

Building Bridges with Traditional Knowledge II

An International Summit meeting on Issues Involving Indigenous Peoples,
Conservation, Sustainable Development and Ethnoscience.

Held Jointly with

The Society for Economic Botany, 42nd Annual Meeting

and

The International Society for Ethnopharmacology

in

Honolulu, Hawai'i

May 28 through June 1, 2001

Hosted by:

The University of Hawai'i

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Summit Meeting Goals

- Provide an open, sharing environment through which conversations and relationships may be built between people who have or use traditional knowledge and natural resources.
- Encourage restoration and preservation of traditional knowledge and cultures.
- Re-evaluation of social and economic priorities in light of cultural rejuvenation.
- Provide a balanced forum for voices of culture, conservation, science, and education.
- Educate the public about key issues in conservation, development, and ethno-science.

Daily Activities

- **Presentation Formats**
Speakers and session organizers have been encouraged to use creative formats and methods for their presentations. Talks will be a mixture of slide or computer presentations and creative expressions including poetry, songs, skits, chants, and panel discussions.
- **Morning Concurrent Sessions on Traditional Knowledge**
Each morning is rich in concurrent theme sessions. Participants may choose to follow a specific theme throughout the week or elect to sample elements of different themes each day.
- **Afternoon Regional Plenary Sessions**
Each afternoon cultural representatives will present views of traditional knowledge from their own perspectives. Participants will learn about ancient and new ways that traditional knowledge is used for the benefit of local and global cultures. Afternoon plenary sessions are the core of the Summit and the cultural representative's unique perspectives hold the key to building bridges with traditional knowledge.
- **Evening Presentations**
Each evening, key speakers will address participants on the roles of traditional knowledge in the areas of cultural and environmental conservation, health, cultural self-determination and the future. Each will draw from their experiences and those of their cultures.
- **Entertainment, Displays, and Posters**
Book, art, craft, cultural demonstration, and product displays will be open to the public. Participants are encouraged to share music, hula, chant, arts, and crafts with others at the Summit. Many of these elements can be found woven into formal presentation sessions and in additional spaces provided throughout the meeting site. Poster presentations will be prominently displayed in areas adjacent to the session rooms for the duration of the summit.
- **Lunch Discussion Groups**
Participants are encouraged to meet in smaller groups to discuss specific issues during the lunch break. These discussion groups can be announced by anybody and a map with locations and topics for each day will be posted daily at the summit.
- **Hawaiian Culture at the Summit**
Sharing traditional Hawaiian culture with a larger audience is an integral part of the Summit. Presentations, chants, hula, music, and traditional Hawaiian science are woven through all aspects of the program.

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Monday, May 28th, 2001

Sunrise Opening Ceremony

6:00-7:00 Kumu Hula **John Keola Lake**, Opening Ceremony: Oli

Concurrent Sessions

Session 1: Kumu 'Ike: Oli, Mele and Hula.

8:00-8:30 Pule, Introduction, and Moderators:

Nalani Olds, Committee for the Preservation of the Hawaiian Language Culture and the Arts, University of Hawai'i at Mānoa, Honolulu, HAWAI'I.

Marjorie Kelly, California State University, Fullerton, California, USA.

Panelists:

Patience Namaka Bacon - Revered Kupuna, Historian, Mentor, Preserver of the traditions of Hawaiian language, culture and the arts, Honolulu, HAWAI'I.

Van Horn Diamond – Musician, Singer, Actor, Mentor, Entrepreneur, Honolulu, HAWAI'I.

Edith Kawelohea McKinzie, Instructor of Hawaiian Culture, Language and Literature, Geneologist, Chant and Hula Master, Committee for the Preservation of the Hawaiian Language Culture and the Arts, University of Hawai'i at Mānoa, Honolulu, HAWAI'I.

Kalena Silva, Master Chanter, Professor, Mentor, Ka Haka 'Ula Ke'elikolani, University of Hawai'i at Hilo, Honolulu, HAWAI'I.

Frank Kawaikapuokalani Hewitt - Kumu Hula, Composer, Teacher, Promoter of traditional Hawaiian healing practices, Waimanalo, HAWAI'I.

Noeoe Zuttermeister – Kumu Hula, Teacher, Mentor, Keeper of traditional family hula and life skills, Honolulu, HAWAI'I.

8:30-10:00 Panel Discussion

10:00-10:30 Morning Break.

10:30-12:00 Panel Discussion

session 2: Intellectual Property Rights: Working Group

8:00-8:30 Introduction to Working Group Panel and Format:

Maui Solomon, Auckland, NEW ZEALAND.

Aroha Te Pareake Mead, Te Puni Kokiri, Wellington, NEW ZEALAND.

Alejandro Argumedo, Indigenous Peoples' Biodiversity Network, Cuzco, PERU.

Elaine Elisabetsky, Laboratório de Etnofarmacologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, BRAZIL.

8:30-10:00 Working Group Discussion

10:00-10:30 Morning Break.

10:30-11:30 Working Group Discussion

11:30-12:00 Conclusions:

Session 3: Traditional Knowledge and Business.

8:00-8:05 **Trish Flaster**, Botanical Liaisons, Inc., Boulder Colorado, USA. Introduction.

8:05-8:35 **Joseph W. Bastien**, Department of Anthropology, University of Texas at Arlington, Arlington, Texas, USA. Healers of the Andes: Kallaway Herbalists and their Use of Medicinal Plants.

8:35-9:05 **Nicolas Gorjestani**, Africa Region, The World Bank, Washington, DC, USA. Using Traditional Knowledge for Socio-economic Development: The World Bank Experience.

9:05-9:35 **Cecilia M. Holmlund**, and **Monica Hammer** Natural Resources Management, Department of Systems Ecology, Stockholm University, Stockholm, SWEDEN. Resource user shift and local ecological knowledge – the case study of fisheries in Stockholm Archipelago, Sweden.

9:35-10:05 **Sehr Hussain-Khaliq**, LEAD, Islamabad, PAKISTAN. Hikmat and the Pharmaceutical Industry in Pakistan.

10:05-10:30 Morning Break.

10:30-11:00 **Michael North**, Greenstar Corporation, Los Angeles, California, USA. Digital Culture: A New Business Model for Villages in the Developing World.

11:00-11:30 **Heloisa Speranza Modesto** and **S. Niessen**. Healthy Dyes Project, Department of Human Ecology, University of Alberta, Edmonton, Alberta, CANADA. The revival of traditional practices as a response to outsiders' demands: the resurgence of natural dye use in San Juan La Laguna, Guatemala.

11:30-12:00 **Dejean-Tchapo Oboté**, **Dété Yachina**, and **Gaglo N'taré Kokouvi**, Information and Communication Initiative for Development (ICI-dev), Lomé, TOGO. Using Information and Communication Technology for increasing access to traditional knowledge and its preservation in Togo.

Session 4:	Applied Biological Conservation I.
8:00-8:10	<u>Introduction</u>
8:10-8:30	J. M. Cruse and J. L. Hamrick , University of Georgia, Athens, Georgia, USA. <u>Conservation of Genetic Diversity in Wild American Ginseng Under Varying Harvest Regimes.</u>
8:30-8:50	Henry Augustine Brown-Acquaye , Department of Education, University College of Education of Winneba, Winneba, GHANA. <u>Traditional Knowledge of Ghanaian Fishermen and Science Education in the Community.</u>
8:50-9:10	Kamau W. Mbuthia , Miami University, Botany Department, Oxford, Ohio, USA. <u>Ethnobotanical and ecological analyses for forest restoration in the Taita Hills, Kenya.</u>
9:10-9:30	Rakiura Titi Islands Committee , Invercargill, NEW ZEALAND. <u>Kia Mau Te Titi Mo Ake Tönu Atu: a research project to assess the sustainability of a traditional harvest of sooty shearwaters (<i>Puffinus griseus</i>) by Rakiura Māori.</u>
9:30-9:50	Lummi Elders , Lummi Nation, Washington, USA. <u>Songs on the Wind: The Arlecho Creek Story.</u> [film]
9:50-10:20	Morning Break.
10:20-10:40	Robert E. Johannes , R.E. Johannes Pty Ltd., Bonnet Hill, Tasmania, Australia. <u>Critical Roles Played by Artisanal Fishers' Knowledge in Effective Tropical Marine Resource Management.</u>
10:40-11:00	Richard Pualoa , Hui Malama 'Aina 'O Laie, Laie, HAWAI'I. <u>Hawaiian Fishing Methods.</u>
11:00-11:20	Chandra Prakash Kala , Wildlife Institute of India, Dehradun, Uttar Pradesh, INDIA. <u>Human Use, Distribution Pattern and Conservation Status of Rare and Endangered Medicinal Plants in the Western Himalayas, India.</u>
11:20-11:40	E.C. Quaye , Department of Botany University of Cape Coast, Cape Coast, GHANA. <u>Conservation of Biodiversity in a Developing country: An Ethnocultural Approach.</u>

Session 5:	Applied Biological Conservation II.
8:00-8:10	<u>Introduction.</u>
8:10-8:30 *	Myrle Traverse (Ojibway) and Richard Baydack , Natural Resources Institute, University of Manitoba, Winnipeg, Manitoba, CANADA. <u>Observing Subtleties: Traditional Ecological Knowledge and Optimal Water management of Lake St. Martin.</u>
8:30-8:50*	Maren B. Peterson , Bryan A. Endress and Simon Montagu , Miami University, Oxford, Ohio, USA. <u>The Impact of Biosphere Reserve Policies on Natural Resource Use and Livelihood Strategies of Local Communities in the El Cielo Biosphere Reserve, Tamaulipas, Mexico.</u>
8:50-9:10*	Todd Taiepa , Ngai Tuhoe, The School of People, Environment and Planning, Massey University, Palmerston North, NEW ZEALAND. <u>Weaving our stories world-wide: An indigenous approach to global economics and ecology.</u>
9:10-9:30	Thidinaleni E Tshiguvho , Department of Biological Sciences: Conservation Biology Section, University of Venda for Science and Technology, Thohoyandou, Northern Province, SOUTH AFRICA. <u>An Integrated Community-Based Approach Towards Conservation of Rare Species - <i>Brackenridgea zanguibarica</i> in South Africa.</u>
9:30-9:50	Lyndon Wester , Department of Geography, University of Hawai'i, Honolulu HAWAI'I. and Sekson Yongvanit , Department of Humanities and Social Science, Khon Kaen University, Khon Kaen, THAILAND. <u>Forest Temples and Forest Conservation in North East Thailand.</u>
9:50-10:20	Morning Break
10:20-10:40	Maile T. Drake , Te Papa Tongarewa, Museum of New Zealand, Wellington, NEW ZEALAND, Don R. Drake , Victoria University of Wellington, NEW ZEALAND, and B. Hendry , Georgia Southern University, Statesboro, Georgia, USA. <u>Heritage Plants of the Vava'u Group, Tonga.</u>
10:40-11:00	Wynet Smith , World Resources Institute, Washington, DC, USA. <u>Incorporating Traditional Knowledge in Conservation Planning and Resource Management: Key Lessons from the Gwich'in and Nunavut Settlement Areas, Canada.</u>
11:00-11:20	Rose Marie Kuptana and Jennifer Castleden , International Institute for Sustainable Development, Winnipeg, Manitoba, CANADA. <u>Inuit Observations on Climate Change</u> [film]
11:20-11:40	Yongiri Tadeo and Masereka Selevest , Uganda Wildlife Authority, Semuliki National Park, Kampala, Fort Portal, UGANDA.

Session 7:	Traditional Oceanic Navigation Knowledge.
8:00-8:05	Kawika Kapahulehua , Skipper of first Hokule'a voyage to Tahiti. Ni'ihau, HAWAI'I. <u>Opening Blessing.</u>
8:05-8:15	Ben Finney , University of Hawai'i, Department of Anthropology, Honolulu, HAWAI'I. <u>Introduction.</u>
8:20-9:00	Ben Finney , University of Hawai'i, Department of Anthropology, Honolulu, HAWAI'I. <u>The Revival of Polynesian Voyaging.</u>
9:00-9:25	Tuione Pulutu , Brigham Young University-Hawai'i, Center for the Hawaiian Language & Culture Studies, Laie, HAWAI'I. <u>Rediscovering the Tongan Kalia.</u>
9:25-9:40*	Mark Nickum , University of Hawai'i, Department of Botany, Honolulu, HAWAI'I. <u>The Ethnobotany of Tongan Voyaging Canoes.</u>
9:40-10:00	Morning Break
10:00-10:10	Ben Finney , University of Hawai'i, Department of Anthropology, Honolulu, HAWAI'I. <u>Introduction to: Projects in Melanesia and Micronesia.</u>
10:10-10:40	Mimi George , Vaka Taumako Project, Anahola, Hawai'i, USA, and Taumako Island, SOLOMON ISLANDS. <u>Vaka Taumako, the Taumako Canoe Project.</u>
10:40-10:55	Roselle F. K. Bailey , Ka Imi Naauao o Hawai'i Nei, Wailuku, HAWAI'I. <u>A Hawaiian View of the Taumako Voyaging Revival.</u>
10:55-11:40	Dennis Alessio and Alson Kelen , Waan Aelon in Majel Project, Majuro, Republic of the MARSHALL ISLANDS. <u>Waan Aelon in Majel, the Canoes of the Marshall Islands Project.</u>
11:40-12:00	General Discussion

Session 8:	Biological Invasions: Impacts on Traditional Cultures.
8:00-8:15	George Staples , B.P. Bishop Museum, Honolulu, HAWAI'I. <u>Introduction and Moderator.</u>
8:15-10:00	Group Discussion.
10:00-10:30	Morning Break.
10:30-12:00	Group Discussion.

12:00-1:30 **Lunch Break / Discussion Groups.**

Africa Plenary Session

1:30-1:35	Will McClatchey , Department of Botany, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. <u>Welcome and Introduction.</u>
1:35-1:40	Alan Teramura , Vice President for Research and Graduate Education, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. <u>Welcome from the University of Hawai'i.</u>
1:40-1:50	<u>Educational Welcome.</u>
1:50-2:30	Nat Quansah , Ambodisakoana Clinic, Sovinasoandro, MADAGASCAR. <u>The Neglected Key to Successful Biodiversity Conservation and Appropriate Development: Local Traditional Knowledge.</u>
2:30-3:10	Hareya Fassil , University of Oxford, International Development Centre, Queen Elizabeth House, Oxford, UNITED KINGDOM. <u>Beyond Plants, Professionals and Parchments: The Role of Home-based Traditional Health Knowledge and Medicinal Plant Use in Primary Health Care in Ethiopia.</u>
3:10-3:30	Afternoon Break.
3:30-4:10	Monica Opole , Center for Indigenous Knowledge Systems and Products (CIKSAP), Nairobi, KENYA. <u>Indigenous Food Crops and Traditional Farmers Wisdom.</u>
4:10-4:50	Gilbert Githere , Hawai'i Pacific University, Honolulu, HAWAI'I. <u>Dini za Kienyeji, kwa mfano Mungiki, na Utawala wa Taifa.</u>
4:50-5:30	Phosiso Sola , Research and Development Section, SAFIRE, 10 Lawson Ave. Milton Park, Harare, ZIMBABWE. <u>The Community Resource Management Plan (CRMP): A tool for integrating IKS into resource assessment and management Experiences from the SAFIRE MITI Project.</u>
5:30-7:30	Dinner Break.

Evening Distinguished Speaker

7:30-7:40	Hawaiian Thistle Pipe Band
7:40-7:45	Carl Vogel , Director, Cancer Research Center of Hawai'i, Honolulu, HAWAI'I. <u>Welcome.</u>
7:45-7:50	Mark Merlin , Biology Program, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. <u>Introduction.</u>
7:50-9:00	Sir Ghillean Prance , Former Director, Royal Botanical Gardens, Kew, Richmond, Surrey, England, UNITED KINGDOM. <u>Ethnobotanical studies of the Yanomami people.</u>

Tuesday, May 29th, 2001

Concurrent Sessions

Session 1:	Lā‘au Lapa‘au: Herbal Medicine.
8:00-8:30	Pule, Introduction, and Moderators: Nanette Judd , Imi Ho ‘ola Program, University of Hawai‘i at Mānoa, Honolulu, HAWAI‘I. Loretta Hussey , E Ola Mau, Honolulu, HAWAI‘I. Fern Clark , E Ola Mau, Honolulu, HAWAI‘I. Panelists: Kupuna Marie Place , Po‘okela (leader), Moloka‘i, HAWAI‘I. Kupuna Anita Arce , Moloka‘i, HAWAI‘I. Josephine Manaba, Kako‘o (helper), Moloka‘i, HAWAI‘I. Kupuna Kaohu Chang-Monfort , Miloli‘i, Kona, Hawai‘i, HAWAI‘I. Kupuna Alapai Kahuena , O‘ahu, HAWAI‘I.
8:30-10:00	Panel Discussion
10:00-10:30	Morning Break.
10:30-12:00	Panel Discussion
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Session 2:	Indigenous Perspectives on Ethnobiological Research: Working Group.
8:00-8:30	Benton Keali‘i Pang United States Fish and Wildlife Service, Pacific Islands Ecoregion, Honolulu, HAWAI‘I. <u>Introduction and Moderator.</u>
8:30-10:00	Group Discussion
10:00-10:30	Morning Break.
10:30-12:00	Group Discussion
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Session 3:	Traditional Ecological Knowledge, Natural Disturbances and Ecosystem Management.
8:00-8:10	Thomas Elmqvist , Department of Systems Ecology, Stockholm University, Stockholm, SWEDEN. <u>Introduction.</u>
8:10-8:50	Nancy J. Turner , School of Environmental Studies, University of Victoria, Victoria, British Columbia, CANADA, Fikret Berkes and Iain Davidson-Hunt , Natural Resources Institute, University of Manitoba, Winnipeg, Manitoba, CANADA. <u>Cultural Edges and Ecological Edges: Diversity in Traditional Knowledge Systems.</u>
8:50-9:30	Johan Colding , Thomas Elmqvist , and Per Olsson , Department of Systems Ecology, Stockholm University, Stockholm, SWEDEN. <u>Living with disturbance: Building Resilience in Social-Ecological Systems.</u>
9:30-10:10	Ronald L. Trospar , Applied Indigenous Studies, Northern Arizona University, Flagstaff, Arizona, USA. <u>United States Re-Licensing of Hydroelectric Dams Resembles Contingent Tenure, An American Indian Way to Preserve Resilience.</u>
10:10-10:30	Morning Break
10:30-11:10*	Cristiana Simão Seixas , Natural Resources Institute, The University of Manitoba, Winnipeg, CANADA. <u>Fishery Management Crises and Adapting Mechanisms in a Traditional Society: The Case of the Ibiraguera Lagoon, Brazil.</u>
11:10-12:00	Carl Folke , Department of Systems Ecology, Stockholm University, Stockholm, SWEDEN. <u>Concluding Remarks.</u>

Session 4:	The Convention on Biological Diversity and the Future of Ethnobiological Community Research.
8:00-8:05	Gary J. Martin , The Global Diversity Foundation, Marrakech-Medina, MOROCCO. <u>Introduction.</u>
8:05-8:50	Brian M. Boom , The New York Botanical Garden, Bronx, New York, USA. <u>The Best of Intentions: The CBD and its Impact on Ethnobotanical Research.</u>
8:50-9:35	Jan Salick , Missouri Botanical Garden, St. Louis, Missouri, USA. <u>Process, Variation and Change in Ethnobotanical Research: Examples from the Peruvian Amazon to the Tibetan Highlands.</u>
9:35-10:20	Hinano Murphy , Centre Territorial de Recherche et Documentation Pédagogique (CTRDP), Moorea, POLYNESIE FRANCAISE, Neil Davies , Polynesia Research and Education Laboratories (PEARL), University of California Berkeley, Pirae, Tahiti, POLYNESIE FRANCAISE, Tom Carlson Center for Health, Ecology, Biodiversity, and Ethnobiology (HEBE), University of California Berkeley, Berkeley, California, USA and Brent Mishler University and Jepson Herbaria, University of California Berkeley CTRDP, Pirae, Tahiti, POLYNESIE FRANCAISE. <u>Ethnobiology in Tahiti: Culture, Science, and Education.</u>
10:20-10:30	Morning Break
10:30-11:15	Timothy Johns , Centre for Indigenous Peoples's Nutrition and Environment (CINE), McGill University, Montreal, Quebec, CANADA. <u>Participatory Ethnobotany at the Interface of Human and Ecosystem Health.</u>
11:15-12:00	Gary J. Martin , The Global Diversity Foundation, Marrakech-Medina, MOROCCO. <u>Mutual impact: the relationship between ethnobiological research and the Convention on Biological Diversity.</u>
Session 5:	Traditional Knowledge as the Basis of Organic Farming.
8:00-8:05	<u>Introduction.</u>
8:05-8:35	Eilif Aas , Am Tewa LeHarim, NORWAY. <u>Traditional "tannin" treatment against intestinal parasites in sheep and cattle.</u>
8:35-9:05	Christian R. Vogl , Institute of Organic Farming, University of Agricultural Sciences, Vienna, AUSTRIA. <u>Standards and Regulations of Organic Farming: Moving Away from Small Farmers Knowledge and their Spirit of Ecologically and Culturally Sound Innovations.</u>
9:05-9:35	Kimberly D Clark , Just Add Water, Inc., Waimanalo, HAWAI'I. <u>Building Bridges Between Traditional Knowledge and Organic Farming.</u>
9:35-10:00	Morning Break
10:00-10:30*	Natalia Molina-Martínez and Francisco Basurto-Peña , Jardín Botánico, Instituto de Biología, Universidad Nacional Autónoma de México, Coyoacán, México D.F. MEXICO. <u>Milpa and Quelites in a Nahuat Community of the Sierra Norte de Puebla, MEXICO.</u>
10:30-11:00*	Maria Tengö and Monica Hammer , Natural Resources Management, Department of Systems Ecology, Stockholm University, SWEDEN. <u>Local knowledge on ecosystem processes - nutrient management among the Iraqw of Northern Tanzania.</u>
11:00-11:30*	James Leary , Department of Tropical Plant and Soil Science, University of Hawai'i, Honolulu, HAWAI'I. <u>Horticultural Techniques for the Promotion of a Healthy and Sustainable Agriculture Ecosystem in the Tropics.</u>
11:30-12:00*	Sergio Medellín Morales , Universidad de California, Sustainability Maya Program, MEXICO (John D. & Catherine T. MacArthur Foundation) y <i>Terra Nostra A.C.</i> (Fund for Leadership Development, John D. & Catherine T. MacArthur Foundation) Riverside, California, USA. <u>Reactivation of Traditional Technologies for Honey and Pollen Production of Stingless Bees in Meso-America.</u>
Session 6:	Weaving, Plaiting, and Felting.
8:00-8:15	Elaine Joyal , Department of Anthropology, Arizona State University, Tempe, Arizona, USA. <u>Introduction.</u>
8:15-8:45*	JD Baker , Department of Anthropology, University of Hawai'i, Honolulu, HAWAI'I. <u>A preliminary examination of hala (<i>Pandanus tectorius</i>) selection and management for weaving in Hawai'i.</u>
8:45-9:15*	Elaine Joyal , Department of Anthropology, Arizona State University, Tempe, Arizona, USA. <u>Basketry Ecology: A Museum-Based and Market-Based Global Survey.</u>
9:15-9:45*	Michelle L. Stevens , Jones & Stokes, Sacramento, California, USA. <u>Traditional Resource Management of wetland and riparian plants by California Indians.</u>
9:45-10:15	Morning Break
10:15-10:45	Sue Scheele , Manaaki Whenua, Lincoln, NEW ZEALAND. <u>Weaving people together - the harakeke (New Zealand flax) evaluation trial.</u>
10:45-11:20	Catherine Brown , Ngai Tahu, Te Roopu Raranga/Whatu o Aotearoa, Southbridge, NEW ZEALAND. <u>Demonstration of some techniques used in weaving and plaiting harakeke (New Zealand flax).</u>
11:20-11:55	Minerva Soucie , Northern Paiute, Wada-Tika, Burns Paiute Indian Reservation, Burns, Oregon, USA. <u>Weaving Demonstration.</u>

Session 7:	Economic and Ethnobotany I.
8:00-8:10	Yeong Han Lau , University of Hawai'i, Department of Botany, Honolulu, HAWAI'I. <u>Introduction</u>
8:10-8:30*	Nyree Conard Zerega and Timothy J. Motley , Lewis B, and Dorothy Cullman Program for Molecular Systematics Studies, The New York Botanical Garden, Bronx, New York, USA. <u>Identification of black cohosh (<i>Actaea racemosa</i>) using DNA fingerprinting (AFLP).</u>
8:30-8:50*	Hugh Cross , and Timothy J. Motley , Lewis B. and Dorothy Culman Program for Molecular Systematics Studies, New York Botanical Garden, Bronx, New York, USA and Center for Environmental Research and Conservation, Columbia University, New York, New York, USA. <u>Evaluation of Genetic Diversity in Chayote.</u>
8:50-9:10*	Sylvia H. Salcedo , Department of Botany, University of Hawai'i, Honolulu, HAWAI'I. <u>Preliminary Data Gathered for the Preparation of a High Altitude Medicinal Garden in Namche Bazaar, NEPAL.</u>
9:10-9:30*	Nhamburo Ziyenge , Oxford Centre for Industrial and Applied Mathematics, Institute of Mathematics, Oxford University, UNITED KINGDOM, Mia Munya Ziyenge , Warneford Hospital, Oxford, UNITED KINGDOM and Rebekka Stone , The Institute of Economic Botany, The New York Botanical Garden, Bronx, New York, USA. <u>Mbiretronic Awakenings.</u>
9:30-9:50	My Lien T. Nguyen , University of Hawai'i at Manoa, Honolulu, HAWAI'I. <u>Comparison of Food Plant Knowledge between Vietnamese living in Vietnam and in Hawai'i.</u>
9:50-10:20	Morning Break
10:20-10:45	Herlyne Ramihantaniarivo , HIS University Training Hospital, Antananarivo, MADAGASCAR, Richard F. Ramambazafy , and Nat Quansah , Ambodisakoana Clinic, Sovinasoandro, MADAGASCAR. <u>Medicinal Plants Used in Reproductive Health Disorders.</u>
10:45-11:10	C. Lubini , Laboratoire de Biologie, Institute Supérieur Pédagogique de la Gombe, Gombe, CONGO. <u>Some cultural and economical sights of Yansi ethnobotany in Kikwit (Congo Kinshasa).</u>
11:10-11:35	Praveen K. Saxena , Department of Plant Agriculture, University of Guelph, Guelph, Ontario, CANADA. <u>Plant-based medicines: Application of in vitro production technologies.</u>
11:35-12:00	Harry F. Wasson , Hui Malama 'Aina 'O Laie, Laie, HAWAI'I. <u>Taro Varieties and Healing Methods.</u>

Session 8:	Economic and Ethnobotany II.
8:00-8:10	Heather Harlow , Department of Botany, University of Hawai'i, Honolulu, HAWAI'I. <u>Introduction.</u>
8:10-8:40	Carlos R. Ramírez-Sosa , Department of Biology, St. Lawrence University, Canton, New York, USA. <u>Market Ethnobotany of medicinal Plants in el El Salvador, C.A.</u>
8:40-9:20	Thora M. Herrmann , University of Oxford, School of Geography and the Environment, Environmental Change Institute, Mansfield College, Oxford, England, UNITED KINGDOM. <u>Traditional ecological knowledge and use practices of the natural resources by the indigenous Mapuche -Pewenche: Implications for biodiversity conservation strategies and sustainable management plans of native forests in southern Chile.</u>
9:20-9:50	Michelle Cocks , Institute for Social and Economic Research (ISER), Rhodes University, Grahamstown, SOUTH AFRICA and Tony Dold , Selmar Schonland Herbarium (GRA), Rhodes University, Grahamstown, SOUTH AFRICA. <u>The Medicinal Plant Trade in the Eastern Cape Province, South Africa.</u>
9:50-10:20	Morning Break
10:20-10:40*	Xanic J. Rondón , Department. of Biological Science, California State University, Fullerton, California, USA, Sandra A. Banack , Department of Biological Science, California State University, Fullerton, California, USA. and Wilfredo Diaz Huamanchumo, Huanchaco, PERU. <u>The Ethnobotany of Totorá (<i>Shoenoplectus californicus</i>) Sea Craft Vessels in Huanchaco, Perú.</u>
10:40-11:00*	Michael P. Gilmore , Department of Botany, Miami University, Oxford Ohio, USA, W. Hardy Eshbaugh , Department of Botany, Miami University, Oxford Ohio, USA, and Adolph M. Greenberg , Department of Sociology, Gerontology and Anthropology, Miami University, Oxford Ohio, USA. <u>A Preliminary Assessment of Mai Juna Land Cover Classification in the Peruvian Amazon.</u>
11:00-11:20*	Miriam Kritzer-Van Zant , Department of Plant Biology Southern Illinois University, Carbondale, Illinois, USA. <u>Economic use of the Asteraceae in southern Illinois in the 1990's; extractive reserve potential and implications for conservation, restoration and sustainability.</u>
11:20-11:40*	Isaac S. Bruck and W. Scott Chilton , North Carolina State University, Department of Botany, Raleigh, North Carolina, USA. <u>K'ekchi' Mayan Ethnobotany and the Search for Novel Pesticide Compounds.</u>
11:40-12:00*	Eugene Richard Chung , New York Botanical Garden, Bronx, New York, USA. <u>Kaqchikel Mayan Capsicum L., Ethnobotany and Systematics.</u>

12:00-1:30	Lunch Break / Discussion Groups.
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North and South America Plenary Session

- 1:30-1:40 **Landin Keola Davis** and **David D. Maika'i Hana'ike**, Kawanakoa Middle School General Science Program, HAWAI'I. Educational Welcome: Ka Na'auao a me ke Aloha (Knowledge and Wisdom with Compassion.).
- 1:40-1:45 **Michael Balick**, New York Botanical Garden, Bronx, New York, USA. Introduction and Moderator.
- 1:45-2:15 **Michael Balick**, New York Botanical Garden, Bronx, New York, USA and **Hugh O'Brien**, Research and Development Station, Department of Agriculture, Central Farm, Cayo District, BELIZE. Ethnobotanical and Floristic Research in Belize - Accomplishments, Experiences and Challenges.
- 2:15-2:45 **Moi -Nanto** (Huaorani), Rio Cononaco, ECUADOR and **Hazen Audel**, University of Hawai'i, Honolulu, HAWAI'I. Huaorani and Environmental Impacts on the Yasuni National Nature Preserve in Southwestern Ecuador.
- 2:45-3:15 **Eusebia Berrones-Benítez**, Grupo Cooperativa de Mujeres Campesinas "La Fé", Alta Cimas, Gómez Farías, Reserva de la Biosfera El Cielo, Tamaulipas, MEXICO, **Sergio Medellín Morales**, PRONATURA-Noreste, Monterrey, N.L. & Terra Nostra A.C., MEXICO, **Claudia E. González Romo**, Instituto de Ecología y Alimentos, Universidad Autónoma de Tamaulipas, Cd. Victoria, MEXICO. A Women's Microenterprise: "LA FÉ" Campesino Women's Group Cooperative at El Cielo Biosphere Reserve, Tamaulipas, MEXICO.
- 3:15-3:45 **Leon Secatero**, Spiritual Elder of the I'inebeho (Navajo) of Canoncito. Spirit Walkers Of Turtle Island- Unifying North & South, East & West.
- 3:40-4:00 Afternoon Break
- 4:00-4:30 **Germán Zuluaga Ramírez**, Amazon Conservation Team, Colombia Program, Bogata, COLOMBIA. The Biological And Cultural Conservation Of The Amazon Piedmont In Colombia: Dr. Schultes' Heritage.
- 4:30-5:00 **Dwight Dorey**, Congress of Aboriginal Peoples, Ottawa, CANADA. Indigenous People as Political Powers.
- 5:00-5:30 **Eglé L. Zent** and **Stanford Zent**, Departamento de Antropología, Instituto Venezolano de Investigaciones Científicas (IVIC), Caracas, VENZUELA. The Hoti: Botanically Knowledgeable Trekkers of the Venezuelan Amazon.

