet someday and people can turn to whichever is more appropriate."

An herbal historical footnote from Kathi: "The Pilgrims had dill seeds in the seams of their Bibles," she says, "and would roll them into their hand during long, long church services, then pretend to cough so they could pop them into their mouths. That kept their stomachs from growling." ❐

Recent Canadian HPB Actions

by Rob McCaleb

Canadian "FDA" Ignores Advisory Panel; Bans Many Folk Medicines

Coltsfoot
Tussilago farfara
from, *The Herbal*
John Gerard 1633

The Canadians were off to a great start. The Canadian equivalent of our FDA, the Health Protection Branch (HPB), set up an expert panel to evaluate the regulation of botanicals and make recommendations. Their report, released over two years ago, was heralded as a most promising approach (see *HerbalGram* #9, Spring 1986).

A major industrialized nation was actually considering rational regulation of folk medicines. Realizing that folk medicines will always be used, Canada actually seemed prepared to admit that there is a legimate class of products that lie somewhere between foods and drugs. Yes, many herbs could fall into this category, but so do some other common substances currently regulated as foods. Coffee, tea and prune juice are obvious examples of "foods" that are actually used as "drugs," at least within the functional definition of a drug, which centers on a substance's *intended use*.

The advisory panel suggested that a new category be established for folk drugs, which could be labeled with known physiological effects, along with a disclaimer that the claims are based on cultural, historical and folk information, not necessarily proven by modern laboratory experimentation. This would allow manufacturers of herbal products to label their products with information about known folk uses and physiological effects, without submitting them to the drug approval process. Because botanical folk medicines are low profit and not patentable, they are not serious candidates for formal drug approval.

HPB has decided to play FDA instead. On March 11, 1989, the HPB published two lists of botanicals: one listing botanicals which cannot be sold as food (or food supplements) and one which can be sold only with cautionary labeling. Those on the first list are thus removed from the food category, with no category established to provide any more rational regulatory status—they are essentially banned. Plants on the other list could still be sold as food, but only with this warning: "Caution: Do not consume (common name of plant)-(Latin name) during pregnancy".

The publication of these lists show that botanicals have indeed been singled out for special regulation, but in exactly the opposite direction as common sense and HPB's own experts advise. The newly proposed regulations do not answer the initial question—how to regulate botanicals which are used as folk medicines, but sold as foods without information about their responsible use. HPB is taking the untenable position of trying to outlaw folk medicines. The statements made by HPB to justify their position raise more questions than they answer.

"Certain plants are poisonous if ingested: others are poisonous unless the quantity ingested is carefully controlled." This statement applies equally well to many food plants as well. Ingestion of horseradish, red pepper, salt and coffee should also be "carefully controlled," for exactly the same reason -acute and/or chronic toxicity.

Coffee, tea, and prune juice are obvious examples of "foods" that are actually used as drugs.

"Additionally," says HPB, "the Branch is concerned with the marketing of many herbs and botanical preparations as foods, when in actual fact they are intended to be used and generally are used for medicinal purposes." The same is true of coffee and tea; sold as foods, *promoted and consumed* as stimulant drugs. Prune juice is generally used as a laxative.

The inclusion of plants with small amounts of carcinogens are particularly problematic, since neither Canada nor the United States have reached a rational regulatory stance on natural carcinogens in food. The ban on comfrey leaf is a good example. Comfrey leaf does indeed contain mutagenic alkaloids (so does coffee). According to the classic risk assessment article by Dr. Bruce Ames, a cup of comfrey leaf tea is about as dangerous as a peanut butter sandwich, a third as dangerous as a raw mushroom and a tenth as risky as a beer. Dr. Ames believes that around 99% of known carcinogens are of natural origin. Surveys by Dr. Farnsworth and others have shown that nearly every plant studied contains carcinogens. None of these plants, with the exception

A Word from a Committee Member

by Terry Willard, Ph.D.

"Conflicting scientific claims" Wipes Out Many of the Herbal Formulas Now Sold in Canada.

As a member of the Canadian Expert Advisory Committee on Herbs and Botanical Preparations (H.P.B.), I find the course that the H.P.B. has taken discouraging. Of the four major points we recommended, only one has been acted on. Rather than addressing the reality of a parallel health-care system in Canada, the H.P.B. has simply decided to expand the list of herbs which are considered food adulterants.

In our two-tiered system, we have drugs and foods only. The reason for adding many of these herbs to the food adulterant list is cited as "conflicting scientific claims." The key words here are these herbs "are not to be sold as foods." They have assured us that these substances can still be classified, at a later time, as "drugs." This overlooks the nature of the drug-evaluation process which is geared to pharmaceuticals. They have already made the judgement that there are "conflicting scientific claims," so we can't expect them to be classified as drugs either.

Presently the H.P.B. is not accepting applications for D.I.N. (drug identification numbers) for products with the above botanicals as ingredients, because of "conflicting scientific claims." This, in effect, wipes out many of the formulas that are now sold in Canada.

Another very significant problem is the sheer number of D.I.N. applications that are presently clogging the system. Some distributors have as many as 1,000 D.I.N. applications pending. This is due to both recently proposed price increases of D.I.N. applications and the classification of Chinese Traditional Medicines as "D.I.N.'able" products.

Dong Quai is currently on a list of herbs requiring "pregnancy warning" as a food. But, in reality, the government has stopped its sale as a food, while not accepting D.I.N. application where it is an ingredient. I'm afraid, unfortunately, with the new Minister of H.P.B., what we see with this legislation is just the tip of the iceberg.

With a typical head-in-the-sand attitude, the bureaucrats have not addressed the underlying social problems which form the basis of the herb/drug controversy. This will only send the herbs into the black market, out of the hands of the bigger and more reputable companies and into the hands of less stable groups.

of sassafras, has been "banned." Many plants already analyzed, such as coffee, basil, parsnips, corn, and peanuts, have been found to contain carcinogens.

Now it appears that in Canada, herbs are to be held to a different standard of safety—a higher standard—than other foods. They are to be held to a much tougher standard than drugs, in which some risk is accepted if substantial benefit is present. Make no mistake about it, this is not a consistent move by HPB. There will be no attempt to "ban" mustard powder, which is more acutely toxic than golden seal (*Hydrastis canadensis*), mushrooms or coffee. *Morbidity and Mortality Weekly Report* (published by the Center for Disease Control) rarely reports toxic reactions to herbal products despite increasingly widespread usage, while toxic reactions are common with OTC and prescription drugs. You may still buy and use drugs which regularly produce fatalities, but not golden seal which conceivably could but never has. Plants requiring cautionary labeling are *Angelica polymorpha*, parsley oil, rue and uva ursi. Uva ursi is considered a feeble diuretic, while coffee and tea are potently active in this regard. Yet HPB does not require warnings on caffeinated products. Dong Quai has menstruation- regulating properties according to folklore, but so do many common food plants like papaya fruits, mints, oregano, onions and garlic, asparagus, carrots and grapes. Should these foods too be labeled with pregnancy warnings?

In defense of the HPB, many plants on their toxic list *are* quite toxic, but most of these are not used in food anyway: for example deadly nightshade (*Atropa belladonna*) and *Rauwolfia*, the source of the hypotensive drug reserpine. But others are and have been freely sold for years without incident, like goldenseal and barberry root. HPB began this project over five years ago with the recognition that botanicals needed to be regulated differently than foods. They lost sight of this somewhere, and ended their project with no change in the regulation of foods or drugs, except the attempted outlawing of some botanical folk medicines which are apparently responsibly used.

Here are some highlights of the list of botanicals banned from food use:

Barberry root	*Berberis vulgaris*
Bloodroot	*Sanguinaria canadensis*
Coltsfoot	*Tussilago farfara*
Common comfrey	*Symphytum officinale*
Common wormwood	*Artemisia absinthium*
European mistletoe berries	*Viscum album*
European pennyroyal oil	*Mentha pulegium*
Goldenseal root	*Hydrastis canadensis*
Horse chestnut	*Aesculus hippocastinum*
Lobelia	*Lobelia inflata*
Mountain grape root	*Mahonia aquifolium*
Mugwort	*Artemisia vulgaris*
Prickly comfrey	*Symphytum asperum*
Yohimbe	*Pausinystalia yohimbe*

Revision of Endangered Species Act Increases Protection

by Steven Foster

Tennesse Coneflower
Echinacea tennesseensis,
from *Echniacea Exalted* (3rd ed.),
Steven Foster, 1989 (in edit).
Illustration © 1989 Judith Ann Griffith

In 1973, the issue of endangered species was officially recognized as public policy by the passage of the Endangered Species Act, which stated, "...various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation..."

It further noted that other species "...have been so depleted in numbers that they are in danger of, or threatened with extinction."

Under the provisions of the Act, endangered species were given only limited protection, prohibiting spending of Federal funds on any project that would do harm to an endangered species, and providing very little, or virtually no protection on private lands.

In late 1988, the 100th Congress passed new amendments to the Endangered Species Act, increasing protection in several ways. Amendments were hotly debated. One addition which would have made it illegal for anyone to harvest an endangered species in any fashion was watered down to protect the innocent wild flower lover who stopped by the side of the road to pick an endangered wild flower, protecting this person from the mean Fish and Wildlife Agent lurking in the bushes, rather than the endangered species. The concern here was that unknowing persons might pick a flower and then be attacked with heavy fines, so language was worked in the bill which required proof that the endangered species was knowingly extirpated by an offending party.

Now protections are extended to private lands, if ambiguously. Section 9A 2 B is amended to read, "...to remove or reduce to possession any such species from areas under Federal jurisdiction or maliciously damage or destroy any such species on any such area, or remove, cut, dig up, damage or destroy any such species on any other area in knowing violation of any law of any state or regulation, or in the course of any violation of a state criminal trespass law."

Basically, violation of the endangered species law as it applies to private land is tied to state laws on endangered species or criminal trespass. Unfortunately, many states have no laws protecting endangered species. The burden of proof further lies in developing evidence that the violator knowingly broke the law. In practical terms, it affords little protection to endangered species, but rather protects the innocence of the naive flower lover who happens by accident to pick an endangered flower at a roadside rest stop.

The definition of "person" in reference to offending persons, has been expanded to include municipalities and other political entities. This grew out of a case in which a California municipality planned to build a baseball park in an area where an endangered butterfly occurred. The municipality argued that it was not included under the definition of "person'" under provisions of previous versions of the act, thus exempt from its provisions.

Civil penalties for violating certain parts of the act were raised from $10,000 to $25,000. Fines for criminal violations, including illegal trade of endangered species, were raised in

one category from $20,000 to $50,000 and in another from $10,000 to $25,000.

At the last minute an amendment was added that required the Fish and Wildlife Service to submit an annual report on a species-by-species basis for any program that receives federal funding for recovery of an endangered species. This would include state agencies receiving Federal funding for endangered species recovery.

The 3,000 plants and animals that are endangered or under review for such status, must be monitored and reviewed on a regular basis and a finding made as to the status of the species by the Director of the Fish and Wildlife Service on an annual basis. One frustrated Fish and Wildlife official with whom I spoke thought this would create great problems for the agency, since they didn't even know where many of the species occurred. While the Congress had good intentions here, they added a heavy burden onto the agency without providing the necessary funding and workforce to accomplish the task adequately.

In earlier versions "Secretary" was defined as Secretary of the Interior under whose jurisdiction the Fish and Wildlife Service falls. In the amended Act the definition of "Secretary" is broadened to include all Federal departments which have any jurisdiction over any part of the Act. This would include the Secretary of Commerce and the Secretary of Agriculture whose agency regulates exports and imports of endangered plants and wildlife under the provision of the CITES treaty (Convention of International Trade in Endangered Species). The U.S. is one of more than sixty signatory nations to the treaty. Ginseng exports are regulated under the provisions of that treaty.

These are just a few of the major changes in the updated Endangered Species Act finally passed by the 100th Congress after four years of debate. In essence it gives increased protection to rare plants and hastens the evaluation and restoration process for endangered animals. The Act will likely result in more state laws regulating endangered species. ❐ *(Ed note: We will have another article on this topic in a future issue of* HerbalGram *listing the numerous plant species affected.)*

Native Plants/Ecosystems in Peril

Hundreds of native American plant species could vanish in the next five years, according to a survey completed in 1988 by the Center for Plant Conservation, a Boston-based private foundation. The survey of botanical experts around the country found that 253 species of trees, shrubs, grasses, and other plants face a real risk of extinction within five years. If nothing is done to control present development patterns, 427 other species could disappear by the end of the century. Plants, often perceived by the public as second-class citizens of endangered species, generally receive less attention than animals in conservation programs. Experts are increasingly concerned because of the vital new role that genes from wild plant species are playing in genetic experiments to improve crops and horticultural plants. Says Dr. Bruce McBryde, a botanist for the Interior Department's Fish and Wildlife Service, "Plants are important for economic, medicinal, and economic reasons but the public generally doesn't even know they exist much less their value." (*The New York Times*, Dec. 6, 1988)

Endangered Ecosystems Act Proposed to Congress

Each month the U.S. Fish and Wildlife Service adds about four plants and animals to their Endangered Species List, with thousands more as potential candidates. The Biological Diversity, Conservation and Environmental Research Act was approved last year in subcommittee but Congress recessed before a vote in the House of Representatives. The act would make the preservation of biological diversity a federal policy and establish a research/information/support center. The bill would recognize the value of undisturbed ecosystems such as wetlands and old growth forests. The act was reauthorized last fall but more opposition is expected from oil, timber, and gas companies who were trying to block the Endangered Species Act in an effort to open more land for development. (*Organic Gardening*, March 1989)

Plants, often perceived by the public as second-class citizens of endangered species, generally receive less attention than animals in conservation programs.

Rare Plant Conservation Subject of Conference

Conservation biology, strategies for conserving rare plant species, is an area of science that is rapidly evolving. Scientists from the U.S., Canada, and Australia attended a conference on the conservation and management of endangered plants held at the Missouri Botanical Gardens in March. The participants ultimately hope to develop a genetic definition of biological diversity, seeking to preserve as completely as possible the variation of plant life found in nature. That preservation is expected to include a combination of techniques, among which are management of natural habitats or on-site conservation, and off-site techniques such as cultivation at botanical gardens or seed banking. ❐

Saving The Plants

SECTION I

The International Union of Biological Sciences (IUBS) and International Society for Horticultural Science (ISHS) have established a working group to concentrate on preservation and exploitation of medicinal and aromatic plants. The group met in March 1988 in Berlin. The meeting culminated in the passage of a resolution concerning conservation activities calling for international cooperation and a three-stage program with the following goals:

Short-term action (5-6 months) to select 20-25 endangered model species from different ecological regions. The regions are Africa, Asia, Australia, North, Central and South America, Europe, and Madagascar.

Medium-term action (1 year) to complete a working plan establishing a provisional model for preservation, to select plants and the methods for preservation.

Long-term action (3 years) to widen international efforts and determine directions and opportunities for medicinal and aromatic plant preservation between now and the year 2000.

(*Newsletter of Medicinal and Aromatic Plants* (No. 1, 1988))

SECTION II.

At the First International Ethnobiology Conference held in Belem, Brazil, in July 1988, this same discussion resulted in the following resolution:

DECLARATION OF BELEM

Leading anthropologists, biologists, chemists, sociologists, and representatives of several indigenous populations met in Belem, Brazil to discuss common concerns at the First International Congress of Ethnobiology and to found the International Society of Ethnobiology. Major concerns outlined by conference contributors were the study of the ways that indigenous and peasant populations uniquely perceive, utilize, and manage their natural resources and the development of programs that will guarantee the preservation of vital biological and cultural diversity. This declaration was articulated:

As ethnobiologists, we are alarmed that:

SINCE

- tropical forests and other fragile ecosystems are disappearing;
- many species, both plant and animal, are threatened with extinction;
- indigenous cultures around the world are being disrupted and destroyed;

and GIVEN

- that economic, agricultural, and health conditions of people are dependent on these resources;
- that native peoples have been stewards of 99% of the world's genetic resources; and
- that there is an inextricable link between cultural and biological diversity;

We, members of the International Society of Ethnobiology, strongly urge action as follows:

1) henceforth, a substantial proportion of development aid be devoted to efforts aimed at ethnobiological inventory, conservation, and management programs;
2) mechanisms be established by which indigenous specialists are recognized as proper authorities and are consulted in all programs affecting them, their resources, and their environments;
3) all other inalienable human rights be recognized and guaranteed, including linguistic identity;
4) procedures be developed to compensate native peoples for the utilization of their knowledge and their biological resources;
5) educational programs be implemented to alert the global community to the value of ethnobiological knowledge for human well-being;
6) all medical programs include the recognition of and respect for traditional healers and the incorporation of traditional health practices that enhance the health status of these populations;
7) ethnobiologists make available the results of their research to the native peoples with whom they have worked, especially including dissemination in the native language;
8) exchange of information be promoted among indigenous and peasant peoples regarding conservation, management, and sustained utilization of resources.

SECTION III.

The Herb Research Foundation, the American Botanical Council, the American Herbal Products Association and the International Herb Growers and Marketers Association offer their full cooperation and support of activities to protect medicinal, aromatic and other economic plants from depletion due to overcollection, the destruction of rain forests and other habitats, or any other development pressures. These groups are in contact with international organizations and will assist in any way they can, including outright bans on collection of endangered species. As *HerbalGram* readers are aware, these organizations have already moved to cease the collection of wild Lady's slipper roots (*Cypripedium* spp.) from the Eastern U.S. forests. ❐

Market Report on Herbs and Spices

by Peter Landes and Mark Blumenthal

The late winter/early spring quarter, a traditionally slow and featureless one in these markets, proved true to tradition with a few exceptions.

Spices: The big news here is that the Indonesian Cassia Marketing Board is fully in control of this important commodity, setting prices, allocating quantities and shippers, and wreaking general havoc in this market. They hold an "auction" every 2-3 months, importers "bid" for certain quantities of whatever grades they feel they need and the marketing board then allocates them a percentage of that quantity and assigns a shipper (sometimes a very inferior one that the importer has been avoiding for years) to the contract. Prices have spiralled upward 15-20 cents per pound at every auction and still bids received have been 3-4 times quantities allocated. In the most recent auction 3,000 tons were slated for sale and bids totalled 14,000 tons. This system has sent importers to alternate sources for **Cassia**, mainly China, which cannot supply enough quantity for the American market at the moment. But **Cassia** is a hardy tree, practically immune to disease, and needs only to be harvested. The market will adjust with blends of **Indonesian/Chinese Cassias**. Naturally, the Chinese varieties are not interchangeable with the Indonesian, but U.S. grinders have become skillful in blending to bend with market disruptions like this one. Unfortunately (or fortunately, depending on one's market position), higher prices are definitely in the offing. **Cassia Bark** is sold under the name **Cinnamon** in the U.S., although it is not really the same plant. **Cassia** is one of several species of Cinnamon. **Black Pepper** has had a nice run-up and now remains fairly steady to lower, with a large Indonesian crop in July/August to be marketed before the Brazilian crop comes on in the fall. Prices are attractive. **White Pepper**, historically $500-$1,000 a ton more expensive than Black, is now available at almost the same price. **Cloves** remain available and cheap—coverage should be extended. Reports from the Mediterranean region indicate a drought may affect the **Oregano** crop; current crop is available now at very low levels, too low, in fact, to make it worthwhile to harvest. Prices should increase. **Chillies** are once again available, albeit at very high prices; the huge Indian crop saved this market from extreme shortage.