5:30-6:00 **Evening Break.**

Evening Distinguished Speakers

'Aina and Health presented by the John A. Burns, School of Medicine, University of Hawai'i.

- 6:00-6:05 Ole
- 6:05-6:10 **Edwin C. Cadman**, Dean, John A. Burns, School of Medicine, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Welcome.
- 6:10-6:15 **Bruce A. Wilcox**, Director, Division of Ecology and Health, John A. Burns, School of Medicine, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Introduction.
- 6:15-6:30 **Ben Young**, Director, Native Hawaiian Center of Excellence, John A. Burns, School of Medicine, University of Hawai'i at Mānoa, Honolulu, HAWAI'I, **Nanette Judd**, Director, Imi Ho'ola, John A. Burns, School of Medicine, University of Hawai'i at Mānoa, Honolulu, HAWAI'I, **Cathy Bell**, Native Hawaiian Center of Excellence Fellow, Department of Psychiatry, John A. Burns, School of Medicine, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Native Hawaiian Health.
- 6:30-7:30 **Paul Ka'ikena Pearsall**, Psychoneuroimmunologist/Author, **Kawaikapu Hewett**, Kumu Hula, and **Kuhai Halau O Kawaikupuokalani**, Lecture/Concert: Hawaiian Heart, Modern Mind, and Indigenous Soul.

7:30-9:00 Lu'au at the All Star Hawaii Cafe in King Kalakaua Plaza (additional charge for attendance)

Wednesday, May 30th, 2001

Concurrent Sessions

- Session 1:** 'Āina: Hawaiian Views of Land and Sustainable Living.
8:00-8:15 Pule, Introduction, and Moderators:
Kawika Winter, Department of Botany, University of Hawai'i at Mānoa, Honolulu, HAWAI'I.
Kamaui Aiona, Department of Botany, University of Hawai'i at Mānoa, Honolulu, HAWAI'I.
Panelists:
8:15-9:00 **Carlos L Andrade**, Center for Hawaiian Studies, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. The Hui Maka'ainana o Makana (The Organization of Land Tenders of Makana).
9:00-9:45 **Eric Enos**, Ka'ala Farms, Wai'anae, O'ahu, HAWAI'I. Rebuilding the Ahupua'a in Wai'anae, O'ahu.
9:45-10:15 Morning Break.
10:15-11:45 Kumu Hula **John Ka'imikaua**, Halau Hula O Kukunaokala, Moloka'i, HAWAI'I. The Knowledge of Land Preservation through Ancient Moloka'i Chant and Dance.
11:45-12:00 Discussion
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- Session 2:** **Ethnobiological College Education in the 21st Century: Working Group.**
8:00 - 8:30 **Bradley Bennett**, Department of Biology, Florida International University, Miami, Florida, USA. Introduction: What is Ethnobotany? Session Moderator.
8:30 - 9:00 Discussion: The Death of Ethnobotany
9:00 - 9:30 Discussion: Questions in Ethnobiology
9:30 - 9:45 Discussion: Graduate Programs in Ethnobiology
9:45 - 10:15 Morning Break
10:15 - 10:30 Discussion: What should an Ethnobiologist know?
10:30 - 10:45 Discussion: Botany in Action
10:45 - 12:00 Open Forum
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- Session 3:** **Society for Economic Botany Council meeting** (closed session)
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- Session 4:** **Ethnopharmacology: Building Bridges Between Natural Product Chemistry and Traditional Knowledge.**
Sponsored by: The Cancer Research Center of Hawai'i, Natural Products Program
Hosted by: The International Society for Ethnopharmacology
8:00-8:30 **Nina L. Etkin**, Department of Anthropology, University of Hawai'i, Honolulu, HAWAI'I.
Ethnopharmacology: Building Bridges to Where?
8:30-9:00 **Rudi Bauer**, Institut für Pharmazeutische Biologie, Universitäre Düsseldorf, GERMANY. Traditional Chinese Drugs: Their Application and Evaluation in Western Medicine.
9:00-9:30 **Walter H. Lewis**, Washington University, Department of Biology, St. Louis, Missouri, USA. Traditional and Western Medicine: How Bridges can lead to New Therapeutic Discoveries.
9:30-10:00 **Charles Wambebe**, Director, National Institute for Pharmaceutical Research and Development Abuja, NIGERIA. Bridging Research to the Clinical Use of Plant Medicines.
10:00-10:30 Morning Break
10:30-11:00 **Elaine Elisabetsky**, Laboratório de Etnofarmacologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, BRAZIL and **Gabriela Coelho de Souza**, Programa de Pós Graduação em Botânica, Universidade Federal do Rio Grande do Sul, Porto Alegre, BRAZIL. Ethnobotany and Ethnopharmacology as Tools for Diversifying Economic Activities in a Mata Atlântica Biosphere Reserve Community.
11:00-11:30 **Gamaniel K. Shingu**, National Institute for Pharmaceutical Research and Development, Department of Pharmacology and Toxicology, Abuja, NIGERIA. Ownership and Sustainability Issues in Botanical Medicine.
11:30-12:00 Discussion

Session 5:	Practical Applications in Non-Timber Forest Products.
8:00-8:15	<u>Introduction.</u>
8:15-8:35	Julie Velásquez Runk , Yale School of Forestry and Environmental Studies and The New York Botanical Garden, New Haven, Connecticut, USA. <u>Sustainability and Management of Tagua Palms in Ecuador: Did a Management Manual and Six Years Make a Difference?</u>
8:35-8:55	Margaret Delfeld , Brownsville, Wisconsin, USA. <u>Orchids: Mexican glue-pots.</u>
8:55-9:15*	Bryan A. Endress , Miami University, Oxford, Ohio, USA. <u>Harvest intensity, conservation, and management of the vulnerable understory palm, <i>Chamaedorea radicalis</i>, by local communities in the El Cielo Biosphere Reserve, Mexico.</u>
9:15-9:35*	Lorna Hall and M. Johnston , Iwokrama, Bel Air Howe, Bel Air Georgetown, GUYANA. <u>Balata (<i>Manilkara bidentata</i>) latex-a brief history, a study on the impacts of harvesting, and potentials for the future.</u>
9:35-9:55*	Celeste Lacuna-Richman , Faculty of Forestry, University of Joensuu, Joensuu, FINLAND. <u>Using Suitable Projects in Adding Value to Non-Wood Forest Products in the Philippines.</u>
9:55-10:20	Morning Break
10:20-10:40	Honorato G. Palis , Ecosystem Research and Development Bureau, UPLB Campus, College, Laguna, PHILIPPINES. <u>Indigenous Non-Timber Forest Products Management System Practice: The Case of Batak Tribe in Palawan, Philippines.</u>
10:40-11:00	J.V. Ramana Rao , Wildlife unit, Department of Zoology, Osmania University, Hyderabad, INDIA, V. Nagulu , Wildlife unit, Department of Zoology, Osmania University, Hyderabad, INDIA and V. Vasudeva Rao , Economic Ornithology, ANGR Agricultural University, Rajendranagar, Hyderabad INDIA. <u>Indigenous People's Traditional Knowledge - Building bridges for conservation and sustainable development.</u>
11:00-11:20	Sonali Saha , University of Illinois at Chicago, Department of Biological Sciences, Chicago, Illinois, USA. <u>Effects of fire and fire-exclusion on <i>Diospyros melanoxylon</i>, a NTFP species, phenology and growth in central Indian deciduous forests.</u>
11:20-11:40	Arvind A. Boaz , Indian Forest Service, Bhopal, INDIA. <u>Innovative Traditional Perspective of the Primitive Tribe-The Saharias for Sustainable Forest Management In Central India.</u>
Session 6a:	Conservation of Heirloom Plant Knowledge.
8:00-8:10	John Rashford , Department of Anthropology, College of Charleston, Charleston, South Carolina, USA. <u>Introduction.</u>
8:10-8:40	John Rashford , Department of Anthropology, College of Charleston, Charleston, South Carolina, USA. <u>Seasonal Hunger in Jamaica: the Contribution of Traditional Knowledge to Research, Development and Conservation.</u>
8:40-9:10	Graham Harris , Horticulture and Ethnobotany, The Open Polytechnic of New Zealand, He Wharekura-tini Kaihoutu o Aotearoa, Lower Hutt, NEW ZEALAND. <u>Nga Riwai Maori: The adoption of the potato by Maori in Aotearoa and the conservation of relict cultivars within Maori communities.</u>
9:10-9:40	Diane Ragone , National Tropical Botanical Garden, Kalaheo, HAWAI'I, Paul Matthew Cox , Brigham Young University, Provo, Utah, USA, Joan M. Stevens , Department of Biological Sciences, California State University, Fullerton, California, USA, Patricia Ann Stewart , West Dermatology, Santa Barbara, California, USA, Rebekka Stone , New York Botanical Garden, Bronx, New York, USA, Gaugau Tavana , National Tropical Botanical Garden, Kalaheo, HAWAI'I, and Paul Alan Cox , National Tropical Botanical Garden, Kalaheo, HAWAI'I. <u>Using Traditional Knowledge to Conserve Breadfruit Diversity in Samoa.</u>
9:40-10:10	Morning Break
Session 6b:	On Common Ground: A Case Study in Preserving Cultural Lands and Landscapes.
	Over the next few years, the landscape of Alaska may be unalterably changed with projected activities of the Department of Defense. The relationship between the agencies of the Department of Defense and the 42 tribes of the Tanana Chiefs Conference provides a showcase of how indigenous communities working to preserve their culture and way of life can integrate Native values into the decision-making process of institutions bringing change to the community.
10:10-10:15	Kurt Russo , Florence Kluckhohn Center for the Study of Values, Bellingham, Washington, USA. <u>Introduction.</u>
10:15-10:45	Kurt Russo , Florence Kluckhohn Center for the Study of Values, Bellingham, Washington, USA. <u>Building Relations between the Military and Native Alaskan Communities in the Interior.</u>
10:45-11:15	Robert Lee Demmitt , Tanana Chiefs Conference of Alaska. <u>On Common Ground.</u>
11:15-11:45	Jerome Montague , Alaskan Command, United States Department of Defense. <u>On Common Ground.</u>
11:45-12:00	Discussion

Session 7:	Applied Methods in Ethnobiology.
8:00-8:05	<u>Introduction.</u>
8:05-8:35	Jeffrey Thomas , Puyallup Tribal Fisheries, Puyallup, Washington, USA. <u>The "Eco-Centric" Subsistence Model; A Tool for Environmental Education.</u>
8:35-9:05	Le Thi Xuan , Institute of Biotechnology, National Center for Science and Technology, Hanoi, VIETNAM, Bui Minh Vu , Forest Research Institute, Hanoi, VIETNAM, Charlotte Gyllenhaal , Program for Collaborative Research in the Pharmaceutical Sciences, College of Pharmacy, University of Illinois at Chicago, Chicago, Illinois, USA, and Djaja Djendoel Soejarto , Program for Collaborative Research in the Pharmaceutical Sciences, College of Pharmacy, University of Illinois at Chicago, and the Department of Botany, Field Museum, Chicago, Illinois, USA. <u>Building Bridges with the Muong Communities at Cuc Phuong National Park, Vietnam.</u>
9:05-9:35	Stanford Zent , Departamento de Antropología, Instituto Venezolano de Investigaciones Científicas (IVIC), Caracas, VENEZUELA. <u>Indigenous Knowledge (IK) Dynamics: A Critical Methodological Perspective.</u>
9:35-10:05	Janis B. Alcorn , Biodiversity Support Program, World Wildlife Fund, Chevy Chase, Maryland, USA. <u>Mapping's Magic.</u>
10:05-10:30	Morning Break
10:30-11:00*	Nathaniel Bletter , City University of New York/New York Botanical Garden, New York, New York, USA. <u>A Technique for Quantitative Comparison of Medicinal Plants for Different Diseases from Different Cultures.</u>
11:00-11:30	Judith Schmidt , USA. <u>Respect in Building and Crossing Bridges.</u>
11:30-12:00	Christo Fabricius , Environmental Science Programme, Rhodes University, Grahamstown, SOUTH AFRICA. <u>Knowledge sharing can restore burnt bridges: combining formal and traditional knowledge to tackle resource degradation in South Africa.</u>

Session 8:	Plants of the Gods: Past. Present and Future.
8:00-8:15	Mark Merlin , Biology Program, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. <u>Introduction.</u>
8:15-9:00	Chris Kilham , Medicine Hunter Inc., Lincoln, Massachusetts, USA. <u>Nights of Kava: Social Custom In Vanuatu.</u>
9:00-9:45	Jonathan Yee , Hawaiian Kava Center, Honolulu, HAWAI'I. <u>'Awa's (kava's) dual role as a sacred plant and commercial product – a Hawai'i perspective.</u>
9:45-10:15	Morning Break.
10:15-11:00	Mark Merlin , Biology Program, University of Hawai'i at Manoa, Honolulu, HAWAI'I and William Raynor , Field Director, The Nature Conservancy, Pohnpei Island, FEDERATED STATES OF MICRONESIA. <u>Contemporary use and environmental impact of the kava plant, <i>Piper methysticum</i> Forst. f., in Pohnpei, Federated States of Micronesia.</u>
11:00-12:00	Discussion: The future of: Plants of the Gods

12:00-1:30	Lunch Break / Discussion Groups.
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Europe and Mediterranean Plenary Session

- 1:30-1:40 Educational Welcome.
- 1:40-1:45 **Charles Hayes**, Dean, College of Natural Sciences, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Welcome.
- 1:45-1:50 **Sterling Keeley**, Chair, Department of Botany, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Welcome and Moderator.
- 1:50-2:25 **Alain Touwaide**, University of Oklahoma, Department of History of Science, Norman, Oklahoma, USA. Building Bridges between Past and Future: The Materia Medica Mediterranea Database.
- 2:25-3:00 **Brigitte Vogl-Lukasser & Christian R. Vogl**, Institute of Ecology and Landscape Conservation, University of Vienna, Vienna, AUSTRIA. The Management of Homegardens on small farms in the Alpine Region of Osttirol (Austria) by farmers women: An Example of Change in Traditional Local Knowledge.
- 3:00-3:35 **Adil M. Abdalla**, ICOMOS, PMI & DQMG, Dubai, UNITED ARAB EMIRATES, Cultural Bridging in Architectural Preservation.
- 3:35-4:00 Afternoon Break
- 4:00-4:35 **Mark Blumenthal**, Founder & Executive Director, American Botanical Council, Austin, Texas, USA. Leading Herbs and Phytomedicines in Europe: How Scientific Research and Clinical Testing of Traditional Medicines Has Created a Multi-billion Dollar Industry in Europe and the United States.
- 4:35-5:10 **Fredric J. Pashkow**, Medical Director, Heart Institute, The Queen's Medical Center, Honolulu, HAWAI'I. Nature vs. Nurture: Lifestyle & Diet in Contemporary Life.
- 5:10-5:30 Discussion.

5:30-7:30 **Dinner Break.**

Evening Distinguished Speaker

- 7:30-7:40 **Papalii Failautusi Avegalio**, Pacific Business Center, University of Hawai'i at Manoa, Honolulu, HAWAI'I. Welcome and Introduction.
- 7:40-9:00 **Paul Cox**, Director, National Tropical Botanical Garden, Lawai, HAWAI'I and **Gaugau Tavana**, National Tropical Botanical Garden, Lawai, HAWAI'I. Ethnotaxonomy as a key to Indigenous Conservation Strategies. Plus a short presentation by the **Polynesian Cultural Center.**

Thursday, May 31st, 2001

Concurrent Sessions

- Session 1:** **Ho'ihoi Ea: Decolonization, Hawaiian Sexuality, and Hawaiian Sovereignty.**
8:00-10:00 **Lilikala Kame'eleihiwa**, Center for Hawaiian Studies, University of Hawai'i, Honolulu, HAWAI'I. Ka Le'al'a o na Kupuna: Ni'aupi'o, Punalua, Po'olua & Aikane (Hawaiian Sexuality in Traditional Times, A Celebration of Life).
10:00-10:30 Morning Break
10:30-12:00 **Keali'i Gora**, Ka Lahui Hawai'i [the Hawaiian Nation], HAWAI'I. Ea Hawai'i: Hawaiian Sovereignty in the 21st Century: Nation within a Nation or Independence?
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- Session 2:** **Ethics and Ethical Guidelines: Working Group.**
8:00 - 8:30 **Gail Wagner**, Department of Anthropology, University of South Carolina, Columbia, South Carolina, USA. Introduction to Ethical Codes and Guidelines. Session Moderator
8:30 - 9:00 Discussion: Facing Ethical Dilemmas.
9:00 - 9:45 Discussion: Issues in Ethics Relating to Traditional Knowledge.
9:45 - 10:00 Morning Break
10:00-10:30 Discussion: Developing Principles for Codes and Guidelines.
10:30-11:15 Working Forum
11:15-11:30 Ethics Education, or What Good is a Code if No One Knows It?
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- Session 3:** **Integrating Business, Culture, and Ethnoscience.**
8:00-8:05 **Trish Flaster**, Botanical Liaisons, Inc., Boulder Colorado, USA. Introduction.
8:05-8:35 **Julie Anne Chinnoek**, Bastyr University, Seattle, Washington, USA. An Introductory Assessment of Ethnomedicine and CAM Healthcare in Cuba.
8:35-9:05 **Amy Craver** and **Amy Witt**, Alaska Native Science Commission, Anchorage, Alaska, USA. Lessons Learned: Developing a Community-Based Model for Documenting Alaska Native Traditional Knowledge About Environmental Change.
9:05-9:35 **Leanora Pumehana Dizol Kaiaokamalie**, Hawai'i Coastal Zone Management Program, Hawai'i Statewide GIS Program, State Office of Planning, Honolulu, HAWAI'I. Pili Pa'a Pili Pu Pili Pono: Restoring Balance--Using ArcView GIS to Integrate Indigenous Land and Resources Management Techniques with Contemporary Coastal Zone Management in Hawai'i.
9:35-10:05 **Mary Maruca**, United States Fish and Wildlife Service and **Trish Flaster**, Botanical Liaisons, Inc., Boulder Colorado, USA. Green Medicine--Shared Commitments to Medicinal Plant Conservation.
9:40-10:10 Morning Break
10:10-10:40 **Robert Stauffer**, Hawaiian Language Legacy Program, Alu Like, Honolulu, HAWAI'I. Bringing the Legacy of 19th Century Hawaiian Language Material to the Public.
10:40-11:10 **Elisabeth Poscher**, Office of Arid Lands Studies, University of Arizona, Tucson, Arizona, USA. Healing with Halophytes: A Case Study of the Seri Indians.
11:10-11:30 **Singam Veerasingam**, Business Council for Sustainable Development, Kuala Lumpur, MALAYSIA. The Challenges Ahead for "SMALL and MEDIUM ENTERPRISES".
11:30-11:50 **R. Sugandhi**, People for Animals, Bhopal, INDIA. Patenting & Property Rights of Indigenous Medicine of India.

Session 4:	Ethnopharmacology: Building Bridges Between Natural Product Chemistry and Traditional Knowledge. Sponsored by: The Cancer Research Center of Hawai'i, Natural Products Program . Hosted by: The International Society for Ethnopharmacology.
8:00-8:40	Michael Heinrich , Centre for Pharmacognosy and Phytotherapy, School of Pharmacy, University of London, England, UNITED KINGDOM. <u>Ethnopharmacology or Bioprospecting: Two Sides of the same (Western) Coin?</u>
8:40-9:20	Barbara Frei Haller , PhytoQuest, Agency for consulting and research into ethnobotany, ethnomedicine and phytochemistry, Zerne, SWITZERLAND and S. Mueller , Cilag AG, Schaffhausen, SWITZERLAND. <u>Probing the Foundations - Reflections on the Actors and Their Environment in the Field of Ethnopharmacology.</u>
9:20-10:00*	Patrick L. Owen , School of Dietetics and Human Nutrition, McGill University, Montreal, CANADA. <u>Graduate Studies in Ethnopharmacology: Building Bridges Between Disciplines.</u>
10:00-10:30	Morning Break
10:30-11:00	Memory Elvin-Lewis , Washington University, Department of Biology, St. Louis, Missouri, USA. <u>Conceptual Similarities in Traditional Treatments for Hepatitis.</u>
11:00-11:30	Daniel E. Moerman , University of Michigan, Dearborn, Michigan USA. <u>"Prescription sticks": Indigenous 19th Century Pharmacopoeias.</u>
11:30-12:00	Discussion

Session 5:	Ethnobotany and Conservation of Indo-Malay and Indo-Pacific Native Fruit. Hosted by: ECO-SEA
8:00-8:10	Jeanine Pfeiffer , University of California, Davis, California, USA. <u>Introduction.</u>
8:10-8:40	Ida Bagus Ketut Arinasa , Eka Karya Bali Botanic Gardens, Bali, INDONESIA. <u>Sacred Uses of Indo-Malay Native Fruits in Balinese Adat.</u>
8:40-9:20*	Lisa X Gollin , University of Hawai'i, Department of Anthropology, Honolulu, HAWAI'I and Asung Uluk , Cultural Representative, Kalimantan, INDONESIA. <u>A Spoonful of Fructose Helps the Medicine Go Down: Kenyah Leppo'ke Therapeutic Fruits.</u>
9:20-10:00	Alvin Keali'i Chock , Department of Botany, University of Hawai'i at Mānoa, Honolulu, HAWAI'I, and (retired) Animal & Plant Health Inspection Service, United States Department of Agriculture. <u>The Role of India-Pacific Fruits in Ancient and Modern Hawaiian Culture.</u>
10:00-10:20	Morning Break
10:20-10:50	Diane Ragone , National Tropical Botanical Garden, Kalaheo, HAWAI'I. <u>Conservation Status and Traditional Uses of Breadfruit in the Pacific Islands and Indo-Malay Region.</u>
10:50-11:20	Domingo A Madulid , National Museum, Manila, THE PHILIPPINES. <u>The Native Fruits of the Philippines.</u>
11:20-11:50*	Jeanine Pfeiffer , University of California, Davis, California, USA and Andreas Ambe , Nampar Macing Village, Pulau Flores, Nusa Tenggara Timur, INDONESIA. <u>Malesian Fruit in Kempo Manggarai Traditions and Ecosystems, East Nusa Tenggara.</u>
11:50-12:00	Discussion.

Session 6:	Pacific Ethnobotany.
8:00-8:05	Sheri S. Mann , Territorial Forestry, ASCC Forestry Program, AMERICAN SAMOA. <u>Introduction.</u>
8:05-8:25	Sheri S. Mann , Territorial Forestry, ASCC Forestry Program, AMERICAN SAMOA. <u>Gender Roles in Forestry Around the World.</u>
8:25-8:45	Malala Malaetia Misa , ASCC AHNH Land Grant Forestry Program, Mapusaga, Pagopago, AMERICAN SAMOA. <u>Malae, The Sacred Ground of Samoa.</u>
8:45-9:05	Art Whistler , Isle Botanica, Honolulu, HAWAI'I. <u>The Dark Side of Politically Correct Science in Polynesia.</u>
9:05-9:25*	Michael Wysong , University of Hawai'i at Manoa, Department of Botany, Honolulu, Hawai'i, USA. <u>Quantitative ethnobotanical study of plant resource usage in Manu'a, American Samoa.</u>
9:25-9:45*	Orlo Colin Steele , Department of Botany, University of Hawai'i, Honolulu, HAWAI'I. <u>Ecological and Cultural Influences on Samoan Mangrove Bio-geography.</u>
9:45-10:00	Morning Break.
10:00-10:20*	Timothy Motley , The Lewis B. and Dorothy Cullman Program for Molecular Systematics Studies, <u>The New York Botanical Garden, Bronx, New York, USA.</u> <u>The Ethnobotany of <i>Fagraea</i>: The Timber of Malesia and the Scent of Polynesia.</u>
10:20-10:40*	Liloa Dunn , Department of Botany, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. <u>The Ethnobotany of Polynesian Tattooing.</u>
10:40-11:00*	Puanani Anderson-Wong , Ecology, Evolution, and Conservation Biology Program, Department of Botany, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. <u>Returning the beloved plant <i>laua 'e maoli</i>, to the Hawaiian people and clarifying the role of the invasive alien <i>laua'e (Phymatosorus grossus)</i> holds significance for cultural and natural conservation efforts.</u>
11:00-11:20*	Jon Webster Abbott , Department of Anthropology, University of Hawai'i at Manoa, Honolulu, HAWAI'I. <u>We call them Weeds...Traditional Hawaiian Botanical Medicine and Introduced Plant Species.</u>
11:20-11:40*	Nyree Conard Zerega, Diane Ragone, Timothy J. Motley, Lewis B. Garden, and Dorothy Cullman , Program for Molecular Systematic Studies, The New York Botanical Garden, Bronx, New York, USA, and The National Tropical Botanical Garden, Kalaheo, HAWAI'I. <u>Hybrid origin of breadfruit, <i>Artocarpus altilis</i>.</u>
11:40-12:00	Sam Gon , The Nature Conservancy, Honolulu, HAWAI'I. <u>Application of traditional ecological knowledge and practices of indigenous Hawaiians to the re-vegetation of Kaho'olawe.</u>

Session 7:	Research, Teacher Education, and Post-Secondary Perspectives I.
8:00-9:00	Michael T. Hayes , College of Education, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. <u>The Critically Engaged Listener and the Impossibility of Knowledge: Towards an Anti-Colonial Science Education Practice.</u>
9:15-10:15	Pauline W. U. Chinn , College of Education, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. <u>Reconciliation in Hawai'i: Malama I Ka Aina, Sustainability.</u>
10:30-11:30	Gregory Cajete , University of New Mexico, Albuquerque, New Mexico, USA. <u>LOOK TO THE MOUNTAIN: An Ecology of Indigenous Education.</u>

Session 8:	Research, Teacher Education, and Post-Secondary Perspectives II.
8:00-9:00	Benjamin C. Feinstein , College of Education, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. <u>Constructing a Traditional Ecological Knowledge Curriculum: Considerations and Possibilities.</u>
9:15-10:15	Louis Herman , University of Hawai'i-West O'ahu, Honolulu, HAWAI'I. <u>A Socratic-Shamanistic model for education in an age of Globalization.</u>

12:00-1:30	Lunch Break / Discussion Groups. Society for Economic Botany membership business meeting.
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Asia Plenary Session

- 1:30-1:35 **Pauline Chinn**, Teacher Education and Curriculum Studies, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Welcome.
- 1:35-1:45 **Randy Hitz**, Dean, College of Education, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Singing Welcome.
- 1:45-2:15 **Shengji Pei**, Department of Ethnobotany, Kunming Institute of Ethnobotany, Chinese Academy of Sciences, Kunming, Yunnan, P.R. CHINA. Applied Ethnobotany: Participatory Approach for Community Development and Conservation.
- 2:15-2:45 **Krishna K. Shrestha**, Central Department of Botany, Tribhuvan University, Kirtipur, Kathmandu NEPAL, **Narendra N. Tiwari**, Ayurveda Campus, Institute of Medicine, Tribhuvan University, Kathmandu, NEPAL and **Suresh K. Ghimire**, Central Department of Botany, Tribhuvan University, Kirtipur, Kathmandu, NEPAL. Ethno-medicine and Conservation of Traditional Knowledge in Nepal.
- 2:45-3:15 **S. K. Jain**, Institute of Ethnobiology, National Botanical Research Institute, Lucknow, INDIA. In India, 'Bridges' always existed: resurgence of ethnobotany is strengthening them.
- 3:15-3:45 Afternoon Break.
- 3:45-4:15 **Rowena Fong**, School of Social Work, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Cultural Values, Behaviors, and Norms: An Analysis of Protective and Risk Factors.
- 4:15-4:45 **Andreas Ambe**, Tado Clan, Nampar Macing Village, Flores Island, INDONESIA. (with translations by Jeanine Pfeiffer, University of California at Davis, Davis, California, USA. Hidden Wealth: The Challenges of Conserving Our Living Encyclopedias and Pharmacopoeias.
- 4:45-5:30 **Discussion.**
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- 5:30-7:30 **Dinner Break.**

Evening Distinguished Speaker

- 7:30-7:35 **Richard Dubnowski**, Dean, College of Social Science, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Welcome.
- 7:35-7:40 **Nancy Lewis**, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Introduction.
- 7:40-8:40 **Nat Quansah**, Ambodisakoana Clinic, Sovinasoandro, MADAGASCAR, **Herlyne Ramihantaniarivo**, HIS University Training Hospital, Antananarivo, MADAGASCAR. Integrated Health Care System: Meeting Global Health Care Needs in the 21st Century.
- 8:40-9:00 Discussion

Friday, June 1st, 2001

Concurrent Sessions

- Session 1: Conservation of Hawaiian Knowledge.**
- 8:00-8:10 **Edith McKinzie, Nalani Olds, and Henry Iwasa**, Committee for the Preservation of the Hawaiian Language Culture and the Arts, University of Hawai‘i at Mānoa, Honolulu, HAWAI‘I. Pule, Introduction and Moderators.
- 8:10-8:50 **Laiana Wong**, Department of Hawaiian and Indo-Pacific Languages, University of Hawai‘i, Honolulu, HAWAI‘I. The Cost of Language Lost.
- 8:50-9:30 **Lilikalā Kame‘eleihiwa**, Director, Center for Hawaiian Studies, University of Hawai‘i at Mānoa, Honolulu, HAWAI‘I. HALAU ‘IKE O HAWAI‘I: Center for Hawaiian Studies presents New Directions in Hawaiian Education for the 21st Century, University of Hawai‘i at Manoa.
- 9:30-10:10 **Noeoe Silva**, Department of Hawaiian and Indo-Pacific Languages, University of Hawai‘i, Honolulu, HAWAI‘I. The Importance of Hawaiian Language Sources in Understanding the Hawaiian Past.
- 10:10-10:30 Morning Break.
- 10:30-11:10 **Edith Kawelohea McKinzie**, Instructor of Hawaiian Culture, Language and Literature, Geneologist, Chant and Hula Master, Committee for the Preservation of the Hawaiian Language Culture and the Arts, University of Hawai‘i at Mānoa, Honolulu, HAWAI‘I.
- 11:10-12:00 To be announced.
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- Session 2: Conservation Priorities from Traditional Perspectives: Working Group.**
- 8:00-8:30 No host group discussion, determination of group participants, development of consensus
- 8:30-9:45 Discussion/Open Forum
- 9:45-10:15 Morning Break
- 10:15-11:30 Discussion: What are the priorities?
- 11:00-12:00 Review of discussions and determination of statements
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- Session 3: Economic Botany: Crops and Cultures in the Pacific.**
- 8:00-8:05 **Barbara Pickersgill**, The University of Reading, White Knights, UNITED KINGDOM. Introduction and Moderator.
- 8:05-8:45 **Peter J. Matthews**, Associate Professor, National Museum of Ethnology, JAPAN. Genetic diversity in taro, and the preservation of culinary knowledge.
- 8:45-9:25 **Valérie Kagy**, CIRAD Station de Recherches Fruitières de Pocquereux, NEW CALEDONIA and **Françoise Carreel**, CIRAD-FLHOR, Station de Neufchâteau, Sainte-Marie, Guadeloupe, FRANCE. Cultural and socio-economic importance of bananas in Kanak society in New Caledonia, as explained by their origins.
- 9:25-10:05 **Hugh Harries**, Investigador, Centro de Investigación Científica de Yucatán AC, (CICY), Mérida, Yucatán, MEXICO, **Luc Baudoin**, Geneticist, Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), Montpellier, FRANCE, **Alan Meerow**, Research Geneticist, Systematist & Curator, National Germplasm Repository (USDA-ARS-SHRS), Miami, Florida, USA, **Rolando Cardeña**, Investigador, Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco (CIATDEJ), Guadalajara, Jalisco, MEXICO. Floating, boating and introgression: molecular techniques and the ancestry of coconut palm populations on Pacific islands.
- 10:05-10:30 Morning Break.
- 10:30-11:10 **Vincent Lebot**, CI RAD PMB, Port Vila, VANUATU, and **Patricia Siméoni**, VARTC PRODIG, Santo, VANUATU. The origin of kava (*Piper methysticum* Forst. f.): Is the cultural appreciation of quality responsible for different geographical patterns?
- 11:10-11:50 **Laurent Grivet**, Cirad, Unicamp, BRAZIL, **Christian Daniels**, Tokyo University of Foreign Studies, Tokyo, JAPAN, **Jean Christophe Glaszmann**, Cirad, Montpellier, FRANCE, **Angélique D’Hont**, Cirad, Montpellier, FRANCE. Origin and evolution of sugarcane: what more do we know after 15 years?
- 11:50-12:00 Conclusions.

Session 4a:	Traditional Medicine in Modern Societies.
8:05-8:25*	John R. Stepp , University of Georgia, Athens, Georgia, USA. <u>Ethnoecological Distribution of Highland Maya Medicinal Plants.</u>
8:25-8:45*	Kurt A. Reynertson and Edward J. Kennelly , The Graduate Center, City University of New York, Lehman College, Department of Biology, Bronx, New York, USA. <u>Antioxidant Polyphenols from Fruits of the Myrtaceae: A Chemotaxonomic and Ethnomedical Approach to Discovery.</u>
8:45-9:05*	Scott Herron , Southern Illinois University at Carbondale, Carbondale, Illinois, USA. <u>The Ethnobotany of the Medicine Wheel Delineates the Cosmology of Native Americans.</u>
9:05-9:25*	Sharon Tang , Centre for Pharmacognosy and Phytotherapy, The School of Pharmacy, London, UNITED KINGDOM, Christina Schlage, Institut für Pharmazeutische Biologie, Albert-Ludwigs Universität, Freiburg, GERMANY, Simon Gibbons and Michael Heinrich , Centre for Pharmacognosy and Phytotherapy, The School of Pharmacy, London, UNITED KINGDOM. <u>Ochna macrocalyx A Medicinal Plant from the Usambara Mountains of Tanzania: Ethnobotany, Phytochemistry and Biological Activity.</u>
9:25-9:45*	Jon Mozena , University of Iowa, College of Medicine, Iowa City, Iowa, USA. <u>Traditional medical systems of the Ririo tribe on the Island of Lauru in the Western Solomon Islands.</u>
9:45-10:15	Morning Break
10:15-10:35	Bula Logan , Malama Na Pua Health Center, HAWAI'I. <u>Hawaiian Health Care.</u>
10:35-10:55	Hans Wohlmuth , School of Natural and Complementary Medicine, Southern Cross University, Lismore, AUSTRALIA. <u>Herbal Medicine in Contemporary Australian Society.</u>
10:55-11:15	L. Ikramov and M. Ikramov , Samarkand State University, Samarkand, UZBEKISTAN. <u>Lagochilus inebrians Bynne: A Valuable Blood Stopping Plant.</u>
11:15-11:35	Jack R. Donaldson and Rex G. Cates , Natural Product Research Group, Department of Botany, Brigham Young University, Provo, Utah, USA. <u>Comparing ethnobotany and chemical ecology approaches in the search for medicinal plants.</u>
11:35-11:55	Harpreet Kaur and Sukhjeet Singh Hira , University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh, INDIA. <u>Efficacy of An Indigenous Multi-Herbal Anti-Diabetic Formulation: A Preliminary Clinical Study.</u>

Session 4b:	Traditional Medicine in Modern Societies.
8:05-8:25	Wesley Sen and Lehua McCandless-Sen , HAWAI'I. <u>The ancient art of the foot walking lomi lomi and the revival and restoration of ancient Hawaiian physiotherapy and its practice in the Spa Industry in Hawai'i.</u>
8:25-8:45	Cecelia Mitchell , D. Mitchell , Roosevelt Town, New York, USA and C.R. Ramirez-Sosa , Department of Biology, St. Lawrence University, Canton, New York, USA. <u>Recovering Traditional Knowledge of Medicinal Plants at Akwesasne Mohawk Reservation, Akwesasne, New York.</u>
8:45-9:05	Ina Vandebroek , Laboratory of Tropical and Subtropical Agronomy and Ethnobotany, Faculty of Agricultural and Applied Biological Sciences, Coupure Links, Ghent, BELGIUM. <u>Qualitative and quantitative analysis of traditional medicinal plant use by Quechua healers in the Bolivian Andes (Apillapampa, Department of Cochabamba).</u>
9:05-9:25	Wana Domokamaca-Sivoi , Wainimate, Suva, FIJI. <u>The Roles of Traditional Healers and their Potential Position in Good Health.</u> [cultural demonstration]
9:25-9:45	Thomas J. S. Carlson , Department of Integrative Biology, University of California, Berkeley, California, USA. <u>Botanical Medicines in Contemporary Communities: Benefits and Pitfalls.</u>
9:45-10:15	Morning Break
10:15-10:35	S. Semple and M. Barton , School of Pharmaceutical, Molecular and Biomedical Sciences, University of South Australia, Adelaide, South Australia, AUSTRALIA. <u>Ethnopharmacological investigations of the antimicrobial activity of some Australian Aboriginal medicinal plants.</u>
10:35-10:55	Lucia Swart , Department of Pharmacology & Therapeutics, Medical University of Southern Africa, SOUTH AFRICA. <u>Traditional Remedies. The Medical University of Southern Africa Experience.</u>
10:55-11:15	Dawn K. Wasson , Hui Malama 'Aina 'O Laie, Laie, HAWAI'I. <u>Kuleana Land.</u>
11:15-11:35*	E. Klaus Dragull , W.J. Tang , and C.S. Tang , Department of Molecular Bioscience and Biosystems Engineering, University of Hawai'i at Manoa, Honolulu, HAWAI'I. <u>HPLC analysis of pipermethystine and kavalactones in kava (Piper methysticum Forst.) leaves.</u>
11:35-11:55*	Kamaldeep Dhawan , Suresh Kuma , and Anupam Sharma , Pharmacognosy Division, University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh, INDIA. <u>Passiflora incarnata L. - A Traditional Medicine of the Pre-historic Era: A Promising Herbal Anxiolytic and Sedative of the Modern World.</u>

Session 4c:	Traditional Medicine in Modern Societies.
8:00-8:05	Stefania Dimitrova , Foundation MADARA BULGARIA, Sofia, BULGARIA. <u>Indigenous knowledge about curing diseases in Bulgaria.</u>
8:05-8:25	Matchu-Mandje Jean-Baptiste Dhetchuvi, T. Agasuru, Tasile and G. Manzima. Phytotherapeutic Centre of Bunia, DEMOCRATIC REPUBLIC OF CONGO. <u>Ethnobotanical, ethnopharmacological research and clinical uses of plant extracts in Bunia (Kibali-Ituri), North-Eastern of Democratic Republic of Congo.</u>
8:25-8:45	Abdul Hafeel , Foundation for Revitalization of Local Health Traditions, Bangalore, INDIA. <u>Contemporary Relevance of Local Health Traditions - A Participatory Assessment Approach.</u>
8:45-9:05	Shekar CN Chandra, K K, Srinivasan, Susan Benjamin, & K. Gopalakrishna, Kasturba Medical College, Manipal, Karnataka, INDIA. <u>Hypoglycemic effects of different extracts of <i>Salacia reticulata</i> root bark.</u>
9:05-9:25	R.R. Rao , National Botanical Research Institute, Lucknow, INDIA. <u>Role of Traditional Knowledge in Bioprospection in Developing Countries.</u>
9:25-9:45	Mohamed A. Alnagarabi , Khartoum, SUDAN. <u>Globalization & health of the poor in Africa.</u>
9:45-10:15	Morning Break

Session 5:	Agricultural and Aquacultural Applications of Traditional Knowledge.
8:00-8:05	<u>Introduction.</u>
8:05-8:40	Mary Elizabeth Brooks , He'e'ia, HAWAI'I. <u>Fish and Poi in the Ahupua'a of He'e'ia.</u>
8:40-9:15	Mary W. Eubanks , Department of Biology, Duke University, Durham, North Carolina, USA. <u>Ancestral Genetic Resources Provide an Alternative to Genetically Modified Organism (GMO) Crops.</u>
9:15-9:50	Alan Friedlander , The Oceanic Institute, Makapu'u Point, Waimanalo, HAWAI'I, Kelson Poepoe , Hui Malama o Mo'omomi, Kualapu'u, HAWAI'I, Kaipo Poepoe , Hui Malama o Mo'omomi, Kualapu'u, HAWAI'I, Kanohe Helm , Hui Malama o Mo'omomi, Kualapu'u, HAWAI'I, and Paul Bartram , Pacific American Foundation, Honolulu, HAWAI'I. <u>Validating traditional knowledge concerning the harvest of marine resources using the Hawaiian moon calendar.</u>
9:50-10:15	Morning Break
10:15-10:50	Lauren Roth , Ecological Designer, Ocean Arks International, Honolulu, HAWAI'I. <u>The Living Machine: bringing together traditional knowledge with bioremediation.</u>
10:50-11:25	DKNG Pushpakumara , Department of Crop Science, University of Peradeniya, Peradeniya, SRI LANKA. <u>Potential use of Traditional Knowledge in Modern and Sustainable Societies: Lesson from Sri Lanka.</u>
11:25-12:00	Mario Serracin , Department of Plant and Environmental Sciences. University of Hawaii at Manoa, Honolulu, HAWAI'I. <u>The History, cultivation and science of coffee in the Hawaiian Islands.</u>

Session 6:	Indigenous People as Political Powers.
8:00-8:05	<u>Introduction.</u>
8:05-8:40	Brendan Tobin , Asociacion para la defensa de los Derechos Naturales (ADN), Lima, PERU. <u>Face to Face: Redefining Perspectives and the Role of Customary Law in the Protection of Traditional Knowledge: Experiences from the Pacific Region.</u>
8:40-9:15	Kahungunu Barron-Afeaki , Auckland, NEW ZEALAND. <u>The Traditional Science of Polynesian Warrior Athletics.</u>
9:15-9:50	Myrtle Driver , Tribal Cultural Traditionalist with Cultural Resources of the Eastern Band of Cherokee Indians, Cherokee, North Carolina, USA. <u>Cherokee Dance and Drama.</u>
9:50-10:15	Morning Break.
10:15-10:50	Margaret Forster , Rongomaiwahine, Te Putahi-a-Toi, School of Maori Studies, Massey University, Palmerston North, NEW ZEALAND. <u>Te Hoe Nuku Roa: A journey towards Māori centered research.</u>
10:50-11:25	Joanna Hadjicostandi , University of Texas of the Permian Basin, Department of Behavioral Science, Odessa, Texas, USA. <u>Building Bridges: The Role of the Black Teacher.</u>
11:25-12:00	Margaret Swan , Grand Chief, Southern Chiefs Organization, Winnipeg, Manitoba, CANADA. <u>Requirements and Expectations of a First Nations Leader.</u>

Session 7:	Theoretical Ethnobiology.
8:00-8:05	Christiana Ehringhaus , Forestry and Environmental Studies, Yale University, New Haven, Connecticut, USA. <u>Introduction and Moderator.</u>
8:05-8:35	Deanna Donovan , Environmental Studies, East-West Center, Honolulu, HAWAI'I and R. K. Puri , Department of Anthropology, University of Kent, Canterbury, England, UNITED KINGDOM. <u>Framework for Applying Indigenous Knowledge in Forestry Research.</u>
8:35-9:05	Anya Hinkle , Department of Integrative Biology, University of California, Berkeley, California, USA. <u>The Uses of Phylogenetics in Ethnobiological Research.</u>
9:05-9:35	Roberta Lee , New York, New York, USA. <u>Lessons from the field - a multidisciplinary perspective on ethnomedical interviewing.</u>
9:35-10:05	Christiana Ehringhaus , Forestry and Environmental Studies, Yale University, New Haven, Connecticut, USA.
10:05-10:30	Morning Break.
10:30-11:00	Jennifer Sowerwine , University of California, Berkeley, Berkeley, California, USA. <u>Globalization and the Conservation of Traditional Botanical Medicine in Vietnam: Linking Theory with Ethnobotanical Methods to Better Inform Conservation Programs.</u>
11:00-11:30	Karen Meech , Institute for Astronomy, University of Hawaii, Honolulu, HAWAI'I and Clive Ruggles , School of Archaeology and Ancient History, Leicester University, England, UNITED KINGDOM. <u>Blending Modern and Ancient Astronomical Searches for Origins as a Means of Teaching Astronomy to Culturally Diverse Groups.</u>
11:30-12:00	L. Jan Slikkerveer , Leiden University, CA/SNWS, Leiden, NETHERLANDS. <u>Building Bridges between Knowledge Systems: Towards a Multi-variate Model of Biocultural Conservation of Medicinal, Aromatic and Cosmetic (MAC) Plants in Indonesia.</u>

Session 8:	K-12 School and Community Perspectives: Values and Visions.
8:00-9:00	Steven Kubota , Ahupua'a Action Alliance, Honolulu, HAWAI'I, Candice Felling , University of Hawai'i, Honolulu, HAWAI'I, and Sandy Zicus , University of Hawai'i, Honolulu, HAWAI'I. <u>Islands of Hope.</u>
Sub-session 8a:	
9:15-10:15	Steven Kubota , Ahupua'a Action Alliance, Honolulu, HAWAI'I. <u>Ahupua'a, Education, and the Community.</u>
10:30-11:30	Traci Sylva , College of Tropical Agriculture and Human Resources, University of Hawai'i at Mānoa, Honolulu, HAWAI'I, Pauline Chinn , College of Education, University of Hawai'i at Mānoa, Honolulu, HAWAI'I, Lillian Yanagawa , Kalani High School, HAWAI'I, William McFeeley , Maryknoll High School, Honolulu, HAWAI'I, David Hanaïke , Kawanānakoā Middle School, HAWAI'I and David Fuertes , Kohala High School, HAWAI'I. <u>Hawaiian Style Bioremediation.</u>
Sub-session 8b:	
9:15-10:45	Anona Napoleon and Norma Jean Stodden , University of Hawai'i, Honolulu, HAWAI'I. <u>Ho'oponopono Curriculum For Secondary Teachers and Counselors.</u>
11:00-11:30	Lilette Subedi , Ka'ala Farms, Waianae, HAWAI'I. <u>'Imi Ao - Seek Knowledge: Kalo, Kapa, Pokahu.</u>
Sub-session 8c:	
9:15-11:30	Candice Felling , University of Hawai'i, Honolulu, HAWAI'I and Sandy Zicus , University of Hawai'i, Honolulu, HAWAI'I. <u>Ethnoscience of Hawaiian Fish ponds.</u>

12:00-1:30 **Economic Botany: Distinguished Economic Botanist for 2001 Presentation.**
Isabella A. Abbott, Bernice P. Bishop Museum, and the University of Hawai'i, Honolulu, HAWAI'I. ____
Interpreting pre-western Hawaiian Culture as an Ethnobotanist.

Pacific Island Plenary Session

1:30-1:35 **Willa Tanabe**, Dean, School of Hawaiian, Asian and Pacific Studies, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Welcome.

1:35-1:40 **Barbara Pickersgill**, The University of Reading, White Knights, UNITED KINGDOM and **Gail Wagner**, Department of Anthropology, University of South Carolina, Columbia, South Carolina, USA. Society for Economic Botany Annual Meeting Awards: Fulling Award & Morton Award.

1:40-1:45 **Will McClatchey**, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Introduction and Moderator.

1:45-2:25 **Aroha Te Pareake Mead**, International Institute for Indigenous Resource Management, Denver, Colorado, USA, Cultural Heritage & Indigenous Issues Unit, Ministry of Maori Development, Wellington, AOTEAROA, Maori Business, Faculty of Commerce & Administration, Victoria University of Wellington, AOTEAROA. Are Human Genes 'Property'? Human Genetic Research and the Pacific.

2:25-3:05 **K.K. Batibasaga**, Fiji Visitors Bureau, Suva, FIJI. Concept of Vanua and Environment.

3:05-3:25 Afternoon Break.

3:25-4:05 **Bill Raynor**, Federated States of Micronesia Country Program Director, The Nature Conservancy, Pohnpei, FEDERATED STATES OF MICRONESIA and **Mark Kostka**, Community-based Enterprise Development Coordinator, The Nature Conservancy, Pohnpei, FEDERATED STATES OF MICRONESIA. Back to the Future: Using Traditional Knowledge to Strengthen Biodiversity Conservation in Pohnpei, FSM.

4:05-4:45 **Papalii Failautusi Avegalio**, Pacific Business Center, University of Hawai'i at Manoa, Honolulu, HAWAI'I and **James Matayoshi**, Mayor, Rongelap Atoll Local Government, Rongelap Atoll, MARSHALL ISLANDS. Healing the Scars; Can ecology become the basis of sustainable development at Rongelap Atoll.

4:45-5:25 **Vicky Holt Takamine**, Kumu Hula of Pua Ali'i `Ilima, University of Hawai'i at Mānoa, Leeward Community College, and the University High School, Honolulu, HAWAI'I. 'Ilio'ulaokalani: Political Empowerment through Cultural Practices.

5:25-5:30 Discussion.

5:30-7:30 **Dinner Break.**

Evening Distinguished Speaker

7:30-7:35 Pule.

7:35-7:40 **Lilikala Kame'eleihiwa**, Center for Hawaiian Studies, University of Hawai'i at Mānoa, Honolulu, HAWAI'I. Welcome and Introduction.

7:40-7:50 Kumu Hula **John Keola Lake**, Evening Closing Ceremony: Oli

7:50-8:40 **Nainoa Thompson**, Polynesian Voyaging Society, Honolulu, HAWAI'I. Malama Hawai'i.

8:40-9:00 Discussion

Saturday, June 2nd, 2001

K-12 Education Excursions

Session 1: Loko I'a (Fish pond, aquaculture) field trip
8:00-12:00

Session 2: Ahupua'a: Kahana Valley: Steven Kubota
8:30-4:00

Optional Excursions

Session 1: Lo'i Kalo Tour: Hawaiian Farming.
TBA

Session 2: Dole Food Company, Hawai'i Tour.
TBA

Session 3: Native Plant Hike.
TBA

Session 4: Polynesian Cultural Center.
TBA

Session 5: Building Bridges Outreach Project I: He'e'ia Loko I'a (Hawaiian Aquacultural System)
TBA

Session 6: Building Bridges Outreach Project II: Waiahole Lo'i Kalo (Hawaiian Taro Farming System)
TBA

Session 7: Botanical Garden Tours.
TBA

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Outstanding individuals inspire us by demonstrating that barriers of ethnicity, class, gender and geography can be overcome. Professor Isabella Aiona Abbott became an internationally recognized authority in her field when few women, especially those of Polynesian ethnicity even completed college. Isabella Aiona was born in the remote little town of Hana, Maui to a Hawaiian, missionary-schooled mother and immigrant Chinese father who came to labor on Hawaii's sugar plantations. At this time, Hawaiian culture was suppressed and polygeny, a theory that humans belonged to different, unequal races justified the exploitation of dark-skinned workers. A prominent missionary descendant, Reverend Bishop, even proposed that Chinese and Hawaiians "being of similar social level" could produce offspring with better qualities than the parent races (Porteus, 1962).

How did a scientist emerge from this background? Dr. Abbott says "having supportive parents for education, not necessarily science, but education makes you a winner to begin with." As a child she remembers displaying "a perpetual interest, a curiosity that wasn't sat on by either my mother or father who each took the time to explain any sort of question that I might have." This desire to learn was recognized by a Hawaiian elder who took the young Isabella into the forest-clad mountains. He placed her high on a branch of an *ohi'a lehua* tree and told her to watch silently. He wiped a substance onto the branch, then they waited. At last a red *i'iwi*, a Hawaiian honeycreeper, landed and stuck fast on the substance. The man gently plucked the bird off the branch, wiped its feet with kukui nut oil and released it. He finally spoke, "This is what we used to do. I wanted you to know."

Dr. Abbott believes her "very dedicated, ambitious, authoritarian" father and her school teacher mother laid the foundation for her academic success. From her missionary-schooled mother she learned to speak both Hawaiian the proper English that enabled her to pass tests required to attend academically superior English Standard schools. Her mother also taught her the Hawaiian names of plants and the close observational skills that are indispensable to a scientist. Dr. Abbott says she "was always curious about plants. My mother had a green thumb and I planted or watched her plant a lot of things." This habit of observing became "so much part of me that I could not imagine life without that outlook."

Dr. Abbott's upbringing also prepared her for a competitive, male dominated scientific career. When she received her Ph.D. in 1950 in botany, men greatly outnumbered women. She remembers "plenty of competition; if you were "wasting time you were cut dead right away". But she was used to competition. At dinner, her father encouraged his children to express their opinions and defend their ideas. Isabella, who had five brothers and was the sixth of seven children, recalls: "from the word go you had to compete or they'd run right over you! My brothers even used to fist fight with me until my father told them, 'You can push her but not hard and never slap or hit.' But still you have this kind of competition. And I think that made me look at my male colleagues in science and think, 'Oh, what the hell, you're just like one of my brothers!'"

When Isabella was 12, her mother enrolled her in a school for Hawaiian girls so she would learn to be a young lady. During her five years at the school, the girls helped plant and tend the campus gardens. The principal noticed Isabella's interest in plants and went out of her way to do something her mother could not do--teach her the scientific names of familiar plants. Dr. Abbott believes that these family and school experiences shaped her decision to choose a botany major. When she entered the university she recalls, "I didn't know what "botany major" meant except that it was plants."

At the University of Hawaii, a chance event contributed to shaping her scientific career. In her freshman year, Isabella met a young man from the midwest who had come to Hawaii to study marine zoology. When her botany professor arranged his students alphabetically, he placed Isabella Aiona next to Donald Putnam Abbott, her future husband. Dr. Abbott says that without this chance event "my life would have been completely different". They graduated in 1941 on the brink of World War II. Isabella Aiona studied for a master's degree at the University of Michigan while Don Abbott served in the military. After the war, they married and entered doctoral programs at the University of California-Berkeley, where they supported each other by alternately teaching and doing research. After the Abbotts received their doctorates and were hired by Stanford University, they collaborated on another challenging project: they became parents of a daughter, Ann.

Stanford, located on California's coastline, provided an ideal setting for the Abbotts' marine oriented research. As Dr. Isabella Aiona Abbott gained recognition for her scientific work, the fact that she was Hawaiian-Chinese and a working wife and mother also established her as a path breaker for women and minorities in science and higher education. Dr. Abbott recognized that each of her social categories—professor, scientist, wife, mother, Chinese, Hawaiian—involved a different public image, role and social ranking. Growing up in Hawaii's multicultural, multilingual, class-oriented society, Isabella Aiona Abbott was adept at recognizing and foregrounding the role most advantageous to a situation. In her roles of wife and scientist, she utilized her high school home-making skills to establish a social and scientific network which she and her husband found helpful to their academic careers:

In school I learned to cook, sew, take care of babies. But that all came to help me in the future. As a woman scientist, if you don't know how to cook, you don't feel comfortable about asking people over or socializing. My husband loved to

entertain people at home, so I got a double dose. I got my scientists, I got his scientists, and we had them over to the house a lot. And when you're eating, everybody's equal, right?

Stanford University appointed Dr. Isabella Abbott as its first female biology professor. After returning to Hawaii after taking early retirement from Stanford in the early 1980s, Dr. Abbott was the first woman appointed to be Wilder Professor of Botany, one of the few endowed chairs at the University of Hawai'i-Manoa. In Hawaii, she continued her research and teaching, introducing innovative ways of teaching ethnobotany through weekly "living demonstration" laboratory activities. Students made *kapa*, pounded poi, grew culturally important plants, prepared teas from native plants and researched and made traditional Hawaiian items such as *pahu* (drums), cordage, canoe accessories, and dyes. Her classes in Hawaiian ethnobotany were in high demand, especially among Polynesian students for whom she is a model of that rare individual: a prominent minority scientist who is also directly connected to traditional cultural knowledge.

One of her major goals is to increase the enrollment of underrepresented groups such as Polynesians and women in higher education. To that end, she continues to mentor female junior faculty at the university and is active in issues involving K-12 Hawaiian students. She recalls that her father would have mortgaged the family house to educate his children. She knows some of her students "never got any inspiration or support from their families or their friends". Professor Abbott acknowledges the support of individuals who gave her the strength and confidence to take risks:

If you know that someone supports you, no matter what you do, even if you fall on your face they'll pick you up, that gives you the greatest kind of confidence in the world. Well, I always had that kind of support, either from my father or mother, or from my husband. From my professor on, everybody was supportive. So I'm really lucky and I'm the first to admit it. Sexism or genderism, I've seen it all around me, but I've never been practically affected by it.

Dr. Abbott's teaching, research, and writing have measurably contributed to the Hawaiian cultural renaissance. In 1992 she received the *Kulia I Ka Nu'u* award from the Association of Hawaiian Civic Clubs and in 1996 was recognized by *'Ahaui Malama I Ka Lokahi* as a Native Hawaiian Scholar in Science and Hawaiian Culture. Her awareness that many young Hawaiians have been cut off from their cultural roots is one of the reasons she writes for general as well as scientific audiences. Her 1992 book *La'au Hawaii: Traditional Hawaiian Uses of Plants* brings the cultural uses of Hawaiian plants to a wide audience. In her preface, she asks her Hawaiian readers to return to their families to search out, "treasure", and write down "stories of the old ways". She knows this is a way to return meaning and knowledge making to Hawaiians. She actively develops her Hawaiian students' pride in their culture and counteracts their negative self-concepts by telling them about their ancestors' accomplishments:

Their notion of what a Hawaiian is, is not great. And I say it in exactly these words. These Hawaiians, you think they were lazy? They weren't lazy because even as farmers, they left evidence of their intelligence and their hard work. And the *kahuna la'au lapa'au* (doctors) or the *kahuna kalai wa'a*, the canoe builders, these people were specialists. Even the priests were specialists. They had to know these long chants that went on for hours and days. And if they made one mistake, off with their heads! So it's no slouch that learned this kind of stuff. I tell the students just this: "So don't tell me, 'Oh, you're a brain, Dr. Abbott'. You all come from people who have brains!"

Professor Abbott thinks more minority students and girls would pursue education and science if their teachers and parents encouraged questioning, communicating, and exploring interests. Her views on education exemplify current science content and teaching standards that emphasize critical thinking and de-emphasize learning science as a body of facts. She thinks even very young children should be "taught to pose questions and look for the answers". She thinks:

It's scandalous that students do not come out of high school knowing how to think. I'm not one bit interested in the fact that they can memorize. They don't understand anything. There is one difference, those who are going to be scholars. They need a certain amount of basic information in order to pursue what they want to pursue. The rest don't need all that, so why present it to them? But the application is to life, too. If children were taught to ask questions and to seek the answers, not just an answer that they know the teacher is looking for, but to answer it for themselves, they could live far more productive lives! They could read the newspapers or hear some news and say, "How can they say that?" They don't have any evidence to say that!" Now, this is the scientific method, isn't it? And they would have the keys to doing things.