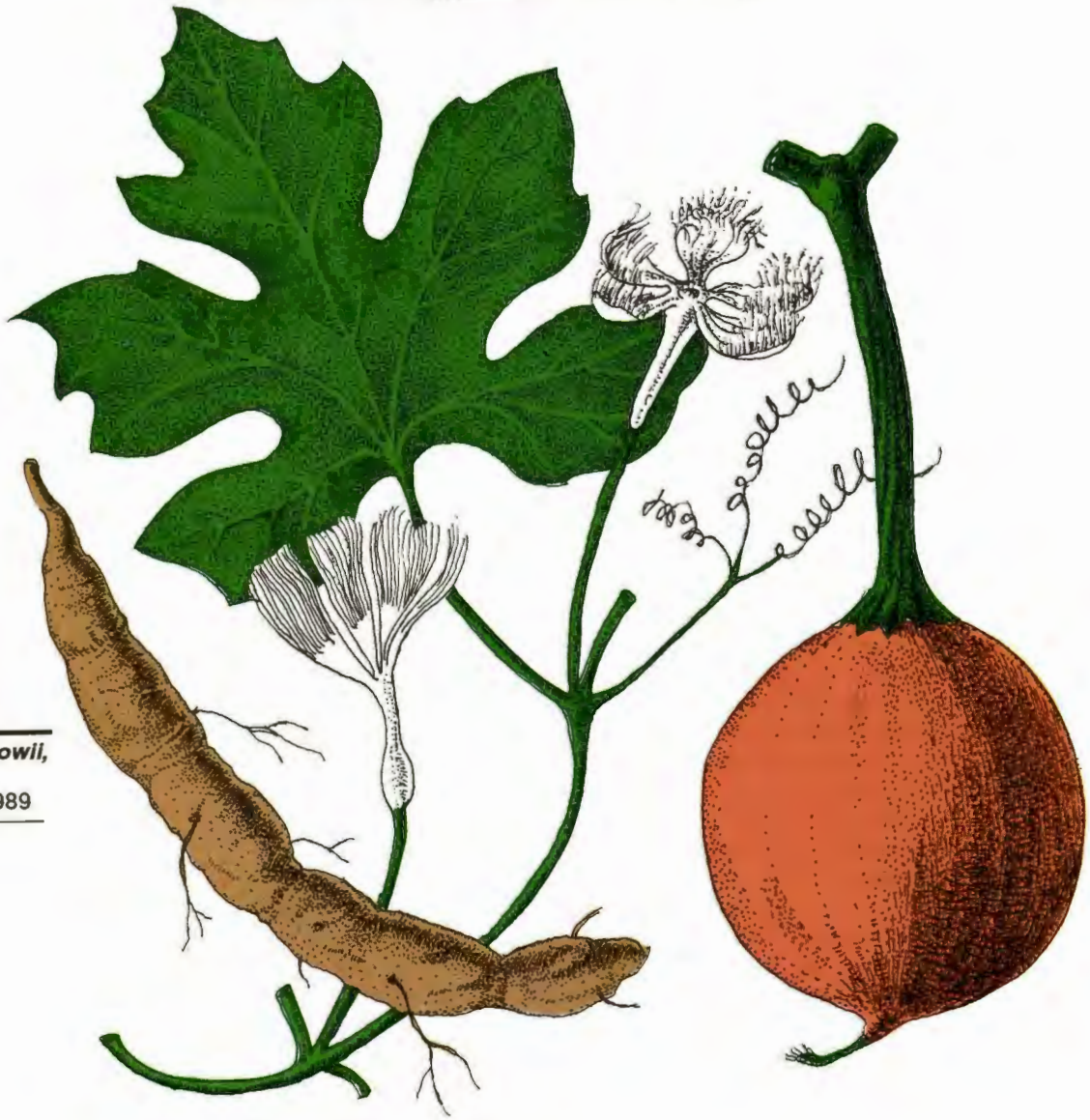
Botanicals: This market remains strange and disorganized with users struggling to cover requirements from an almost-empty and fragmented market. This "hand-to-mouth" buying pattern makes for a very inefficient market mechanism and correspondingly inefficient high prices and low availabilities. Special attention should be paid to roots like **Dandelion**, **Althaea** (Marshmallow), etc., which have featured poor crops the last few years. This year's fall buying season will be critical since stocks and pipelines are empty. Pay attention now or scramble for *very* limited supplies later.

Globe Amaranth
Gomphrena globosa,
from *The Illustrated Dictionary of Gardening*,
George Nicholson,
ca 1888.

Potpourri Ingredients: Traditionally low demand in the late winter/early spring quarter has lulled many manufacturers into ignoring their coming needs. With importers' warehouses well-stuffed with these items currently, there are many bargains available now. This situation certainly will not last as demand picks up in the later spring and summer. Price competition among suppliers is intense and many of these quality-sensitive items are being traded like commodities (which they certainly are not, with few exceptions like the almost-uniformly good **Globe Amaranth** from Thailand). We feel the market is going through a maturation period with attendant quality problems soon to rear their ugly flower heads as dealers compete to bring in lower and lower priced goods. Some ingredients remain genuine bargains: the above-mentioned **Globe Amaranth** is a good example. Others include **Calendula, Kesu Flowers, and Hibiscus** (though prices are higher now than the unsupportable lows of last summer and fall). **Orange Peel** should be covered now since crops are almost at an end. Reasonably good quality **Indian Pink Rosebuds/Petals** are coming on strong and cheap; the Pakistani spring **Red Rose** crop is in full swing with bargains readily available. ❐

Tricosanthes kirilowii: A new hope in the AIDS-relief search?

by James A. Duke, Ph.D. and Steven Foster



Tricosanthes kirilowii, by Ira Kennedy, for *HerbalGram,* 1989

Summary: Tricosanthes kirilowii, *a Chinese member of the gourd family (Curcubitaceae) has been of great interest recently since publication of a study by M. McGrath* et al., *in the April 13, 1989, issue of the Proceedings of the National Academy of Science. A highly purified protein from the root, trichosanthin, may be promising as a treatment in HIV-infected individuals. Phase I human studies have been approved by the FDA and are underway. A use method of inhibiting HIV in human immune cells, and a unique assay of HIV in human cells has been patented by McGrath et al. The root of T. kirilowii, Tian-hua-fen, is a traditional Chinese drug with over 2,000 years of documented use. In recent years injectable forms of trichosanthin have been used clinically in China as an abortifacient and treatment in diabetes, but with undesirable side effects. We review the botany, history, uses, adulterants, toxicity, and current popular and scientific interest in the plant.*

In March of 1989, Duke got a call from a friend in New York, a guerilla warrior against AIDS. He said that they had been using two Chinese species of the gourd family in underground AIDS treatments. Duke suggested to his friend that both probably contained cucurbitacins, very active triterpenoid compounds in the Cucurbitaceae or gourd family. That might be why the "mole" called the active compound "Q."

April 7, Duke was called by the National Institute of Health (NIH), and April 10, by *Newsweek* , all asking, "What is compound Q?" Duke gave them roughly the same story he gave his "mole" in New York.

A few days later the media blitz began, all resulting from a research paper by Dr. Michael McGrath and fourteen co-authors, "GLQ223: An inhibitor of human immunodeficiency virus replication in acutely and chronically infected cells of lymphocyte and mononuclear phagocyte lineage," published in the April 13th issue of the *Proceedings of the National Academy of Science*. Here the ubiquitous "Compound Q" (GLQ223) was revealed to be "a highly purified, formulated preparation of trichosanthin," a protein derived from the root of *Trichosanthes kirilowii* , a traditional Chinese drug. A flurry of national print and television news reports followed.

We were delighted when the news blitz of mid to late April suggested "Chinese cucumber root" as the source of the activity, effectively throwing up a smokescreen which might divert overeager beavers away from *Trichosanthes* until USDA had obtained reliable germ plasm. One caller asked Duke how to corner the market on Chinese cucumber.

Some books call *Trichosanthes kirilowii* Maxim. the Chinese Snake-gourd; in Traditional Chinese Medicine the fruit is the major drug from the plant, called Gua-lou. Second in importance is the root, known in pinyin as Tian-hua-fen. Both are listed as "official" drugs in Volume 1 of the *Pharmacopeia of the People's Republic of China* (1985), as are the seeds (Gua-lou-zi) and the fruit peel (Gua-lou-pi). In addition, the stems and leaves have been used in Chinese folk medicine. Duke first heard about the use of the root as an abortifacient when he was in China in 1981. He heard that the root of *Trichosanthes kirilowii* , like the fruit of *Momordica charantia* L. (ku-gua), were used in prescriptions to treat diabetes, especially relieving thirst which often accompanies the disease.

One caller asked Duke how to corner the market on Chinese cucumber.

The toxic fresh root of *T. kirilowii* has centuries of folk acclaim as an abortifacient. Its juice was expressed onto a sponge which was inserted into the vagina during the second trimester of pregnancy. The protein, trichosanthin, is responsible for the abortifacient activity, and has been used for killing the fetus in ectopic pregnancy. That protein inhibits choriocarcinomata and invasive moles. Though the roots are one of the most frequent antidiabetic drugs in China, the decoction or extract proved hyperglycemic in experimental rabbits.

Tian-hua-fen is first mentioned in the 2,000 year old classic, Shen Nong Ben Cao Jing. Shen-nong classifies drugs in three groupings according to priority of importance. Tian-hua-fen was placed in the middle class.

In Traditional Chinese Medicine (TCM), Tian-hua-fen is considered somewhat bitter, somewhat sweet, and cool. Its "functions" include: promoting the production of body fluids, treating "dryness syndrome by reducing fire-heat," allaying pus, and reducing swelling. It is used in compound prescriptions for thirst due to fever diseases, dry cough due to lung heat, mastitis, and sores with swelling. The usual dose is 9-12 g., when used in combination with other drugs that mitigate the toxicity of Tian-hua-fen. Modern Chinese clinical reports on usage include diabetes and use as an abortifacient in crude form and in the form of an injectable drug. It is, of course, contraindicated during pregnancy. (Lou, Z.C., P.G. Xiao, and G.J. Xu (eds.) 1980).

Among 52 Chinese prescriptions for curing "excessive thirst," 23 contain *Trichosanthes*. The roots are considered antibiotic, antipyretic, expectorant, laxative, sialogogue, and suppurative, and are also used in decoction for abscesses, boils, bronchitis, congestion, constipation, diabetes, dysuria, fever, jaundice, laryngitis, mastitis, mumps, and piles. A starch extracted from the roots is used for abscesses, amenorrhea, jaundice and polyuria (Duke and Ayensu, 1985).

National Cancer Institute's Jonathan Hartwell, *Plants Used Against Cancer* (1982,) notes that qua-lau from Vietnam (*T. multiloba* Miq.) is in the Sino-Vietnamese pharmacopeia as a powder for tumors, and that it is used for carcinomatous sores in China. Hartwell notes that the *T. kirilowii* roots and seed, powdered, or perhaps taken with wine, were used for breast or mammary cancers, from the Ming Dynasty (1368-1644) to populist mainland China in 1967. So we have at least three centuries of Chinese usage for cancer (Hartwell, 1982).

Tian-hua-fen, the root of *T. kirilowii*, is a very commonly used traditional drug in China. *T. kirilowii* is indigenous to the northern and east-central Chinese provinces of Hebei, Henan, Shandong, Shanxi, Jiangsu, Anhui, Zhejiang, Shaanxi, and Gansu. *T. japonica* Regel and *T. rosthornii* Harms (*T. uniflora* Hao) are used in China as substitutes for *T. kirilowii*. *T. japonica* is found in Anhui, Jiangxi, Zhejiang, Hubei, Hunan, Guangxi, and Guangdong. *T. rosthornii* is distributed in Hubei, Hunan, Gansu, Guangxi, Yunnan, Guizhou, and Sichuan (Lou, Z.C., P.G. Xiao, and G.J. Xu (ed.) 1980). The *Pharmacopeia of the People's Republic of China* (1985) recognizes *T. kirilowii* and *T. japonica*

See Tricosanthes, page 25

Castor bean
Ricinus communis,
from *Materia Medica and Pharmacology*,
Culbreth, 1927

New Strategy Against AIDS: Castor Bean Compound

Bear with me, as this is big news, but highly technical. Researchers Till *et al.* from U. of Texas and Genentech, Inc., have presented a fascinating approach to AIDS therapy. The scientists report on an experimental method using the toxic "A" chain of the toxin ricin from the castor bean (*Ricinus communis*).

The ricin fragment—called dgA—is combined (conjugated) with an antibody to a specific protein in infected T cells (recombinant soluble CD4: rCD4). This protein is found only in infected cells, and the toxin is released only when the antibody portion of the conjugate finds infected cells. In binding to the rCD4 site, the toxin is freed, and prevents the virus from reproducing by inhibiting DNA synthesis. The level of inhibition is over 90%. In contrast, the toxicity of the rCD4-ricin conjugate is 1/1000 of this level for normal, uninfected cells. The understated conclusion of the authors: "Hence, the toxicity of rCD4-dgA is specific...If infected cells from HIV-positive individuals can also be killed by rCD4-dgA, it might be possible to prevent or delay the onset of clinical disease.

"The effective application of such a therapeutic strategy, however, must take into account the mode of latent HIV infection and the factors contributing to viral activation." Needless to say, this is preliminary and very high tech. Castor beans are very toxic, and in crude form are of no use in AIDS treatment. (*Science*, 242, 25 Nov. 88, 1166-8.)

NCI Upgrades Natural Products Research

Washington Insight (2/13/89) reports major revisions to the National Cancer Institute's Natural Products Drug Discovery Program, which could have important implications for natural products research in the U.S. The new program will feature two components: 1) natural products cooperative drug discovery groups and 2) the Frederick Cancer Research Facility.

According to Associate Director Michael Boyd, "the functions of the natural products branch have changed. It will now focus on the Contract Collaborator Program at FCRF and will participate more intimately in the overall management of the Drug Discovery Program which permeates many branches." NCI was authorized this year to fill 33 new positions, half for the AIDS program and half for the Natural Products Drug Discovery Program.

NCI is seeking natural products chemists to fill some of these positions. *Washington Insight* summarizes, "Boyd envisions that FCRF with its intramural researchers, enormous repository of extracts and compounds, and contract support program will become a center of excellence in drug discovery."

Hypericin Update

A brief report in *AIDS Treatment News*, 72, 1/13/89, p.4, provides a follow-up on the report in our last issue (*HerbalGram* 18-19) about hypericin, the antiviral compound in St. John's Wort, *Hypericum perforatum*. It is reproduced here in its entirety:

> "So far, we have received only one report of human use for AIDS/HIV, from a physician who has five patients who are using 'Hyperforat' (a high-strength, standardized St. John's Wort extract available in Germany), with good to excellent results. It is generally believed that most of the St. John's Wort preparations available in the U.S. are worthless, because they do not contain enough hypericin, the active ingredient. Laboratory testing is now going on to see if any of the U.S. preparations appear likely to be useful."

More Detail on *Castanospermum*

The Moreton Bay chestnut (*Castanospermum australe*) contains the alkaloid castanospermine reported in *HerbalGram* 17 to inhibit replication of the human immunodeficiency virus, HIV.

This alkaloid also is an intensely active feeding deterrent and toxin to some insects, inhibits root growth in some plants, reduces tumor growth, and alters carbohydrate metabolism in rats.

A recent article by USDA's R. Molyneux provides details of the structure of another alkaloid, australine, in the same plant. This is a pyrrolizidine alkaloid. (Toxic alkaloids found in comfrey, coltsfoot and borage are of this type.)

Australine, like castanospermine, is a glucosidase inhibitor, the very effect which inhibits HIV replication. This structure-elucidation article does not discuss research on pharmacological effect. (*J. Natural Products*, 51(6), 11-12/88, 1198-1206.)

Kyoto Pharmaceutical University:

Antiulcer Effect of Ginger Studied

Ginger has become one of the most respected of "stomachic" medicines, in widespread use to prevent motion sickness and treat morning sickness. Research at Kyoto Pharmaceutical U. has already confirmed antiulcer effects of *Panax japonica* (Japanese ginseng) and magnolia bark, against hydrochloric acid/alcohol induced ulcers. Using this same test, acetone and 50% methanol extracts of ginger (*Zingiber officinale*) were shown to inhibit gastric ulceration by 97.5% and 91.1% respectively. No single fraction was as effective as the acetone extract. Although the authors suggest that the terpenoids in ginger are likely the most active components, zingiberene, the chief terpenoid in the acetone extract, was only 54% effective against ulceration. What this all means, of course, is that we still don't know what makes it work, but the effectiveness of ginger in treating a variety of stomach complaints is being amply demonstrated. (*J. Ethnopharmacology*, 23 (2,3) Jul./Aug. 1988, 299-304.)

Ginger
Zingiberis officinale, from *The Herbal*, John Gerard, 1633

Passion Flower Sedativity Indicated

Passion flower vine (*Passiflora incarnata*) has a long history of medicinal use as a sedative, both in folk medicine and as a recognized pharmaceutical agent. Active principles in *Passiflora incarnata* have not been identified. Speroni and Minghetti of the Universita di Bologna, Italy, tested various fractions chemically and pharmacologically in search of active products. *P. incarnata* showed anticonvulsant effect, increased sleeping time and decreased locomotor activity, all indicators of "complex activity on the CNS."

The most active sedative component is apparently a glycoside, but not a flavonoid nor an alkaloid, as was previously thought. (*Planta Medica*, 54 (6), 12/88, 488-91.)

Holy Basil! More Immunostimulants!

"Holy basil," *Ocimum sanctum*, has been used medicinally by at least four cultures, and is revered in India as a sacred plant. Over the ages, the leaves of the plant have been used as an expectorant, diaphoretic, anti-emetic, anticancer, anthelmintic (dispelling intestinal parasites), antiseptic, analgesic and as a tonic.

Without scientific evidence to support its purported activities, *Ocimum sanctum* has sometimes been regarded as an adaptogen, operating by increasing non-specific resistance.

Last year, researchers at Sardar Patel Medical College in Rajasthan, India, examined immunoregulatory effects of this plant. The study showed that extracts of *Ocimum sanctum* increased the titre (concentration) of antibodies produced by treated rats against sheep erythrocytes and typhoid H antigen. A methanol extract was more effective than aqueous suspension, with doses of 100, 250 and 500 mg/kg doses producing a 131, 168 and 20% increase in immune response.

Note that the highest dose tested was much *less* effective than the two lower doses. "The observed immunostimulation may account for the adaptogenic action of *Ocimum sanctum* whereby its use increases the physical endurance and body resistance of experimental animals subjected to stress and disease." (Godhwani *et al.*, *J. Ethnopharmacology*, 24, 1988, 193-8.)