Dr. Abbott supports the social acts of speaking and writing to develop independent, critical thinkers. Her belief in the importance of writing as a tool for thinking and learning (Fulwiler, 1987), was the reason she served on the board of the Manoa Writing Program for several years and focused on writing in a keynote address at a recent University of Hawaii graduation. She suggests that teachers "get students to write something, maybe once a week, about some person like a scientist or some person who made a point with them":

This is to get them to express what they feel, so indeed they are talking story after awhile. They have a wealth of stories to tell, but nobody asked them before. In other words, everybody has something to say. So everybody can make an impression on science or whatever they do. Their interpretation of history.

Dr. Abbott recently retired for a second time, but this does not mean she has cut back on her research, writing, and interest in education. She still has her university laboratory and is even busier as her expertise in science, education, and Hawaiian cultural practices becomes more widely recognized. In 1997 she went to Washington, D.C. to receive the National

Academy of Science's Gilbert Morgan Smith Medal. This prestigious award, accompanied by a \$15,000 prize, recognizes Dr. Abbott "for her comprehensive investigations of the biogeography and systematics of marine algae in the eastern and central Pacific". In 1999, Bishop Museum Press published Marine Red Algae of the Hawaiian Islands, her book documenting all the Hawaiian species of red algae.

Dr. Abbott works 6 days each week, dividing her time between her 6th floor laboratory and the Bishop Museum where she is a Research Associate. She publishes at least two scientific articles a year, participates in national and international conferences, and serves on the Kaho'olawe Island Commission overseeing the restoration of a former military bombing target. As a respected scientist, educator and cultural expert, she is often asked to be a keynote speaker, to serve on advisory boards and to review grants, books and articles. Several of her former doctoral students are in Hawaii as researchers and professors. She continues to mentor junior faculty, advise doctoral and masters students, and host dinners at which people explore ideas, defend positions, and enjoy good food and stimulating conversation.

Dr. Abbott keeps her busy professional and social pace because she is passionate about her civic work and her science. As she says:

I'm one of the very rare students who declared an offbeat major--that became a phycologist. And I've never been sorry. If I had my life to do over, I'd do it again!

Written by Pauline Chinn, January 2000.

The Scientific Publications and other works of Isabella Aiona Abbott

The scientific career of Dr. Isabella Abbott is one that has been long and distinguished by the marks of a patient, hard worker. Her work has been conducted in two fields of inquiry: phycology and ethnobotany. She has made her mark in both, and while working in the intersection of these areas has developed new ways of perceiving cultural interactions with the marine environment.

Dr. Abbott has published 143 peer reviewed papers, 7 books, and numerous short articles and commentaries. Among these, no less than 15 have had major influences upon key understandings in the field of phycology and upon the research trajectories of other scientists.

The first of her professional works was the publication of her master's thesis on the genus *Liagora*. As with many graduate students, the selection of an early project guides many future projects as natural outgrowths. In this case, her research on this common tropical genus (and many segregates from it) continued throughout her entire career, with her most recent publication on the red algae of Hawaii systematically reviewing her lifelong associate with *Liagora* and the red algae of Hawaii. Along the way, Dr. Abbott segregated the genera, *Dotyophycus*, *Trichogloeopsis* and *Yamadaella* from *Liagora*. Dr. Abbott also conducted periodic excursions into other groups of red algae, including naming a new genus: *Reticulocaulis*. In 1990, Dr. Abbott published the first of a series of papers dealing with the herbarium of Lamouroux, where she carefully examined the type specimens of *Liagora*. In many ways, this represented the completion of this part of her life's work on the genus *Liagora*.

Throughout the course of her career, the focus upon her home in Hawaii was never lost. Despite this, she continually cast her nets farther afield, examining algae from California to Japan and into the South Pacific. In 1995, she summarized the state of systematics in the Tropical Pacific Islands in a paper that illustrates the extent of her understanding of the field of Pacific phycology. Between 1985 and 1997, she served as editor of a series of volumes on the taxonomy of economically important algae. These volumes emphasized the need for accurate taxonomy and illustrated the role that taxonomic scientists play in development and maintenance of economically important plants and plant products.

A second theme that may be seen in Dr. Abbott's publications is her effort to learn and teach about her native Hawaiian heritage of knowledge of marine and terrestrial plants. Her earliest work in ethnobotany resulted from childhood interactions with her mother, Annie Ka'ilihou Aiona, and her maternal uncle. Although she did not publish the information she learned, she did remember it and use it to increase her natural abilities in school. During her high school years, Maude Schaeffer, who was the school principal at Kamehameha noticed that she knew the complete Hawaiian names of all of the garden plants in the school. At that time, students worked each day in the gardens as part of their school responsibilities. Principal Schaeffer then encouraged her in her scientific training and assisted her in learning the scientific names of the plants, providing a parallel knowledge with that of her traditional background. Later, much after her professional career was established, Dr. Abbott returned to those roots and conducted research with Eleanor Williamson of the Bishop Museum on the edible algae or "limu" of the Hawaiian culture. Her writings from the early 1970's are still in demand with a wide audience who are interested in the practical and traditional aspects of Hawaiian algae. Among the most important observations from her ethnobotanical studies of Hawaiian algae are: 1) Hawaiian women were taxonomic experts on the marine environment, 2) edible algae provided key nutritional components of the ancient Hawaiian diet, 3) development of knowledge of marine algae in ancient Hawaii was probably driven by the unique Hawaiian taboo or "kapu" system that restricted women's access to many land food resources, and

4) delicate ecological balances of marine algal systems were maintained through conservative resource protocol employed by the ancient Hawaiians.

The University of Hawaii has one of the oldest continuous traditions of training in the field of ethnobotany among United States Universities. Famous botanists who have been a part of this tradition include Joseph Rock, Harold St. John, and Beatrice Krauss. However it was not until 1985 when Dr. Abbott moved into the Wilder Chair that the program was taught by an Hawaiian woman (Alvin Keali'i Chock preceded Dr. Abbott by a few years as the first Hawaiian to teach ethnobotany at the University). This occurred at an opportune time when interest in Hawaiian culture was on a dramatic rise. Because of her participation (as a Hawaiian and a woman) in ethnobotany education and because of her stance on the need for good science in ethnobotany, the discipline flourished under her leadership and included the training of a number of future Hawaiian leaders in conservation biology, ecology, and ethnobotany. Key to her impact on the development of Hawaiian ethnobotany was the publication of the first textbook of ethnobotany: *La'au Hawai'i: Traditional Hawaiian Uses of Plants*. This book is both a compilation of the literature and a set of unique reflections upon her earliest childhood memories. Few textbooks have so inspired people, probably because so very few are written from the heart as this is.

Dr. Isabella Abbott has spent her scientific career in two spheres that rarely cross. In the world of systematic phycology, she stands as a giant leaving a legacy of works that inspire generations of her peers. Dr. Abbott has single handedly brought Hawaiian ethnobotany to the class room from the perspective of a Hawaiian scientist. In this process she has inspired many Hawaiians and non-Hawaiians to consider careers in science and has helped open doors that would otherwise have been seen as closed. Although we have herein recognized some of her scientific publications and provide a complete bibliography below, her greatest publication of all is the legacy of her life: A woman, who followed her heart, remained true to her culture, and set a high mark of excellence for which many others now strive.

Dr. Abbott stands out among ethnobotanists in several ways. She is the first Hawaiian woman to have obtained a Ph.D. and in this regard represents a bridge between two worlds of experience and perspective. She has published the first scientific studies of the uses of plants by Hawaiians. This is an amazing accomplishment since so many had assumed for so long that Hawaiian ethnobotany had been well studied. Dr. Abbott has blended her traditional cultural upbringing with the rigorous discipline of systematics to produce precise analyses of cultural usage patterns of marine and freshwater algae. Although algae are important in a vast array of cultures, she was the first to describe their usage and to discuss the ethnobotanical implications of algae consumption by humans. Dr. Abbott has been a pioneer in ethnobotany as a representative of Hawaiian culture and as a female scientist. She has inspired two generations of young biologists and is probably responsible for more Hawaiians choosing to enter the biological sciences than any other individual.

Dr. Abbott retired from the University of Hawaii in 1997, however as an emeritus faculty member she has continued to mentor students (four are still under her tutelage) and to conduct research in phycology and Hawaiian ethnobotany. She may be found daily in her university laboratory or at the Bishop Museum conducting her work, advising students and faculty members, and persisting in the highest of academic standards.

Observations of the author

As a young scientist working in a marine natural products lab at Oregon State University, I remember many hours of pouring over Abbott and Hollenberg's *Marine Algae of California*. We used and reused the book as if it were some kind of sacred, ancient manuscript. The book was lovingly referred to as "Abbott" and new initiates into the lab were instructed in the rules of handling "Abbott", where it could and could not go, and how severe the punishment would be if one lost or damaged it. I remember wondering upon more than one occasion about what this Dr. Abbott must look like. Perhaps he was a grey-haired old man who had spent many hours staring at specimens, taking careful notes and thinking infinitely detailed thoughts that could never be fully understood by us mortals. Throughout the years, I built up a picture of "Abbott" in my mind and associated that picture with the pleasant light-blue cover of the text and the creases and folds in the dog-eared copy that played such an important role in this early part of my graduate career.

Quite a few years later, I interviewed for a new faculty position at the University of Hawaii, as an assistant professor of ethnobotany. During the course of my interviews, I was taken to breakfast by Dr. Isabella Abbott, who quizzed me about my background and perspectives. She was very kind and considerate and yet probing and inquisitive. She told me a bit about her work in phycology and I wondered if I was being examined in the same manner in which her trained eye must review each algae collection in search of its signature characteristics and any hints of something new and different. At that time, I had not yet realized that this wonderful woman with whom I was sharing a meal was the author of the book with which I had spent so many hours. At least a year later after I had been hired, I happened to be visiting with Dr. Abbott in her office. During a lull in our conversation, I happened to notice a copy of the sacred blue text on her book shelf. Without thinking much about it, I reached for the book and began to thumb through the pages, feeling the memories wash over me. Then as if struck by lightning, the obvious hit me and for the first time I took note of the first name of the author. With child-like enthusiasm I exclaimed, "Oh, YOU are the same Abbott!" Dr. Abbott laughed and asked me who I had thought had written that book. Sheepishly, I explained about my visions of the grey-haired old man and his specimens. She laughed again and confirmed that pretty much all that I had gotten wrong was the gender of the author.

It is a strange thing when we meet our heros. Many have commented that they have felt let down, having realized the humanity of those they have respected from a distance. In my case, I only gained further respect for this great WOMAN of science and the way that she has touched my academic career from its beginning through this very day.

Written by Will McClatchey, May 2000.

Abstracts

Eilif Aas, NORWAY. Traditional "tannin" treatment against intestinal parasites in sheep and cattle.

Most organic certification agencies around the world have some restrictions on the use of "parasiticides" on animals in milk or meat production. But there is a simple but well-working herbal treatment against intestinal parasites that traditionally have been used in both Eurasia and America ; leaves and bark of various species with a common ingredient -- tanning acid. In Scandinavia, dried leaves of *Populus tremuloides*, *Salix alba* and *Quercus* sp. have been fed on cattle, sheep and horses in winter, and also some fresh bark in spring, and fresh leaves in summer. I will also discuss my own experiences with tannin treatment of sheep. Many places in America, traditional herbal treatment against intestinal parasites and diarrhoea in humans, follow the same pattern. Some few examples : Winnebago, Wisconsin -- *Populus grandidentata* , *P. tremuloides* and *Quercus rubra* -- to cure worms. Tzotzil and Tzeltal Maya, Chiapas : *Acacia angustissima* - to cure bloody diarrhea. Belize -- Guava - *Psidium* sp. -- against diarrhoea How does it work ? It is a long term treatment and work with the body's immune-defense. Louisiana State University have done research on parasite resistance in Gulf Coast Native Sheep and it can explain some aspects of tannin-treatments relation to the immune defense as well. Modern parasiticides will do a lot of harm to beneficial gut-microbes, especially in ruminators, but traditional tannin treatment don't, rather the opposite.

Isabella A. Abbott, Bernice P. Bishop Museum, and the University of Hawai'i, Honolulu, HAWAI'I. Interpreting pre-western Hawaiian Culture as an Ethnobotanist.

Settlement of the Hawaiian Islands was accomplished 2200 to 1700 years ago (200 BC to 300 AD) by voyagers in canoes from southwestern Polynesia. In one of the most daring voyages of all time, matched only recently by the Hawaiian voyaging canoe, *Hokulea*, these Polynesians brought 5-6 species of food plants, and approximately 30 other species some of which were edible, but for which there were also other known uses. Investigating what inhabitants of other far-flung islands of Polynesia ate, and how the food was prepared in comparison with what was known about Hawaiian foods and food preparation shows many similarities but also some distinct differences. Basic Polynesian food plants are taro, sweet potatoes, breadfruit, bananas, and coconut. Each of these plants, taro, breadfruit, sweet potato, banana, and coconut is associated with one or more of the main Hawaiian gods (*akua*). The visual body-form (*kino lau*) of these gods was expressed by one or more plants or animals. The entire taro plant represented the body of Kane, the pig whose ears reminded one of sweet potato leaves represented the body of Lono, the banana plant and fruit represented the body of Kanaloa and the coconut tree the body of Ku. Except for three (out of 70) varieties of bananas, no woman could touch, use, or eat these food items, on pain of death. Although Hawaiians had the same gods as their Polynesian relatives, they were ranked differently, and the prohibitions that were established in Hawai'i are not recorded for other Polynesians. Early changes in religion and their effect on society, told by oral history over hundreds of years, but not substantiated by archaeological findings indicate a stricter religious enforcement over time, just as the chiefly class became more hieratical . Thus, the number of prayer-chants increased, the number of plants became marked as sacred to certain gods or goddesses, the every-day chores became more ritualized as guilds of specialists proliferated (different kinds of healers, with different training; bird-catchers, certain kinds of fishermen, skilled cordage and basket makers, *tapa* makers and designers, feather workers, woodworkers, sculptors) many of whom left behind beautiful objects that we can see today. How were wooden objects made without metal tools? what kinds or what parts of plants were used as abraders, sanders? Why the choice of one kind of plant over another that would have worked as well? Using the same species of plants, how is it that Hawaiians made the finest *tapa* and baskets, but were outclassed by Samoans in *Pandanus*-plaiting, wood carving by Maori and tattooing by Marquesans?

Jon Webster Abbott, Department of Anthropology, University of Hawai'i at Manoa, Honolulu, HAWAI'I. We call them Weeds...Traditional Hawaiian Botanical Medicine and Introduced Plant Species.

There has been a developing body of literature on the plants employed by practitioners of *La'au Lapa'au* in the past ten to twenty years, however there remains virtually no information on the use of plant species introduced to the Hawaiian islands post 1778. This is problematic as many of the plants commonly used by practitioners are those commonly termed 'weeds'. This presentation explores the various dimensions of the topic, from the first plant introductions of the Polynesians right up to the current use of 'weeds' by practitioners of *La'au Lapa'au*. Tasty snacks will be provided.

Janis B. Alcorn, Biodiversity Support Program, World Wildlife Fund, Chevy Chase, Maryland, USA. Mapping's Magic.

While researchers have long used mapping techniques and satellite imagery to analyse local situations for academic purposes and for making recommendations to donors and government, NGOs are now increasingly bringing this analytical power to the local level for improving local decisions and enabling local analyses to be shared with outsiders in order to improve management and policies. Maps reveal information about conflicts, overlaps and trends in areas where rights and responsibilities are cloudy. They raise questions and trigger action. They stimulate movement toward policy reforms. They allow men, women, youth and elders to share their knowledge and history. Community-based maps allow popular participation in arenas previously dominated by the maps of governments and corporations created for development and exploitation of natural resources. They provide a way to renew local commitment to governing local exploitation of those same resources. In short, maps are powerful political tools in ecological and governance discussions. In this presentation, I will introduce the power of maps for revealing and participatory

analysis of local knowledge and resource management. I will outline key questions for guiding community-based mapping, and use illustrative examples from Asia and Latin America.

Dennis Alessio and Alson Kelen, Waan Aelon in Majel Project, Majuro, MARSHALL ISLANDS. Waan Aelon in Majel, the Canoes of the Marshall Islands Project.

When Western explorers first reached the Marshall Island atolls they were amazed at the size, speed and grace of the Marshallese outrigger canoes. These persisted into the Twentieth Century but began to disappear after the American takeover in WW2, the devastation and dislocations wrought by nuclear testing, and then the introduction of interisland ships and of aluminum boats powered by outboard motors. By the time Dennis Alessio arrived in the Marshalls in 1989 these sleek sailing canoes were mostly just a memory. He then developed a program whereby elders who had built, sailed and navigated these canoes worked with youths to reconstruct and sail them. The goal was to give the youths an appreciation for the skills of their ancestors as naval architects, canoe builders and sailors, as well as to teach them new maritime skills useful for the construction and handling of modern craft. After organizing the construction and documentation of key canoe types on various atolls, the Waan Aelon in Majel project now has its headquarters on Majuro Atoll, with a large canoe house for instruction and canoe building. Among future projects is the revival traditional navigation by the way atolls reflect, refract and diffract ocean swells.

Andreas Ambe, Tado Clan, Nampar Macing Village, Flores Island, INDONESIA. (with translations by Jeanine Pfeiffer, University of California at Davis, Davis, California, USA) Hidden Wealth: The Challenges of Conserving Our Living Encyclopedias and Pharmacopoeias.

In the southwestern corner of Flores Island, eastern Indonesia, rapid ecological change threatens the survival of indigenous bio-cultural wealth. This keynote address describes the Tado Cultural Ecology Conservation Project, one of the first projects in Southeast Asia to involve an indigenous community in all project activities and phases. The project aims to equip the Tado clan with the methodological tools necessary to identify and reverse ongoing processes of cultural and ecological degradation within their native human and plant communities. The Tado, a Kempo Manggarai-speaking clan, are part of a population which is 90% agrarian and pertains administratively to Manggarai district, East Nusa Tenggara province. This province contains the lowest population density and greatest degree of poverty in Indonesia outside of West Papua. The area may be poor economically, but it is rich in biological and cultural diversity: an estimated thirty dialects are spoken in Manggarai district, an area smaller than the State of Delaware. Indonesian plant diversity is estimated at 20,000 taxa, and species belonging to over 180 plant families have been identified on Flores. Area studies estimate that the average senior indigenous resident can name and distinguish at least 700 plant species. Although the flora of the Manggarai is the most completely documented in all of Nusa Tenggara, these scientific results have not been shared with the indigenous communities whose lives are intrinsically interwoven with the plant species growing on their ancestral lands. The Tado Cultural Ecology Conservation Project reverses this trend by enrolling Tado community members as project directors, advisors, researchers, analysts and authors - instead of merely as informants or assistants. *Bapak* Andreas Ambe, traditional Tado leader and naturopathic healer, will share why conserving bio-cultural diversity is important to his community, and how the project is contributing to that goal.

Puanani Anderson-Wong, Ecology, Evolution, and Conservation Biology Program, University of Hawai'i, Honolulu, HAWAI'I. Returning the beloved plant *laua'e maoli*, to the Hawaiian people and clarifying the role of the invasive alien *laua'e* (*Phymatosorus grossus*) holds significance for cultural and natural conservation efforts.

The "maile-scented fern," *Phymatosorus grossus* (also referred to as *Microsorium scolopendria* in many publications) is found commonly throughout the tropical Pacific, both in nature and in cultivation. Well known for its sweet fragrance, this species is used for medicinal and ornamental purposes throughout its range. In Hawai'i, the fern is known as *laua'e* and is considered by many Hawaiians to have been an important part of their culture since before the arrival of Europeans (in 1778). Botanists, however, were convinced that the fern was not present in Hawai'i prior to 1900. This study was undertaken to resolve this discrepancy. First, records of early botanical explorations of Oceania were scrutinized, and Polynesian plant names studied. The evidence gathered supported the view that the plants currently known (in Hawai'i) as *laua'e* (*Phymatosorus grossus*) and *laua'e haole* (*Phlebodium aureum*) were NOT present in the Hawaiian Islands before 1900. Next, Hawaiian language literature of the 1800s provided compelling evidence that there WAS a third plant species known as *laua'e* prior to the arrival of *Phymatosorus grossus* and *Phlebodium aureum*. Finally, clues from Hawaiian language literature were combined with facts derived from native elders, field observations, unpublished works by early botanists, and herbarium specimens. This led to the discovery of the identity of the "original" *laua'e*, an endemic Hawaiian species, referred to here as "*laua'e maoli*." The virtual loss of this name and species from Hawaiian "cultural memory" and the rapidly diminishing abundance and distribution of this species in nature has important implications for all ethnobotanists and conservationists.

Carlos L Andrade, University of Hawai'i, Center for Hawaiian Studies, Honolulu, HAWAI'I. The Hui Maka'ainana o Makana (The Organization of Land Tenders of Makana).

Our ancestor, the ʻāina, has lain sleeping for many years in many places in these islands. In Haʻena, the Hui Makaʻainana o Makana is participating in the reawakening of the ʻāina by restoring loʻi that have lain fallow for as a result of the condemnation of land by the State. As we clear the land of alien species, re-till the soil and plant the taro, we also are relearning the songs, stories and names placed there by our kupuna. Our kaikuaʻana, once again feeds us.

- Haʻena: An ahupuaʻa in North Kauaʻi.
- hui: A group or organization.
- kaikuaʻana: Elder sibling (the taro plant is the older brother of the Hawaiian people)
- kupuna: Honored elders/ancestors.
- ʻāina: Land that feeds/sustains us.
- loʻi: Wetland agriculture fields for growing taro (*Colocasia esculenta*)
- makaʻainana: People of the land or land tenders.
- Makana: A renowned and prominent geographical feature of haʻena.

Dawn Anzinger, Oregon State University, Corvallis Oregon, USA. [Integrating Oral History and Traditional Knowledge in Ecological Research: forest succession in big huckleberry \(*Vaccinium membranaceum*\) fields on ceded and usual and accustomed use lands of the Confederated Tribes of the Warm Springs, Oregon, USA.](#)

My graduate research in forest ecology is a component of the Warm Springs Sustainability Project (WSSP). The goal of the WSSP is to improve big huckleberry management on ceded and usual and accustomed use lands of the Confederated Tribes of the Warm Springs. Ceremonial huckleberry pickers were interviewed in an earlier portion of the project, and excerpts were made available to me to help with my research on forest succession in huckleberry fields. The oral histories provided key information for several portions of my research project: problem identification, site selection, fire history determination, and management practice recommendation. However, I encountered a few difficulties in integrating oral history into ecological research. Traditional knowledge is difficult to quantify and, therefore, include in data-based research. In addition, the location of resource sites is confidential, precluding discussion of management options for specific fields. Nevertheless, the benefits of including oral history far outweighed the difficulties. The oral histories identified many huckleberry fields on ceded and accustomed use lands that I would not have been able to locate on my own. Some of these fields are now completely forested, and knowing their location allowed me to conduct a retrospective study on forest succession. The oral histories provided detailed information about historic huckleberry yields, fruit quality, changes in yield and environment over time, and traditional management practices. Oral history embody a lifetime of close and caring observation over a wide landscape and added considerable ecological depth to my brief study. [poster]

Ida Bagus Ketut Arinasa, Eka Karya Bali Botanic Gardens, Singaraja, INDONESIA. [Sacred Uses of Indo-Malay Native Fruits in Balinese Adat.](#)

Balinese ritual and ceremony is world-renowned for its complexity and elaborate decoration. This session will describe several dozen Indo-Malay native fruit taxa used in Balinese traditional ceremonies, focusing specifically on the betrothal and wedding rituals. Cosmological and religious significance of each ethnobotanical item incorporated into the ceremonies will be discussed, as well as the variation in practice resulting from class-based differences. The ongoing *ex situ* conservation and interpretation of ceremonially significant native plant taxa in the Eka Karya Bali Botanic Garden collections will be discussed, as well as the conservation of historical Balinese ethnobotanical texts on sacred lontar (*Borassus flabellifer*) leaves in the Gedong Kirtya Museum, Singaraja, Bali.

Papalii Failautusi Avegalio, Pacific Business Center, University of Hawaiʻi at Manoa, Honolulu, HAWAII and **James Matayoshi**, Mayor, Rongelap Atoll Local Government, Rongelap Atoll, MARSHALL ISLANDS. [Healing the Scars; Can ecology become the basis of sustainable development at Rongelap Atoll.](#)

Bikini Atoll was the site for nuclear testing that displaced and forever changed an idyllic society. The people of neighboring Rongelap Atoll were assaulted by the forces of a nuclear maelstrom. Over decades and generations, these displaced and abused people have wandered the Pacific in search of a home. Reparations have been secured from the United States Government that affords the means for, at long last, the redevelopment of the islands of Rongelap Atoll. More than once we have seen the naïve attempts to “develop” [Pacific island] societies by imposing on it highly incongruous industrial era forms without recognizing that for these to operate successfully, traditional family and customs, belief systems and role structures would all have to be crushed, the entire culture ripped up by its roots. The belief that traditional [island] societies must transition into a growth stage of industrialization to enter the high technology information age civilization continues to be advocated. Such approaches have been discredited by research over the past two decades. The Rongelap project, coordinated through the University of Hawaii College of Business Administration-Pacific Business Center Program seeks to further that research by utilizing the various colleges of the Univ. of Hawaii system in helping with the resettlement of Rongelap Atoll.

Roselle F. K. Bailey, Ka Imi Naauao o Hawai'i Nei, Wailuku, Hawai'i, USA. [A Hawaiian View of the Taumako Voyaging Revival.](#)

We Hawaiians love to employ metaphor with sometimes hidden meanings to say what we really mean. These lines refer to cultural revival, of which I have been involved both in Hawai'i and on Taumako:

Ku ke lehua me ka maile kalehua

Ohu ohu wale ka noe pau'ehu o Lele

I mohala no ka lehua i ke kee ke ehi ia ka ua.

The lehua stands tall with the fragrant Maile

Adorned with the bright red mists of Lele

Lehua blossoms unfold because the rains tread upon them.

JD Baker, Department of Anthropology, University of Hawai'i, Honolulu, HAWAI'I. [A preliminary examination of hala \(*Pandanus tectorius*\) selection and management for weaving in Hawai'i.](#)

In Hawai'i, as in the rest of the Pacific, *Pandanus tectorius* leaves (lau hala) are one of the primary materials used for weaving. While a substantial body of literature about Polynesian use of *P. tectorius* exists, especially with respect to plaiting techniques, little is written about where weavers obtain *P. tectorius* leaves, the criteria by which they select leaves, or the resource management methods they employ. To address these topics, four Hawaiian weavers were interviewed. Contemporary Hawaiian weavers use locally gathered leaves, and many additionally use material imported from other parts of the Pacific. In contrast to the rest of Polynesia, where in most cases green leaves are harvested and subsequently boiled, Hawaiian weavers prefer to gather lau hala that have turned brown but are still attached to adult trees. They select leaves based on variable characteristics such as color, texture, and presence or absence of thorns. Weavers recognize that environmental conditions such as proximity of the tree to the ocean, amount of rainfall the tree receives, and amount of sun exposure the leaves receive, affect the characteristics of the leaves. Additionally, weavers recognize that leaf characteristics vary from tree to tree independent of environmental factors. Weavers manage locally harvested trees so that trees will produce better weaving material. Weavers' recognition of lau hala variability, and their techniques for managing hala for the production of superior weaving material represent aspects of Hawaiian weavers' traditional knowledge that have not been adequately addressed by researchers.

Michael Balick, New York Botanical Garden, Bronx, New York, USA and **Hugh O'Brien**, Research and Development Station, Department of Agriculture, Central Farm, Cayo District, BELIZE. [Ethnobotanical and Floristic Research in Belize - Accomplishments, Experiences and Challenges.](#)

In this paper we will discuss experiences since 1987 involving ethnobotanical and floristic research in Belize, Central America. This was a multi-institutional effort involving the Ixchel Tropical Research Foundation, The Belize Traditional Healers Foundation, The Faculty of Agriculture and Natural Resources of the University of Belize, the Belize Zoo and Tropical Education Center, the Belize Center for Environmental Studies and the New York Botanical Gardens. The objectives of the ethnobotanical and floristic research were the preservation of cultural and traditional knowledge, natural products research (through the National Cancer Institute), technology transfer, student training and institutional strengthening. The authors will discuss the implementation and progress of the project and relate the experiences and challenges that have resulted. For example, in the case of a conflict over the management of the region's first ethnobiomedical reserve, two competing groups claimed to be responsible for its management. However, the conflict was eventually resolved and resulted in the creation of two such reserves, together resulting in 15,000 acres of land set aside for conservation and use by traditional healers. In effect, negative events can be transformed to have positive results. The perspective of local participants and communities in this project will also be presented, including a short video presentation.

Sandra Anne Banack, **Xanic J. Rondon**, California State University, Fullerton, California, USA. and **Wilfredo Diaz Huamanchumo**, Huanchaco, PERU. [Ethnoecological Conservation of Totora \(*Schoenoplectus californicus*, Cyperaceae\) in Peru.](#)

In coastal and highland Peru, totora, *Schoenoplectus californicus* (Cyperaceae), has been a key resource for centuries. Both habitats are harsh with little rainfall, low growing vegetation, and a dearth of trees. Ingenuity and artisan skill permitted the inhabitants of these areas to make the most of their surroundings and extract a living. Totora reeds played a central role in their culture and were used to build boats, houses, roofs, mats, walls, containers, clothing, string, and fans and have been noted for its use as both food (humans and livestock) and fertilizer. We conducted unstructured interviews in Spanish and followed participant observation methods from June to August 1999 in Huanchaco and Lake Titicaca located respectively in coastal and highland Peru. Details were documented using video recording, still photographs, audio recordings, written notes, and herbarium vouchers. In Huanchaco, totora, was cultivated in sunken gardens within a protected reserve. The beds were owned and cultivated by families of fishermen. With careful cultivation, the beds produced totora suitable for reed boats (caballitos) for 5--7 years. Men were responsible for totora cultivation, which required considerable time and effort. It took one man, working every day, a full five months to dig one 100 m² bed. In Huanchaco, totora was maintained solely through human cultivation and its most important use was in the construction of boats. In Lake Titicaca totora grew wild along shore. Nevertheless, residents still went to some effort to cultivate the plant. Residents actively transplanted rhizomes along the shore in response to changes in water level. This practice bolstered the supply of totora, which was used primarily to feed their livestock. [poster]

Kahungunu Barron-Afeaki, Auckland, NEW ZEALAND. The traditional science of Polynesian warrior athletics.

INTRODUCTION - I am a barrister, based in Auckland, NZ who has extensive specialist experience in the area of sport law, sport management and sport agent work over the past 14 years. About 80% of the individual sport stars I've been involved with have been Polynesian and about 90% of my sport work has been based overseas. I am currently researching a thesis, through the University of Auckland that attempts to explain 'why Polynesians are so disproportionately and phenomenally successful in sport worldwide'. Very little research exists on this topic worldwide. I am a NZ Maori / Tongan having spent part of my childhood and early teens in Tonga and the remainder in Aotearoa. I have strong and regular involvement with both cultures. My research is hence undertaken with a cultural understanding of being Polynesian as well as from an academic point of view.

The research findings to date are both intriguing and informative and likely to be of particular interest to the multi billion dollar industry of professional sport. The sport industry closely co-exists alongside the relatively new multi-disciplinary field of sport science. Many scientific disciplines combine to create sport science such as; kinesiology, bio mechanics, sport equipment design & construction, dietetics, physiology, psychology, sociology, anthropology, genetics and so on.

TOPIC - The traditional science of Polynesian warrior athletics. This traditional sport science also includes, in particular, ownership of the unique Polynesian physiological prowess as a cultural, racial and scientific asset. This recognition also needs to identify the role of traditional sport science in contemporary western sport science as a result of the Polynesians disproportionate and phenomenal success in sport worldwide.

OVERVIEW - Through the disproportionate and phenomenal success of Polynesians in sport, contemporary western sport science is just beginning to recognize the extreme physiological abilities of the Polynesian race. These abilities are further enhanced by the cultural athletic warrior mindset of Polynesian cultures. Sport has become a major international institution with far reaching political, economic and social influences that are unprecedented for sport in human history. Sport and sport science are a multi billion dollar industry on a global basis. The extreme success of Polynesians in sport will become a recognized phenomenon worldwide into 21st century as the knowledge of their phenomenal athletic ability spreads. From a population base of no more than a million, worldwide such success in many recognized sport codes is disproportionate, on an unprecedented scale. Their success in sport today, is also a natural extension of long standing traditional knowledge and practices [restrictions, diets, training regimes, disciplines, religious ceremonies] and religious practices that surrounded the traditional warrior athlete of the immediate past. As a culture and race, this natural virtue of possessing a physiology highly suited to modern sport, coupled with a traditional warrior athletic cultural mindset needs to be recognized, nurtured and managed to the benefit of Polynesians. The special virtues of this traditional science also need to be protected from exploitation. Success in sport by Polynesians unlike other areas of traditional science, is providing immediate economic, social and political mobility for the Polynesian in the 21st century.

Joseph W. Bastien, Department of Anthropology, University of Texas at Arlington, Arlington, Texas, USA. Healers of the Andes: Kallawaya Herbalists and their Use of Medicinal Plants.

The Kallawayas are a famous group of herbalists in the Andes. They follow a tradition of medical expertise more than a thousand years old and use over a 1,000 different mineral, animal, and plant remedies. Investigator has spent 25 years studying their use of plants and will present a slide show of this cultural tradition. Presentation emphasizes Kallawaya's ecological perspective of health and disease, examining the interrelationships between environmental, cultural, social, and physiological factors. It also discusses how Kallawaya herbal medicine has articulated with Western biomedicine to improve Andeans' health. This has been done through clinics with doctors and herbalists, community health workers using traditional medicines, and by using Kallawaya plants for development of Western drugs.

Rudi Bauer, Institute of Pharmaceutical Biology, University of Dusseldorf, Dusseldorf, GERMANY. Traditional Chinese Drugs: Their Application and Evaluation in Western Medicine.

Traditional Chinese medicine (TCM) has developed over the last 5000 years in East Asia with a unique cultural background. Its impact on western medicine has slowly grown and has been dramatically intensified by economic globalization at the end of the 20th century. Besides the classical use of Chinese traditional drugs in western countries, TCM drugs also have been evaluated in a western pharmacological sense and several western drugs, such as artemisinin and camptothecin, are based on originally Chinese botanicals. The integration of traditional Chinese drugs in western medicine implies the acceptance of standards for quality assurance in a therapeutic as well as a pharmaceutical sense. Controlled clinical studies are necessary for broad acceptance of Chinese materia medica by the western medical profession. The uncontrolled use of TCM as dietary supplements or functional foods is not fully comparable with the original application and bears some risks in terms of side effects or interaction with western drugs. A rational medical use of traditional Chinese drugs also requires the acceptance of pharmaceutical quality control issues as they are obligatory for all other (botanical) drugs. This is especially necessary to avoid the risks of mislabeling, adulteration and contamination with heavy metals, pesticides, microbes and aflatoxins, and to guarantee consistent drug quality in terms of active constituents. The example of the first TCM hospital in Germany will be presented to demonstrate the integration of TCM in western medicine and the application of quality control standards that are obligatory in

western countries. Moreover, the application of pharmacological assays in the screening of Chinese herbal drugs for inhibitors of 5-lipoxygenase and cyclooxygenase-2 will be outlined.

Eusebia Berrones-Benítez, Grupo Cooperativa de Mujeres Campesinas “La Fé”, Alta Cimas, Gómez Farías, Reserva de la Biosfera El Cielo, Tamaulipas, MEXICO, **Sergio Medellín Morales**, PRONATURA-Noreste, Monterrey, N.L. & Terra Nostra A.C., MEXICO, **Claudia E. González Romo**, Instituto de Ecología y Alimentos, Universidad Autónoma de Tamaulipas, Cd. Victoria, MEXICO. A Women's Microenterprise: “LA FÉ” Campesino Women's Group Cooperative at El Cielo Biosphere Reserve, Tamaulipas, MEXICO.

La Fé Women's Cooperative started in 1993 as a conservation and development experience from a local perspective of local ethnobiological knowledge, environment, and gender issues. Sergio Medellín was granted a John D. and Catherine T. MacArthur foundation fellowship during 1993-1996 to develop the establishment of an organized women's group, 18 women gathered to give rise to “La Fé” group with Sergio's guidance, training and support as the first organized working group within El Cielo Biosphere Reserve. *La Fé Cooperative* has proudly served as an inspiration and a guide for the rise, and development of 11 other men and women groups in *El Cielo*, that meet **Organízate!** Mandate “*Local inhabitants have the empowerment to make their own decisions on resource and conservation management of El Cielo Biosphere Reserve*”. *El Cielo Organízate!* (WWF Biodiversity Support Program, WRI, TNC 1993-1996, 1999-2000) program's goals were *campesino* training, organizing groups, and collegiate involvement in the Reserve's decision making process. The cooperative wanted to undertake projects where the central ingredient would be sustainable use of resources, and the possibilities of domestication. They launched a microenterprise venture using wild edible plants, and some cultivated ones to make preserves, and make other products for ecotourists using their knowledge, resources and training skills. At present, the cooperative runs five production conservation projects: ecotourism (Restaurant “Natura”, Eco-shop ‘La Fé’), a captive wild bird breeding (*Crax rubra*, *Ara militaris*), and management unit (UMA, environmental unit for wildlife management), ornamental plants (several cultivated foliage and flower species, *Agapanthus* sp. and *Calla* lily), environmental interpretation (guided tours). All these projects nationally and internationally funded (WWF, Mexico's Federal and Tamaulipas State government agencies, and the Netherlands Embassy in Mexico City). Eusebia wants to address from her own experience the constraints and learning process she and 12 cooperative members had to face to reach: levels of better self-esteem, and empowerment at the local, and regional level. How some have gained greater involvement in the Reserve's decision making; they have gender equal opportunities with other local working groups; how they have reached the development of a framework for encouraging leadership and training resources; how the trained women have become promoters for community development, based on participatory research processes, and the promotion of proposals of local productive, and conservation projects within El Cielo, and other areas of the state.

Nathaniel Bletter, CUNY Graduate Center/New York Botanical Garden, New York, New York, USA. A Technique for Quantitative Comparison of Medicinal Plants for Different Diseases from Different Cultures.

Ethnobotany has proven to be a valuable method to find new herbal medicines and plant-derived drugs, but given limited resources, thousands of plants to consider, and many cultures to investigate, where can we focus our attention? With only about 0.5% of the known 250,000 species of angiosperms examined for medicinally active compounds, 25% of all western drugs being derived from plants, and a more than \$25 billion yearly worldwide market in plant-based medicines, this is obviously a fruitful area to explore if we have techniques to narrow in on the plants with the highest medical potential. Building on previous work in quantitative ethnobotany, I will explore a new way to determine plants with high medical potential that are worthy of further investigation by finding related plants from unrelated cultures that are used to treat the same or related diseases, where relations between cultures, plants, and diseases are derived from phylogenetic trees. This is a method of corroborating that the plants have biologically active compounds in them, and it avoids problems in previous similar techniques where plants are grouped by family. This technique is then used to analyze and compare herbal remedies for diabetes, eczema, asthma, malaria, and uterine fibroids collected from herbalists from different traditions (Ayurvedic, Chinese, European, Dominican, and Cuban) around New York City, as well as Itza and Q'eqchi' Mayan groups in Guatemala.

Mark Blumenthal, Founder & Executive Director, American Botanical Council, Austin, Texas, USA. Leading Herbs and Phytomedicines in Europe: How Scientific Research and Clinical Testing of Traditional Medicines Has Created a Multi-billion Dollar Industry in Europe and the United States.

Traditional knowledge of medicinal plants in Europe has evolved into the investigation and documentation of their benefits and potential risks through modern science and clinical testing. Western Europe, particularly Germany, leads the world in the development of high quality, pharmaceutically-prepared, chemically-defined herbal extracts that are often integrated into conventional medical practice. Analysis of the leading herbs sold in both Germany and in the U.S. reveals a correlation between the top-selling herbs in the marketplace and clinical research of these herbs. This includes traditional European herbs like feverfew, St. John's wort and milk thistle, as well as herbs "borrowed" from other cultural traditions, e.g., ginkgo from Asia, kava from Polynesia, and the native American medicinal plants black cohosh, echinacea and saw palmetto. This presentation will

discuss the regulatory systems, market conditions, media reporting, and scientific research that have converged to produce the current situations in the European and American herbal marketplaces.

Arvind A. Boaz, Indian Forest Service, Bhopal, INDIA. Innovative Traditional Perspective of the Primitive Tribe-The Saharias for Sustainable Forest Management In Central India.

There are seven Primitive tribes in Madhya Pradesh, the Biggest state in central Indian, that have been recognized as Primitive Tribal Groups by the Government of India. Out Of these seven groups, the SAHARIAS, who inhabit the isolated and inaccessible areas of the Chambal and the Gwalior revenue Divisions, have a total population of 4,17,171 living in 1159 villages in this tract are the most neglected with very meager development assistance from the government. The Saharias have responded to this neglect by developing an innovative Sustainable Development Strategy in harmony with the forest areas they inhabit. This study is an ideal example of a primitive tribe that has lived in harmony with the forests and have not only derived their livelihood from these areas but have also ensured the preservation and conservation of the forest areas on a sustainable basis.

The Saharias have developed a unique system of protecting the forests and especially the Salai (*Boswellia serrata*) tree, a source of a high value Oleo-resin, from destruction. The author toured this area extensively and was surprised to note that it was the saharia community that tapped this tree with strict discipline. They had divided the whole forest area in parts and allotted them to a particular family and they are authorized to exploit the NTFP from this area. In lieu of this right it was the duty of this family to protect the Salai tree and the forest areas allotted to him as per the norms laid down by the community based on their long experience.

Brian M. Boom, The New York Botanical Garden, Bronx, New York, USA. The Best of Intentions: The CBD and its Impact on Ethnobotanical Research.

Throughout history, botanists have strived to convince other scientists, corporate leaders, politicians, and the general public about the importance of plants and fungi in our local, regional, and global economies. With relatively few, albeit significant exceptions, this message largely fell on deaf ears. All that changed in 1992 in Rio de Janeiro. There, at the "Earth Summit," formally known as the United Nations Conference on Environment and Development (UNCED), the message that biodiversity has economic value was heard loud and clear. It was from the UNCED, of course, that the Convention on Biological Diversity (CBD) was spawned, which has come to set the tone and substance of studies involving genetic material throughout the world. The CBD, a triumph in terms of giving biotic resources a higher profile in diplomatic circles than at any previous point in history, did some things well and other things less well. In this paper, the impacts of the CBD on the conduct of ethnobotanical research will be explored by examining the situation of the Chacobo, an indigenous group in the South American country of Bolivia that has been the focus of studies by the author, among others, both pre- and post-CBD. From this case study, it will be shown that while the CBD is well designed to install toll booths along the path to developing biodiversity resources, it is still primarily up to ethnoscientists to build the bridges along that path and be the brokers in a process in which they are uniquely positioned to defend the intellectual property rights of the stewards of traditional knowledge. This responsibility is codified in the Professional Ethics Guidelines of the Society for Economic Botany, available for reference on the SEB website, www.econbot.org.

Mary Elizabeth Brooks, He'e'ia, HAWAII. Fish and Poi in the Ahupua'a of He'e'ia.

The ahupua'a of He'e'ia in windward O'ahu, Hawai'i, retains key engineered components of a pre-contact resource management system - terraced mauka lands, an intricate water distribution system of 'auwai, and a large 88-acre coastal reef fishpond which retained the water's value even after it reached the bay. The system was brilliant in design, integrating the flow of water, nutrients, and energy in pathways leading to the efficient production of staple foodstuffs. The Hawaiian coastal pond production system is especially noteworthy, unparalleled in the history of world Aquaculture. It blended physical and biological forces of land with those of rising sea tides. In this way, the four essentials of aquatic production - stocking(recruitment), feeding(nutrition), water quality management for fish health, and harvesting - were fulfilled entirely by natural force. Major post-contact changes drastically affected the social and physical environment within which the ahupua'a and fishpond thrived. During the 19th and 20th centuries the pond increasingly fell into disrepair, eventually losing function and a traditional master-student lineage was broken such that much knowledge was lost. Twelve years ago an Aquaculture scientist came to the pond with a plan. She repaired the sea walls with prayer and body - blood, sweat, tears, love and laughter. Through trial and error the pond began producing fish and limu again. Could the threads of traditional wisdom inherent in the legacy left by its inventors and builders be re-woven into a working knowledge of place and nature? Plans would have to be changed, ways of knowing would have to shift, lessons would have to be learned, understandings would have to evolve in time. The pond would be the teacher, the scientist the student, personal experience the bridge to the past. This paper is that story.

Catherine Brown, Ngai Tahu, Te Roopu Raranga/Whatu o Aotearoa, Southbridge, NEW ZEALAND. Demonstration of some techniques used in weaving and plaiting harakeke (New Zealand flax).

In conjunction with the presentation on the harakeke evaluation trial, Cath Brown will demonstrate some traditional techniques for extracting fibre and plaiting the leaves of harakeke. The demonstration will show the differences in use and quality between various traditional cultivars of harakeke.

Henry Augustine Brown-Acquaye, Department of Education, University College of Education of Winneba, Winneba, GHANA. Traditional Knowledge of Ghanaian Fishermen and Science Education in the Community.

Attempting to integrate local knowledge systems with current educational curriculum in Ghana has been difficult and hard to achieve. The British Colonial government considered traditional methods as native, crude, simple, primitive, devilish and based on superstitions, while the British methods they were injecting into the local people were civilized, modernising and progressive. Two hostile systems were thus created which were uncommunicative with each other. Even after Ghana gained its independence from the British and dichotomous situation has persisted because of the educational system the British left and which has not been changed much. In the large fishing villages and towns along the coast of Ghana, a high proportion of the youth who complete the junior secondary schools fail to continue with their education due to the high cost involved in further education. The boys, therefore, learn the fishing trade of their fathers by going to sea to fish, while the girls join their mothers in selling fish. These boys and girls, by virtue of the fact that they had completed the compulsory primary education would have learnt in school. The sky and the Heavenly Bodies one of the topics in the syllabus. School science is regarded by many local citizens in Ghana, especially the fishing and farming communities as foreign and alien to their cultural practices. It is a subject which has no direct application to their daily lives. However, many Ghanaians in these communities use indigenous knowledge systems to understand their world. The Ghanaian local fisherman has an extensive knowledge of the stars and the planetary systems which he relies on in his fishing trade involving going to sea, when and how, type of fish anticipated, how long to stay at sea etc. The stars and the planetary systems are an important tool and guide to the local sea fisherman. The use of the stars and planetary systems, their importance and relevance to the Fante fishermen of Ghana will be highlighted and presented.

Isaac S. Bruck and W. Scott Chilton, North Carolina State University, Department of Botany, Raleigh, North Carolina, USA. K'ekchi' Mayan Ethnobotany and the Search for Novel Pesticide Compounds.

There is an urgent need to identify novel pesticide structures if modern agriculture is going to sustain food production at current productivity levels. Safer, less persistent, compounds must also be identified in order to safeguard the environment and human health. From May until December, 1999, I carried out a survey of K'ekchi' Maya medicinal and poisonous plants in the Toledo District of Southern Belize. My goal was to use ethnobotany as a tool for identifying plants that may contain novel pesticide compounds. Informants included bush doctors in Indian Creek village, local guides knowledgeable about plants within the mountain rain forests and coastal deciduous forests of S. Belize, and villagers within and surrounding Indian Creek Village. Medicinal plants were collected and pressed for submission to herbaria and six poisonous plants, identified by my informants, were collected in bulk for further experimentation. Extraction and fractionation of these samples has been performed. Insecticidal, antibacterial, antifungal, and herbicidal bioassays are being conducted on the six poisonous plants: *Aristolochia Schippii*, *Paullinia tomentosa*, *Caesalpinia sp.*, *Asclepias curassavica*, *Bursera simaruba*, and *Hippobroma longiflora*. Bioassays were selected for their simplicity and rapid turnaround time from setup to result. Structures of the compounds demonstrating positive results as part of these bioassays are being elucidated at this time.

Gregory Cajete, University of New Mexico, Albuquerque, New Mexico, USA. LOOK TO THE MOUNTAIN: An Ecology of Indigenous Education.

With special emphasis on Indigenous "ethnoscience" and utilizing the thesis of my book "Look to the Mountain", I will "metaphorically" present a way of looking at traditional forms of education as the expression of ecological ways of learning, thinking, and acting in "right" relationship with our Indigenous inner and outer ecology. I will present various examples from many Indigenous Peoples to reflect an epistemological basis for contemporary Indigenous Education. At the core of this presentation lie the Indigenous reality of culture, ecological relationship and sense of place...and the relationship of this reality to Indigenous and non-Indigenous education. These realities will be reflected upon through examples related to tribal education, spiritual ecology, and the environmental, mythic, artistic and communal foundations of Indigenous life. The final focus of the presentation will address the challenge of creating a "living vision" for Indigenous Education in a 21st century world.

Rex G. Cates and Kimberly Davis, Natural Products Research Group, Department of Botany, Brigham Young University, Provo, Utah, USA. Employing ethnobotanical and ecological approaches to anticancer drug discovery.

This study investigated the utility of ethnomedical and ecological approaches to finding plants with anticancer properties. Eleven species from the Sonoran Desert were chosen, seven in the ethnomedical group and four in the ecological-based group. Inner bark extracts were tested for anticancer activity on a HeLa cervical cancer cell line, and on noncancerous 3T3 fibroblast cells to determine if plant extracts were harmful to "normal" cells. Active metabolites were found in hexane, methanol, and water extracts from both plant groups. Fourteen of thirty-six extract (39%) actively inhibited cancer cells at a level of 40% or greater. Of these, five (14%) were not toxic as defined by killing less than 30% of the 3T3 cells. Overall, the methanol/water extracts

from the ethnomedical plants showed significantly higher percent HeLa cell inhibition than those of the ecological selected group (61.5% vs. 43.7%, respectively). Three plants were found to be consistently active against cancer cells. The hexane extract from the ecologically selected *Phoradendron californicum* was active against HeLa cells but not 3T3 cells (48.4% vs. 1.5%, respectively). Hexane extracts from the ethnomedically selected *Hyptis emoryi* and *Condalia lycioides* also showed significant activity against the HeLa line but reduced activity against 3T3 cells. Overall, this study suggests that combining both approaches increase the likelihood of finding plants having compounds with activity against HeLa cells. [poster]

Julie Anne Chinnock, Bastyr University, Seattle, Washington, USA. [An Introductory Assessment of Ethnomedicine and CAM Healthcare in Cuba.](#)

For over a decade, the island nation of Cuba has been in an official “Special Period”, an economic crisis that exists in some extent due to the loss of Eastern European markets combined with the impact of the U.S. economic embargo against the country. This economic situation has had a widespread effect on healthcare in Cuba and has contributed to a rise in the interest and use of CAM healthcare, including botanical medicine, acupuncture, and homeopathy. Traditional healing modalities, as well as plant-based pharmacopoeias, have long been utilized in Cuba, primarily in traditional Yoruba and Chinese medicine. The more current “green medicine revolution” has evolved principally as a cost-effective measure to continue to provide improved healthcare to 11 million Cuban citizens. In this paper, I will discuss my preliminary examination of the integration of traditional medicine into the primary health care system in Cuba and the incidence of use of botanical medicine by traditional healers, family doctors, polyclinics, and hospitals.

Pauline W. U. Chinn, College of Education, University of Hawai'i, Honolulu, HAWAI'I. [Reconciliation in Hawai'i: Malama I Ka Aina, Sustainability.](#)

This case study of a US Department of Education grant intended to develop culturally relevant science curriculum and provide professional development to teachers of Hawaiian and Part-Hawaiian students illustrates the political work of a curriculum that incorporates the cultural values and worldview of Hawaiians into science education. Hawaiian cultural values of sustainability of natural resources, kinship and attachment to the land, cooperation among family and community members run counter to dominant western values of competitiveness, individualism, and exploitation of resources for short term profits. As the curriculum developers visited communities and school sites to plan the professional development activities, the history of colonialism, economic oppression and marginalization of Hawaiians by White and Asian capitalists entered the present. Struggles over land use, what should be taught in schools, even the vision of how life should be lived came into sharp focus in a school whose principal wanted to eliminate its agricultural program in favor of more academic subjects. Community members interpreted this as a hostile move by a powerful outsider to eliminate precisely the kind of knowledge necessary to live on the land. The grant's intent is to reconcile western science education with indigenous knowledge, culture and values. In the context of this community, it supports the struggle of Hawaiians and others who hold traditional values.

Alvin Keali'i Chock, Department of Botany, University of Hawai'i at Manoa, Honolulu, HAWAI'I, and (retired) Animal & Plant Health Inspection Service, United States Department of Agriculture. [The Role of India-Pacific Fruits in Ancient and Modern Hawaiian Culture.](#)

The Hawaiian Islands are perhaps the most isolated land mass in the world, more than 2,000 miles from the nearest high island archipelago and continent, surrounded by an immense water barrier. Although Hawai'i is closer to North America than Asia, the majority of its native biota came from the Indo-Pacific region. Hawai'i's native flora is considered to be one of the most distinctive in the world because of its extremely high rate of endemism. These unusual forms of plants, insects, and land shells arrived via the jetstream and on birds, without man's involvement. Some 40% of the flowering plants are of Indo-Pacific origin. The first humanoid immigrants came about 1600 years ago also came from the Indo-Pacific region, and brought with them a couple of dozen food plants. While most of these were root crops, which made up the basic part of the diet, there were a few fruits. The native flora derived from the Indo-Pacific also provided supplementary and famine foods. Today's traditional bridges products consists mainly of fruits and vegetables. Today's barriers are no longer distance and immense areas of water, but many unique plant pests, especially fruit flies, found only in the region. Certain developed countries, such as Japan and the US, do not want to have these plant pests introduced, since they could spread, and in turn drastically affect their own ability to export. Plant quarantines have thus been raised, and can be lowered only through treatments, growing in pest free zones, or other arrangements.

Eugene Richard Chung, New York Botanical Garden, Bronx, New York, USA. [Kaqchikel Mayan Capsicum L., Ethnobotany and Systematics.](#)

The Kaqchikel Mayans are an indigenous ethno-linguistic group of the Guatemalan altiplano, particularly of the departments of Sololá (Tz'olujya in Kaqchikel) and Sacatepéquez, in southern Guatemala (Iximulew). The Kaqchikeles cultivate and use multiple cultivated varieties of the following three species of the genus *Capsicum* (ik in Kaqchikel): *Capsicum pubescens* Ruiz & Pavón, *Capsicum baccatum* Linnæus var. *pendulum* (Willdenow) Eshbaugh, *Capsicum annuum* Linnæus var. *glabriusculum*

(Dunal) Heiser & Pickersgill, and *Capsicum annuum* var. *annuum*. Although it does have pungent capsaicinoids, *Capsicum annuum* var. *glabriusculum* is the wild type and the Kaqchikeles consider it cooling, while the rest of the *Capsicum* taxa, which are all domesticated, are perceived as heating. Both the systematic botany and the ethnobotany (folk taxonomy, perceptions, and uses) of the genus *Capsicum* among the Kaqchikeles were investigated. This involved collection of plant and cultural data in the field, genetic and morphological analysis and phytochemical analysis, the preliminary stages of which have been conducted. One goal is to resolve the Kaqchikel folk taxonomic nomenclature and classification system of the genus *Capsicum* through interviews and plant collections and to gather information on *Capsicum* usage through observation. Also of interest is the documentation of the Kaqchikel Mayan *Capsicum* germplasm diversity. Phytochemical analysis will investigate which capsaicinoids and carotenoids occur in which cultivated varieties of which *Capsicum* taxa. This involves both examining their usefulness as characters in systematic botany and researching the range of antioxidant properties of the various capsaicinoid and carotenoid compounds of interest to natural products chemistry.

Kimberly D Clark, Just Add Water, Inc., Waimanalo, HAWAI'I. [Building Bridges Between Traditional Knowledge and Organic Farming.](#)

Organic farming philosophy follows indigenous people's knowledge of how to balance giving and receiving from the land. Whenever I am posed with a question about almost anything, I go to the garden and nurture the plants. Being patient, listening and being creative are the tools used for solutions to complex questions, as science is observation of nature, or common sense. Technological calculations are a manipulation of nature, whereas, basic learning and strength of the group is grounded in traditions of cooperation, diversity of knowledge and awareness of survival for the whole, in which the best interest of the individual is achieved through cooperation with other members of the group. A philosophy with little regard for nature and a valuation which does not account for the imbalance, leading to degradation, through warring with the planet and each other. Restoration of our present food system through traditional models in the integrated approach of nature with humans, as in Chinese agriculture, Hawaiian ahupua'a and Native American hunting and gathering are models to strive for in practice. Present models, such as Community Supported Agriculture (CSA), cooperatives and farmers markets are based on traditional principles in a modern world where community, or ohana, is the basic unit and healthy lifestyle is the goal, through physical work, sharing resources and spiritual practice. Building bridges between traditional knowledge and the organic movement leads to the restoration of the health of the soil, plants, humans and the ecosystem we all share.

Johan Colding, Thomas Elmqvist, and Per Olsson, Department of Systems Ecology, Stockholm University, Stockholm, SWEDEN. [Living with Disturbance: Building Resilience in Social-Ecological Systems.](#)

Large-scale disturbances such as fire, cyclones and pest outbreak induce both quantitative and qualitative changes in natural ecosystems that may be important for the maintenance of biological diversity and the long-term resilience of the system. Conventional resource management commonly seeks to block out natural disturbances and reduce the natural variation in target resources, since the fluctuations impose problems for industry. Such management practices may often prove to be effective in the short run, but over time may reduce resilience in ecosystems by making them more vulnerable to novel surprises and disturbances. On the contrary, local resource users often have learned to live with natural disturbances and developed specific management techniques reducing the risk of large-scale social-ecological crises. Here we deal with how local adaptive strategies may be used to cope with natural disturbances with examples ranging from local resource users in Africa, Asia and the Pacific. We discuss how small-scale societies also may deliberately use disturbances such as fire, for management purposes. We argue that knowledge about disturbance in many small-scale societies is preserved by way of 'social memory', or 'institutional memory' and that this knowledge is a valuable component of human capacity building for adapting to rapidly changing conditions.

Paul Cox, National Tropical Botanical Garden, Kaua'i, HAWAI'I. [Ethnotaxonomy as a key to Indigenous Conservation Strategies.](#)

Hugh Cross, and Timothy J. Motley, Lewis B. and Dorothy Culman Program for Molecular Systematics Studies, New York Botanical Garden, Bronx, New York, USA and Center for Environmental Research and Conservation, Columbia University, New York, New York, USA. [Evaluation of Genetic Diversity in Chayote.](#)

Chayote (*Sechium edule*) is a perennial vegetable crop in the Cucurbitaceae family. Its fruits and tubers are grown and eaten throughout the tropics and it is gaining increased culinary acceptance in the United States. The seeds germinate within the fruits and thus cannot be preserved using traditional long-term storage techniques. Therefore, all germplasm for crop improvement must be obtained from living collections and kept *in situ*. Because of space and monetary limitations, it is critical to have an accurate assessment of genetic diversity existing in living collections. Fruits collected in Mexican markets were measured (length, width, thickness, shape, presence of spines, and color) and fruit diversity compared using the Shannon Diversity index. Diversity was compared among regions, and within the state of Jalisco, a region of high production and export in northwestern Mexico. In southern Mexico landrace diversity was much greater than in the north. Within the state of Jalisco, the temporary, mobile markets (or *tianguis*) showed slightly more fruit diversity than the larger, central markets. Based on interviews with

exporters, high disease incidence in their orchards suggest that introduction of more diverse germplasm is needed to improve fruits grown for export. An evaluation of the genetic diversity underlying the morphological diversity seen in the crop has begun in our laboratory and preliminary results with molecular fingerprinting markers (Amplified Fragment Length Polymorphisms) indicate that the crop is genetically quite polymorphic. The data correlation between genetic and morphological diversity is presently underway.