Antitumor Properties of Chlorella

A rivalry has raged within the natural foods industry between proponents of the blue-green algae *Spirulina* and the green algae *Chlorella*. Our last issue of *HerbalGram* (18/19) covered two recent studies on *Spirulina*. Recent research on *Chlorella* has shown it to possess powerful anti-tumor properties. Oral administration of autoclaved *Chlorella* cells protected 73-80% of mice against two types of tumors. All controls and those given protein-free *Chlorella* extract died. The activity of *Chlorella* was shown to be immunostimulant rather than cytotoxic (killing tumor cells), since the algae were inactive if given after tumor cells had been implanted. Even more interesting is the finding that surviving animals could be rechallenged with the same tumor cells later and maintained their immunity without retreatment with *Chlorella*. Thus, it appears that *Chlorella* can be an effective cancer-preventing agent, at least for mice against the two tumor systems tested. (Miyazawa *et al.*, *J. Ethnopharmacology*, 24, 1988, 135-46.)

Horsetail
Equisetum arvense,
from *Common Weeds of the United States*,
U. S. Department of Agriculture, 1970.

Natural Pest Control in China

Organic farmers and gardeners should find this interesting. Dr. R. Z. Yang of the South China Botany Institute and Dr. C. S. Tang from U. of Hawaii have published an article on plants used for pest control in China listing 267 plants, the parts used, preparation and target insects. This is a review article, and most of the original work was done in the 1950s. There are some familiar plants on the list. *Ginkgo biloba* leaf and shell are used against aphids, grubs and *Pieris*; horsetail (*Equisetum arvense*) against *Pieris*; *Agave* against borers, leafhoppers, grubs and mosquito larvae; senna (*Cassia occidentalis*) against insects in general; *Artemisia annua* against aphids, mites, rice borers, mosquitos, flies, fungal spores and others. Plants are classified alphabetically by family and three are reviewed in detail. (*Economic Botany*, 42, 1988, 376-406.)

Hypoglycemic Iraqi Folk Medicine

The validity of another folk medicine was demonstrated by Twaij and Ammar (Baghdad) in a report in *J. Ethnopharmacology*, 24, 1988, 123-6. A hot water decoction of leaves and branchlets of *Artemisia herba-alba* is a popular Iraqi folk medicine for the treatment of diabetes mellitus. A cold water extract of the plant was tested on normal and diabetic (alloxan-induced) rabbits, significantly reducing blood sugar in both groups. The effect was stronger on normal rabbits (33.7% reduction) than diabetic (22.7%). The dosage used in the test was 0.39 grams of extract per kg of body weight, equivalent to 2.3 g of dried plant per kg. The toxic dose was ten times higher.

Garlic Fights *Candida* and Cancer

Garlic (*Allium sativum*) inhibits *Candida* by damaging the structure and integrity of the yeast cell wall, according to research presented in *J. Gen. Microbiol.* 134(11), 1988, 2917-24. An aged garlic extract was effective against 6 strains of yeast at concentrations of 0.8 - 1.6 mg/ml. In the cancer research article (*Cancer Research*, 48(23), 1988, 6872-5), Diallyl sulfide (DAS) was shown to totally inhibit the induction of esophageal cancer by nitrosamines. Nitrosamines are among the most potent carcinogens, especially in esophageal cancer. The DAS also reduced metabolism of the nitrosamine by the liver; a unique anticarcinogenic activity. "It strongly suppresses the tumorigenic effects of potent, metabolically activated monoalkylating carcinogens in the gastrointestinal tract."

Tropical Medicine from Guava Leaves

Several times *HerbalGram* has noted the medicinal effects of guava leaves. The leaves of the guava tree, *Psidium guajava*, are used in over a dozen tropical cultures to treat gastroenteritis, diarrhea and dysentery. Natives of Ghana, Malaysia, Guatemala, Colombia, the Bahamas, Mexico, Costa Rica, Fiji, Thailand, China and many other countries independently discovered guava's powerful medicinal effect against some of the most common of tropical diseases.

It has been speculated that the leaves may have both antibacterial activity and a tranquilizing effect on intestinal smooth muscle. Lutterodt and Maleque of the Malaysian School of Medical Sciences determined that oral or injected guava leaf extract depressed locomotor activity. The activity is apparently due to a flavonoid glycoside derived from quercetin. The pharmacological effects are described as "typical narcotic-like effects," the first time such effects have been attributed to a flavonoid. (*J. Ethnopharmacology*, 24, 1988, 219-31.) ❐

Tricosanthes, *continued from page 21*

as source plants of Tian-hua-fen. *T. rosthornii* was not recognized because its effects are considered inferior to the former two species (C.H. Yueh, personal communication, 1987).

Several other members of the Cucurbitaceae are used locally as substitutes or adulterants in south China. *T. damaioshanensis* C.Y. Cheng et C.H. Yueh, is used in some areas of Guangdong and Guangxi, as is *T. sinopunctata* C.Y. Cheng et C. H. Yueh. *Melothria heterophylla* (Lour.) Cogn. is used as a substitute for Tian-hua-fen in Fujian, Guangdong, Guangxi, Guizhou and Yunnan.

Several species are considered adulterants (rather than substitutes) and are known to cause side effects such as nausea and headaches. Perhaps some of these are responsible for disquieting side effects attributed to *T. kirilowii* by some American AIDS patients who have gone to China seeking the drug. These species include *T. hupehensis* C.Y. Cheng et CH Yueh, *T. cavaleriei* Levl., *Momordica cochinchinensis* (Lour.) Spreng., and *Cynanchum auriculatum* Royle et Wight. (Lou, Z.C., P.G. Xiao, and G.J. Xu (ed.), 1980). In addition, *T. cucumeroides* (Ser.) Maxim., which produces a separate drug, has a Chinese pronunciation very similar to that for *T. kirilowii* and is distinguished by China's pharmacists based on the written Chinese character (C.H. Yueh personal communication, 1987).

A pharmacognosist with the Institute of Chinese Materia Medica, Academy of Traditional Medicine, C.H. Yueh has specialized in the botany, histology, and morphology of Chinese *Trichosanthes* species since 1956. When he began his studies, five species were recognized by Chinese botanists. Through extensive field collections in 28 provinces of China, review of herbarium collections in China, the U.S. and England, C.H. Yueh and C.Y. Cheng now recognize over 40 species of Chinese *Trichosanthes*. Extensive laboratory work has also resulted in the development of macroscopic and microscopic methods for the identification of the crude drug and its adulterants (C.H. Yueh, *et al.*, 1974, 1980, 1982, 1985, 1986, 1987).

Trichosanthin, the protein extracted from the root, appears to be a dangerous sensitizing agent. According to Bingel and Fong (1988) there are two trichosanthins, alpha-trichosanthin, a polypeptide from *T. kirilowii*, and beta-trichosanthin from *T. cucumeroides*. Alpha-trichosanthin (presumably the same as "compound Q") has been administered intramuscularly or extra-amniotically to induce first-trimester abortion but only in conjunction with other medications, e.g., testosterone, propionate, and reserpine. Alpha-momorcharin (from *Momordica*) impaired implantation and further development of embryos when given i.p. Any of these proteins might be dangerous when administered by injection. Subacute LD_{50} toxicity studies in mice produced deaths in 10 days. Intravenous injection of the freeze-dried root extract had an LD_{50} of 2.26 mg./animal, and crystalline trichosanthin proved highly lethal at an LD_{50} of 0.236 mg./animal (Chang & But, 1986). The most complete review of the pharmacology of Tian-hua-fen in English is that of Chang and But (1986). It reports on the chemistry, plus abortifacient, anti-early pregnancy, antineoplastic, antibacterial, anti-diabetic, and antibacterial activity. The review also includes pharmacokinetics, toxicity, clinical studies, and an extensive list of references.

The patent...includes a method of inhibiting HIV antigens in human blood cells with the proteins trichosanthin or momorcharin...

Granted that trichosanthin can be an effective abortifacient in humans the first time around, Norman Farnsworth (personal communication, 1989) warns that those who are aborted with trichosanthin in China must henceforth wear a permanent bracelet warning doctors of possible fatal allergy (anaphylactic shock) to a second injection of trichosanthin. Sensitization of trichosanthin exposure is said to last from 10 to 14 years.

Chang and But (1986) report that other severe reactions have included acute pulmonary edema, brain edema, hemorrhage of brain tissue and myocardial damage. They conclude that because of severe side effects and antigenicity, there is a trend toward abandoning or minimizing the use of trichosanthin in clinical situations except for trials in the treatment of trophoblastoma.

In January, McGrath *et al* ., received U.S. patent #4,795,739 for the use of trichosanthin and momorcharin in experimental HIV therapies. The patent is assigned to the Regents of the University of California and Genelabs, Inc. It includes a method of inhibiting HIV antigens in human blood cells with the proteins trichosanthin or momorcharin, as well as a method of screening drug agents in HI- infected humans. Dr. Michael S. McGrath, M.D., Ph.D., the chief researcher, is an associate professor of medicine at the University of California, San Francisco (UCSF), and director of the AIDS/Immunobiology Research Laboratory at San Francisco General Hospital (SFGH), a UCSF affiliate. The research was jointly conducted by USCF/SFGH scientists; Divisions of Cellular Immunology and Medicinal Biochemistry of Genelabs, Inc. (a Redwood City, California-based, biotechnology firm focusing on the development of novel antiviral agents and immune modulators), and the Department of Biochemistry and Chinese Medicinal Materials Research Center, Chinese University of Hong Kong. The new drug was called "GLQ223," which apparently contains a highly purified form of the protein, trichosanthin, as the primary active component.

See Tricosanthes, page 47

Feverfew

Tanacetum parthenium

A Review by Christopher Hobbs

Feverfew
Matricaria parthenium
by Ira Kennedy after
F. Edward Hulme, from *Familiar Wildflowers*, 1902

SUMMARY

A legend from ancient Greece tells of a plant which saved the life of a person who fell off the Parthenon, the famous temple in Athens. The plant, feverfew, or Tanacetum parthenium, *still retains the name. Since ancient times, it has been recommended by herbalists for headaches and menstrual difficulties. Especially well-known in England, it is currently a favorite folk-remedy for migraine headache and arthritis. Reported successes for these conditions led to many laboratory tests and two double-blind clinical trials, which have demonstrated feverfew's anti-inflammatory effects.*

The following article reviews the botany, history of use, chemistry, pharmacology, cultivation, and clinical application of feverfew.

INTRODUCTION

It is said that there is nothing new under the sun, that everything we discover is, in one sense, a rediscovery. And so it is with herbal medicine—it is certainly nothing new, though perhaps our recent appreciation and nascent scientific understanding of it is new, at least for us. Herbs are slowly coming back into popularity, for a number of reasons, but above all because they do in fact work. The medical establishment still balks at the idea of herbal medicine, but even there the accumulating stock of scientific research validating the efficacy of various traditional herbal medicines is beginning to change some minds. And yet, should the idea of herbal medicine really seem that extraordinary? Plants are our primary source of

food and oxygen—both essential ingredients of life and good health—thus it is only fitting that plants should also provide us with medicine that is both effective and safe.

One especially promising new chapter in the story of the modern herbal medicine renaissance concerns feverfew, a long-forgotten herb that has, in the last decade, been dramatically catapulted into a sort of stardom. In a great number of preliminary trials, including one recent double-blind study (Murphy, 1988), feverfew has proven to be effective against migraine headache and rheumatoid arthritis. Though many drugs, notably ergot derivatives and aspirin, have been tried with these conditions, rarely do they provide a complete cure or even more than moderate success, not to mention the serious side-effects these drugs can induce. Since conservative estimates of the number of people who suffer from migraine in the United States put the figure at 10 million, and 30 million for arthritis (Groenewegen, W.A. & Heptinstall, S., 1986), it seems likely that feverfew may become very popular in the future.

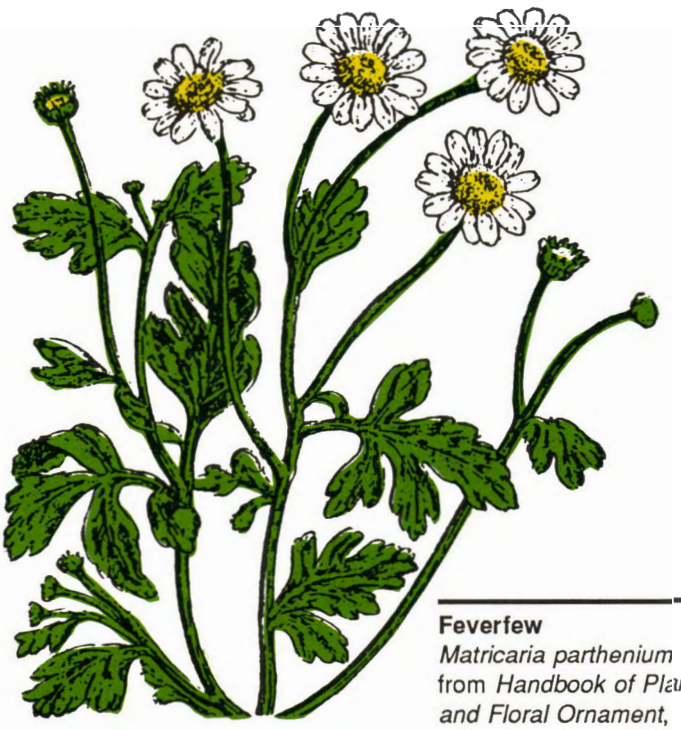
BOTANY

Taxonomy

Feverfew is *Tanacetum parthenium* (L.) Schultz-Bip., a member of the daisy family, Asteraceae (formerly Compositae), the second largest family among the flowering plants. Family relatives of feverfew include the common garden plants black-eyed susan, cosmos, and marigold; the medicinal plants echinacea, burdock, and calendula; and the edible sunflower, artichoke, and jerusalem artichoke. The Asteraceae derives its name from the flowering heads, known as the inflorescence, which actually consists of several to hundreds of smaller, individual flowers—such as in the well-known sunflower head. Within these heads, there are two distinct types of flowers: the large, yellow, petal-like ray flowers that circumscribe the head; and the tubular, yellow disk flowers that fill the center.

There has been some controversy during the last 200 years about what genus of the Asteraceae feverfew should occupy. One of the earliest scientific names for feverfew was *Matricaria parthenoides* L.—that is, it was placed in the genus *Matricaria*, of which chamomile is a member.

Feverfew has not been considered to be a *Matricaria* since the early 1800s. A more recent placement is within the genus *Chrysanthemum*, and one still sees this name commonly in all but the most recent literature. Currently, there are only 5 species of Chrysanthemum recognized *sensu stricto*. Most of the over 100 former members of the genus are now referred to the genus Dendranthema. Other members of this genus—all closely related to feverfew—include the common chrysanthemum or "mums" of florists' shops, which are important in Chinese herbal medicine (*Chrysanthemum morifolium* Ramat.), the common weed, oxe-eye daisy, also an important Chinese herb (*Chrysanthemum leucanthemum* L.), and the source of the insecticide pyrethrum (*Chrysanthemum cinerariaefolium* Vis.) (Bailey, 1976).



Feverfew
Matricaria parthenium
from *Handbook of Plant and Floral Ornament*,
Richard G. Hatton, 1960.

Feverfew is currently recognized as *Tanacetum parthenium*. Another member of the genus *Tanacetum* is *Tanacetum vulgare*, or common tansy, which has been used for centuries for its insecticidal, anthelmintic, and emmenagogic properties (note, however, that *Tanacetum vulgare* L. can be toxic).

In one recent double-blind study feverfew has proven to be effective against migraine headache and rheumatoid arthritis.

There are three or four horticultural varieties (cultivars) of feverfew (*Tanacetum parthenium*) itself: *crispum*, where the leaf edges are curled; and *aureum*, where the leaves are noticeably yellow (Hylands, 1984). Besides these, there are several forms of the so-called common "wild" feverfew: one with two or more rows of ray flowers (the white, petaloid parts), which is called "silver ball"; one with no white ray flowers which has flowering heads with only one row of white ray flowers (Bailey, 1930). This last is the variety has been recommended by several authors as the one that should be collected and used for medicinal purposes (Hancock, 1985; Hylands, 1984).

Feverfew
Tanacetum parthenium
Paul Wilson, 1987

Botanical Description

The following is a description of the "wild variety" of feverfew, which is a common garden plant and has not been specifically developed as an ornamental subject:

> Bushy perennial, 1-3 feet tall and greatly branched, especially above. Very leafy, with short (not usually over 3 inches long), nearly hairless leaves cut variably into sharp-pointed lobes (not linear segments, such as in *Matricaria*). The flowers are many, in open terminal clusters, and are about 3/4" across. They have a single row of white rays (10-20), and a yellow center consisting of many disk flowers. The seeds are 6 to 10 nerved, and the pappus is reduced to a very short, irregular crown, sometimes absent. (Description by the author).

It would be easy to confuse the medicinal variety of feverfew with chrysanthemum, or even other varieties of feverfew—though none of these others are toxic, so a mistake would not be injurious. (The other varieties of feverfew may even be effective, though this is unclear in the literature.)

Etymology of Nomenclature

The ancient Greeks called feverfew "Parthenium" because, according to legend, it was used to save the life of someone who had fallen from the Parthenon, the Doric temple of Athena on the Acropolis in Athens. It is the Parthenion of Galen (Dodoens, 1586), known by the name parthenium through the middle ages.

Linneaus described feverfew as *Matricaria parthenium*, and in modern times, feverfew has been *Chrysanthemum parthenium*, described in the 18th century by Persoon, a German botanist (Bailey, 1949). Feverfew was recently placed in the genus *Tanacetum*. *Chrysanthemum* derives from the Greek *chrusos* (gold) and *anthemon* (flower) and *Tanacetum* is thought to derive from the name Anathasie, which the Greeks knew as a kind of Artemisia. Matthiolus thought *Tanacetum* was a kind of milfoil, or yarrow to the ancients (Dodoens, 1586). The two plants have a similar look and smell.

Feverfew has had numerous different English names over the centuries, which is an indication that it was familiar and widely used in traditional folk medicine. These names include featherfew (because of the feathery outline of the leaves, which some say is the source of feverfew), flirtwort, vettervoo, feather-fully, and, in German, mutterkraut.

HISTORY OF USE

As already mentioned above, feverfew is not a modern discovery; rather, it has been rediscovered. No one knows who first noticed the beneficial effects of feverfew, nor who first used the herb for headaches and arthritis, but there are many ancient sources that speak of the herb and recommend it for various complaints.

Dioscorides (1st century A.D.), the most important Greek herbalist and naturalist, recommended feverfew for many complaints, including "all hot inflammations and hot swellings," which may be a reference to arthritis (Gunther, 1933).

John Gerard, in his early, authoritative history of herbs, attests that feverfew is "very good for them that are giddie in the head"—headaches, that is, perhaps migraine?—and "for such as be melancholike, sad, pensive and without speech" (Gerard, 1633). Gerard claims that feverfew is effective, too, for the ague, a fever of malarial origin. John Hill, in an oft-cited quote from his *Family Herbal* (1772), wrote of feverfew that "in the worst headache this herb exceeds whatever else is known"—possibly a reference to migraine.

Nicolas Culpeper, author of one of the most practical and popular early English herbals (1649), recommends feverfew to women as "a general strengthener of their wombs," and also notes that it is "very effectual for all pains in the head" (Culpepper, 1649). Significantly, many other sources recommend feverfew for female complaints, especially for hysteria and as an emmenagogue, i.e., to promote menstruation (Lewis, 1791; Redwood, 1857; Brown, 1902; Grieve, 1935). It is known that feverfew contains camphor, which can actually be

smelled in the fresh or freeze-dried plant. Camphor was traditionally given as a remedy for hysteria (Grieve, 1935).

Other traditional uses for feverfew include using fresh, flowering heads as an insect repellent (Redwood, 1857), and as a tincture for relieving the pain and swelling of insect bites (Grieve, 1935).

Although never as popular in the United States as in Europe, the plant was brought over early, with the colonists. Josselyn, the well-known plant collector and botanist from New England, said of it "fetherfew prospereth exceedingly." (Pickering, 1879.)

In Traditional Chinese Medicine, which has enjoyed a continuous development for over three thousand years, feverfew, *Tanacentum parthenium*, is not mentioned, but several chrysanthemums, closely related, are. The Chinese generally use chrysanthemums to clear heat (inflammations), and one species, *Chrysanthemum morifolium*, is used as a sedative, for its cooling action on headaches and influenza. The *Barefoot Doctor's Manual*, a standard reference work (Institute of Traditional Chinese Med., 1970), lists five species of *Chrysanthemum*, mainly used for heat conditions such as boils, as well as for headaches. The *Pen Ts'ao* (Pin-yin: *Ben Cao Gang Mu*), a classic Chinese herbal work (Li Shih Zhen, 1578), says that *Chrysanthemum sinense* should be used to promote menstruation, and as a wine (made by steeping the flowers) for digestive, circulatory and nervous difficulties.

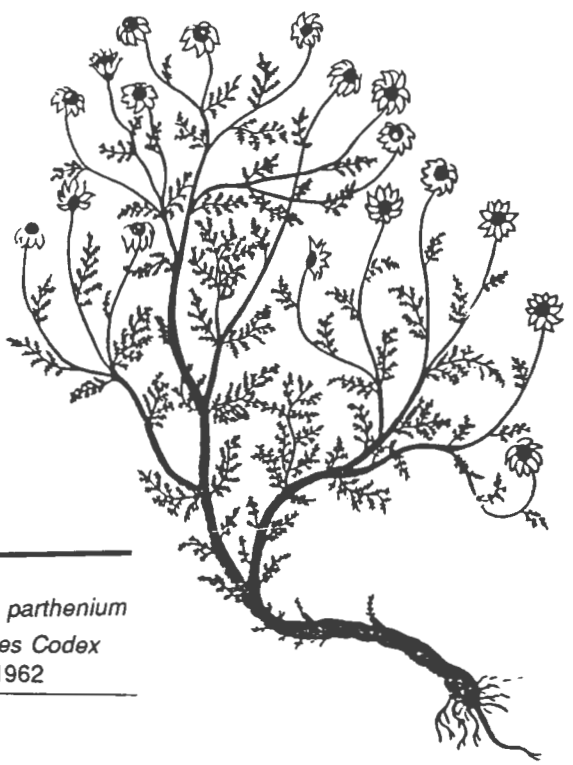
CHEMISTRY

M. Soucek, *et al.* (1960) first isolated and named a new sesquiterpene lactone from feverfew, parthenolide. Parthenolide is the major representative in European feverfew from this class of compounds which are only widespread in the family Asteraceae. There are 5 structural types of sesquiterpene lactones, namely germacranolides, santanolides, eremophilanolides, guaianolides and ambrosanolides. They generally have a bitter taste and are lipophilic (non-water soluble). Each type is characteristically found in one or more tribes in the family (Vickery & Vickery 1981). Since its discovery, parthenolide (a germacranolide) has been well studied by several groups (Soucek, 1961; Johnson, 1984; Bloszyk, 1978b). One of the most thorough reviews of the chemistry of *Tanacetum parthenium* is by Bohlmann and Zdero (1982), who reported that *parthenium* roots contain beta-farnesene (an acyclic sesquiterpene), bicyclogermacrene (a sesquiterpene), and spiroketal enol ethers. The aerial parts of the plant are said to contain a complex mixture of sesquiterpene lactones, germacrene D, beta-farnesene, camphor, several alpha-pinene derivatives, bornyl acetate, angelate, costic acid methyl ester, spiroketal enol ethers, and costunolide. Earlier work by Romo, *et al.* (1970) characterized the sesquiterpenes santamarine, chrysartemin A, and chrysartemin B.

Drs. Johnson, Hylands and Hylands (1983) filed for a European patent for a non-polar extract of feverfew, especially concerning bio-active sesquiterpene lactones. In this patent, it is stated that certain extracts of feverfew, especially when made with a non-polar solvent (such as commercially available vegetable oil, hexane, or chloroform), are more likely to be effective against migraine, asthma, and/or arthritis. Effective extracts contain either parthenolide, chrysanthemonin, or chrysartemin A (from the germacranolide class of sesquiterpenes). Two novel compounds extracted for the patent were partholide and chrysanthemolide (also germacranolides). It was determined that germacranolides containing more than one germacrane nucleus were likely to be more effective than ones containing only one, and could be administered at a lower dosage level, while an oxygen functional group at position 10 rendered a higher bio-activity (Johnson, Hylands and Hylands, 1983). The paper also reports on methods to change the molecular structure of the naturally-occurring compounds, which makes the preparations easier to protect by patent. Also reported is a list of synthetic analgesics, such as aspirin, that may be combined with feverfew compounds. The optimum dosage of the active ingredient is given as 0.25 to 20 mg a day, orally (Johnson, Hylands and Hylands, 1983).

Greger (1969) determined the main flavonoid glycosides in feverfew to be luteolin and apigenin, while Stefanovic, et al. (1980) mention the sesquiterpene lactones reynosin, 1-b-hydroxyarbusculin, and magnolialide.

Obviously, feverfew exhibits a complex chemistry, but Groenewegen, *et al.* (1986b) have identified five active sesquiterpene lactones, parthenolide (I), Canin (II), seco-Tanapartholide A (III), Artecanin (IV), and 3-beta-Hydroxyparthenolide (V). All the active compounds contained an alpha-methylene butyrolactone unit (the oxygen-containing ring).



Feverfew
Matricaria parthenium
Dioscorides Codex
Gunther 1962

Other unknown active compounds were identified, and determined to contain the same unit (see pharmacology section).

Later work by Begley, *et al.*, further elucidates the actual structural identities of these a-methylenebutyrolactones-containing compounds. They establish by X-ray analysis that canin is identical with chrysartemin A. Further, they establish the structures of compounds in the two major groups of guaianolides in feverfew, indicated in the chart on page 30.

These researchers mentioned that the levels of alpha-methylenebutyrolactones in feverfew may be much higher than previously thought. "Besides parthenolide, Bohlmann and Zdero found less than 5 mg/kg of all other lactones. Our plant samples, by contrast, provided about 330 mg/kg of endoperoxide and about 56 mg/kg of canin." They did add that variation in source material may have accounted for some of the difference.

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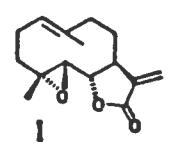
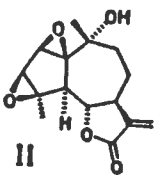
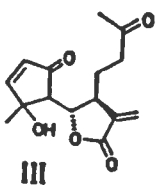


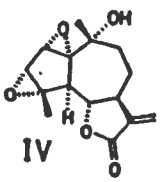
I



II

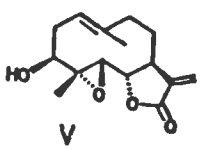


III



IV

Major group
tanaparthin-alpha-peroxide (I)
canin (II)
seco-tanapartholide-A



V

Beta-series
beta-peroxide (III)
artecanin (IV)
seco-tanapartholide B

PHARMACOLOGY

Many recent reports indicate that feverfew extracts taken on a continual basis may decrease the symptoms of asthma, bronchitis, arthritis, migraine headache, and most recently, may be useful as an antithrombotic agent (Voyno-Yasenetskaya, 1988).

The biochemical changes that either specific compounds from feverfew or the whole plant extract induce to bring about these beneficial results is still not fully known. However, there are some data available and researchers have put forth some preliminary deductions. These can be summarised as follows:

1. Prostaglandin inhibition. Prostaglandins can cause smooth muscle contraction and help mediate the inflammatory process, among other effects.
2. Inhibition of platelet aggregation and secretion. In addition to prostaglandins, platelets secrete histamines, serotonin, leukotrienes and other inflammation-inducing substances.
3. Inhibition of phagocytic potential and inhibition of release of Vitamin B-12 binding protein from polymorphonuclear leukocytes (PMNL).
4. Inhibition of the deposition of platelets on human collagen substrates.
5. A protective effect on the endothelial cell monolayer of perfused aorta tissue, suggesting an antithrombotic potential.
6. Inhibition of the phagocytic activity of human neutrophiles, which may reduce the tissue-damaging potential of oxygen radicals.
7. Anti-microbial activity.
8. Cytotoxic activity against human tumor cells.

Since 1980, several studies have been conducted concerning the effects of feverfew extracts on prostaglandin biosynthesis (Makheja, 1981, 1982). Prostaglandins are common lipids, derived from arachidonic acid, that have a broad range of biological activity, including: regulation of body temperature, control of blood clotting, modulation of cellular immune reactions, and maintenance of vascular smooth muscle tone (uterus, etc.).

For instance, Collier, *et al.* (1980) demonstrated prostaglandin (PG) biosynthesis inhibition in seminal vesicles using feverfew extracts. They report that boiling for 10 minutes inactivates the inhibiting factor, and that the feverfew's PG inhibition differs from aspirin (another PG inhibitor) in that it does not inhibit cyclo-oxygenation by PG synthetase. Pugh & Sambo (1988) showed that 3 active sesquiterpenes from feverfew, parthenolide, michefuscalide and chrysanthenyl acetate, inhibited prostaglandin synthetase in vitro using a seminal vesicle mitochondrial fraction test.

It is possible that feverfew extracts modulate levels of serotonin in the brain, thus leading to the euphoria described.

Makheja and Bailey (1981) report that feverfew extracts also inhibit platelet aggregation, and that they do not block aggregation induced by arachidonic acid, suggesting, again, that the active principle in feverfew interferes with the initial step of thromboxane synthesis, i.e., the release of arachidonic acid substrate from platelet phospholipids. Thus the anti-inflammatory and anti-aggregatory activities of feverfew extract may be due to a phospholipase inhibitor which prevents the release of arachidonic acid by normal stimuli (such as the inflammatory process of arthritis, or some unknown factor in the

pathogenesis of migraine). Also, since arachidonic acid is the precursor of both PG and the recently discovered leukotrienes, including slow-reacting substances of anaphylaxis (immediate hypersensitivity reactions, such as in bee stings), the researchers conclude that "these observations may explain the diverse range of pharmacological activities which have been ascribed to feverfew." (Makheja, 1981).

Referring to the feverfew patent of Johnson, Hylands and Hylands (1983), previously mentioned (see Chemistry section), the researchers tested 238 different fractions (separated by TLC and column chromatography) for activity against acetylcholine, 5-HT, and histamine to determine which constituents were the most likely to produce anti-inflammatory and spasmolytic activity. They concluded that the sesquiterpene lactones, parthenolide and santamarine, are the important bioactive constituents. [For an excellent review of the toxicity and pharmacological actions of the sesquiterpenes, which are very common in the Asteraceae, see Ivie and Witzel (d.m.).]

On the basis of this research, Johnson, *et al.* predict that feverfew will be useful not only for classical and cluster migraine, but for premenstrual, menstrual, and other headaches as well. They hypothesize that the activity of feverfew preparations may be due to "an altered reactivity of the cerebral blood vessels to biogenic amines and prostaglandins released locally or into the systemic circulation"—which altered reactivity can lead to the stabilization of the blood vessel smooth muscle cell membranes, and consequently to the direct inhibition or reduction of their responsiveness to biogenic amines and prostaglandins.

These researchers also find that feverfew preparations "block the actions of neurohumoral transmitters and autacoids such as acetylcholine, noradrenaline, bradykinin and prostaglandin E2 on smooth muscle." Also, apparently long-term administration of feverfew extracts "causes a progressive decrease in the reactivity of...smooth muscle to 5-hydroxytryptamine and histamine" which are also allergy producers. The conclusion that can be drawn here is that feverfew may be useful for a wide array of diseases characterized by chronic inflammation.

Regarding arthritis, the researchers Johnson, *et al.* note that substances such as prostaglandins, histamine, and bradykinin are released in and around joints, and that prostaglandins potentiate the pain-inducing activities of the other substances, such as leukotrienes. Therefore they hypothesize that the effectiveness of feverfew against arthritis may lie in its ability to block the production of these substances.

Heptinstall, *et al.* (1985) reported that extracts of feverfew have a more pronounced effect than that "obtained with very high concentratons of non-steroidal anti-inflammatory agents." The team showed pronounced inhibition of serotonin release from platelets, inhibition of platelet aggregation, and inhibition of the release of vitamin B12-binding protein from polymorphonuclear leukocytes (PMNL).

Groenewegen, *et al.* (1986b) tested the anti-secretory activity of different fractions from feverfew with labeled platelets from human blood, stimulated by adrenaline. They were able to identify 5 active compounds (see chemistry section), all sesquiterpenes containing an alpha-methylene butyrolactone unit. The researchers indicate that these alpha-methylene butyrolactone units probably interact with "biological nucleophiles such as sulphydryl groups (SH)" (perhaps as a Michael acceptor), leading to the assumption that the anti-secretory activity of feverfew is probably, at least in part, due to sulphydryl group blockade during platelet secretion. The authors support this contention with the fact that cysteine (a sulfur-containing amino acid) can block the effects of feverfew extracts on platelet secretion.

Feverfew
Tanacetum parthenium,
from *The Herbal*,
John Gerard, 1633.

Heptinstall, *et al.* (1987) and Lösche, *et al.* (1988a), in an international effort, have further reported on work concerning feverfew on the inhibition of the phagocytic activity of human PMNL and the inhibition of platelet secretion and aggregation. They used a variety of tests, including measurement of the ability of PMNL to ingest radiolabelled liposomes and opsonized zymosan particles among others. Further, they showed that feverfew extract does not cause cell damage, and again, that feverfew "reduces the number of acid-soluble sulphydryl groups in PMNL." They supported the latter mechanism by showing that "the inhibitory activity of [feverfew] extract on the phagocytic capacity of PMNL is neutralized by the suphy-

dryl-containing compound 2- MPG." Heptinstall, *et al.* (1988) further supported this contention in several ways, among them that "both feverfew extract (FE) and parthenolide reduced the number of acid-soluble and acid-insoluble SH groups in platelets."

Johnson, *et al.* (1987) studied 10 patients who had taken feverfew extracts for 3.5 to 8 years. Analysis of blood samples showed that platelet aggregation was not inhibited by ADP and thrombin, but that it was greatly attenuated in response to high doses of serotonin (though not to low doses). However, Johnson, *et al.* advise that whether or not the activity of feverfew is due to the inhibition of serotonin remains to be established.

After the test, 59% of the patients reported that the feverfew treatment period was effecitve in preventing migrine, as opposed to only 24% reporting that the placebo period was effective.

Work by Lösche, *et al.* (1988) and Voyno-Yasenetskaya, *et al.* (1988) has demonstrated the ability of feverfew extract to inhibit the deposition of platelets on human collagen substrates. Work to show a protective effect from feverfew on the endothelial cell monolayer of perfused aorta tissue, due to an increase in cAMP was also reported. Based on their findings, the authors propose that feverfew "may have an antithrombotic potential."

An additional way in which the anti-inflammatory potential of feverfew is augmented was proposed by Williamson, et al. (1988). They have shown that FE inhibits phagocytosis of *Candida guilliermondii in vitro* by neutrophiles, which may reduce the "generation of tissue-damaging oxygen radicals."

Feverfew extracts have shown anti-microbial properties (Blakeman, 1979). The most active anti-microbial component is parthenolide, the highest concentrations of which are found in glands on the seeds and leaves of feverfew. It is interesting that the highest concentration of parthenolide occurs in the younger leaves, for some sources indicate that the younger growth on the plant is more potent. In any case, the amount of parthenolide present in feverfew is fixed from young growth and does not increase as the leaf expands. Parthenolide may play a role in the defense of the plant against disease; staphylococcus aureus and some other gram-positive bacteria were inhibited in a growth test, but gram-negative and filamentous fungi were not affected (Blakeman, 1979).

Finally, parthenolide, as well as other sesquiterpene lactones, has been reported to show cytotoxicity for human tumor cells (Awang, 1989).

CLINICAL TRIALS

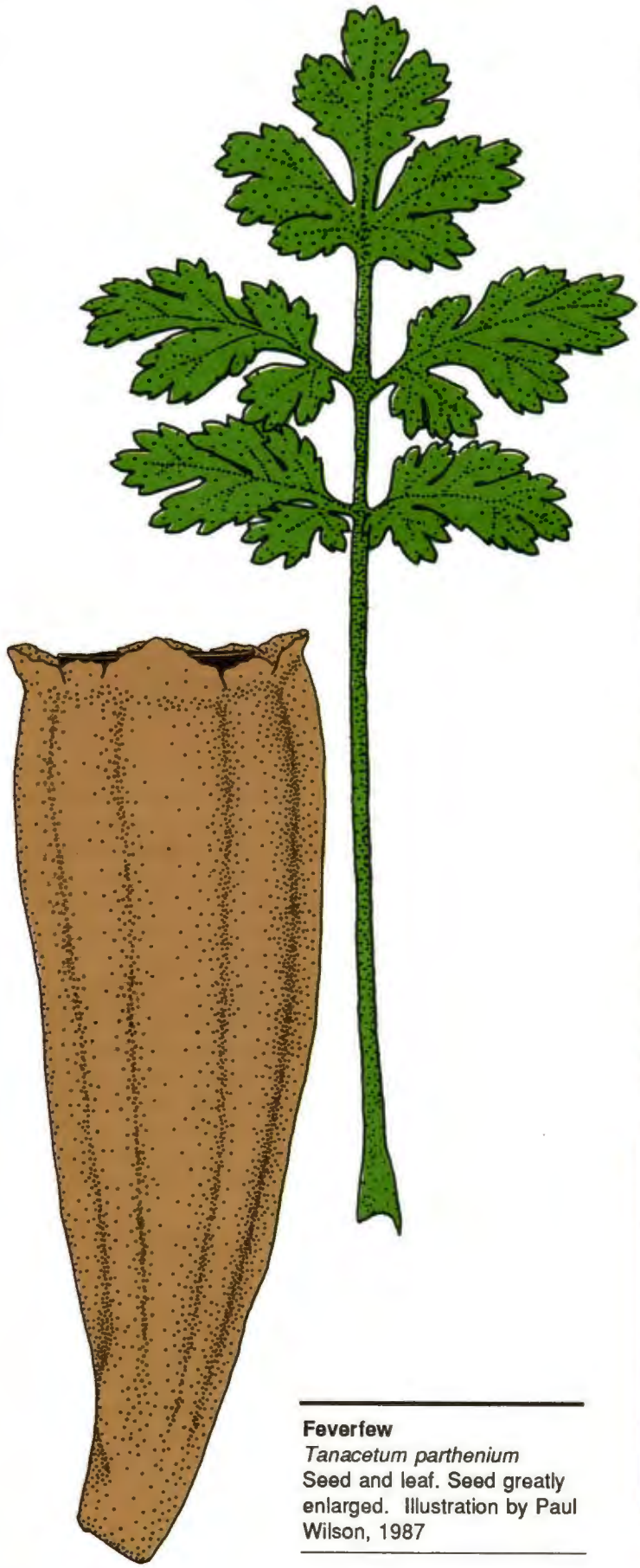
One of the more suggestive studies is by Johnson, *et al.* (1985), who conducted a double-blind study on twenty patients who had eaten fresh leaves of feverfew daily as a protective against migraine headache. All subjects had eaten the leaves every day for at least three months prior to the study, and had a history of common or classical migraine for at least two years' duration, with no more than eight attacks a month, at the time of the test. No subjects were allowed who had taken any tranquillizers, alpha-blockers, beta-blockers, anti-depressants, non-steroidal anti-inflammatory agents, or clonidine and pitzotifen within one month prior to the test.