J. M. Cruse and J. L. Hamrick, University of Georgia, Athens, Georgia, USA. Conservation of Genetic Diversity in Wild American Ginseng Under Varying Harvest Regimes.

Conservation and sustainable management of populations of wild harvested plants require information about processes such as reproduction, pollen and seed movement, fragmentation, and isolation. Analysis of genetic diversity among population allows for inferences about population dynamics. Allozyme analysis was used to determine whether genetic diversity was related to population size, management strategy, or age or spatial structure of plants in the populations of American ginseng (*Panax quinquefolius*). Twenty-four wild populations, where harvest was (unprotected) or was not permitted (protected) were sampled throughout the Southern Appalachian Mountains. A higher proportion of flowering individuals in protected populations suggests that management status positively affects the demography of the populations. The level of genetic diversity within populations is similar to that reported for plants with mixed value is closer to that reported in the literature for selfing species. Approximately 45% of the total genetic diversity is distributed among populations. This along with low indirect estimates of gene flow suggest little pollen or seed movement between populations. Protected populations had higher mean within population genetic diversity than unprotected populations. Significant differences in allele frequencies and greater diversity among populations where harvest is permitted suggests that unprotected populations have undergone bottlenecks in gene frequencies leading to a loss of different alleles in the different populations. The estimated level and pattern of genetic variation after simulated harvest under varying intensities and collection strategies was used to make recommendations for conserving maximal diversity within wild populations of American ginseng.

Cathy Davenport, Maui Community College, Pukalani, HAWAI'I, Laha'ole ke olona, he ma'awe o ka lau nahele o Hawai'i nei. Mai ka lawai'a i ka 'ahu 'ula, The Hawaiian endemic fiber plant olona, from fishing to feather capes. [poster]

Margaret Delfeld, Brownsville, Wisconsin, USA. Orchids: Mexican glue-pots.

Mexicans and some people in Central America occasionally use certain orchid pseudobulbs as a handy source of glue. This use seems to be unique: as far as I was able to find out, no one in any other part of the world has tried it. When a gourd cup cracks, a Mexican might pick a pseudobulb off a tree-branch, or dig one up out of the ground, depending on which orchid is handy. She sticks a knife into the bulb and squeezes the mucilaginous juice onto the broken edges of the gourd, then holds or ties them together until the glue sets. This use may be a result of the Mexican fig-bark paper, marketed in enormous quantities in Aztec times. The artisans in subject nations peeled the bark off branches of fig trees, soaked it in lime-water to loosen the fibers, and pounded the bark to make paper sheets. The paper was used for religious, magical and recording purposes. The artisans sometimes mixed orchid juice with the bark fiber during manufacture, possibly to give a thinner more delicate paper. Painters also used it for their best work, to help their colors stick to the paper or other surface. At least six different orchid genera are used today as glue-pots, and have been for centuries or even millennia. I would be interested to know if anyone else has a similar use for their local orchids.

Leanora Pumehana Dizol Kaiakamalie, Hawai'i Coastal Zone Management Program, Hawai'i Statewide GIS Program, State Office of Planning, Honolulu, HAWAI'I. GIS Mapping Tools for Natural Resources Education and Decision-Making in Hawai'i. [poster]

Leanora Pumehana Dizol Kaiakamalie, Hawai'i Coastal Zone Management Program, Hawai'i Statewide GIS Program, State Office of Planning, Honolulu, HAWAI'I. Pili Pa'a Pili Pu Pili Pono: Restoring Balance--Using ArcView GIS to Integrate Indigenous Land and Resources Management Techniques with Contemporary Coastal Zone Management in Hawai'i.

This paper will discuss how the State Coastal Zone Management Program could utilize ArcView GIS to map culturally-significant areas and archaeological features associated with land management (such as early hydraulic infrastructure and agricultural terracing simulations) in order to better understand traditional Hawaiian land management techniques, and to incorporate these techniques into our contemporary system of coastal management. The poster focuses on the *Ahupua'a of Waikiki* (please refer to the poster for the definition of ahupua'a). As Dr. George Kanahale, a distinguished Hawaiian historian asserts: (1) valuable lessons from Waikiki's past can help us deal with some of the challenges of the present; (2) its survival as well as its prosperity as a center of hospitality lies in the perpetuation of its uniqueness—its sense of place; and (3) its time for Waikiki, referred to by tourist publications as the “ninth island,” to reconnect to its original and spiritual past—to become part of its surrounding and people again.² Hawai'i's history of land management dates back to its ancient civilization of Hawaiian people

who arrived on the islands approximately 1,500 years ago. Native Hawaiian culture, religion, mythology, resource gathering, and agriculture were based on the natural topography of the land and on the climate. In Hawaiian thought, the land (*Papa*, or “Mother Earth”) was considered a living entity that would provide all necessary food and resources when cared for properly. Many *heiau* (shrines or places of worship) are thought to be weather stations or water regulation stations. Their location, therefore, are important sites for studying land management techniques of Old Hawai‘i. Information about culturally-significant areas and their uses are available on older maps, from Native Hawaiian scholars, and from *kūpuna* (elders). Earlier arrivals, such as Captain James Cook and others have written extensively about the ingenuity of early Hawaiians to manage their land. In 1792, in regard to Waikīkī, British Navy Captain, George Vancouver described the area as follows: “We found the land in a high state of cultivation, mostly under immediate crops of taro; and abounding with a variety of wild fowl, chiefly of the duck kind... The plains, however, if we may judge from the labour bestowed on their cultivation, seem to afford the principal proportion of the different vegetable productions At Wo‘aho‘o (O‘ahu) nature seems only to have acted a common part in her dispensations of vegetable food for the service of man; and to have almost confined them to the taro plant, the raising of which is attended with much care, ingenuity and manual labour.”³ Another instance of land and resource management and self-sufficiency is evident in Waipi‘o Valley on the Big Island of Hawai‘i. A terraced ahupua‘a of about 800 acres of taro sustained a population of approximately 40,000 people. This area, which is currently regulated by the County of Hawai‘i Special Management Area (SMA), is prone to floods and tsunamis. Understanding the ways of the land and climate, the Hawaiian people were able to skillfully regulate the water and other resources in the valley in order to deal with flooding, storms, and pollution from run-off. Their methods provided both a constant renewal of resources, as well as a way of efficiently reprocessing of CO² emissions and waste. Many of the coastal issues that adversely affect our islands today were successfully controlled by the Hawaiians of the past. Much of the ancient knowledge to “read” the sky, lands, and ocean has been lost. Modern science and technology, while not indigenous, can contribute to our *reconnection* with nature. This poster is an example of the role science and technology can play in assisting planners in assessing the causes of contemporary urban problems, as well as help us formulate a way of restoring some of the crucial elements and processes that have been damaged. Using the mapping capabilities of ArcView GIS, information on the rates and spatial distribution of culturally-significant and archaeological features of Hawai‘i can be easily subjected to statistical and scientific analysis. The information gained from mapping analysis of these features could be shared with other Pacific Island Nations (PIN's) that are faced with similar problems.

Wana Domokamaca-Sivoi, Wainimate, Suva, FIJI. The Roles of Traditional Healers and their Potential Position in Good Health.

The roles that traditional healers execute are community based and may be compared to village or community health care workers. There is no definition to express the roles of traditional healers however they may be defined in the following way: Traditional healers are members of the community who practice their roles using traditional healing methods (natural, customary and indigenous), and in general serve to prevent and cure people who are debilitated from any form of sickness, infirmity in his or her healthy well being. Traditional healers serve to coordinate health delivery services where no doctors are available. Some roles traditional healers in our communities can provide are:

- a) Treatment of people who are sick where no doctor or nursing services are available for immediate medical attention in remotely located areas where transportation, communication, and absence of medical facilities causes inconvenience.
- b) Provision of treatment for people who cannot be cured by medical trained doctors at government or private medical institutions for the sickness they suffer or for resistant side effects and allergies from medical treatments at hospitals, etc.
- c) Provision of affordable health care for medical problems when afflicted community members cannot afford the costs of treatment. This is true in village or poor communities who lack financial resources when seeking medical treatment.

Jack R. Donaldson and **Rex G. Cates**, Natural Product Research Group, Department of Botany, Brigham Young University, Provo, Utah, USA. Comparing ethnobotany and chemical ecology approaches in the search for medicinal plants.

The objective was to test the efficacies of ethnobotanical and ecological-based approaches to finding plant species effective against human health diseases. Leaf extracts from 63 Sonoran Desert species representing 26 families were screened in a microtitre liquid suspension assay against *Candida albicans*, *Staphylococcus aureus* and *Pseudomonas aeruginosa*. These same extracts also were tested against a HeLa cervical cancer cell line. Overall, 28 of 63 species (44%) showed significant activity against at least one microorganism. Fourteen of the 31 ethnomedical species (45.2%) showed significant activity compared to 14 of 32 (43.7%) ecologically selected species. Among growth forms, the pattern of activity against *S. aureus* and *C. albicans* was that extracts from herbaceous perennials had the greatest activity (19% ethnomedical vs. 16.7% ecological, respectively), followed by woody perennials (15.7% vs. 13.7%, respectively), evergreen (8.3% vs. 11.1%, respectively) and then annual species (6.7% vs 8.3%, respectively). No significant differences were found among growth forms tested against *P. aeruginosa*. In the HeLa assay, 34 of 63 (54%) showed significant inhibitory effects, of which nine were not inhibitory to mouse fibroblast cells (3T3). Based on results of this study 20 species were recommended for further investigation. This study supports using an ecological approach that incorporates life history characteristics and current theories of plant defensive chemistry in the search for medicinal plants.

Deanna Donovan, Environmental Studies, East-West Center, Honolulu, HAWAII. and **R. K. Puri**, Department of Anthropology, University of Kent, Canterbury, England, UNITED KINGDOM. Framework for Applying Indigenous Knowledge in Forestry Research.

Despite repeated calls for incorporating indigenous knowledge in forest conservation and development programs, progress in this direction is slow. In this presentation, the authors propose a method by which scientists could make greater use of technical knowledge accumulated in indigenous cultures to refine current research efforts in tropical forestry, among other disciplines. By way of example the authors examine knowledge regarding *gaharu*, an aromatic, resin-impregnated wood (*Aquilaria* sp.) Of the tropical forests of Asia, which has been traded throughout this region for nearly 2000 years. Information collected in an ethnobiological survey of forest-adapted groups in central Borneo is compared to the accumulated findings of formal research on this species for several decades of tropical forest ecology. The authors illustrate how indigenous technical knowledge can be used in formulating research hypotheses needed to better understand the physiology and the ecology of tropical forest species - information critical for the development of suitable conservation and development plans. Findings support arguments for a greater role for ethnobiological research and enhanced cooperation between ethnoecologists and forestry researchers in development of forest management systems that could improve returns to local forest managers while conserving the biologically rich forest resource base.

Dwight Dorey, Congress of Aboriginal Peoples, Ottawa, Ontario, CANADA. Indigenous People as Political Powers.

I. Pre-colonial contact, political organization and processes

- Consensus decision making
- Matriarchal impacts
- Division of rights & responsibilities
- Aboriginal "Democracy"

II. Colonization imposition of European structures and values

III. Disadvantages (cultural, social, historical) faced by Aboriginal societies seeking political equality and powers

IV. Political power-sharing with dominant governance structures

V. Alternative governance systems in global structures

VI. The Canadian experience as prelude the 21st century imperatives

K. Dragull, W.J. Tang, and C.S. Tang, Department of Molecular Bioscience and Biosystems Engineering, University of Hawai'i, Honolulu, HAWAII. HPLC analysis of pipermethystine and kavalactones in kava (*Piper methysticum* Forst.) leaves. A widely used reversed-phase HPLC (high-pressure liquid chromatography) method (Shao *et al.*, 1998) for the quantification of kavalactones in kava roots was verified for applicability to aerial parts of *Piper methysticum*. Eight individual plants, grown under the same conditions, four from the cultivar 'Mo'i' and four from cultivar 'Isa', were chosen for analysis. Samples were prepared by extracting the dried leaves (60 °C) with 70 % methanol. Peaks were identified based on the retention time and their UV absorbance using a photodiode array detector. It was found that the pyridone alkaloid pipermethystine (absorbance $\lambda_{\text{max}} = 210$ and 243 nm) overlapped with the peak for the kavalactone yangonin at retention time of 30 min. Partial separation of pipermethystine and yangonin was achieved by decreasing the polarity of the mobile phase using gradient elution. Pipermethystine was collected and its identity confirmed by GC-MS (gas chromatography-mass spectrometry). Dried kava leaves are commercially available in Hawai'i as an herbal tea. Pipermethystine can be mistaken for yangonin when Shao's method is used for the analysis of kava leaf. Furthermore, during quality control of the main commercial product (roots and lower stems) in which the yangonin content is high and the pipermethystine content is low, the alkaloid may falsely be added to the total kavalactone content and misinterpreted as a desirable quality trait. It is important to determine the pharmacological and toxicological properties of pipermethystine since related alkaloids from the genus *Piper* show cytotoxic, antifungal and insecticidal activity.

Maile T. Drake, Te Papa Tongarewa, Museum of New Zealand, Wellington, NEW ZEALAND, **Don R. Drake**, Victoria University of Wellington, NEW ZEALAND, and **B. Hendry**, Georgia Southern University, Statesboro, Georgia, USA. Heritage Plants of the Vava'u Group, Tonga.

We present the results of an oral history and ethnographic field study documenting cultural, regional specialisation in plant usage in Vava'u, Tonga, an archipelago of one large and many small islands, supporting 40 villages. Interviews with 73 informants in 18 villages on 12 islands were conducted in the Tongan language, producing information on over 100 species of plants. Plants were categorised according to their traditional uses. Many species are traditionally associated with particular villages, where they serve as markers of village identity, for example, in traditional dancing costumes. Reason for such associations include: geographic locations of villages, plant availability, linkage of a plant with a local legend, and specific responsibilities of the village chief to the king. It is critical to act quickly to conserve this information before it is lost through displacement by introduced plants and foreign influences; most of the information is currently held by the older residents of the villages. A joint Tongan/English publication for use in schools and museums could offer a vehicle for conveying to new generations an awareness and appreciation of Tongan plants and their traditional uses.

Myrtle Driver, Tribal Cultural Traditionalist with Cultural Resources of the Eastern Band of Cherokee Indians, Cherokee, North Carolina, USA, **Karen Hall**, Clemson University, Department of Plant Physiology, Clemson, South Carolina, USA, and **N. Dwight Camper**, Clemson University, Department of Plant Physiology, Clemson, South Carolina, USA. Cherokee formulas: Not just a prescription for good health.

To effect good health in an individual, a Cherokee healer may use verse, song, dance, plant material, implements or any combination of these. Since the advent of the Cherokee syllabary, individual healers have written formulas that contain verse to address specific conditions and their treatment. Formulas may also contain instructions for the preparation of plant material to be used in medicines and functional craft. The purpose of this paper is to document several formulas, originally written in Cherokee by a now deceased healer. They are specific for the treatment of colds in children and for the preparation of dye for oak splits used in basketry. [poster]

Liloa Dunn, University of Hawai'i at Manoa, Department of Botany, Honolulu, HAWAII. The Ethnobotany of Polynesian Tattooing.

Tattooing is a traditional art form that survives today in many Polynesian cultures and is actually making a strong resurgence as we speak. Before the advent of modern tattooing instruments, people relied on natural materials found in their particular environments for use in constructing tattooing devices such as needles, handles, mallets and pigments. Needles, which were used to puncture the skin there by injecting the pigment, were made out of fish, bird, and human bones. Dogteeth and highly polished and finely pointed stone were also used in the construction of needles. The handle or rod, to where the needles were attached, was fashioned out of bamboo and other native woods of the particular areas. The cordage used to attach the needle to the handles varied with different plants available. In many areas coconut or coir fiber was used. Mallets, used for striking the handle/needle, implement was constructed of denser type woods of that particular island environment. Pigments were generally extracted from plant material by carbonizing certain plant part such as the seeds of the Kukui (*Aleurites moluccana*). In other areas like Aotearoa, where kukui does not grow, other ingenious methods of pigment preparation was used. Different areas had different materials afforded to them, so in many instances there were some clever innovations in materials used. This seminar will give a

general introduction into the ethnobotany of tattooing in the Polynesian cultures of Hawai'i, Marquesas, Rapa Nui, Aotearoa, Tahiti, Samoa and the Tuamotu Archipelago. This is a synthesis of data collected through an extensive literature review, personal experience in Tahiti and Hawai'i and interviews with traditional tattoo artists.

Aaron A. Dus, Ethnobotany Program, University of Hawai'i, Honolulu, Hawai'i, USA. - An Ethno-botanical/ Ethno-musicological analysis of Native Australian knowledge of the Didgeridoo.

I will present a preliminary report based on interviews and investigation of four Australian Aboriginal tribes on their perception of the didgeridoo. Through interviews and participant observation methods, I was able to learn about their knowledge of the didgeridoo. This study has helped to build my knowledge of how people incorporate traditional practices and uses of plant materials into their daily lives. The preservation and awareness of these methods is important such that it may allow others to procure an area of interest for themselves. [poster]

Elaine Elisabetsky, Laboratório de Etnofarmacologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, BRAZIL and **Gabriela Coelho de Souza**, Programa de Pós Graduação em Botânica, Universidade Federal do Rio Grande do Sul, Porto Alegre, BRAZIL. Ethnobotany and Ethnopharmacology as Tools for Diversifying Economic Activities in a Mata Atlântica Biosphere Reserve Community.

In the State of Rio Grande do Sul (Brazil) *Rumohra adiantiformis* is abundant in early stages of degraded forest areas. Meeting the demand from flower shops, this species has been heavily exploited since 1970s, becoming the major source of income for an estimated 3000 families in the Brazilian Mata Atlântica Biosphere Reserve. In order to minimize community dependency on a single resource, as well as the pressure on *R. adiantiformis*, alternative sources of income need to be identified. The methods of ethnobotany and ethnopharmacology are being used to: a) document traditional plant knowledge; b) identify the species of economic importance and traditional use; c) characterize the associated processing techniques; and d) provide scientific data relevant for locally produced and traded botanical products. While some species and processing techniques were indeed identified and will be analyzed for economic potential, it is felt that the very process of ethnobotanical inquiry has instilled in the community a better sense of self respect. The paucity of data on the medicinal value of species locally processed into drugs has prompted antifungal and antimicrobial screening. Developing culturally sensitive means for returning to the community scientific data, which often conflict with local perceptions of medicinal value, is a challenging task that requires creative solutions.

Memory Elvin-Lewis, Washington University, Department of Biology, St. Louis, Missouri, USA. Conceptual Similarities in Traditional Treatments for Hepatitis.

A survey of secondary ethnobotanical and ethnomedical literature suggests that plant-based hepatitis remedies are most common where the incidence of hepatitis B is traditionally high such as Africa, Asia, Oceania and South America. As a part of a treatment regimen, select taxa may be used alone, in sequence, or together. Some selections are cosmopolitan in use whereas others are unique to a region or particular pharmacopeia. What appears to be a widespread factor in many of these therapies is the selection of plants that work together to ameliorate symptoms or affect a cure. Where correlative information is known, this means that these remedies may possess antiviral, hepatoprotective, immunostimulatory, anti-inflammatory and anti-cirrhotic properties, and that the taxa are combined in ways to enhance these bioreactivities. The therapeutic basis of these treatment regimens is strikingly similar in spite of the disparate pharmacopeias from which they have been derived. This observation suggests that where "natural" bridges of knowledge transfer are limited, distinct traditional medicinal systems may still apply similar criteria to effect beneficial treatments to complex illnesses like hepatitis.

Bryan A. Endress, Miami University, Oxford, Ohio, USA. Harvest intensity, conservation, and management of the vulnerable understory palm, *Chamaedorea radicalis*, by local communities in the El Cielo Biosphere Reserve, Mexico.

Leaves from the understory palm, *Chamaedorea radicalis*, are harvested in northeastern Mexico for sale in the international cut foliage market. The objectives of this study were to 1) assess current harvest pressures on palm populations, 2) document current conservation and management strategies, and 3) explore the biotic and social factors affecting the harvest of *C. radicalis* leaves by communities in the El Cielo Biosphere Reserve, Tamaulipas, Mexico. Ecological data was obtained from transects and permanent plots where we are examining the effect of leaf removal on palm demography. Palm collectors were interviewed to ascertain harvesting practices and current management strategies. Results indicate that 69% of adult palms have had leaves removed during the past two years. In palms that showed evidence of recent leaf removal, the number of leaves harvested ranged from 1-4 leaves per year (mean = 1 leaf/yr.). In addition, we calculate that palm collectors harvest approximately 50% of all leaves produced by adult palms. Current conservation strategies employed by local communities include leaf harvest decision rules based on palm phenology, as well as palm propagation and reforestation activities. However, lack of a diversified resource base, low price for palm leaves, leaf sales based on quantity instead of quality, lack of competition between middlemen, and illegal harvesting by other communities, all inhibit further community conservation and management strategies. These results

show that numerous interacting factors operating at different scales affect the collection of NTFP's, and conservation strategies focusing solely on a few factors or scales may be insufficient to address issues concerning the harvest of NTFP's.

Eric Enos, Ka'ala Farms, Wai'anae, O'ahu, HAWAI'I. Rebuilding the Ahupua'a in Wai'anae, O'ahu.

The reclamation of Hawaiian's spiritual, cultural, and physical relationship to the 'aina (land) is crucial to being in balance with nature as an embodiment of our kupuna (ancestors) who exist in all forms. The ultimate goal of rebuilding the Ahupua'a System of land management is to physically and symbolically put fish and poi (mainstays of the traditional Hawaiian diet) back on the table.

Nina L. Etkin, Department of Anthropology, University of Hawai'i, Honolulu, HAWAI'I, **Paul J. Ross**, Department of Anthropology, University of Hawai'i, Honolulu, HAWAI'I, **Aki F. Miller**, Department of Anthropology, University of Hawai'i and St. Francis Medical Center, Honolulu, HAWAI'I, **Jessica N. Busch**, Department of Anthropology, University of Hawai'i, Honolulu,, and **Jonathan D. Baker**, Department of Anthropology, University of Hawai'i, Honolulu, HAWAI'I. Building Bridges to Where?

A productive future for ethnopharmacology lies in crafting our diverse objectives and methods into a transdisciplinary effort that yields not only collaboration among researchers but also the application of that knowledge to practical ends for local communities. The issue of research objectives is fundamental to an integrated ethnopharmacology. If, as pharmacologists and economic botanists contend, drug development is the primary aim of ethnopharmacology, who will be the chief recipients of those advances – the West, where much of the pharmacological research is conducted, or the developing world which continues to bear the greater disease burden at the same time that they are the source of many of the botanicals being tested? Rather than advancing the biomedical pharmacopoeia, anthropological ethnopharmacologists use phytochemical data to better understand the implications of plant use in particular cultural and epidemiologic circumstances. We suggest that simple catalogues of “plant X used for condition Y,” which satisfied earlier generations of ethnobotanists, be contextualized to actual circumstances of plant use and problematized in such a way that pharmacologic assessment of those plants is meaningful both to pharmacologists and to the people who use those plants. We discuss our current research to illustrate the application of a transdisciplinary perspective. We examine how oncology patients in urban Honolulu use complementary and alternative medicines (CAM), a contemporary Western health-seeking phenomenon that combines diverse folk traditions. In this context we consider the implications of combining botanical and conventional therapies, and outline the application of those findings for patient and staff education and hospital policy. We conclude that a transdisciplinary ethnopharmacology can meaningfully integrate, translate, and apply the results of sophisticated medical ethnography and rigorous bioassays for the benefit of populations who use those plants.

Mary W. Eubanks, Department of Biology, Duke University, Durham, North Carolina, USA. Ancestral Genetic Resources Provide an Alternative to Genetically Modified Organism (GMO) Crops.

Concern about the effects of pesticides on human health and the environment, has been a major rationale for promoting transgenic crops, often referred to as genetically modified organisms (GMOs). Companies engaged in genetic engineering of crop plants claim that biotechnology offers a safe alternative to agricultural chemicals and is necessary to feed the world's expanding human population. There are still many unknowns, however, about the safety of GMOs for human health and the environment. For example, when a crop is engineered to produce a toxin that kills insects, the insecticide is produced throughout the plant and human intake cannot be avoided; whereas, pesticides that are applied to crops externally can be washed off and thus are not ingested with food. Another issue in regard to GMOs is that the transgenes can be transferred from GM plants to wild plants, organic, and non-GMO crops via cross-pollination and insect pollinators. An alternative approach to transgenic technology is the exploitation of beneficial genes from wild relatives of crop plants using conventional breeding methods. An example of the efficacy of this approach is a hybrid between two wild ancestors of corn, *Zea mays* L., that reconstructs a prototype of the ancient ancestor of corn and provides a genetic bridge to move hardy genes into corn. This recombinant hybrid was derived from crossing perennial teosinte, *Zea diploperennis* Iltis, Doebley and Guzmán, and Eastern gamagrass, *Tripsacum dactyloides* L. It is fully fertile and cross-fertile with corn. This fertility, which is unprecedented in a wide-cross hybrid between corn's wild relatives, overcomes the problem of sterility between *Tripsacum* and *Zea*, and provides a genetic bridge for using *Tripsacum* genes in corn improvement. Transfer of insect resistance genes into corn via this bridge using a recurrent selection strategy and conventional plant breeding methods has been successful. This is an exemplar for crop improvement that is a viable alternative to transgenic crops. Benefits and issues of conventional methods and GMO technologies are presented in order to better inform the public about some of the risks of genetically engineered crops and about safe alternative solutions for crop improvement.

Christo Fabricius, Environmental Science Programme, Rhodes University, Grahamstown, SOUTH AFRICA.

Knowledge sharing can restore burnt bridges: combining formal and traditional knowledge to tackle resource degradation in South Africa.

South Africa is approaching its 7th year of democracy and has made great strides towards improving local participation, especially by historically disadvantaged people, in conservation and forestry management. Scholars of collaborative management have however pointed out that, although co-management policies look good on paper, there are looming problems related to a lack of control, historical and new conflicts, a mistrust of traditional and scientific knowledge, and unrealistic expectations of benefits by communities. Recent initiatives to promote knowledge sharing between local communities, scientists and conservation and forestry officials could however address some of these problems. This paper makes use of case studies in conservation and forestry to illustrate how knowledge sharing in general, and participatory monitoring in particular, could benefit local communities, scientists and officials and lead to better biodiversity management. Participatory techniques were used to generate hypotheses about the impact of excessive use on medicinal plants and timber products, by qualitatively comparing utilized and unutilized areas on state and communal land respectively. This was followed up with conventional scientific methods to test these hypotheses. Both approaches involved local villagers, scientists and officials. These initiatives are on-going, but the provisional outcomes have been: a) improved relations; b) changes in the views of all parties about the impact of consumptive use on biodiversity; c) progress in implementing new policies; d) more cost-effective and adaptive natural resource management. Collaborative management and benefit sharing in conservation and forestry remains a dynamic and conflict-prone process with no simple solutions.

Hareya Fassil, University of Oxford, International Development Centre, Queen Elizabeth House, Oxford, UNITED KINGDOM.
Beyond Plants, Professionals and Parchments: The Role of Home-based Traditional Health Knowledge and Medicinal Plant Use in Primary Health Care in Ethiopia.

This paper is concerned with the use of medicinal plants and the related lay traditional health knowledge and practices amongst rural communities in the Bahir Dar Zuria district of Gojam located in the Northwestern highlands of Ethiopia. Much of the research on Ethiopian traditional medicine and medicinal plants to date has been carried out in a compartmentalized manner, with researchers from various disciplines pursuing their interests in relative isolation. Most studies have focused on the medicinal plants and the related knowledge of professional traditional health practitioners. Others in the community who may also be knowledgeable about plant remedies and traditional health practices have been given relatively little attention. Due this 'plant focus' relatively little attention has been paid to the local socio-cultural context in which medicinal plants continue to be used by ordinary people and knowledge about them developed and passed on. The preliminary findings of a study seeking to address this research gap by focusing on lay community members are presented here. Systematic qualitative and quantitative analysis of the data gathered through the main phase of the field research (over the period August-December, 2000) is still underway. Nevertheless, this presentation offers an opportunity to discuss the main findings of the household surveys and discussion interviews held with various members of five rural communities around Bahir Dar and to revisit the central hypothesis and objectives of the research in light of these findings.

Benjamin Charles Feinstein, University of Hawai'i-Manoa, Honolulu, HAWAII. Constructing a Traditional Ecological Knowledge Curriculum: Considerations and Possibilities.

Traditional Ecological Knowledge (TEK) is a rapidly expanding field throughout Academia. Now more than ever, it is imperative that TEK is taught at the college level. However, how does one write a curriculum for TEK? More appropriately, what are the considerations to take into account when constructing a TEK curriculum, and what are some of the possibilities for such a curriculum? In this presentation, we will look at the process of constructing a curriculum on Local Traditional Ecological Knowledge, discuss the issues surrounding this topic, and explore the models currently in place as well as possible considerations for the future.

Candice Felling, University of Hawai'i, Honolulu, HAWAII and **Sandy Zicus**, University of Hawai'i, Honolulu, HAWAII.
Ethnoscience of Hawaiian Fish ponds.

Hawaiians developed the most advanced form of aquaculture known in all of Oceania. Hawaiian fishpond technology evolved long before the influence of modern-day science impacted island culture. This traditional technology is so complex that ocean engineers and aquaculture scientists, even though armed with scientific measuring tools and computer modeling systems, are having difficulty reconstructing how Hawaiians maintained and operated fish ponds on a day-to-day basis. During this workshop we will explore the cultural and ecological importance of Hawaiian fish ponds and will engage in some hands-on activities that will provide insight into how these fish ponds were designed and managed. At the beginning of the workshop, we will explore the ahupua'a system of land management to provide an ecological and economic context for the role that fish ponds played in tradition.

Ben Finney, University of Hawai'i, Department of Anthropology, Honolulu, HAWAI'I. Session organizer for Traditional Oceanic Navigation Knowledge.