The average dosage for the patients before the test was around 60 mg/day. The fixed dose during the test was 25 mg per capsule of freeze-dried feverfew leaf. The freeze-dried herb was chosen because it is the form most like fresh leaves (the method of choice for most users); preparations like powdered extract, or air-dried herb that is old, improperly dried, or has been heated to 100 deg. C, may possibly be inactive.

The result of this double blind test was that the patients who received placebo "had a significant increase in the frequency and severity of headache, nausea, and vomiting with the emergence of untoward effects during the early months of treatment," while the feverfew group "showed no change in the frequency or severity of symptoms of migraine." Johnson, *et al.* (1985) thus concluded that feverfew does in fact prevent migraine attacks. The researchers also reported other beneficial effects, for instance, the average blood pressure of the feverfew group went down in 6 months of treatment from 134/86 to 125/82, and some users described an increased sense of well-being after using feverfew for a period of time.

International interest was stimulated by a random, double-blind, placebo-controlled crossover study on the efficacy of feverfew in migraine prevention. In the test by Murphy, Heptinstall and Mitchell (1988), reported in the *Lancet*, 72 volunteers randomly received either a capsule of dried feverfew leaves or a placebo each day for four months. The volunteers were then switched to the other treatment category. Migraine attacks in both groups were assessed for severity and frequency with the use of diary cards. After the test, 59% of the patients reported that the feverfew treatment period was effective in preventing migraine, as opposed to only 24% reporting that the placebo period was effective. Considering 17 patients with classical migraine as a separate group, feverfew "reduced the number of attacks by 32% (95% confidence interval 11-53%, $p<0.05$). Overall, the researchers reported that the number and severity of migraine attacks and the degree of vomiting was definitely reduced. The duration of individual attacks was not affected by feverfew.

This test is well-designed, and goes a long way in demonstrating the potential of feverfew in prevention and treatment of migraine headache. In keeping each group in a feverfew period for four months, most, but perhaps not all, people who would be relieved of symptoms were noted. It is known that some people, such as the "discoverer" of the feverfew—mi-



Feverfew
Tanacetum parthenium
Seed and leaf. Seed greatly enlarged. Illustration by Paul Wilson, 1987

graine connection, Mrs. Jensen, take many months before fully realizing the beneficial effects. Also, the dose of one capsule per day can be considered a minimum amount.

A low starting dose is indicated for most people, for the potential for side-effects is then reduced. In this test, the researchers found very few adverse effects with feverfew. In fact, in nearly every case, including mouth ulceration, the placebo group experienced more side-effects than the feverfew group. The researchers caution that more work is needed before feverfew can be used on a regular clinical basis for migraine.

TOXICITY

Approximately 18% of feverfew users questioned report some kind of adverse effect, the main one being irritation and possible inflammation of the oral mucosa and tongue (11.3%) (Johnson, 1984). In addition, the possible detrimental effects of long-term use are still uncertain, although many people have been self-medicating with fresh feverfew leaves for over 6 years and report no adverse effects (Hancock).

In a study of 270 patients taking feverfew regularly, Johnson (1984) found a number of negative side-effects, though for the most part these were minor and infrequent (see Table 1). Mouth ulceration was the most common adverse side effect noted (6.4%), followed by abdominal pain and indigestion (3.9%). Interestingly, mouth ulcers have been reported among users of common anti-inflammatory and anti-rheumatoid drugs, too, though such ulcers are only a minor side-effect of these drugs (Johnson, 1984). Unfortunately, mouth ulcers have occurred among users who took feverfew in capsules, instead of in its fresh form, so these ulcers cannot be attributed only to the herb directly contacting the mucous membranes in the mouth. Experience shows, however, that the tablets may show a lower incidence than the fresh leaves. Also, a lower dose (50mg/day—which still shows effectiveness) may limit these unwanted effects.

Table 1. Adverse Side-Effects of Feverfew*

Mouth ulcers/sore tongue	=	6.4%
Abdominal pain & indigestion	=	3.9%
Unpleasant taste	=	3.0%
Tingling sensation	=	3.0%
Urinary problems	=	0.9%
Headache	=	0.9%
Swollen lips & mouth	=	0.9%
Diarrhea	=	0.4%

*Per Johnson, 1984

However, as previously mentioned, another controlled study found mouth ulcers more common in the placebo group. One of the identified active ingredients in feverfew, parthenolide, has been mentioned in the literature as being the compound responsible for causing contact dermititis (Mitchell, 1971). These compounds are well-known contact allergens.

In one clinical study, 30 migraine patients who had taken feverfew daily for over 11 consecutive months were compared to 30 non-user migraine patients (Anderson, et al. 1988). The groups were individually age- and sex-matched. For several months, blood samples were taken, and the frequency of chromosomal aberrations and sister chromatid exchanges were determined from lymphocyte cultures. Chromosomal aberrations were of a lower mean frequency in the feverfew group, but the difference was too small to be significant. The mutagenicity of urine samples from the two groups were compared, using the Ames Salmonella mutagenicity test system, and again, there was little difference between the two groups. Although some of the subjects were female, and no chromosomal aberrations were seen in the feverfew group, there is little reported experience with feverfew use in pregnancy. For this reason, and because of feverfew's long-standing reputation as an emmenagogue, its use should be discouraged during pregnancy, until more is known.

PHARMACOGNOSY

In commercial herb trade, even among small businesses, the standardization and analysis of an herb is crucial, both to prevent adulteration of samples and to ensure high quality. In these regards, three questions must be answered: is the correct plant being used, how old is it, and does the sample have an acceptable amount of the major active compound(s)? Four tests are generally used to ensure proper identification and quality: sensory inspection, microscopic analysis, thin-layer chromatography (TLC) or high-pressure liquid chromatography (HPLC).

Chemically, the activity of feverfew is most certainly due to sesquiterpene lactones. Thus, standardization of feverfew is best accomplished from the determination of the amount of these compounds in feverfew. Parthenolide is known to be the most important constituent in feverfew from European origin—however, at least two samples of feverfew from Mexico did not show any parthenolide at all (Romo 1970). Because of this, more work needs to be done on American plants to determine the major active compounds, as an aid to standardization.

Parthenolide is also found in species of plants not from the Asteraceae (Blakeman, 1979). For this reason, commercial feverfew samples should first be identified botanically to determine if they are in fact *Tanacetum parthenium*, before TLC work is performed. Information on the use of the first three methods mentioned above in quality determination for feverfew samples follows. The author could not find a method for HPLC in the literature.

Sensory Inspection

Sensory inspection is a preliminary test and, depending on the skill and experience of the investigator (and range of quality that is considered acceptable), can provide all the information that is necessary. It is desirable to have an authenticated sample of the herb in question on hand. This will provide a standard against which to compare samples in question. The best standard is fresh herb, as even the best dried sample can lose volatile constituents and thus the characteristic aroma of the particular herb.

With feverfew, for instance, there is a very characteristic smell, rich and camphoraceous, that is unmistakable. A closely related plant, such as tansy or chamomile, will have a similar but not identical odor. The difference should be noted. I have found that taste is also a good measure of an herb, though for aromatic herbs taste is not as distinguishing a trait as smell. For an excellent report on the use of sensory determination in quality control, as well as a key to these characters, see Schneider (1921).

Microscopic Analysis

When more exact determination is required, microscopic analysis can be used. A low power hand lens (10 or 20X) or dissecting scope (35X) can provide information about morphological characteristics. For this, a good botanical description, (such as that in Bailey, 1949) is desirable, as it will give detailed information about flower, leaf, root, and stem structure.

With feverfew, observe a detailed drawing of the plant, and then compare with the sample. Flowers may be present in a given commercial herb sample; these are the first things to inspect under magnification. The seeds should have a low, irregular crown around the top, and be 6 to 10 nerved. The corollas will probably be withered and dried, and thus offer little information. However, the receptacle and phyllaries should be observed and compared to the reference drawing (See page 33) that in the drawing. Also, note the presence or absence of hairs. Feverfew leaves are finely puberulent beneath, and are covered with sesquiterpene lactone-bearing glandular dots, or trichomes, found on both leaf surfaces, the flower calyxes, and the seeds (Blakeman, *et al.* 1979). These glands are absent from German chamomile (*Matricaria recutita*) and common tansy (*Tanacetum vulgare*), both possible adulterants of feverfew (Berry 1984).

If even more detailed analysis is desired, the leaf structures can be observed under a high-power microscope (250-1000X). For this, mount a thin section of leaf on a glass slide, and inspect for cellular structures and various crystals. A book on microscopic analysis is usually consulted for comparison; however, *T. parthenium* is not commonly found in these books. In this case, compare the leaf microscopically with a known sample. This method was common in the early 1900's, when large quantities of herbs were used by the drug companies.

Thin-layer chromatography (TLC)

Thin-layer chromatography (TLC) is a method for separating the various constituents of an herb and identifying them (qualitative analysis). Semi-quantitative analysis can also be performed in some cases. TLC works from the principle that every compound has a different polarity and is more or less attracted to the molecules in a coating on a glass (or plastic) plate as the sample spot of compound is carried up with the solvent by capillary action. Since each compound's spots can be developed and will exhibit unique colors, TLC can thus aid in the detection of active constituents.

The methods have been reported in the literature and can be consulted for the determination of various sesquiterpene lactones in feverfew (Bloszyk, 1978b; Drozdz, 1978; Blakeman, 1979).

CULTIVATION

Many people may not realize that they already have feverfew growing in their gardens. Once the plant becomes established, whether through intended cultivation or by chance, it may wander over a whole area. For small-scale, personal use, only several plants are required. One can sow seeds from the flowering heads yearly, thus assuring a source of new plants, though feverfew is perennial and will continue to flourish from the same roots the following spring. In any case, the guidelines for small-scale cultivation are the same as for larger scale or commercial cultivation, explained below:

It is easiest to start the plants from root divisions or cuttings. One well-developed plant can yield up to 10 or 15 starts. Alternatively, seeds can be started in a cold frame and set into the beds outside (space them 18" apart) when they are 3" high. The germination rate varies with the age of the seeds. If the seeds have not been allowed to dry out, and are not over one year old, the rate should be around 70-80%. Note that plants started from seed as early in the spring as possible may only provide one harvest, possibly two in a very warm climate. Also, plants started from seed will not yield as much as ones from cuttings in the first year, but will compare favorably the second year.

Feverfew will grow in sunny or shady situations, but seems to do best in partial shade, one reason it does so well in a summer fog climate, such as is found on the coast of central California. There are many commercial chrysanthemum farms in this area of the United States.

In a temperate climate, where the first frost does not occur until November or December, one can continuously harvest leaves from May until the cold weather. In Santa Cruz, California, for instance, we have plants with leaves on them all year that grow actively from March through the end of November. In 1986, plants we started in March, by May 15th afforded their first harvest, with a yield of 1/2 lb. per plant. However, cuttings started in April, we harvested about June 1st, with a yield of up to 1 lb. per plant; we were able to get 3 or 4 cuttings from these latter plants before December (unpublished results).

The best soil condition for feverfew is rich, well-drained soil. An application of manure tea and compost stimulates greater growth (we have had phenomenal success using an exotic mix of quail manure tea and composted organic material). After a year-long trial with various degrees of fertilization and watering, we discovered by TLC that the plants that were not overwatered and given ample manure tea had the highest concentration of parthenolide (unpublished results). Feverfew seems to put on its best growth in the spring. Later growth periods and harvests are slower, and the plant has a tendency to produce flowers not leaves. Hence it is important to nip off the buds before they open, to encourage fuller leaf development. ❐

I am grateful to Paul Wilson for providing the fine drawings for this review. Thanks, too, to Peter Finkle who through his keen interest in feverfew gathered much useful information.

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See Feverfew, page 47

The Modern Rediscovery of Feverfew

by Christopher Hobbs

Feverfew, like all herbs, is not a modern discovery; it has had a long history of use in traditional and folk medicine, especially among Greek and early European herbalists. However, unlike more popular herbs, such as chamomile and dandelion, during the last few hundred years feverfew has fallen into general disuse, even among herbalists. Thus the first significant, modern, public account of the use of feverfew as a preventative for migraine appeared only very recently, in 1978.

The story concerned a certain Mrs. Jenkins, reported on by the British health magazine, *Prevention* (not to be confused with the American publication) who had been ,suffering from severe migraine since the age of 16. The headaches had been getting progressively worse over the course of her life, until, at the age of 68, she was having them once every ten days, each episode lasting two or three days.

In 1974, a friend of Mrs. Jenkins's sister mentioned the headaches to her father, who had found a common garden weed, feverfew, to be of great help in his arthritis. Where he had heard of this application of feverfew is unknown, but it is likely that the feverfew tradition has been handed down orally, perhaps for hundreds or even thousands of years.

More and more people are trying feverfew for alleviating migraine and arthritis, and their attendant symptoms of pain, nausea, and stiffness.

Mrs. Jenkins received a plant from the old man, with the advice that she should take a "pinch" of fresh leaf every day. She began with one leaf, and when nothing happened, she increased the dose to three leaves daily—eaten in a bread and butter sandwich. For months nothing happened, but she persevered. After five months, although the headaches were not much better, the nausea and vomiting that usually came with them had stopped. She began to notice that she used her ergotamine prescription (a vasoconstricting drug) less and less, and then finally, after six months, her headaches disappeared for a period of four weeks. After that, she occasionally had a headache, until the tenth month, at which time they ceased altogether.

Initially Mrs. Jenkins was afraid to tell anyone about her experience with feverfew, lest there was some mistake; she wanted to be sure it was really helping. Ironically, in this modern age we must become desperate and completely disillusioned with "orthodox" drugs before we dare turn to the plants that grow all around us, plants that untold generations of our ancestors have used medicinally. Eventually, however, Mrs. Jenkins became convinced of feverfew's curative properties, and began to give it to other migraine sufferers. By 1978, fifteen of her clients had found similar relief, and Mrs. Jenkins made a big media splash: a television interview, more magazine articles, and hundreds of letters from people with migraine and arthritis requesting more information.

At this point, at the request of the Migraine Trust, a research institute in London, Dr. Stewart Johnson, a respected physician, writer, and pharmacologist, then with King's College, was consulted concerning the alleged powers of feverfew. Dr. Johnson was skeptical at first, but discussed the possibility of analyzing the plant for active constituents. To begin with, he sent out a questionnaire to the 700-plus people on Mrs. Jenkin's list of feverfew users. The initial results were propitious, indicating that feverfew was generally safe and efficacious.

Dr. Johnson went on to become highly involved in feverfew research over the next eight years, and generally found that the plant demonstrated strong, positive effects on migraine and arthritis, with only a few negative side-effects (swollen lips and sores in the throat, in a few cases). In late 1983, Dr. Johnson agreed to appear for an interview on a prominent British television program, and since then interest in feverfew has spread quickly and has been widely reported in the media.

The feverfew story is still being written today. More and more people are trying feverfew for alleviating migraine and arthritis, and their attendant symptoms of pain, nausea, and stiffness. Judging from the thousands of letters that Dr. Johnson, Mrs. Jenkins, and other experts have received, many people are well satisfied with the results.

In the United States, word is just getting out about the benefits of feverfew. Stories have been run on its virtues in one of America's leading health magazines, *Prevention*, and on national television. The herb industry, usually quick to respond to interest in a marketable herb or nutrient, has done its homework and come up with a variety of products, some of which are of excellent quality. ❐

Proposal For Funding AIDS-Monitoring Research Using Chinese Herbal Prescriptions

by Subhuti Dharmananda, Ph.D.

During the past 20 years it has been firmly established that medicinal herbs containing complex polysaccharides and other ingredients can restore immunity that is depressed by cancer growth, cancer therapies, corticosteroid therapies, and unknown causes. The research has been conducted not only in China, Japan, Taiwan, and Hong Kong, but also in the U.S. at the M.D. Anderson Hospital (Texas). Among the most interesting of the herbs studied are *Ganoderma* (and related mushrooms), *Astragalus*, *Ligustrum*, and *Rehmannia*.

Further, research during this period has demonstrated the effectiveness of medicinal herbs in treating acute and chronic viral infections (as well as other infections, including bacterial, malarial, and fungal). Conditions such as hepatitis, epidemic encephalitis, and influenza are effectively controlled by herbal prescriptions. In vitro studies, including one conducted at UC Davis (California) have shown that several of the herbs used for such purposes inhibit the infective potential of HIV. Herbs of particular interest are *Isatis*, *Polygonum cuspidatum*, *Viola*, and *Lonicera*.

In light of these findings, it is reasonable to enquire about the potential influence of Chinese herbs on the health status of HIV-infected individuals. In order to obtain a reliable answer to questions that can be raised about the effects of Chinese herbs, one must carefully monitor health status over a period of time to learn about the natural variability of the measure parameters as well as the direction of change under the influence of Chinese herbal treatments.

Initial explorations of this question have already begun. As early as 1984 practitioners of Chinese herbal medicine noted apparent positive benefits from providing immune-enhancing herbs to their patients. An initial investigation using easy-to-administer Chinese herb tablets and powders revealed promising results. These results were taken by the community of HIV-infected individuals as a signal to begin, where possible, professionally administered or self-administered Chinese herbal therapy.

It can be estimated that in early 1989 more than 4,000 HIV-infected individuals, mostly homosexual males, were using this method of therapy, often along with other therapies.

Ganoderma lucidum
Ira Kennedy for *HerbalGram*, 1989

The same or similar herb therapies are being used by persons with viral hepatitis and chronic fatigue syndrome and those undergoing treatment for cancer.

Monitoring of patients consuming Chinese herbal therapies began at the Quan Yin Clinic in San Francisco during late 1987. Since this time, the size of the study group monitored has risen in the course of five evaluation periods from 16 to 30 to 80 to 105 to 180, largely because of favorable responses described to others by participants. At the same time, study groups using essentially the same herbal therapy have started in Chicago and New Mexico, adding another fifty individuals by early 1989. Plans for continuing and expanding the research are in place.

As early as 1984 practitioners of Chinese herbal medicine noted apparent positive benefits from providing immune-enhancing herbs to their patients.

These research activities have been limited for complete blood analysis by lack of funds, since the costs involved in such measures as T-cell evaluation frequently exceed $150 per data point. Due to variability in blood parameters in HIV-infected individuals, this type of data must be collected at approximately monthly intervals to reveal a clear pattern of change. However, neither HIV-infected individuals nor researchers have had adequate funds for such monitoring on a regular basis.

Therefore, the results of Chinese herbal therapies, though promising, are not well-established from a scientific view. There is no doubt among researchers and participants that many individuals feel much better while taking the herbs and experience a reduction of symptoms associated with HIV infection, including night sweating, diarrhea, weight loss, thrush, lymphatic swelling, and severe fatigue. Some individuals do not respond to the herbs, and others appear to experience slight adverse reactions, such as gastro-intestinal disturbance, but on the average, at least 60% and as high as 80% respond favorably.

Individual reports of dramatic increase of T-cell total number, of improved T4/T8 ratios, of disappearance of P24 antigen, and other improvements in blood profile have been received. However, these reports lack statistical significance due to the small number of such instances that can be documented. The combination of clearly evident subjective and clinical improvements, and a small number of reports of improved status of blood parameters in an increasing population of Chinese herb users provides a strong basis for developing further monitoring.

It is proposed that funds be provided to the Quan Yin Clinic (which has just moved into a larger facility for the purpose of handling the increased load of HIV-infected patients). These funds would be utilized for improved monitoring of progress made by these individuals over a period of time while

See AIDS research, page 39

American Herbalists Guild Formed

More than 20 herbalists from across the U.S. met at the home of Christopher Hobbs, Santa Cruz, Cal., on Feb.18th - 19th to discuss the organization of a professional herbalists' association which would address the collective needs of the members. Formation of the American Herbalists Guild was the result. Those in attendance developed a statement of purpose which includes the following goals:

1. To form a professional body to develop, promote and maintain levels of excellence in herbalism including individual and planetary health.
2. To strengthen and further the network of communication and support between herbalists.
3. To foster high levels of ethics and integrity in all areas of herbalism.
4. To integrate herbalism into community health-care.
5. To promote cooperation between herbalists and other health-care providers, encompassing traditional wisdom and knowledge as well as current medical models.
6. To establish and maintain criteria and standards of education for the professional practice of herbalism.
7. To promote an ecologically healthy environment and to increase awareness concerning the interdependence of all life, especially the plant-human relationship.
8. To serve as a liaison that interfaces with other professional associations and regulatory agencies.
9. To promote further research, education and study of herbal medicine.

Herbman, from Friess' *Spiegel der Artzney*, Strasbourg, 1529

The group elected five interim officers to move the organization forward until such time as a membership body can be established and bylaws be developed, then voted on by the general membership. Interim officers are David Hoffman, President; Christopher Hobbs, Vice President; Michael Tierra, Treasurer; Amanda McQuade and Cascade Anderson, Secretaries. The organization's first annual meeting has been scheduled for the last weekend of May 1990, to be held in Cincinnati, Ohio, at the Lloyd Library and Museum.

Membership categories include professional, student, associate, active, and benefactors. Professional membership will be by invitation and sponsorship, based on nomination for outstanding achievement and recognition in the field, submission and approval of a written resume, and fulfillment of educational requirements still to be determined.

Formation of such an organization had been discussed by herbalists for five years. The American Herbalists Guild will work toward establishing definitions and standards for professional herbalists in North America, along similar lines as, but not limited to, other professional herbalists organizations such as the British Herbal Medical Association. The development of the American Herbalists Guild is a positive step.

For more information write:
American Herbalists Guild
Box 1127
Forestville, CA 95436

Ginseng Institute Finds New Home

Headquarters of the Ginseng Research Institute of America (GRIA) has moved from its previous location in Roxbury, NY to Wausau, Wisc. Robert Duwe, president of the Institute, said the purpose for the move was "to attract long-term funding by situating GRIA activities in the heart of the North American industry, home of over 1,500 growers." Research proposals on the health benefits of American ginseng are currently being solicited. For more information, contact: The Ginseng Research Institute of America, 500 Third St., #208-2, Wausau, WI 54401 715/845-7300.

Liberty Hyde Bailey:
Botanist/Horticulturist Honored

In 1958, the Council of the American Horticultural Society voted to name its highest annual award in honor of Liberty Hyde Bailey, whose contributions to American gardening exemplify its aim of promoting excellence in horticulture, and who served as keynote speaker at the first American Horticultural Congress in 1946. At its Annual Meeting in July, the Society will again honor Bailey in a special observance.

Liberty Hyde Bailey (1858-1954) illuminated the American garden scene as have few men. Author of more than sixty-seven books, and editor-in-chief of the massive and still useful *Cyclopedia of American Horticulture* (four volumes, 1900-1902, revised later in separate six- and three-volume editions), Bailey combined the best qualities of botanist and horticulturist at a time when plant scholars often had deep contempt for the practical benefits of botanical science. Bailey coined the word "hortorium" to refer to a herbarium that includes plants of garden as well as of natural origin. His successors carry on his work at the Bailey Hortorium bearing his name at Cornell University. As professor of horticulture (1889) and later dean of the College of Agriculture at Cornell 1903-1913, Bailey was a pioneer and chief spokesman in the extension service program, a uniquely American institution. Since farmers often could not go to college, Bailey, in effect, brought college to them through a multitude of public information bulletins issued by his office. His long, productive life spanned the last half of the nineteenth century and the first half of the twentieth—he worked another thirty-six years after his "retirement." In fact, his major complaint while convalescing from a broken thighbone caused by being hustled through a revolving door in 1950 was that his upcoming plant-hunting trip to Africa had to be canceled. He was 91 at the time. (*Horticulturist*, Feb. 1989)

Bailey combined the best qualities of botanist and horticulturist...

AIDS Research, *from page 37*

they are consuming Chinese herbal prescriptions. The focus will be on clinical observations and blood parameters. ❐

The following literature contains numerous references to publications in the scientific literature regarding the improvement of immune system functions and treatments of viral and other infections via the actions of Chinese herbs and prescriptions. These references are too numerous to list here; it is recommended that the review literature be consulted both for articles and reference

Review Literature

Chang, H. M., editor. *Abstracts of Chinese Medicine,* Chinese University of Hong Kong, quarterly journal since 1987.

Chang, H.M, and But, P.P.H., editors, *Pharmacology and Applications of Chinese Materia Medica*, World Scientific, 1987 (two volumes).

Dharmananda, S., *Chinese Herbal Therapies for Immune Disorders*, Institute for Traditional Medicine, 1988.

Enger, B., and Longs, E., editors, *AIDS, Immunity, and Chinese Medicine*, Oriental Healing Arts Institute, 1989.

$650,000 Grant for Study of Peruvian Plants

The Andrew W. Mellon Foundation has awarded a three-year grant of $650,000 to the Missouri Botanical Gardens which, under the direction of Dr. Peter H. Raven, operates the most active tropical botany research program in the world. The grant is to support ongoing studies of the plants of Peru and will fund a botanist/computer expert to refine the TROPICOS system, a data base developed by Garden botanists. The National Science Foundation selected TROPICOS as the central data base about plants, and significant progress has been made in centralizing information on plants of the New World. TROPICOS will provide several advantages over traditionally published materials. Scientists can easily search and sort information through coded materials in the data base. This information is always the most current available, since it is constantly updated as new materials are discovered.

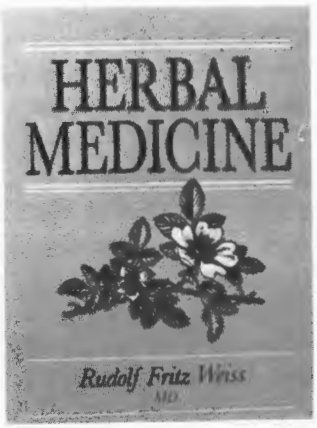
Botanist and Herb Firm Aid Samoan Rain Forest

When the government of Western Samoa required the village of Falealupo on the island of Savai'i to construct a new elementary school, a debt was created which was impossible for the villagers to repay. As a result, the chiefs and caretakers of the Falealupo rain forest who had, until then, courageously protected their rain forest from commercial exploitation, reluctantly relented and allowed logging to begin in July 1988. This irreplaceable forest is considered by all of Samoa to be the spiritual focal point of their traditions, and is the source of much of their food, medicines, ceremonial artifacts, and folklore.

Dr. Paul Cox, world-renowned ethnobotanist at Brigham Young University, contacted Ken Murdock, president of Nature's Way, about the problem. (Twenty-five years ago, Murdock lived in Samoa for two and a half years serving as a missionary.) Nature's Way recently helped rescue the largest remaining lowland rain forest in Western Samoa, comprising approximately 30,000 acres.The contribution was made under a special covenant with the village chiefs whereby the village retains complete ownership of the rain forest and has pledged to keep the forest in its pristine state for the next 50 years.

German Herbal Manual Now in English

HERBAL MEDICINE. *by Rudolf Fritz Weiss, M.D. Translated by A. R. Meuss from the Sixth German Edition of* Lehrbuch der Phytotherapie. *Beaconsfield Publishers, Ltd., Beaconsfield, England. 1988. Softcover. 363 pp. Distributed in the U.S. by: Medicina Biologica, 4830 N.E. 32nd Ave., Portland, OR 97211. $49 postpaid.*
(Ed. Note: We received two reviews of this book; one from Steven Foster, the other from Dr. Jim Duke. Each offers a different perspective, though their conclusions are the same: get this book!)



Nice to be snowed in with a crisp new book to review. And this one, being a translation of a German "Lehrbuch," is full of interesting items that do not appear among the herbal echoes of our English-language herbals.

It differs from many American herbals, also pleasantly, in being arranged by indication rather than herb. First off is the digestive system (Chapter 4), led by Hungarian chamomile, well illustrated by Dinzinger, with discourses on other chamomiles. Effective ingredients are summarized, azulene as anti-inflammatory and febrifugal, bisabolol as anti-inflammatory, antiulcerogenic, and spasmolytic (three times more active than papaverine). Sharing my belief in synergies, the author adds "chamomile flowers...contain a whole complex of active principles which only gives the full chamomile effect when used in its totality.... Where chamomile is concerned, chamomile tea, or alternatively, fluid extract of chamomile, is greatly to be preferred to pure azulene."

American medicine, by contrast, tends to isolate the azulene and throw out all its synergistic consorts. Weiss names the scientists responsible for advancing the knowledge about chamomile with brief references sporadically included in the text. Weiss enumerated several chamomile compounds that are both anti-inflammatory and spasmolytic, without commenting on whether their combined activities would be antagonistic, additive, or synergistic. I'll bet on the latter without endorsing chamomile enemas. Cited as both antiphlogistic and spasmolytic are (-)-alpha-bisabolol, bisabolol-oxide, bisabolol-oxide-A,B,C, chrysosplenin, chrysosplenol, and jaceidin, with apigenin and chamazulene cited merely as spasmolytic and antiphlogistic respectively.

Lending an even greater air of credibility, Weiss candidly states: "It has been stated that azulene also has antiallergic properties, but as yet there has been no experimental proof."

...this book has evolved from the German phytotherapy tradition, where herbal medicine is at least an accepted medical modality...

Following the pharmacological paragraph, chamomile preparations are discussed. The author then moves on to peppermint, long famed as a carminative, giving it a parallel treatment.

When my wife was suffering gallstone attacks, I would have referred to this book had I had it. On page 29, Weiss notes that patients with gallstones (and nausea) "will benefit from peppermint tea" (although that reference to gallstones is not indexed). Certainly I would take a peppermint tea to counter the nausea of a bilious attack, were I to suffer such.

A few errors slipped in here and there. Milk thistle, also called Marian thistle (not indexed, e.g., page 79), is carried under three different scientific names, *Cnicus marianus*, *Canduus marianus*, and more correctly, *Silybum marianus*.

Saw Palmetto (*Serenoa repens*, alias *Sabal serrulata*), highly regarded in Europe, is described as growing "wild in Mediterranean countries, from southern Spain and Majorca down to North Africa, where it is most common." As best I can determine, the species, widely respected for prostate ailments, is native to Florida, from whence it is exported to Europe. I'm surprised to read (and doubt) that in Europe the evening primrose flowers remain "wide open throughout the following day" after opening. Here in Maryland, the flowers close early in the morning (except late in Autumn or on very cloudy wet days). I know not of beta-linolenic acid for the evening primrose; a slip of Weiss's pen, I suppose. It should read "gamma linolenic."

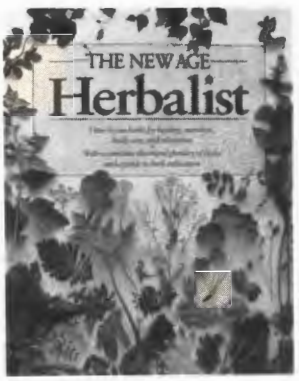
Coverage is good, with nearly 500 species binomials indexed. In spite of a few errors, I find this to be a well-illustrated, interesting, and useful reference book, fairly well indexed, and very welcome on my nearest bookshelf. — JAD

This book, *Herbal Medicine*, is unequivocally the most useful English-language text on the subject to come across my desk since the long-outdated, but still useful Felter and Lloyd's 18th edition of *King's American Dispensatory*. From the outset it is important to understand that this book has evolved from the German phytotherapy tradition, where herbal medicine is at least an accepted medical modality, if not sanctioned. All important and controversial issues (such as "Native Substance versus Pure Substance," "Objections to Phytotherapy," "Phytotherapy is not Homeopathy," "Side Effects," "Phytotherapy in Modern Medicine," and "The Placebo Problem in Proof of Efficacy," just to scratch the surface) dealing with herbs and their role in medicine are discussed in the first three chapters of the book.

The fourteen chapters that follow deal with specific herbal therapies, rationale, preparation, dose, and refer-

Color Photos Give New Age Herbal Extra Edge

THE NEW AGE HERBALIST.
Richard Mabey (ed.), Photography by Philip Dowell. Macmillan (hardcover $32.50), Collier Books (softcover $16.95): Macmillan or Collier Books, 866 Third Ave., New York, NY 10022. 1988. 288 pp.



This is essentially a British production offered to an American audience, attempting to cover all the bases as "a complete guide for natural living, recommending healthy herbal alternatives to synthetic chemical products." Part one of the book, "understanding herbs," is primarily an encyclopedic treatment of 200 species of herbs for healthy living. Each listing included parts used, constituents, main uses, cautions and restrictions, coupled with small pen and inks of each plant. This is one of the best popular quick references to medicinal uses of herbs that I have seen. One of the most appealing aspects of this section of the book is the fact that the medicinal information is often but not always referenced to scientific literature.

Color photographs of plants on a seamless white background are scattered throughout the book. These include freshly harvested wild plants supplied by Suffolk Herbs, Sawyers Farms, Little Conrad, Sudbury, Suffolk, and dried plant material supplied by G. Baldwin & Co., London. It is these excellent photographs that set the book apart from all other titles currently available. Most impressive, except for the mis-identified plants such as *Echinacea purpurea* labelled "*Echinacea pallida*" and *Echinacea pallida* labelled "*Echinacea angustifolia.*" It's not the first time that there has been confusion about the identify of Echinacea species, however. On the same page (p. 50) a goldenrod species is mislabeled *Solidago canadensis*. Hopefully these unfortunate mistakes will be corrected in future printings of the book. If for no other reason, buy the book for the fabulous photography.

This is one of the best popular quick references to medicinal uses of herbs that I have seen. One of the most appealing aspects of this section of the book is the fact that the medicinal information is often but not always referenced to scientific literature.

In Part Two of the book every aspect of herb use is covered in five chapters. Chapter two covers herbs and the user, and plants and human technology. Chapter three includes preparations, body care, mind and relaxation, aromatherapy, home care, fragrance, dyeing with plants, and insect repellants. Chapter four covers herbs for nutrition and health. This is the culinary section dealing with herb use and health from a preventative perspective. Here, one finds teas, vinegars, herb salads, and wild edibles. Chapter five deals with green medicine aspects, covering different body systems and first aid. Chapter six gives the basics of herb gardening. Looks like the editors were burned out by the time they got to compiling the tiny resource section and the very basic, but useful chemical glossary.

This is the best all-round "be everything" popular herbal I've seen in a long time. A standard popular reference. — SF

Herbal Medicine

ences, according to body system and disease condition—the digestive system, the cardiovascular system, the respiratory system, etc. You will find more detail, more factual information backed-up with scientific literature, more clinical experience, more explanation for the rationale of using a plant, preparation, or combination, and more benefit of experience, than you will find in any other single source.

On the negative side, I could point out the few misspellings, the sometimes out-dated Latin binomials, the fact that most of the European commercial products mentioned in the book are not available here, the sometimes conflicting information in which knowledge from earlier editions was not replaced by updates in later editions, and the nightmarish manner in which the references are typeset at the end of each section (requiring glasses to make sense of the citations or a change in prescription if you already wear them). But, hey, why bother? The fact is this: *Herbal Medicine* is simply better than any book in print on the subject you now have in your library (unless you read Chinese or German). Besides, as Alexander Pope once wrote (as quoted in *Botanico-Periodicum-Huntianum*):

> "Whoever thinks a faultless piece to see
> Thinks what ne'er was, nor is, nor ne'er will be."

Words for reviewers to live by. Are you interested in medicinal plants? "Yes," means you've just been sold a copy of this book. — SF

"Planetierra" Herbology

PLANETARY HERBOLOGY.
By Michael Tierra. Lotus Press, P.O. Box 6265, Santa Fe, NM 87502-6265. 1988. Softcover 485 pp. $18.95

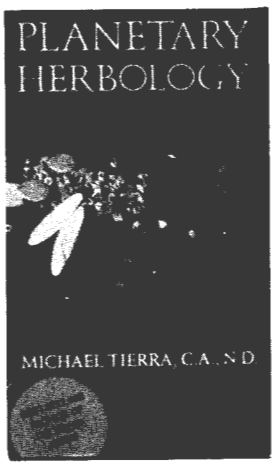
(Ed Note: Like the reviews of Weiss's Herbal Medicine, *we offer two reviews of this book. First, Mark Blumenthal's somewhat philosophical review, and then botanical book curmudgeon Steven Foster's characteristically more critical treatment.)*

We are living in a time when synthesis seems to be the order of the day. East is meeting West in many of our cultural aspects: food, medicine, religion, art, business management, and more. Medicine has experienced the emergence of a "holistic" movement in which practitioners visualize the whole body/mind as one phenomenon. There are many more examples of how seemingly disparate forces, trends, customs, and ideas are blending into a global awareness. McLuhan's "global village" is upon us.

Enter into this arena the popular herbalist, author, and teacher Michael Tierra. His first book, *The Way of Herbs*, sold hundreds of thousands of copies. In *Planetary Herbology*, Tierra continues his progression into the uses of herbs from various cultures. To my knowledge never before in the English language has one herbal attempted to treat the herbal lore of China, India, Europe and America in such a comprehensive manner.

The first hundred pages or so deals with Tierra's own brand of eclectic global (I mean "Planetary") herbalism. He devotes a fair amount of space to an explanation of the "nature" of herbs through the energetic system of herb classification. This system of typifying herbs according to thier energies (heat/cold, damp/dry, bitter/sweet, etc.) is how they are considered in the Chinese and Ayurvedic systems of traditional medicine.

Tierra treats his subject with the respect that one would come to expect of a man who is dedicated to teaching and practicing the ancient arts of using herbs by their energies, mixing herbology



with his own clinical practice of acupuncture and food counseling. To Tierra, herbs are not merely mixtures of chemical soups to be reduced by the Western physicalist/reductionist/scientific mind to their lowest common denominator and "active ingredients." To Michael Tierra, the sum of the whole is greater than the parts.