The ancestors of the indigenous peoples of Oceania were the premier deep-sea sailors of the ancient world. Thousands of years ago their ancestors from Southeast Asia began developing seagoing canoes and ways of navigating that they and their descendants employed to expand eastward into the Pacific, finding and settling every habitable island in this greatest of oceans. In 1973 the Polynesian Voyaging Society was founded in Hawai'i to develop a joint experimental and cultural program to revive the ancient canoes and wayfinding methods and test these on long sea voyages over legendary voyaging routes. The many voyages made throughout Polynesia by the Society's voyaging canoe, *Hokule'a*, have served both to revolutionize contemporary scientific thinking about ancient voyaging and navigation, and to spark a voyaging renaissance that has given Hawaiians and other Oceanic peoples a new pride in the skill of their ancestors as naval architects, sailors and navigators. Now groups from all over Polynesia and also in Melanesia and Micronesia are reconstructing their own ancestral voyaging canoes, relearning traditional sailing and navigation methods and retracing sea routes sailed by their ancestors. Canoes sailors, builders and navigators from the Polynesian Voyaging Society, the Vaka Taumako (Taumako Canoe) Project of the Polynesian outlier in Melanesia by that name, the *Waan Aelon in Majel* (Canoes of the Marshall Islands) project in Micronesia, and the Center for Hawaiian Language and Culture Studies of Brigham Young University-Hawai'i will share their experiences and discuss the impact of this movement among contemporary Oceanians.

Ben Finney, University of Hawai'i, Department of Anthropology, Honolulu, HAWAI'I. The Revival of Polynesian Voyaging. By the 1950s deep-sea voyaging canoes and their navigators had disappeared from Polynesia. At this time some scholars began claiming that these technologies had been too crude for Polynesians to have purposefully explored and settled the Pacific, and that the islands could only have been accidentally reached by castaways. To contest this view, anthropologists, sailors and canoe enthusiasts began reconstructing the old voyaging canoes and ways of navigation, and testing these on long voyages. Under Hawaiian leadership the reconstructed canoe *Hokule'a* has sailed almost 100, 000 nautical miles throughout Polynesia, an achievement that has refuted the accidental settlement hypothesis and has given Polynesians a renewed sense of pride with which to face contemporary problems. Furthermore, *Hokule'a's* many voyages have sparked the building and sailing of voyaging canoes throughout Polynesia, and has also inspired other Pacific peoples to similar efforts.

Rowena Fong, School of Social Work, University of Hawai'i, Honolulu, HAWAI'I. Cultural Values, Behaviors, and Norms: An Analysis of Protective and Risk Factors.

Among professionals providing social services to clients with problems, it is fully expected that people's behaviors are mostly influenced and structured by their cultural or ethnic group affiliation. In the discipline of social work, culturally competent social work practice emphasizes the training of social workers to identify the cultural values which are strengths to the clients and integrate them into the assessment processes as resources (Devore and Schlesinger, 1999; Fong and Furuto, 2001; Lum, 1999). However, with the increasing incidents of family violence, substance abuse, child abuse and neglect (Ja and Yuen, 1997; Lie, 2001; Mokuau, 1998) traditional cultural values (such as, family loyalty, patriarchal family structures, etc.) which have been regarded as protective factors need to be re-examined to determine risk.

This paper presentation will define cultural values, behaviors, and norms from a social science perspective. An analysis of cultural values as protective factors will be presented in order to determine the contexts in which they can become risk factors. Case examples from the Chinese culture will be given.

Sheri F.T. Fong, University of Hawai'i at Manoa, Pacific Biomedical Research Center, Honolulu, HAWAI'I, **Andrew Johnson**, University of Hawai'i at Manoa, Pacific Biomedical Research Center, Honolulu, HAWAI'I, **Chi-Tang Ho**, Rutgers University, New Jersey, USA, and **Katalin Csiszar**, University of Hawai'i at Manoa, Pacific Biomedical Research Center, Honolulu, HAWAI'I. Extracts of *Morinda citrifolia* (noni) exhibit selective anti-tumor activity against breast and colon carcinoma cell lines.

Morinda citrifolia (noni), one of the most effective medicinal plants utilized by native Hawaiians, was used for a variety of ailments, including the treatment of breast cancer by at least one Polynesian community. Currently in Hawai'i, noni is the second most commonly used ethnobotanical, mainly for the treatment of cancer, hypertension and diabetes. However, there are only few reports which address the biological activity of noni. Thus, to evaluate if noni has anti-tumor activity and to elucidate possible ethnopharmaceutical compounds and their mechanism of action, four extracts (hexane, ethyl acetate, butanol, water) from the noni fruit were evaluated for anti-proliferative activity on MCF-7, a breast carcinoma cell line; HCT-116, a colon carcinoma cell line; and DU-145, a prostate carcinoma cell line. Both the water and butanol fractions demonstrated selective growth-inhibitory action on the MCF-7 and HCT-116 cell lines. Seven individual compounds were isolated from the butanol fraction and one of these, a novel glycoside, demonstrated anti-proliferative activity against MCF-7, but not against HCT-116. The water fraction, which represented a more traditional preparation, was used for a 5 day exposure of both MCF-7 and HT-1080, a fibrosarcoma cell line. Significant growth inhibition of MCF-7 up to 80% was accompanied by morphological changes indicative of apoptosis, compared to HT-1080 which was unaffected. An Atlas cDNA array specific to apoptosis revealed that the active compounds in

this water extract appear to affect several genes of the TNF apoptotic pathway and cell cycle, and result in inhibition of cancer cell growth. [poster]

Margaret Forster, Rongomaiwahine, Te Putahi-a-Toi, School of Maori Studies, Massey University, Palmerston North, NEW ZEALAND. Te Hoe Nuku Roa: A journey towards Māori centered research.

Maori people (the indigenous people of New Zealand) have a unique body of knowledge that is based on ancestral traditions that have adapted to meet contemporary challenges. While Maori knowledge is widely applied in Maori communities it is now increasingly being used in mainstream domains including resource management, social policy, health and research.

This presentation will focus on a project known as Te Hoe Nuku Roa: Best outcomes for Maori. This is a longitudinal Maori household project with a focus on Maori development in cultural, social and economic terms. This project is based on a cultural framework that has been formulated from 'traditional' principles. It provides a model for the interaction between Maori knowledge and mainstream social science practices and demonstrates how Maori knowledge and the western scientific tradition can be used together to resolve critical failings in previous research and advance the aspirations of Maori people. It is just one example of how traditional principles are demonstrating their continuing value in contemporary Maori development.

Alan Friedlander, The Oceanic Institute, Makapu'u Point, Waimanalo, HAWAI'I, **Kelson Poepoe**, Hui Malama o Mo'omomi, Kualapu'u, HAWAI'I, **Kaipo Poepoe**, Hui Malama o Mo'omomi, Kualapu'u, HAWAI'I, **Kanohe Helm**, Hui Malama o Mo'omomi, Kualapu'u, HAWAI'I, and **Paul Bartram**, Pacific American Foundation, Honolulu, HAWAI'I. Validating traditional knowledge concerning the harvest of marine resources using the Hawaiian moon calendar.

Subsistence fishing is culturally and economically important to many rural communities in Hawai'i and in previous times Hawaiians developed a management system that provided for sustainable harvest of their natural resources. The traditional system in Hawai'i emphasized social and cultural controls on fishing with a code of conduct that was strictly enforced. Harvest management was not based on a specific amount of fish but on identifying the specific times and places that fishing could occur so it would not disrupt the basic processes and habitats of important food resources. Understanding when, where, and how to conduct fishing so that it is compatible with local resource dynamics requires an intimate knowledge of natural rhythms and processes associated with these resources. The moon calendar is a tool that the ancient Hawaiians developed for holistic understanding of marine and terrestrial environments that emphasizes the biological and ecological processes that repeat at specific places and times. On-going studies to reconstruct the moon calendar are being conducted by the Hui Malama o Mo'omomi, a group devoted to the wise use of the inshore fisheries along the northwest coast of the island of Moloka'i. Community resource monitors are being taught traditional Hawaiian observational methods of monitoring marine resources based upon careful observation by expert fishermen and their recorded observations become the raw material to construct a calendar patterned after the traditional moon calendar. Information validating traditional Hawaiian knowledge makes management decisions more understandable and acceptable to local communities with a history of local resource knowledge.

Mimi George, Vaka Taumako Project, Anahola, HAWAI'I, and Taumako Island, SOLOMON ISLANDS. Vaka Taumako, the Taumako Canoe Project.

Although the small and isolated island of Taumako is located in the Reef-Santa Cruz group of Melanesia's Solomon Islands, its people are primarily of Polynesian origin. They were famed for their fast and seaworthy outrigger canoes which they used to undertake trading voyages throughout the Reef-Santa Cruz group, and also traded them to the other islanders. However, this trade declined as people turned to the cash economy, imported goods and power boats, and the last of the canoes went out of service in the 1960s. Twenty-five years later when Mimi George sailed to this remote island she was approached by Ariki Kaveia, the Paramount Chief of Taumako who is one of the last Taumako who still knows how to build, sail and navigate the old canoes. He proposed that they work together to pass on his knowledge to the youths by teaching them to build, sail and navigate the canoes they had never before seen. Two canoes have already been built and several more are under construction. Earlier this year the Ariki Kaveia opened a school of traditional navigation on the island.

Michael P. Gilmore, Department of Botany, Miami University, Oxford Ohio, USA, W. **Hardy Eshbaugh**, Department of Botany, Miami University, Oxford Ohio, USA, and **Adolph M. Greenberg**, Department of Sociology, Gerontology and Anthropology, Miami University, Oxford Ohio, USA. A Preliminary Assessment of Mai Juna Land Cover Classification in the Peruvian Amazon

The Peruvian Amazon is a biologically diverse and heterogeneous region. Many indigenous groups have systems of land cover classification, which organize and make sense of this heterogeneity and diversity. The initial phase of this study was carried out in an attempt to understand the resource landscape of the Mai Juna, a Western Tukanoan people, and how they order and classify the different land cover types in their environment. The objectives of this study were to (1) identify the different land cover types that the Mai Juna recognize, (2) understand how they recognize these land cover types, (3) document the Mai Juna names for each, and (4) identify what, if any, land use types and scientifically recognized habitat types correspond to the different Mai Juna recognized land cover types. The "field interview" method was utilized while accompanying Mai Juna individuals on hunting,

fishing, collecting, and farming trips. Preliminary results indicate that the Mai Juna recognize 24 different land cover types. Of these 24 land cover types, 5 are defined by geomorphology, 16 are defined by vegetation, and 3 are defined by use. These results provide

insight into how indigenous groups perceive their environment and the sorts of land cover types that are found in the Peruvian Amazon on a fine scale. These methods, when coupled with ethnobiological information, can also be used to identify where culturally significant plant and animal species are found, and to identify areas of potential management significance.

Gilbert Githere, Hawai'i Pacific University, Honolulu, HAWAI'I. Dini za Kienyeji, kwa mfano Mungiki, na Utawala wa Taifa. Githere looks at the possibilities of Kenya nations, (nations here meaning different tribes of Kenya), a good example here being, the Agikuyu nation (or The Kirinyaga Nation) forming their own systems of governance. This trend will be in line with what the Europeans found in Kikuyu land. Before colonial rule there were three nations in Kikuyu land, these were the Southern nation, northern nation and Eastern Nation (Louis S. Leakey: *The Southern Kikuyu Until 1903*: 1978) In this paper, I intend to trace the Agikuyu system of governance from the days they were living in Egypt, along the Nile delta. Using EA. Wallis Budge's book entitled, **Book of the Dead** (1885), I will try to connect Agikuyu with the early pharaohs of Egypt in 3500 B.C.

After looking at the early history of the Agikuyu, I will use the present political climates in Africa, especially what has happened in Somalia (breaking up of post colonial Somalia to its pre-colonial boundaries), to see whether the same thing is possible in today's Kenya. Already there is a microcosm of Somalia happening in Kenya. The Karen area (named after Karen Blixen of the movie Out of Africa), has broken away from the Nairobi City Council, and has formed an independent civic government. The Nation of Kirinyaga, will be the first system of governance to use an indigenous belief (ancestral worship) system to run its day to day socio-political activities. The ancestral worship I intend to look at is very much, in the fashion of Mungiki nation. In conclusion, I will try to show why going back into pre colonial traditional institutions could be better for the Kikuyus, and for Kenya in general. In order to achieve the above I intend to look at the way the colonialists and the post independent systems have treated the Kikuyu people. Swahili is a language spoken by approximately 175 million people in East, Central and South Africa.

Lisa X Gollin, University of Hawai'i, Department of Anthropology, Honolulu, HAWAI'I and **Usun Uluk**, Center for International Forestry Research, Jakarta, INDONESIA. A Spoonful of Fructose Helps the Medicine Go Down: Kenyah Leppo'ke Therapeutic Fruits.

The forest-dwelling people of the mountainous interior of Borneo draw from the exceptional diversity of their natural surroundings for a wide array of ethnobotanical taxa for foods, medicines, building and craft materials, ritual purposes, and more. This presentation centers on the healing fruits of the Kenyah Dayak Leppo' Ke of East Kalimantan, Indonesian Borneo. Research conducted in settlements in the Upper Bahau River watershed underscore the therapeutic value of native fruits. Of the over 200 plant species that have a place in the prevention and treatment of disease, 15% are comestible fruits. Furthermore, some of these species are ranked as the most effective remedies in the Leppo' Ke pharmacopoeia for treatment of malaria (e.g., *Lansium domesticum*, Meliaceae), diarrhea (e.g., *Dipterocarpus oblongifolius*, Dipterocarpaceae), dental caries (e.g., *Nephelium rambutan-ake*, Sapindaceae), among others. Many of these are endemic or native species harvested or transplanted from the rain forest. The authors will discuss the ecology of fruits grown and gathered, their therapeutic applications, and their pharmacological influence on health. We will also consider a hidden category of use, that is, the less "charismatic," labor intensive, low yield fruits consumed by children. Children possess a unique diet attendant to play. Several children's fruits (e.g., **jelemutin, mata atuk**) also serve as important medicinals, dyes, fish stunners, etc., and are the salient playthings by which children learn of the healing potential of their environment. A better understanding of the multiple roles of Bornean fruit taxa can help shape community and national public health, and conservation programs.

Sam Gon, The Nature Conservancy, Honolulu, HAWAI'I. Application of traditional ecological knowledge and practices of indigenous Hawaiians to the re-vegetation of Kaho'olawe.

Kaho'olawe Island has been established as a natural and cultural reserve, and an ongoing process of removal of dangerous unexploded ordnance is to be followed by a restoration of the native vegetation of the island, now largely denuded and highly disturbed by alien weeds. As part of the planning process for this effort, a review of Hawaiian traditional ecological knowledge and land management practices was undertaken, offering many premises, precedents, and practical for the effort, all stemming from chants and recorded practices of Hawaiians. It becomes clear that traditional approaches have much to offer the modern restoration effort.

Keali'i Gora, Ka Lahui Hawai'i [the Hawaiian Nation], HAWAI'I. Ea Hawai'i: Hawaiian Sovereignty in the 21st Century: Nation within a Nation or Independence?

Ka Lahui Hawai'i is a Native Hawaiian initiative for self governance formed in 1987 by a constitutional convention. The Ka Lahui Hawai'i constitution is based on peace and non-violence, and asks for nation within a nation status. Since 1987 Ka Lahui Hawai'i has seated a government in exile, held 3 constitutional conventions, 3 state wide democratic elections, and 35

legislative sessions. It has also submitted annual interventions to the United Nations Working Group on Indigenous Peoples in Geneva and is closely involved with the establishment of the UN Permanent Forum on the Rights of Indigenous Peoples. Keali'i Gora was elected in 1998 as the Lt Governor of Ka Lahui Hawai'i, and it is his portfolios include public relations and media, international relations and lobbying in Washington DC. A dynamic speaker, Mr. Gora has a background in education and business, as well as being a Hawaiian cultural expert.

Laurent Grivet, Cirad, Unicamp, BRAZIL, **Christian Daniels**, Tokyo University of Foreign Studies, Tokyo, JAPAN, **Jean Christophe Glaszmann**, Cirad, Montpellier, FRANCE, **Angélique D'Hont**, Cirad, Montpellier, FRANCE. Origin and evolution of sugarcane: what more do we know after 15 years?

Sugarcane is an old companion of mankind that has witnessed many key periods of human prehistory and history over the five continents. Its own evolution and common history with man is rich and complex, as can be traced from botany and genetics. In 1987, J. Daniels and B. T. Roach published an exhaustive multi-disciplinary review of evidence permitting the domestication and the early evolution of sugarcane to be traced. Since then, new data, particularly molecular marker data, have been produced. We try here to clarify their contribution to the understanding of the global picture, and point out hypotheses that have been corroborated as well as important questions that still remain to be answered.

Joanna Hadjicostandi, University of Texas of the Permian Basin, Department of Behavioral Science, Odessa, Texas, USA. Building Bridges: The Role of the Black Teacher.

Affirmative action, diversity training, minority programs, multicultural education are only a few of the ways in which interest has been expressed to bridge the gap of understanding social conditions in communities and policy making. Many programs have been created to allow for the "integration" of "minority" people into the social, economic and political fabric of this society, which emphasized community interests and thus opened these to public scrutiny.

In an effort to examine how to bridge the gap between communities, a study of the social history of the African-American community of Odessa and Midland, told by the people themselves through the collection of oral histories, was conducted.

People's views about their participation in the creation, preservation and perpetuation of their community and the wider society were examined.

In this presentation I wish to focus on the role of black teachers before and after desegregation in building the community. The oral histories compiled in this study provided a wealth of information on this and many other dimensions of community building. It is aspired that deeper analysis of social relations will provide the potential of improving understanding and breaking invisible barriers.

Lorna Hall and **M. Johnston**, Iwokrama, Bel Air Howe, Bel Air Georgetown, GUYANA. Balata (*Manilkara bidentata*) latex-a brief history, a study on the impacts of harvesting, and potentials for the future.

Balata latex, once a major economic product of the countries Guiana Shield, is still locally harvested on a small scale, although its original markets are now supported mainly by artificial substances. At present it is used for waterproofing, making traditional waterproof containers, and for a small but developing market of craftwork figures. The impact of tapping, *Manilkara bidentata* (A.DC). Chev. For latex has been studied since 1998 in the Iwokrama Rain Forest Reserve in Central Guyana. The data will be used to assist with management decisions for the Iwokrama forest. Experimental harvests have been conducted in June and November 1999 and June 2000. Trees were harvested at different intensities and the balata latex was collected and dried by local balata bleeders, using traditional methods. Fruit production and growth rate data have been collected in the harvested area.

The market for balata in Guyana remains localized, concentrated in areas where craft figures are produced for the tourist market, particularly Nappi, an Amerindian Village in the Rupununi Savannas. Since individual trees can only be harvested every 15 years or so, the time it takes for the bark cells to regrow, it is possible that demand could outstrip local supply. *M. bidentata* does not fruit annually, but has exhibits fruiting events on approximately a 4 year cycle. A better understanding of the effects of harvesting on fruit production could support management decisions to ensure that this developing financial resource is substantial and retains a high unit value.

Barbara Frei Haller, PhytoQuest, Agency for consulting and research into ethnobotany, ethnomedicine and phytochemistry, Zerne, SWITZERLAND and **S. Mueller**, Cilag AG, Schaffhausen, SWITZERLAND. Probing the Foundations - Reflections on the Actors and Their Environment in the Field of Ethnopharmacology.

Research in ethnopharmacology includes cultures who hold traditional knowledge, researchers who represent diverse intellectual traditions, and commercial enterprises. Although these three groups of stakeholders have tried to work together in various projects in the past decades, the amount of useful and applied "results" generated is disappointing. Are the objectives, operational cultures, and especially the needs of the three groups involved perhaps too different for collaboration and practical application? This paper analyzes the key factors that influence each of these triangulated groups. Further, the methods of ethnopharmacology, including ethnobotany and ethnozoology, will be discussed to identify several techniques that advance comparability of results and practical application from the onset of the project. We discuss what has been established to date and focus on how to forge

future dialogue and collaboration among the groups involved. Our objective is to outline a methodology that encourages rigorous ethnopharmacological investigations that are relevant not only to the ethno-sciences but also to the indigenous populations from whom traditional knowledge is drawn.

Hugh Harries, Investigador, Centro de Investigación Científica de Yucatán AC, (CICY), Apdo. Postal 87, Cordemex 97310, Mérida, Yucatán, MEXICO, **Luc Baudoin**, Geneticist, Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), BP 5035, 34032 Montpellier Cedex 01, FRANCE, **Alan Meerow**, Research Geneticist, Systematist & Curator, National Germplasm Repository (USDA-ARS-SHRS), 13601 Old Cutler Road, Miami, FL 33158, USA, **Rolando Cardeña**, Investigador, Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco (CIATDEJ), Av. Normalistas No. 800, Guadalajara 44270, Jalisco, MEXICO. Floating, boating and introgression: molecular techniques and the ancestry of coconut palm populations on Pacific islands.

It has previously been suggested that the coconut populations of Pacific islands arose by introgression between wild types that disseminated by floating from an ancestral centre of origin and domestic types that were brought in small boats from a centre of domestication. This simplistic model is complicated by the subsequent movement of the introgressed germplasm in large boats, particularly following the industrialisation of coconut growing for copra in the late 19th century. Although copra is no longer an attractive article of trade, the coconut palm continues to be an attractive eco-amenity for the tourist industry. The occurrence of epidemic lethal diseases in previously important copra producing areas, and the increasing opportunity for pathogens and vectors to be transmitted by innocent tourists and uninformed landscape developers is a potential threat to coconuts and other palm species. It has also been suggested that disease resistance arose during domestication. If that is so, then the ability to use molecular techniques to characterize coconut varieties will help accelerate selection, which presently can only be based on survival in long-term field exposure trials.

Graham Harris, Horticulture and Ethnobotany, The Open Polytechnic of New Zealand, He Wharekura-tini Kaihautu o Aotearoa, Lower Hutt, NEW ZEALAND. Nga Riwai Maori: The adoption of the potato by Maori in Aotearoa and the conservation of relict cultivars within Maori communities.

It is generally accepted by scholars that potatoes *Solanum tuberosum* were first introduced to New Zealand/Aotearoa in the late 18th century by Captain James Cook and the French explorer, Marion du Fresne. Further introductions of potatoes from a variety of sources including possible direct introductions from South America, followed into the 19th century. Maori were quick to recognise the advantages that these new introductions had over their traditional food crops including kumara (*Ipomoea batatas*) and taro (*Colocasia esculentum*) both of which they introduced from East Polynesia some 800-1000 years previously. Potatoes soon became a staple item in the Maori diet and an important trade commodity and by the mid 19th century they were growing thousands of hectares of potatoes for that purpose. The various cultivars that were introduced were given Maori names and many of these early types are still grown by Maori today, having been passed down through families for many generations. With their deep set eyes, often knobby irregular shape, "open" leaves and colourful tubers these "Maori Potatoes" are quite distinctive in appearance from modern potatoes and some retain many of the features of *Solanum tuberosum* subsp. *andigena* types. It is claimed by some Maori that potato varieties were introduced to New Zealand by their ancestors prior to the arrival of Europeans, however it is more likely that they developed some of their own cultivars by making selections from seedlings. This paper discusses the adoption of the potato by Maori, the effects it had on Maori society and the perpetuation of the early cultivars within Maori families. It also describes the relict cultivars still grown today and observations made by the author from studies of a cultivar collection maintained over several years.

Michael T. Hayes, University of Hawai'i, Honolulu, HAWAI'I. The critically engaged listener and the impossibility of knowledge: Towards an anti-colonial science education practice.

In this chapter I develop a perspective on science teaching that strives for an anti colonial stance. I develop this perspective within the framework of my experiences with Native Hawaiian students in an elementary science methods course. I am a White male recently arrived in the Hawaiian islands from the mainland United States. Recently I taught an elementary science methods course on a neighbor island and two female students of Native Hawaiian ancestry challenged my preconception about science knowledge and how it is conceived and represented in teaching practice. As a class assignment these two students offered a traditional Hula (dance) and Oli (chant) for a class presentation and their final written project was arranged as a deeply personal narrative about the Hau tree, an important personal and cultural aspect of their local natural environment. The students were consciously challenging western and scientific traditions of what it meant to know and represent knowledge of the natural world and of science teaching practice. The actions of these two students forced me to rethink my position as a "knower" and a "professor" of science knowledge. Instead, I was forced to reconstruct my position to that of an engaged and critical listener who strives to make meaning and to understand Others but must ultimately accept the impossibility of knowing. Edward Said (1978) argues that the very foundation of colonialism is the anthropological claim to know and to have mastered knowledge of an Other. As an outsider, an interloper on the lands, and people of a culture that is not mine, I can not claim to know the personal and cultural awareness that these students have concerning science knowledge and science teaching. Instead, I must embrace the

possibility of not knowing to constitute an engaged and empathetic awareness; a struggle for a meaning of the cultural Other that is epistemologically and ethically defensible but never complete.

Michael Heinrich, Centre for Pharmacognosy and Phytotherapy, School of Pharmacy, University of London, England, UNITED KINGDOM. Ethnopharmacology or Bioprospecting: Two Sides of the same (Western) Coin?

Ethnopharmacology is often reduced to an auxiliary science in drug development or even equated with bioprospecting. As a truly multidisciplinary science *ethnopharmacology* needs to refocus on its anthropological dimension and to pay particular attention to its role in further developing local and indigenous pharmacopoeias ("ethnopharmacopoeias") (Etkin 2000; Heinrich 1994, 2001; Heinrich et al 1998). I discuss some examples of ethnopharmacological research as it had been conducted during the last two centuries, look at the current role of this discipline in drug discovery (especially with respect to the U.S. and European markets), and examine the further development of these phytotherapeutical resources for local use in the countries of origin (ethnopharmacology). Examples from 19th century research on curare (Humboldt and Bernard), from the 20th century on hallucinogenic mushrooms (Wasson), and on Mexican Indian indigenous plants (our own research) are used to illustrate the development of this discipline and to highlight the challenges for the future. Our own results from various projects on Mexican Indian ethnobotany and subsequent pharmacological and phytochemical studies form the empirical basis for this contribution. Medicinal plants are an important element of indigenous medical systems in Mexico. Medicinal plants in five indigenous groups of Mexican Indians – Maya, Nahuatl, Popoluca, Zapotec, and Mixe – have been studied in greater detail. The relative importance of a medicinal plant within a culture is documented using a quantitative method, and the data are compared *intra-* and *interculturally*. While the species used by the indigenous groups vary, the data indicate that there exist well-defined criteria specific for each culture, which lead to the selection of a plant as a medicine. For example, a large number of species are used for gastrointestinal illnesses by two or more of the indigenous groups. At least in this case, the multiple transfers of species and their uses within Mexico seems to be an important reason for the widespread use of a species. Some species shared by two or three of the five groups may be truly 'traditional' ones, which have been used for many centuries. Some of the data we gathered in order to evaluate the indigenous claims are also discussed, focusing on the transcription factor NF-κB as a molecular target. These studies led to the identification of sesquiterpene lactones like parthenolide as potent and relatively specific inhibitors of this transcription factor (Bork et al. 1997).

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Heinrich, M. (1994) Herbal and Symbolic Medicines of the Lowland Mixe (Oaxaca, Mexico): Disease Concepts, Healers' Roles, and Plant Use. *Anthropos* 89: 73-83.

Heinrich, M (2001) *Ethnobotanik und Ethnopharmakologie. Eine Einführung.* Stuttgart (D). Wissenschaftliche Verlagsgesellschaft.

Heinrich, M., Ankli, A., Frei, B., Weimann, C., Sticher, O. (1998) Medicinal Plants in Mexico: Healers' Consensus and Cultural Importance. *Social Science and Medicine* 47: 1863-1875.

Louis Herman, University of Hawai'i-West O'ahu, Honolulu, HAWAII. A Socratic-Shamanistic model for education in an age of Globalization.

Abstract: This is an approach to both classroom teaching and research which I developed in equal part from the Socratic roots of the truth quest, Western science, and indigenous shamanistic traditions. It is both exemplifies "bridge building" and constitutes a method for bridge building. This approach has proved particularly valuable at University of Hawai'i, West O'ahu, the most multi-cultural campus in the UH system because of the way in which it fosters democracy, individual growth, conflict resolution and consensus building.

Thora M. Herrmann, University of Oxford, School of Geography and the Environment, Environmental Change Institute, Mansfield College, Oxford, England, UNITED KINGDOM. Traditional ecological knowledge and use practices of the natural resources by the indigenous Mapuche -Pewenche: Implications for biodiversity conservation strategies and sustainable management plans of native forests in southern Chile.

Southern Chile has experienced serious deforestation during the last century and it is anticipated that by the year 2025 Chile will be totally devoid of native forests. There is still a lot to do for a sustainable management of biodiversity.

An ethnoecological research were conducted among an indigenous Mapuche –Pewenche community in the southern Chilean Andes Mountains, to determine the traditional ecological knowledge and use practices of the natural patrimony, in order to generate a basis for the design of biodiversity conservation strategies and sustainable management plans of native forests in southern Chile. Data were collected through interviews in the native Mapudungun tongue, group discussions, participatory

workshops, field visits and analyzed using GIS. The study illustrates (1) the ecological relationship between the Mapuche–Pewenche community and the environment with respect to their perceptions, classifications and traditional uses of the forest, (2) the link between the conservation and use of biodiversity by the indigenous Pewenche people and (3) produced answers relevant to the potential of using traditional ecological knowledge and use practices in the design of biodiversity conservation strategies and management plans within a participatory framework.

Scott Herron, Southern Illinois University at Carbondale, Carbondale, Illinois, USA. [The Ethnobotany of the Medicine Wheel Delineates the Cosmology of Native Americans.](#)

This research probed the botany and mythology of the Native American cultural symbol of the medicine wheel, which is a circle with a cross superimposed on it to separate the circle into four equal quadrants. Each of the four cardinal directions on the medicine wheel, corresponding to a compass direction, has many attributes, including a plant viewed as sacred, a color, a season, a natural element, a human attribute, and a life-cycle period. The ethnobotany of each of the four plants is described to explain why they were given mythic status and elevated onto the symbol that defines Indian cosmology throughout much of North America. The reasons for the choice of these plants as mythically sacred were investigated through utility and cultural status provided in oral traditions, focusing on the Anishinaabe (Ojibwa) medicine wheel as a model and comparing it to the distinct cultures of the Lakota, Blackfeet, and Cherokee. Other writers have shown that oral traditions function as historical records, governing infrastructures, educational platforms, entertainment forums, cosmological ideologies, and social identities. According to the Ojibwa, tobacco is associated with the eastern direction, white cedar with the south, sage with the west, and sweetgrass with the north. The origins, distributions, and prevalence of these four plants are described and it is shown, through case studies, how the North American Indian oral traditions have taught about the plants as sacred entities. Current scientific knowledge of these plants is described, and anthropological theories are shown to relate these plants to the soul, spirits, and disease.