Although suitable for the beginner, it is more valuable to those who have a basic degree of familiarity with herbs, which these days would mean thousands of people.

One of the highlights of the text is the Appendices. The "Chemistry of Herb Energetics," by botanist/author Christopher Hobbs, in which an attempt is made to clarify the Oriental energetic theories with respect to Western chemical pharmacology, is probably the first treatment on this subject this reviewer has ever seen. Truly a synthesis here!

The second appendix, "Herbal Supplements for Vegetarians," by Tierra, is both practical and timely, given the increased interest in non-meat diets these days.

Another accomplishment of this book at providing synthesis is David Frawley's treatment of the comparison of Ayurveda and Chinese medicine in the third appendix. Frawley, who edited this volume, is not only a Sanskrit scholar and author, but also teaches both Chinese and Ayurvedic medicine. This essay offers the reader a valuable insight into these two ancient systems. I am sure the publishers and author had to labor long over the decision whether to position these Appendices at the end of the book or as part of the initial introductory material, as they add an important dimension of understanding, especially for the novice.

The "herbal" or "materia medica" portion of the book is arranged by functions. That is, herbs are grouped by their primary therapeutic functions, such as "heat clearing," "surface relieving," laxatives, stimulants, tonics, sedatives and nervines, diuretics, etc. Thus, we find Elecampane root (*Inula helenium*, whose Latin name is misspelled in the book) listed as a tonic for its "chi tonic" properties, instead of finding it listed in the section with "Expectorants and Antitussives" where one would most likely expect to find Elecampane. But because it acts to clear lungs and thereby increase "prana" and "chi," it is listed as a tonic. Such is the orientation of herbology within the Chinese/Ayurvedic tradition.

Another example might be the classification of Camphor (*Cinnamonum camphora*) in the "sedative and nervine" category. Usually considered to be a circulatory stimulant, it can also have sedative and anti-spasmodic properties, depending on dosage and mode of administration. But in Tierra's world, this herb is listed as a sedative. To journey into the world of herbs with Tierra, the reader must sometimes forego some previously acquired Western herbalism in order to be able to get the whole picture. Such are the demands of a "Planetary" perspective.

The short monograph on each herb includes the energetics, the acupuncture meridians and organs affected, which part of the herb is used, active chemical constituents, pharmacological properties, usage (indications) and dosage. The information is gleaned from numerous references (interesting bibliography) plus Tierra's own experience.

Although suitable for the beginner,

Many consumers have been waiting for another book to complement the author's *Way of Herbs*. *Planetary Herbology* is born of Michael Tierra's concept of blending and integrating Western herbalism with the diagnostic and therapeutic traditions of Chinese and East Indian herbalism. The author builds on the theme of "Planetary Herbalism" as a concept of harmonizing the best points of the world's most developed traditional herbal medicine systems (such as differential classification of disease and energetic classifications of herbs) with useful scientific knowledge.

The first part of the book introduces us to "Planetary Herbalism," its roots, and historical traditions, and discusses the nature of plant energetics as viewed in Chinese and Ayurvedic traditions. We learn how herbal medicines are viewed as foods. Next, the author explores Western traditions including the European tradition, Native American herbalism, and the Eclectics.

"Preparation and Processing of Herbs" follows with clear guidelines for dosage and administration of herbs. Chapters on "principles of food therapy," "eight methods of herbal therapy," and a brief discussion of "diseases and their treatment" follow. Then comes a chapter on "Planetary Formulas" which has the appearance of an advertising section for the product line of the same name, endorsed by the author. While actual product names are not mentioned, recommended dosage for many of the formulas is in tablet form, and I can't find instructions for tableting in the "preparations and processing" chapter. Store owners should check listings in this chapter carefully against product labelling and make sure that the book is not displayed in the store in such a way as to constitute labelling. The perception, real or false, that the book promotes a product line, is troubling from a journalistic standpoint.

That covers the first 142 pages. Part Two is an encyclopedic treatment of over 400 herbs and other medicinal substances, including information on their "energetics," "meridians/organs affected," "parts used," "active constituents," "properties," "uses," "dosage," and where appropriate, "precautions." These are arranged in chapters according to their functions and uses from "heat-clearing herbs" to sedatives. In these articles various herbal traditions are blended, from Chinese and historical American uses to scientific vindication. Those interested in quick reference information on the use of herbs will find this section handy and useful. Information on dosage, lacking in many books, is available here.

The major drawback in the book comes in credibility of presentation. It is a sea of misspellings, errors in capitalization, bad hyphenation, lack of footnoting for quoted references (coupled with their absence from the bibliography), and other problems that could have been avoided with more than cursory attention to editing. Many of the Latin plant names are misspelled, intermixed with inconsistencies—too many of each. Some of the "Latin names" combine pharmaceutical Latin with botanical Latin. A number of the Latin names are long out-of-date. Sometimes more than one Latin name falls under the same common name heading, with no clearly defined intention. Patchouli, we are told, is represented by *Agastache rugosa* (Anise Hyssop) and *Pogostemon cablin* (Patchouli). While they may be used interchangably in Chinese medicine, they are two very different products from a Western perspective. The reader has no clue. Under "birch" we find *Betula alba* and *B. lenta* treated as one—two very different products. While *B. alba* may produce only a "trace of essential oil," *Betula lenta* produces substantially more. Under Spikenard, we find *Aralia racemosa* properly listed, along with three other species, "*A. califorica*" [sic], *A. nudicaulis* (the first time I have seen this species described as Spikenard), and "*A. quinquefolia*," a synonym for American ginseng (*Panax quinquefolium*) out of usage for more than 100 years. That name has no place here or anywhere else in the book. Names are reference points. Here, too often, the use of names is ambiguous. Their utility as reference points is lost.

Planetary Herbology (and I am still looking for an English language dictionary that lists the word "herbology") is an interesting book full of thought-provoking directions for herbalism, both philosophical and practical. Many will find it a useful, helpful reference.

2There is a lot here. Lotus Press should be commended for bringing this valuable text to the public, but not in this condition. I hope before a second printing reaches the presses, the book will benefit from the proper editing that is commensurate with the respect due the author. — SF

it is more valuable to those who have a basic degree of familiarity with herbs, which these days would mean thousands of people. Practitioners of acupuncture and other "alternative" therapies will no doubt find this book useful.

Quite predictably, this book will be hailed as a welcome addition to the literature on Eastern herbal lore by enthusiasts of both Ayurveda and Traditional Chinese Medicine. Like Frawley and Lad in *The Yoga of Herbs* (the most definitive American book to date on Ayurvedic herbs, from the same publisher, 1986), Tierra has taken the principles of the Ayurvedic system of herbal energetics and applied it not only to the more popular major Ayurvedic herbs, but also to Western herbs as well. Thus, the reader can find such staple Western herbs as Goldenseal, Echinacea, and Oregon Grape Root with information regarding their particular energies from the Oriental perspective. To this, add the Chinese perspective of how each herb affects the acupuncture meridians and you have "Planetary Herbology."

However, some herbalists, botanists, pharmacists and others of a similar conventional Western training might find Tierra's approach a challenge to their botanical/pharmacological belief systems. So be it. After all, where and when do we ever arrive at the limits of knowledge on any subject?

Tierra may or may not be exploring the limits of current knowledge about herbs, but there is no doubt that he is providing herb students with valuable information in areas that are becoming more popular among an increasingly larger segment of the population. One can only wonder where he will go next for more interesting herbs to incorporate into the evolving body of Western herbal lore. Should we expect "Galactic Herbology" in a few years? — *MB*

Neanderthal Nibbling: The Missing Link Diet?

THE PALEOLITHIC PRESCRIPTION. A PROGRAM OF DIET AND EXERCISE AND A DESIGN FOR LIVING. *S. Boyd Eaton, Marjorie Shostak, and Melvin Konner. Harper and Row, New York. 306 pp. $17.95.*

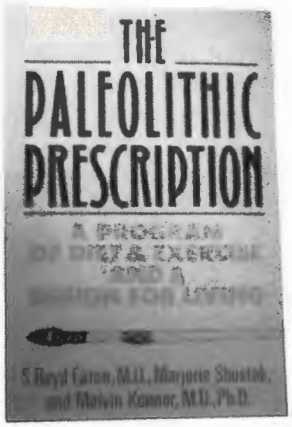
Certainly this is more readable than most diet books, but then again, it's as much philosophy as prescription. The philosophy is that of paleolithic foragers, as viewed from afar, with evidence justifying the interpretation.

The main thesis of the book, at least in this reader's eye, is that the genes of modern man equip him more to live in the paleolithic world, with paleolithic family, foraging , and exercise patterns, than in an affluent "New Age," "Rock and Roll" America.

The main argument of the book, the discordance hypothesis, is advanced in Chapter 3. "Fully 99 percent of our genetic heritage dates from the period before our ancestors became human (and of the remainder, 99 percent dates from before the development of agriculture)...So here we are in the late twentieth century, with a 40,000-year-old model body...with genetic makeups essentially out of synch with our lifestyles, and inevitable discordance...This mismatch—referred to here as the discordance hypothesis—can account for many of our illnesses, especially the chronic diseases of civilization that cause 75 percent of the deaths in industrial societies."

A modern forager's diet, like a paleolithic forager's diet, can help avoid many of these "diseases of civilization." They are listed below with the paleolithic prescription.

1. Atherosclerosis: Less fat, more exercise, no tobacco
2. Hypertension: Less sodium, more calcium and potassium; more exercise



3. Diabetes: More exercise, more non-nutrient fiber and complex carbohydrates, fewer simple sugars
4. Chronic obstructive lung disease: No smoking
5. Cancer: Less fat; more calcium, more non-digestible fiber, no smoking, no alcohol
6. Osteoporosis: More exercise, more calcium
7. Hearing loss: Avoid noise
8. Dental caries: Less refined sugar
9. Alcohol diseases: No alcohol (or no more than 2-3 drinks a day)
10. Diverticular disease: More fiber
11. Obesity: More exercise, more fiber, less saturated fat

If you're the average American, here's what the authors say you need to do to "go paleolithic."

1. Eat half as much fat.
2. Reverse your polyunsaturated/saturated fat ration, favoring the former.
3. Consume more complex carbohydrates and crude fiber and less refined sugar and finely ground flour.
4. Consume only one-fourth as much sodium, in the process consuming more potassium than sodium.
5. Double your calcium intake.
6. Get an abundance of micronutrients, especially iron, folate, ascorbic acid, vitamin B12, and essential fatty acids.
7. Consume considerably more fiber (50-100 mg/day), more from fruits and vegetables, and less from grains.
8. Take calorie-sparse rather than calorie-dense food.
9. Consume no alcohol (or considerably less than the 7-10% of total calories that most Americans consume each day.)

Herbalists (and readers of *HerbalGram*) will recognize that the changes indicated above are natural if you live off the land, grazing in the forest instead of the supermarket. The authors frequently remind us that our genes equip us better for the forager's than the supermarket diet. Not giving short shrift to heritage (handed down mouth-to-mouth, generation to generation), the authors credit our ancestors for "Complex and beautifully crafted weapons, potent poisons, increased understanding of edible and inedible plants, and of medicinal herbs..."

I stop that quote with medicinal herbs, to emphasize my major criticism of the book. That's about as far as the authors, two of them medical doctors, go in mentioning medicinal plants.

But their logic re diet could, it seems to this biased review, as well be extended to medicine. Ninety-nine percent of our genes have been with humankind over 40,000 years, and have co-evolved with the plants and animals which we have learned to use as food and medicines. Are we not as well equipped to deal with paleolithic medicines as we are to deal with paleolithic diets? If so, I'm pretty well on the way to compiling the paleolithic pharmacy, which should interest many of our readers. *The Paleolithic Prescription*, here reviewed, should appeal to a wide spectrum of readers, from foragers and herbalists to nutritionists. I recommend it highly. — JAD

Masterpiece of Medicinal Mushrooms

ICONES OF MEDICINAL FUNGI FROM CHINA. *By Ying Jianzhe, Mao Xiaolan, Ma Qiming, Zhong Yichen, and Wen Huaan. Translated by Xu Yuehan. Science Press, Beijing. 1987. Hardcover. 575 pp. $90.00 (shipping $4.00) Available in U.S. from: American Botanist Books, 1103 West Truitt Ave., Chillicothe, IL 61523.*

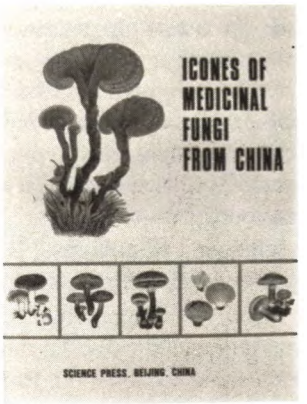
I had a chance to visit the Medicinal Fungus Department of the Institute of Medicinal Plant Development in Beijing last year. Here scientists were working on bringing mushrooms used in Traditional Chinese Medicine under cultivation for the first time. The Reishi Mushroom (*Ganoderma lucidum*) was growing in row upon row of jars in a cellar. In a laboratory above, polysaccharides were being extracted for use in an injectable drug used as an adjunct immunostimulant therapy for patients undergoing chemotherapy cancer treatment. Across the city, at the Institute of Chinese Materia Medica, Academy of Traditional Chinese Medicine, a similar product was being produced from *Polyporus umbellatus*.

We often think of mushrooms in terms of food or poison, rarely as medicine, but the Chinese have been using mushrooms for medicinal uses for at least 2,000 years. This compendium, covering 272 species, enumerates Chinese medicinal fungi. They are alphabetically arranged by scientific name. Each write-up includes a description of the mushroom and identifying features, followed by "habitat," "distribution," plus notes on medicinal value, often including traditional knowledge and always including current referenced scientific citations.

While providing a wealth of information, the chief feature of the book is the attractive, accurate, color art work opposite the text on each plant. Many of the fungi genera in this book are familiar to the Western mushroomer. Without seeing the title of the book, thumbing through it could make one think they were looking at a beautiful color guide to mushrooms of North America. Science Press has again made a major contribution to the medicinal plant literature that is not only useful, but beautiful and essential.

— SF

Note: When ordering this book and *Colour Atlas of Chinese Traditional Medicines*, allow eight weeks for delivery.



COLOUR ATLAS OF CHINESE TRADITIONAL DRUGS. Vol. 1. *Edited by The National Institute for the Control of Pharmaceutical and Biological Products. Science Press, Beijing. 1987. Hardcover. 300 pp. $80.00 (shipping $6.00) Available in U.S. from: American Botanist Books, 1103 West Truitt Ave., Chillicothe, IL 61523.*

On a trip to Beijing last September, I had the pleasure of visiting the National Institute for the Control of Pharmaceutical and Biological Products (NICPBP), with Prof. Yueh Chung-hsi. Prof. Yueh had been assigned to this institution from 1972-1976 to work on the 1977 edition of the *Pharmacopeia of the People's Republic of China*, which included over 700 plant drugs. Producing China's *Pharmacopeia* is only one of the duties charged to NICPBP, China's counterpart to the FDA. They develop standards for identification and quality of drugs used in China, both chemical and herbal. The NICPBP's specimen collection includes over 60,000 plant and animal drug samples from all over China, including substitutes and adulterants. They are neatly organized and displayed in specimen jars within seemingly endless rows of glass cabinets. If one wants to know the form of a traditional Chinese plant drug, this is the collection to see. NICPBP also has an excellent herbarium with pressed specimens of all drug plants. The current 1985 edition of the *Pharmacopeia of the People's Republic of China* contains over 500 plant drugs. Over 200 obscure "nationality medicines," drugs used by ethnic groups in China were dropped from the revised *Chinese Pharmacopeia* due to lack of availability throughout all of China.

With each entry, this book gives a clear, detailed botanical description (including Latin name and authority), as well as habitat and distribution.

The *Colour Atlas of Chinese Traditional Drugs* Vol. 1 is the first of three volumes serving as an English-language interpretive text of the 500 official plant drugs recognized by the Chinese Pharmacopeial Committee to be produced by NICPBP. Anyone interested in Chinese medicinal plants (or uses of horticulturals growing in the U.S.) will want to own this volume. One hundred fifty drugs, mostly plants, but including some animal drugs, are included. The volume contains over 600 (that's not a misprint) excellent, clear, detailed, well-composed, beautifully reproduced color photographs. The photos not only

See Atlas, page 46

BOOK REVIEWS

Atlas, *from page 46*

depict each plant in its native habitat or in a commercially cultivated situation, but details of the flowers and fruits, the plant part used for medicine, and a photo of the finished form of the crude drug. Great pains were taken to find excellent specimens to photograph at the proper stage of growth, then before photographs were taken, each plant and crude drug material was scientifically identified.

As a person with a botanical orientation, I am frustrated by most English-language books on Chinese medicinal plants which fail to describe the source plant of the drug. With each entry, this book gives a clear detailed botanical description (including Latin name and authority), as well as habitat and distribution. Next comes information on the part harvested, timing of harvest, method of preparation, processing or cleaning, and a description of the drug part itself, along with notes on flavor and fragrance. Notes on the chemistry of the plant follow. Finally, there is a brief enumeration of medicinal characteristics and applications.

While those who are not interested in Chinese medicinal plants may not think this book is for them, think twice. Not only is the book a valuable research tool to any scientist working on natural products, herbalists, and practitioners of Chinese medicine, but for the herb enthusiast simply interested in a beautiful, profusely illustrated herbal for the coffee table, this book is among the best "glossy herbals" I've seen in years. And many of the plants are familiar to Americans. Here we find peonies, Rose-of-Sharon, Flowering-quince, Garden Balsam, Bletilla Orchid, Mimosa (*Albizzia*), Lilyturf, Cockscomb, and Balloon Flower. Here we also find common familiar "weeds" such as Purslane, Self-Heal (*Prunella*), Plantain, Burdock, and Japanese Honeysuckle. If you are a natural products researcher, this book is a must. If you are simply interested in appreciating plants for their beauty and use, you will want to own this volume. Highly recommended. — SF

SPECIAL REPORT

Tricosanthes, *from page 25*

According to a 13 April 1989 press release from San Francisco General Hospital/ UCSF, which coincided with the publication of the research paper, Sandoz, Ltd., the Swiss pharmaceutical giant, helped finance the research and will have exclusive rights to market the product. The press release states that the drug seems to "block HIV replication in infected T-cells and kills HIV-infected macrophages—the body's scavenger cells—in cell cultures." It does so by selectively killing cells harboring the AIDS virus, apparently without affecting uninfected cells. To this point the results have only come from cell culture tests in the laboratory — not studies in animals or humans. Extensive clinical trials will be necessary before any definitive conclusions can be drawn from the cell culture studies.

Trichosanthin, deemed the active ingredient of GLQ223, has been tested in humans by Chinese researchers. Chang & But (1986) reported on clinical studies on more than 10,000 human subjects using trichosanthin (but not in AIDS treatment). The *New York Times* ran a feature article on GLQ223 on April 18, 1989. Under the headline, "Early Tests Promising For a New AIDS Drug," Gina Kolata acknowledges that "the plant extract has been used in China since A.D. 300 to induce abortion. It [GLQ223] is also the only drug that deals directly with macrophage cells, which serve as a reservoir for the virus in the body....people with AIDS typically have tens of billions of infected macrophage cells."

"Other drugs, like AZT, the only drug now licensed for the treatment of AIDS," the *New York Times* report continues, "prevent the virus from replicating in T-4 cells, which are immune system cells that are destroyed by the virus. But they do not affect the macrophages." (Kolata, 1989.)

In a 27 April 1989 press release, San Francisco General Hospital announced that FDA approval has been granted for Genelab's Investigational New Drug (IND) application for Phase I clinical trials. Initial GLQ223 injection trials in humans have now begun. These trials are designed to determine the safety and tolerance of GLQ223 in humans. Further information on the Phase I trials will not be released from the researchers or collaborating institutions until the study is completed.

If trichosanthin cures AIDS, it may be equivalent to curing the plague. But will the Third World be able to afford it? There is a tendency in the industry to make semisynthetic derivatives, which *may* be more *proprietary*, efficacious, safe, and/or soluble. Trichosanthin, applied parenterally, can cause abortion. At this point, it is suspected that orally ingested trichosanthin will not pass into the bloodstream, where, presumably, it is needed for AIDS. That seems an important question for Third-World scientists to tackle while First World scientists wrestle with building a proprietary drug that can recoup the $125 million it takes to prove a new drug safe and efficacious.

No one should, in desperation, be injecting or ingesting unknown substances from the Cucurbitaceae. Dr. McGrath notes the case of 6 AIDS patients who went to China, bought some white powder said to be cucumber root, injected it, suffered seizures and fevers, and were hospitalized. He speculates that they bought a crude extract of plant proteins, including lectins, which cause blood cells to stick together and which can be lethal. The drug that Dr. McGrath and his colleagues studied is believed to be highly purified, consisting of a single protein from the plant root.

Farnsworth is concerned that clinical trials may experience some of the same difficulties that the Chinese experienced with respect to sensitization and anaphylaxis after the initial exposure. He wonders whether researchers will be able to knock out the HIV virus with only one initial dose, without putting the patient at further risk with subsequent treatments.

Adds Farnsworth, "What do you do *if* a drug like GLQ223 proves to be effective for HIV? Once you kill off the virus, what happens to a person with

virtually no immune system left intact? If Chinese herbs hold the answer to killing the AIDS virus, then possibly Chinese herbs—i.e. the traditional tonics like ginseng and astragalus, etc.—may also hold the key to restoring immune functions!" ❐

(Editor's note: Unauthorized AIDs treatment has been underway in several major American cities, under the direction of several physicians and biochemists. One patient reportedly died in late June from complications possibly resulting from Tricosanthin injections. The FDA is now investigating unauthorized trichosanthin treatment programs. Stay tuned...)

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June 23-25 — Fourth Annual Women's Herbalist Conference. Women from many different paths study how to use plants for healing. Classes for all skill levels. Rugged physical accomodations at Trillium Farm in S. Oregon's Applegate Valley. Contact: Wren Davidson 503/342-6369.

July 7-August 15 — Tibetan Herb Walk and Practical Seminar. Two-week seminar on traditional Tibetan herbs, Ladakh, India, near the Tibetan border. $3,500 includes air fare from U.S. West Coast. Contact: Chakpori Institute of Medicine, P.O. Box 956, Boulder, CO 80306.

July 22-25 — Herbs '89: Herb Growers and Marketers Conference. Fourth annual sponsored by International Herb Growers and Marketers Association, Purdue Univ. and Univ. of California, Davis. Red Lion Inn, San Jose, CA. Contact: Maureen Buehrle, IHGMA, P.O. Box 281, Silver Springs, PA 17575.

July 23-29 — Third International Symposium on Poisonous Plants. Sponsored by USDA Poisonous Plants Res. Lab; Utah Ag. Exp. Station; Queensland Dept. of Primary Industries & Animal Res. Inst. Contact: Jillyn Smith, Utah State Univ., Logan, UT 84322-0500. 801/750-1359.

July 26-29 — American Horticultural Society 44th Annual Meeting. Radisson Plaza Hotel, Minneapolis, Minn. Program includes visits to Como Park Conservatory, Dodge Nature Center, Minneapolis Institute of Art, Minneapolis Sculpture Garden, Cowles Conservatory, Minnesota Landscape Arboretum, Rose and Rock Gardens. Contact: American Horticultural Society, Box 0105, Mount Vernon, VA 22121.

July 30-31 — Eastern Native Plant Alliance (ENPA) Meeting. ENPA covers eastern U.S. and Canada, uniting organizations that promote and demonstrate native plant conservation in order to present a consistent conservation message. For information, contact: Editor, *Wildflower*, 90 Wolfrey Ave., Toronto, Ontario, Canada M4K 1K8.

July 30-August 7 — Gardens of the Canadian Rockies, horticultural adventure sponsored by American Horticultural Society. Tour gardens in Calgary, Banff, Jasper, and Edmonton areas, some never open to the public. Contact: Carolyn Marsh Lindsay, American Horticultural Society, Box 0105, Mt. Vernon, VA 22121 or call Leonard Haertter Travel Co., 800/942-6666. (In Missouri, 314/721-6200).

August 5-7 — Oregon Herbal Workshop. Three days with Cascade Geller. Medicinal and edible uses. Contact: Sitka Center, P.O. Box 65, Otis, OR 97368. 503/994-5485.

August 6-10 — 30th Annual Meeting of the American Society of Pharmacognosy. Includes Symposiums on "Natural Products and the Disease Condition" and "Biotechnology of Natural Products." Contact Dr. Pedro Chavez, Scientific Program Chairman, School of Pharmacy, U. of Puerto Rico, G.P.O. Box 5067, San Juan, P.R. 00936. 809/758-02525 ext. 5316 or 5410.

August 18-20 — Women's Herbal Conference. Rosemary Gladstar and seven leading women herbalists share skills in herbal medicine, cosmetics, animal care, wise woman healing, and more. $150 includes workshops, camping, meals. Register by July 7th and save $25. Send 50% deposit to: Blazing Star Herbal School, P.O. Box 6, Shelburne Falls, ME 01370. 413/625-6875.

August 24-27 — Mushroom Conference, Telluride, Colorado. For those interested in mushrooms, both wild and cultivated; edible, poisonous and psychoactive species. Didactic courses led by Gary Lincoff, Paul Stamets, Andrew Weil, and Ethan Nodleman. Forays into forests and mountains in beautiful setting. Contact: Fungophile, P.O. Box 5503, Denver, CO 80217.

September 3-5 — Annual Conference of the American Holistic Veterinary Medical Association. Seattle Hilton Hotel. Contact AMHVMA, 2214 Old Emmorton Road, Bel Air, MD 21014.

September 5-9 — 37th Annual Congress of the Society for Medicinal Plant Research, University of Braunschweig, FRG. Contact: Prof. Dr. T. Hartmann, Institut für Pharmazeutische Biologie der Technischen Universität, Mendelssohnstr. 1, D-3300 Braunschweig (FRG), Phone: (0531) 3-91-56 80. TELEX: 9 52 526 TUBSW. FAX 3-91-45 77.

September 11 — American Chemical Society, Division of Agricultural and Food Chemistry, Miami Beach, FL. One day conference: "Plant Chemical Useful to Humans." Contact Dr. Herbert Nigg, 813/956-1151.

September 13-17 — Eighth Annual Breitenbush Professional Herbalists Retreat. Professionals, Sept 13-15; General student workshops, Sept 15-17; herb walks, classes, workshops, and demonstrations. California School of Herbal Studies, P.O. Box 39, Forestville, CA 95436. 707/887-7457.

September 22-24 — Green Nations Gathering, Catskill Mountains. Gardeners, foragers, and earth-centered folks learn from each other, network for the planet, and play. Sweat lodges, herbal emporium, and workshops with Thundercloud, Field Chief of the Cherokee Nation and 12 leading herbalists. $150 ($130 if received before July 28), plus room and board. Contact Pam Montgomery, Box 41, Rt. 9W, Milton, NY 12547 914/795-5238.

October — Two-week guided herbal medicine expedition to the unexploited area of the Amazon in Venezuela. Live for 4 days in the jungle with the Anonami people. Hurry! Tour limited to 8 people. Contact Michael Tierra, East/West, P.O. Box 712, Santa Cruz, CA 95061.

November 8-12 — International Conference on Holistic Health and Medicine. Bangalore, India. Contact: Dr. Issac Mathai, International Conference on Holistic Health & Medicine, c/o Travel Corporation India Pvt. Ltd., 9 Residency Rd., Bangalore-560 025, India.

1990 EVENTS

May 29-31, 1990 — Rhubarb '90, First International Symposium on Rhubarb, Chengde, China. Sponsored by the State Administration of Traditional Chinese Medicine, to promote all aspects of rhubarb studies. Participation of taxonomists, pharmacists, physicians, manufacturers, allied experts, consultants, and administrators in various health fields to exchange views and experiences on rhubarb. Papers invited. After-meeting tours available to participants. Contact: Dr. Hu Shilin or Ms. Huang Yiping, RHUBARB 90 Secretariat, Institute of Chinese Materia Medica, China Academy of Traditional Chinese Medicine, Beixineang No. 18, Dongzhimen Nei St., Beijing, 100700, China. Tel: 4014411-2954, 2964. Telex: 210340 CATCM CN.

October 15-17, 1990 — International Congress on "Traditional Medicine and Medicinal Plants." Contact: Prof. Dr. Sutarjadi, Centre of Research and Development for Traditional Medicine, Airlangaa University, Jalan Airlangaa 4-6, Surabaya, Indonesia.

March 1989 - 1993 — Rainforest Exhibit Tours U.S. "Tropical Rainforests: A Disappearing Treasure," an exhibit visiting 13 North American cities on a five-year tour. The exhibit uses slides, videos, and dioramas showing the beauty, ecological complexity and dilemmas of rainforests; people and animals that live in them. Lighted map tracks deforestation around the world. Interactive video game shows long- and short-term impact of rainforest management decisions. Circulated by the Smithsonian Institution Traveling Exhibition Service (SITES) in cooperation with the World Wildlife Fund. Schedule: **1989** - July 9 - Oct. 1, Discovery Place, Charlotte NC; Nov. 11 - Jan. 28, 1990, Indiana State Museum, Indianapolis, IN. **1990** - Mar. 3 - May 27, Los Angeles City Museum of Natural History, Los Angeles, CA; July 1 - Sept. 23, Missouri Botanical Gardens, St. Louis, MO; Oct 28 - Jan 20, 1991, Boston Museum of Science, Boston, MA. **1991** - American Museum of Natural History, NYC & Denver Museum of Natural History, Denver; **1992** -Houston Museum of Natural Science, Houston & Fernbank Science Center, Atlanta; **1993** - Chicago Botanic Garden, Glencoe, IL, Science Museum of Minnesota, St. Paul & Cleveland Museum of Natural History, Cleveland. Contact Smithsonian Institution Traveling Exhibition Service, Washington, D.C. 20560. ❐

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Herb Magazine - New! Its colorful pages include cultivating, propagating, harvesting, and decorating with herbs. Subscription $16/4 issues. *The Joy of Herbs*, P.O. Box 7617-HG, Birmingham, AL 35253.

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. StoneAcre Press, 84 Carpenter Rd., Apt. 78711-1, New Hartford, CT 06057.

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. $22/yr. Aromatherapy Publications, 3 Shirley St., Hove, E. Sussex, BN3 3WJ England.

Foster's Botanical and Herb Reviews - Information resources, book reviews, new periodicals, etc. Quarterly. $8/yr from Steven Foster, P.O. Box 106, Eureka Springs, AR 72632. 501/253-7309. FAX 501/253-7442.

American Herb Association Quarterly Newsletter - $20/yr. AHA, P.O. Box 353, Rescue, CA 95672.

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 inside back cover.

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Sequoyah College of Herbology - Arkansas State certified 9 months to 1 year correspondence Course I for Certification as Herbalist. Course II, Masters in Herbology. For more information, write: P.O. Box 56057, Little Rock, AR 72205.

Wild Rose College of Natural Healing - Established 1975, offering classroom and correspondence courses in Herbology, Pharmacognosy, Nutrition, Wholistic Health, Biology, Physiology, Homeopathy, Iridology, Vitamin Therapy, and many other fields. Programs for Master Herbalist (two years) and Wholistic Health Therapist (three years). Send $3 for detailed calendar. #302, 1220 Kensington Rd. N.W., Calgary, Alberta, CANADA T2N 3P5. 403/270-0936.

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The School of Herbal Medicine - (American branch, National Institute of Medical Herbalists) offers one-year correspondence course. For information, send business-size SASE to: P.O. Box 2446-G, San Rafael, CA 94912.

Dominion Herbal College - Est. 1926. Chartered Herbalist Degree by correspondence. Master Herbalist Degree and Practical Summer Seminar offered. For information, 7527 Kingsway, Burnaby, British Columbia, CANADA V3N 3C1. 604/521-5822.

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OTHER

Herbalviews 1988 slate of interviews: Madalene Hill, Cascade Anderson-Geller, Nathan Podhurst, Carlo Calabrese (National College of Naturopathic Medicine), Steve Smith (Stash Tea). $5.50 per interview. Send SASE for more information to Barbara K. Bobo, Editor, 1920 Apple Road, St. Paris, OH 43072.

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ACCESS, *from page 5*

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Wildflower — The only magazine in North America devoted exclusively to wild flora. 1 yr/$20; 2 yrs/$35. (Payable in U.S. dollars from U.S. subscribers.) The Canadian Wildflower Society, 75 Temhill Crescent, Don Mills, Ontario, Canada M3C 2E4.

Companion Plants — This plant and herb catalog gives information on longevity, light conditions necessary for cultivation, and usages. 480+ plants/150+ seeds available. 18" x 23" companion planting chart shows relationships between 54 different herbs and vegetables - $2/3 yr catalog subscription. Companion Plants, 7247 North Coolville Ridge Rd., Athens, OH 45701. 614/592-4643.

What's On Tape — Catalog of video tapes on herbs, gardens, gardening, health, and related topics geared specifically to businesses, institutions, and individuals interested in these topics. More than 30 on herbs, including tapes covering wild edibles, herbology, herb gardening, and cooking with herbs. The Seeker Press, P. O. Box 299, Battle Ground, IN 47920. 317/567-2884.

The Herbalist, Quarterly Journal of the Botanical Medicine Society of Ontario, Canada. Original articles on herb history, usage and clinical anecdotes, more. $25 Associate Membership for journal from Botanic Medicine Society, P.O. Box 82, Stn. A. Willowdale, Toronto, Ontario, Canada M2N 5S7.

Leaves of Grass. — International Newsletter on Marijuana Research. Research and data base on legitimate research on this controversial plant. $5.00 per year. Contact: Dr. D.E. Moss, Editor, Leaves of Grass, Dept. of Psychology, Univ. Texas at El Paso, El Paso, TX 79968-0553.

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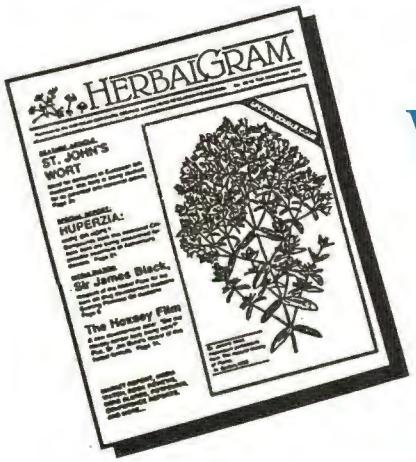

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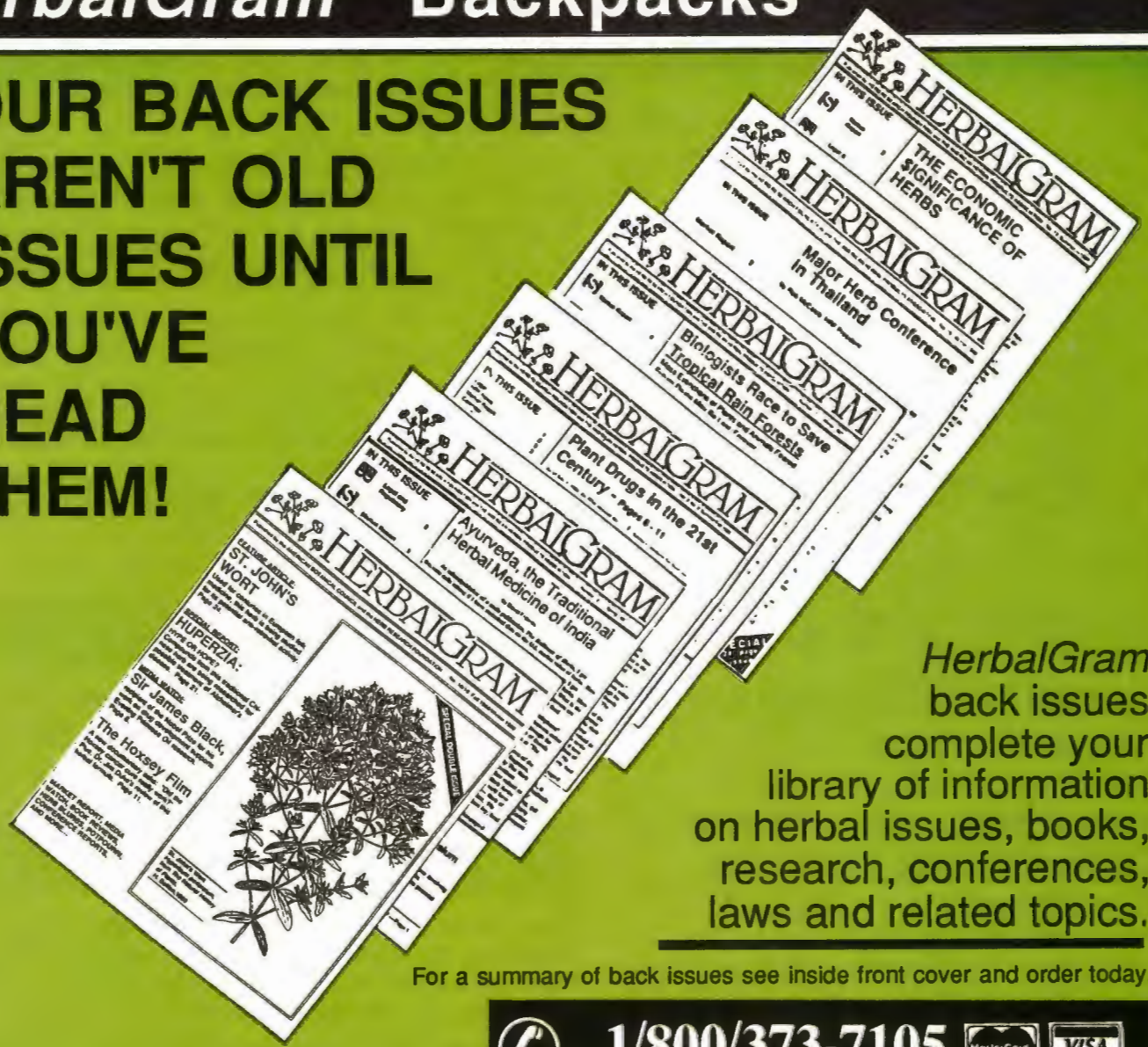

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