Kumu **Kawaikapuokalani Kako'omaio'loonalaninuia mamao Hewett** is one of Hawaii's most respected teachers and cultural practitioners. Kumu is Cultural Director of 'Ai Kupele Integrated Behavioral Health and Cultural Healing Program, Waimanalo Health Center, where he practices Hawaiian healing. He is also well known for his hula and mele. He and his Kuhai Halau students currently are Hoku Award Nominees.

Micheline Hickebotham, Black Hills State University, Spearfish, South Dakota, USA. [An Indigenous Model: Bridging Science Education to Traditional Knowledge.](#)

South Dakota has a greater percentage of Native Americans than any other state in the "lower 48". Black Hills State University has the only American Indian studies major in a public university in South Dakota. The two speakers are interested and concerned in taking the science learning tradition about South Dakota Sioux and presenting it fairly to teacher education majors at BHSU and other universities. The two South Dakota teacher, a K-8 teacher and a higher education professor of pre-service teachers, are presenting a session on a specific example of science teaching that is indigenous for Lakota Sioux in South Dakota, and on implications for teacher education. The Lakota Sioux in South Dakota have a tradition of using science in their everyday culture, and a method of transmitting knowledge of traditional science from grandparents and parents to children that is very different from methods of teaching science that have come from a Northern European tradition. The first speaker will give pictures and examples of curriculum materials she used with her Lakota students to present science as it is understood by the Lakota culture. The second speaker will discuss her syllabus for a science course for pre-service teachers, and how that syllabus can be adapted to include the Lakota traditions of science in South Dakota. The implications for improving science teaching and cultural understanding of Lakota science will be discussed, and there will be request for comments from the attendees.

Anya Hinkle, Department of Integrative Biology, University of California, Berkeley, California, USA. and **Brent D. Mishler**, University and Jepson Herbaria and Department of Integrative Biology, University of California, Berkeley, California, USA. [The Uses of Phylogenetics in Ethnobiological Research.](#)

Phylogenetic trees, showing hypothesized relationships based on shared derived characters (or synapomorphies) are the best way to summarize known data about attributes of organisms, predict unknown traits, and study functions of all kinds. Phylogenetic trees are thus the best basis for formal classifications and for making comparisons among organisms. For example, taxol (the drug used to control ovarian and breast cancer) was discovered in the bark of *Taxus brevifolia*, the Pacific Yew. A random screening for a source for taxol in other plants in the same environment would have taken years, but a search based on an understanding of phylogenetic relationships lead quickly to the European Yew (*T. baccata*), which turned out to be more sustainable source of taxol. Phylogenies can be used to study functional traits in two ways: (1) Sister-group comparisons. In order to find the cause of a particular characteristic, systematists compare as closely related species as possible, where the trait is present in one and absent in the other -- the cause has to be somewhere in the difference. Phylogenies are useful for reducing background variance in the phenotypes. (2) Ancestor-descendant comparisons. We can reconstruct likely ancestral conditions by using the structure of the phylogenetic tree to predict the historic sequence of assembly of particular traits of interest. This allows us to study complex systems of interacting genes and their products at a simpler point in time. Phylogenies have great potential for linking pharmacological and biochemical studies to ethnobiological investigations.

Cecilia M. Holmlund, and **Monica Hammer**, Natural Resources Management, Department of Systems Ecology, Stockholm University, Stockholm, SWEDEN. Resource user shift and local ecological knowledge – the case study of fisheries in Stockholm Archipelago, Sweden.

In this paper, we analyze how a resource user shift may have altered the content and use of local ecological knowledge regarding fish resources, using Stockholm Archipelago as case study. This archipelago region including the City of Stockholm is a semi-urban landscape of islands, bays and lagoons. It is a multi-stakeholder regime with sometimes conflicting interests of conservation, exploitation, and recreation.

For centuries, fisheries have been a major source of livelihood for archipelago residents. However, between 1940 and 2000, the traditional small-scale commercial fishery decreased from 6 000 fishermen to less than 50. Simultaneously the recreational fishers increased from a few to over 150 000. This has resulted in changed user group composition and new exploitation patterns. In this paper, we analyze this user shift with regard to the accumulation, content and use of local ecological knowledge. For example, the recreational fishers are building up new species-specific ecological knowledge in connection to their active participation in habitat restorations, fish stocking operations, and other management practices. This development may have important consequences for the future use and governance of archipelago fish resources. However, this knowledge is to a large degree separated from traditional fisheries management.

We argue that new resource user groups such as the recreational fishers may contribute to building bridges of communication between the local community and management agencies. These new carriers of ecological knowledge need to be integrated into a co-management regime, in order to improve the capacity of the archipelago society to adapt to dynamics in nature.

Cherilyn Holter, Haida Nation, P.O. Box 349, Hydaburg, Alaska, USA. Reconnecting with the spirits of our Ancestors.

I have been a student of my own culture (Haida) and other first Nations for my entire life. I am currently working on my teaching certification as a Haida Cultural teacher. I am the environmental planner for my tribe and work under the established policy “If we can describe it culturally we can protect it”. I am an accomplished weaver, singer, composer, of the Haida culture. I have developed curriculum on plants used for medicine, Haida moon and tides, beginning Haida myths, legends, storyteller, theater, and have an all ages dance group. Talung uu Xaataagang (We who are Haida) it is my belief we are obligated to learn all we can about who we are, once learned it is our obligation to teach. [poster]

Lucile A. Housley, Lakeview Bureau of Land Management, Oregon, USA, Bruce Crespín, Wenatchee Bureau of Land Management, Washington, USA. and Minerva Soucie, Burns Paiute Tribe, Burns, Oregon, USA. Federal Management of Natural Areas in Ceded Lands: Mechanism for Conservation, Promotion of Biodiversity, and Protection of Natural Resources for Tribal Peoples.

During the past ten years, Federal land managers have become aware of the trust relationship between indigenous peoples, the land, and the agency which manages it. This presentation will discuss the differing world views of Native Americans and Federal agencies; it will examine the process by which ACEC's (Area of Critical Environmental Concern) can be created to protect Native American land values; and preview the future work that needs to be accomplished to further understanding of this land, the original people who lived on it, and modern management processes. [poster]

Timothy Johns, Centre for Indigenous Peoples' Nutrition and Environment (CINE), McGill University, Montreal, Quebec, CANADA. Participatory Ethnobotany at the Interface of Human and Ecosystem Health.

Conservation-oriented ethnobotanical undertakings, while accepting the role of local communities in the management of plant and animal resources, have largely ignored human needs related to health and nutrition as fundamental to successful long term management of the environment. Locally-based initiatives increasingly recognize the urgency for a fuller integration of resource management with needs assessment and satisfaction. Research related to medicinal plants is dominated by a polarized focus on commercial potential and the protection of Intellectual Property and other Indigenous Peoples' rights. Unfortunately, while important issues are debated, public health aspects of traditional resource use are put aside. Research that makes local community health the priority while addressing global issues of change in the human environment presents a pressing necessity.

Participatory research models can facilitate both the evaluation of nutritional, non-nutritional, pharmacological and toxicological properties of food and medicinal plants in relation to relevant public health concerns, and the development of appropriate non-commercial rationales of conducting useful scientific studies. Community groups and scientists working independently, or within national support networks with limited resources, should look for global partnerships in order to raise awareness of this crucial endeavour and to foster productive collaborations.

Elaine Joyal, Department of Anthropology, Arizona State University, Tempe, Arizona, USA. Basketry Ecology: A Museum-Based and Market-Based Global Survey.

Baskets, as expressions of material culture and as sources of income, are at the forefront of many native crafts revivals. Being both utilitarian and aesthetic, they are often collected, and examples held in public and private collections are thus accessible for research. Most baskets are made from wild-harvested plant populations that are managed to produce good quality and quantity of

basketry materials. Unfortunately, knowledge of these management practices is being lost, especially as basketry in many places has been a dying craft that only now is undergoing a renaissance. Weavers are mostly women and mostly traditional peoples, and thus they are the focus of many community development programs. They are less often thought of as resource managers with an unbroken transfer of traditional knowledge about basketry plants. Basketry styles are studied within the arts, the plants they are made from are studied by scientists, and the basket weavers are relegated to the humanities. Comparatively little research has explored the motivations for weaving, how and why material selection changes over time, and how resource availability and market forces influence the making of baskets. "Basketry ecology," the project described here, aims to link and make transparent the interrelationship of baskets, the plants they are made from, and the humans who make and use them, as well as the environment shared by all three. Data gathered from museum collections, traders, area experts and literature are used to develop and populate a database of basketry ecology. Analysis of the database is used to examine global patterns within basketry ecology, including types of plants used, plant parts used, reasons people weave, and implications for harvest and management. Monocots reign as the premier material for baskets, and palms and grasses stand out in particular. Especially in the tropics, the newly emerging leaves of many palm species are used as are the stems of rattans; the culms of numerous grass species are likewise important through much of the world. Among dicots, the stems of willows are used wherever they occur. A brief list of the most important basketry plants includes: rattans (*Calamus*, *Korthalsia*) from southeast Asia; *Pandanus* from the Pacific; the palm *Hyphaene* and numerous grass species in Africa; the palms *Sabal* and *Astrocaryum* in Latin America; *Yucca*, *Nolina*, and *Rhus* in the southwestern USA; and willows through most of the Northern Hemisphere. Common management techniques include limiting harvest levels and times, careful selection of individuals by age at harvest, burning, and coppicing. Basketry remains within the domain of women in a wide array of traditional cultures. While this study focuses on the traditional peoples who weave, harvest, and manage basketry plants, market forces impact weavers and the interplay among baskets, basketry plants, and management practices. A synthesis of basketry ecology will lead to a better understanding of the relationship of baskets and weavers to the traditional management and conservation of wild-harvested plant resources.

Valérie Kagy, CIRAD Station de Recherches Fruitières de Pocquereux, NEW CALEDONIA and **Françoise Carreel**, CIRAD-FLHOR, Station de Neufchâteau, Sainte-Marie, Guadeloupe, FRANCE. Cultural and socio-economic importance of bananas in Kanak society in New Caledonia, as explained by their origins.

The origin of bananas in the Pacific will be discussed in relation to the settlement of the Pacific by human populations and studies on the genetic diversity of the Maia maoli and Popo'ulu bananas (Musa section Musa genome group AAB). The cultural and socio-economic importance of these bananas in both traditional and contemporary Kanak society in New Caledonia will be discussed and compared with the importance of bananas representing later introductions to New Caledonia (bananas of genome groups AAA, AAB and ABB).

Kumu Hula **John Ka'imikaua**, Halau Hula O Kukunaokala, Moloka'i, HAWAI'I. The Knowledge of Land Preservation through Ancient Moloka'i Chant and Dance.

Explanation of Pre-western Hawaiian chant and dance of Moloka'i, that was utilized by early Hawaiians of that island to preserve their history, genealogy, religion, values and manner in which they preserved and managed the resources of the land for their immediate survival; and for the survival of those generations unborn. The knowledge of traditional land preservation and land management documented in ancient chant and dance, is vital and unparalleled to our own understanding in making contemporary decisions that affect the environment and resources of our Islands.

Lilikala Kame'eleihiwa, Center for Hawaiian Studies, University of Hawai'i, Honolulu, HAWAI'I. Ka Le'ale'a o na Kupuna: Ni'aupi'o, Punalua, Po'olua & Aikane (Hawaiian Sexuality in Traditional Times, A Celebration of Life).

Hawaiian sexuality in traditional times - a scant 200 years ago - was a celebration of life and of lovemaking, where marriage was unknown and all relationships were defined by "Moe aku, moe mai", or "Sleeping here and sleeping there."

In this power point presentation, Dr. Kame'eleihiwa will discuss the importance of brother-sister mating, rules of aloha between various sexual partners, the care of children resulting from such relationships, and why same sex affairs were considered to be safe sex relationships. The poetic metaphor of Mele Ma'i, or Genital Chants will also be reviewed.

Lilikala Kame'eleihiwa, Director, Center for Hawaiian Studies, University of Hawai'i at Manoa, Honolulu, HAWAI'I. HALAU 'IKE O HAWAI'I: Center for Hawaiian Studies presents New Directions in Hawaiian Education for the 21st Century, University of Hawai'i at Manoa.

Dr. Kame'eleihiwa will discuss new Hawaiian Studies Resource Management courses at the BA level that enhance the ancestor's knowledge of MALAMA 'AINA [Living in harmony with the land], and a joint project with the UHM Botany Department called HUI KONOHIKI [Traditional Land Managers]. She will also review the newly proposed Hawaiian Studies Master's Program which will include the following fields:

KUKULU AUPUNI: Envisioning the Nation

MO'OLELO 'OIWI: Native History and Literature

MALAMA 'AINA: Living in Harmony with the Land Native Resource Management

HALAU O LAKA: Hawaiian Academy for Visual, Performing and Theatre Arts

KUMU KAHIKI: Comparative Polynesian and Indigenous Studies

Makiki Kanoda, Field Studies Institute for Environmental Education, Tokyo Gakugei University, Tokyo, JAPAN. Geographical Variation of Finger Millet (*Elusine corocana* (L.) Gaertn) in Asia: With an emphasis on cultivation and utilization in Japan.

Finger millet (*Elusine corocana* (L.) Gaertn) is cultivated from Africa to India, the southern slopes of the Himalayas, southeast Asia and the far east to Japan. The purpose of this study was to evaluate geographical variations of finger millet in Asia, with an emphasis on cultivation and utilization in Japan. A total of 107 strains of finger millet from different regions of Asia were evaluated for geographical variations in 9 quantitative characters related to flowering date and plant types. It was found that altitude significantly correlates with plant height, culm diameter and blade width of the flag leaf. From the results of the cluster and principal component analyses based on the 9 quantitative characters, the 107 strains were classified into eight groups. Japanese strains were classified into three groups. The opens type was a head type common to these three groups. These groups were distinguished from one another in terms of characters such as flowering date, plant height and number of tillers. It was assumed that Japanese finger millet cultivars were affected by geographical conditions and traditional farming systems. In Japan, finger millet is presently cultivated only in mountainous areas. Kuni Village in Gunma Prefecture is used as an example to show how it is cultivated and utilized in Japan. [poster]

James N. Kanyara, Kenya Medical Research Institute, Nairobi, KENYA, **F. M. Tolo**, Kenya Medical Research Institute, Nairobi, KENYA, **C. N. Muthaura**, Kenya Medical Research Institute, Nairobi, KENYA, and **E. N. M. Njagi**, Kenyatta University, Nairobi, KENYA. Potential antiviral activities against HIV of extracts from some Kenyan medicinal plants as determined in an HIV-1 reverse transcriptase assay.

An in vitro HIV-1 reverse transcriptase (RT) assay was developed for screening of anti-HIV activity of extracts obtained from some Kenyan medicinal plants. The assay utilises [3H]-methyl thymidine triphosphate (dTTP) as the enzyme substrate and polyadenylic acid oligodeoxythymidylic acid [poly(rA).p(dT)12-18] as the template-primer dimmer. This assay was optimised and standardised with respect to the various experimental parameters in a microtiter plate methodology. The assay was then applied to test for potential antiviral activities of several Kenyan medicinal plant extracts and the concentrations producing 50 % inhibition (IC50s) of the HIV-1 RT were determined. This assay is described in this report and results obtained with some of the extracts are presented. [poster]

Chris Kilham, Medicine Hunter Inc., Lincoln, Massachusetts, USA. Nights of Kava: Social Custom in Vanuatu.

Kava is both the plant *Piper Methysticum* and a tranquility-promoting beverage prepared from its roots. Kava enjoys a long history of use throughout Oceania, with its most extensive cultivation and consumption occurring in the archipelago of Vanuatu. Kava and its use are central to the history and traditions of Vanuatu, where the beverage is drunk daily as a social libation, and on special occasions for ceremonial purposes. Kava first drew attention from non-natives due to an account penned by Johann Georg Forster, a botanist on Captain Cook's second voyage to the South Pacific on the Resolution from 1771 - 1775. Forster witnessed kava cultivation, harvesting and the ceremonial preparation of a traditional beverage made from its roots, and recounted his observations to the European botanical and science community. Forster's account caused great curiosity about kava, and led to botanical, chemical and medical investigations of the plant which began in earnest in the early 1800's and have continued unabated to this day. Dozens of descriptions of the effects of drinking kava root beverage have emerged in scientific, anthropological and medical literature since Forster's account. One of the most cogent descriptions comes from the intrepid and brilliant psychoactive plant researcher Lewis Lewin in a Berlin Medical Society paper on kava published in 1886. "A well prepared kava potion drunk in small quantities produces only pleasant changes in behavior. It is therefore a slightly stimulating drink which helps relieve great fatigue. It relaxes the body after strenuous efforts, clarifies the mind and sharpens the mental faculties." E.M. Lemert's 1967 description of the effects of drinking kava root beverage depicts the innate friendliness of the experience, and gives insight into why kava has been used to settle disputes in traditional cultures. "The head is affected pleasantly; you feel friendly, not beer sentimental; you cannot hate with kava in you. Kava quiets the mind; the world gains no new color or rose tint; it fits in its place and in one understandable whole." Nights Of Kava, Social Custom in Vanuatu presents the cultivation of kava, its preparation and use in both kava bars and village nakamals (kava drinking huts), and the extent to which kava drinking reinforces community and kinship. This presentation includes vivid photographic slides from Vanuatu, and the first-hand experiences of Chris Kilham, who has conducted kava research in Vanuatu since 1995.

Mikio Kimata, Field Studies Institute for Environmental Education, Tokyo Gakugei University, Koganei-shi, Tokyo, JAPAN. Genetic erosion and biodiversity conservation of millet in Japan.

Local farmers have cultivated traditionally six kinds of millet, Poaceae at mountainous villages in Japan to date. Those are proso millet (*Panicum miliaceum* L.), foxtail millet (*Setaria italica* (L.) P. Beauv.), Japanese barnyard millet (*Echinochloa utilis* Ohwi et Yabuno), finger millet (*Eleusine corocana* (L.) Gaertn.), sorghum (*Sorghum bicolor* Moench), and Job's tears (*Coix lacrynajobi* L. var. *ma-yuen* (Roman.) Stapf.) However, recently the landraces of millet have gotten severe genetic erosion and are losing the biological and cultural diversity. It seems that those have been become so-called lost crops. The millet are grown only by a few farmers in Tokyo. Local farmers are also losing their traditional agricultural knowledge of millet. The author's research group had continued to collect many landraces of millet and those information since 1972. The accessions are stored in a gene bank (ex. *situ*) of Tokyo Gakugei University. Moreover, the author proposes a concept of rural community ecomuseum (in *situ*) with eco and green tourism, and the environmental educational activities such as gardening and making a biotope at school grounds for supporting biodiversity conservation. The students and teachers grow many landraces there and then they conserve the diversity by themselves. The C4 plants such as millet will become very important resources in semi-arid and hill regions through the global environmental issues for the future. [poster]

Miriam Kritzer-Van Zant, Department of Plant Biology Southern Illinois University, Carbondale, Illinois, USA. Economic use of the Asteraceae in southern Illinois in the 1990's; extractive reserve potential and implications for conservation, restoration and sustainability.

Asteraceae is the family most frequently reported as used or known for use in southern Illinois. Reports of use in the Asteraceae are divided as follows into the categories of Horticulture sales (21.43%), Medicinal (19.64%), Bee forage (12.50%), Landscaping (10.71%), Food (8.93%), Foraged and sold (7.14%), Avoided by wildlife (7.14%), Craft and decorative(3.57%), Veterinary (3.57%) and Toxic (1.79%) along with several reports of uses in the Other (3.57%) category. Interviews were conducted during 1995 and 1996, primarily on private land interwoven with the Shawnee National Forest. The Asteraceae were represented in two thirds of the categories in the overall study of use of plants in the vicinity of the Shawnee, which included 182 species in 64 families of plants. Fifty-six of a total of 374 individual vouchered reports of use in the study (15%) were in the Asteraceae. Twelve persons reported using and or witnessing use of species in the Asteraceae, representing 60% of the participants in the study as a whole. Species from 18 genera, Achillea, Artemisia, Aster, Chrysogonum, Cirsium, Chrysanthemum, Echinacea, Erigeron, Eupatorium, Helianthus, Lactuca, Liatris, Ratibida, Rudbeckia, Senecio, Solidago, Taraxacum and Xanthium were reported and vouchered for use. Analysis of vouchered material was made for bioactivity, using the NAPRALERT (Natural Product Alert) database at the University of Illinois at Chicago. Consideration is given to all of the vouchered reports for extractive reserve potential and the implications for conservation, restoration and sustainability.

Steven Kubota, Ahupua'a Action Alliance, HAWAI'I. Living in Your Ahupua'a: Strategies and Tools for Ahupua'a Restoration.

Applying ahupua'a values, principles and practices in our contemporary society can help to develop a environmentally conscious and caring citizens. But we face many challenges as we, as individuals, families, neighbors and communities try to restore our

urban ahupua‘a. This workshop will address practical ideas for applying these principles and overcoming these challenges. Links to the Hawaii Content and Performance Standards will be explored. A case study focusing on the Waikiki Ahupua‘a and the work of the Ala Wai Watershed Association and a video produced by the Federally funded project: "From the Mountains to the Sea" will be presented.

Steven Kubota, Ahupua‘a Action Alliance, Honolulu, HAWAI‘I, **Candice Felling**, University of Hawai‘i, Honolulu, HAWAI‘I, and **Sandy Zicus**, University of Hawai‘i, Honolulu, HAWAI‘I. Islands of Hope.

The Hawaiian Islands are the most remote archipelago on the planet. Their unique and intriguing natural and cultural history gave rise to the ahupua‘a system. The ahupua‘a system incorporated nature.

Caroline Kuebler, School of Forestry and Environmental Studies, Yale University, New Haven, Connecticut, USA, **H. Kathriarachchi**, **C.V.S. Gunatilleke**, and **I.A.U.N. Gunatilleke**, Department of Botany, University of Peradeniya, Peradeniya, SRI LANKA. The Potential for Community Based Management Projects.

Community based management has become an increasingly popular tool for creating successful projects that allow surrounding communities to realize benefits from the forest while still maintaining the forest's integrity. Local people often have insight into the resources available from the forests in their area and how best to manage those resources. Projects can be developed that use this local resource knowledge to combine biodiversity conservation with economic benefits. Buffer zones have been recognized as important areas where these types of joint conservation and economic projects have great potential. The buffer zone of Sinharaja Forest Reserve, a Man and the Biosphere Reserve, is examined as a case study for the possible development of community management projects. This paper builds on a long-term experiment that looks at the viability of under-planting economically important plant species in the buffer zone. The study consists of a social and economic analysis of the potential for community management projects based on the cultivation of these important spice and NTFP plants. These spices and NTFPs, include plant species that the local people are familiar with, either because they are currently cultivated in home gardens or they were harvested in the past, before the establishment of the forest reserve. By surveying the surrounding communities, we have found which species provide the greatest economic benefit. From the results of our study, recommendations for pilot test projects can be made. These test projects include development of permit systems for harvesting, formulation of community groups that work with the forest department and workshops and education programs. [poster]

Rose Marie Kuptana and **Jennifer Castleden**, International Institute for Sustainable Development, Winnipeg, Manitoba, CANADA. Inuit Observations on Climate Change [film]

Observations by the Inuvialuit of Sachs Harbour support what has long been predicted – that climate change would be felt first in the Polar Regions. This community's way of life is at risk, an urgent warning of the negative impacts of climate change predicted to occur elsewhere in the world. On Banks Island in Canada's High Arctic, Inuvialuit hunters and trappers have a close relationship with the natural world. As they travel over the tundra or harvest fish from the sea, they notice even the smallest changes to their environment. Recently, the changes have been significant and worrying. The climate has become unpredictable; the landscape unfamiliar. Autumn freeze-up occurs up to a month later than usual and the spring thaw seems earlier every year. The multiyear sea-ice is smaller and now drifts far from the community in the summer, taking with it the seals upon which the community relies for food. In the winter the sea-ice is thin and broken, making travel dangerous for even the most experienced hunters. In the fall, storms have become frequent and severe, making boating difficult. Thunder and lightning have been seen for the first time. Hot weather in the summer is melting the permafrost and causing large-scale slumping on the coastline and along the shores of inland lakes. The melting has already caused one inland lake to drain into the ocean, killing the freshwater fish. Around the town of Sachs Harbour, it is causing building foundations to shift. New species of birds such as barn swallows and robins are arriving on the island. In the nearby waters, salmon have been caught for the first time. On the land, an influx of flies and mosquitoes are making life difficult for humans and animals. These changes tell local people that the climate is warming. The residents of Sachs Harbour wonder if they can maintain their way of life in the face of further changes. Given the dramatic changes that local people have observed, IISD and the Hunters and Trappers Committee of Sachs Harbour initiated a year-long project to document the problem of Arctic climate change and communicate it to Canadian and international audiences. The project team worked in partnership with specialists from five organizations to develop an innovative method for recording and sharing local observations on climate change. The approach combined participatory workshops, semi-structured interviews, community meetings and fieldwork to better understand the extent of local knowledge of climate change. During the year-long initiative, the project team produced a broadcast-quality video and several scientific journal articles to communicate the negative consequences of climate change in the Arctic and to understand the adaptive strategies that local people are using in response. The science papers document the extent of Inuvialuit knowledge on climate change and explore how that knowledge can enrich scientific research in the Arctic. The video follows local people onto the land and sea as they perform traditional activities. Their voices – and the beauty of a fragile and bountiful land – leave viewers with a clear understanding of what will be lost if climate change continues. This project was made possible through the support and initiative of the community of Sachs Harbour and financial contributions from: the Climate Change Action Fund (Public Education and Outreach); the Walter & Duncan Gordon Foundation; the Climate Change Action Fund (Science, Impacts and Adaptation); Indian and Northern Affairs Canada; and the Government of the Northwest Territories. Generous in-kind support was given by the Hunters and Trappers Committee of Sachs Harbour; the Inuvialuit Game Council; the Inuvialuit Joint Secretariat; the Inuvialuit Communications Society; the Natural Resources Institute, University of Manitoba; the Department of Fisheries and Oceans; the Government of the Northwest Territories; and the Geological Survey of Canada. [film]

Celeste Lacuna-Richman, Faculty of Forestry, University of Joensuu, Joensuu, FINLAND. Using Suitable Projects in Adding Value to Non-Wood Forest Products in the Philippines.

The Philippines is a country with low-forest cover left, but it still has high biodiversity, with many useful forest species. Despite the decline of forest area and degradation of forests, many of the poorest households, both indigenous and migrant are pushed into the remaining forest areas and are dependent upon forest goods for their subsistence. These goods are inevitably non-wood forest products (NWFPs) because timber extraction is now an illegal activity in many parts of the country. The extraction of commercial non-wood forest products, such as resin and rattan, is the only source of a cash income for many. However, despite the long history of NWFP extraction in forest-edge villages, the income collectors get from these products is still minimal. Possible ways of adding value locally to NWFPs are presented in this paper, using three villages as examples, and emphasizing the importance of specific, “custom-made” projects and enterprises for each village.

Yeong Han Lau, University of Hawai‘i, Department of Botany, Honolulu, HAWAI‘I. The Decline in the Usage of Traditional Chinese Medicine and *Chrysanthemum morifolium* Ramat by Recent Chinese Immigrants in Hawai‘i.

In traditional Chinese medicine, *Chrysanthemum morifolium* Ramat is known to be an antipyretic. It is also believed to be able to lower blood pressure and improve vision. *C. morifolium* is commonly prepared by infusion and in the terms of traditional Chinese medicine: clears internal heat and nourishes blood. The majority of the recent Chinese immigrants to the United States of America seem to know about *C. morifolium* and its health properties. However, there seems to be a general decline in the use of traditional Chinese medicine and a shift towards Western biomedicine. This decline is largely due to the fact that medical insurance in Hawai‘i does not cover the usage of traditional Chinese medicine. As such, recent Chinese immigrants tend to avoid using traditional Chinese medicine to avoid complications when dealing with insurance companies. Presumably there will continue to be a decline in the use of traditional Chinese medicine in the near future by these immigrants. [poster]

James Leary, Department of Tropical Plant and Soil Science, University of Hawai‘i, Honolulu, HAWAI‘I. Horticultural Techniques for the Promotion of a Healthy and Sustainable Agriculture Ecosystem in the Tropics

A basic concept in organic farming is the adoption of a “natural” protocol for system management. Traditionally, this has focused on the elimination of synthetic fertilizers and pesticides and a greater reliance on biological cycles that contribute to sustainable agroecosystem management. In tropical climates, a year-long growing cycle allows for the establishment of a permanent groundcover intercrop (living mulch) within an agricultural system to serve as a nurse crop for building soil organic matter, fertility, and structure while also mitigating soil erosion and nutrient runoff. There is also significant evidence of improved pest management due to intercrop presence. The added benefit of increased floral diversity provided by the living mulch is identified as direct source for heightened faunal activity and soil microbial diversity. Soil microbial diversity is an indication of a more stable pathogen-suppressed ecosystem suitable for commercial plant production compared to the modern practice of intensive monoculture manipulation. Successful transition to a living mulch system in tropical organic agriculture is made possible through a farmer’s proactive stance on the development and practice of new and innovative production techniques. Organic farming has generally been viewed as a return to traditional farming practices prior to the advent of chemical fertilizers and pesticides. However, advances in organic farming will require an extensive knowledge base in microbial/plant complex interactions within an agroecosystem and the use of modern technologies compatible with natural product enterprises.

Vincent Lebot, CIRAD, Port Vila, VANUATU, and **Patricia Siméoni**, VARTC PRODIG., Santo, VANUATU. The origin of kava (*Piper methysticum* Forst. f.) : Is the cultural appreciation of quality responsible for different geographical patterns?

An objective of the present paper is to pinpoint the place in the Pacific region where kava (*Piper methysticum* Forst. f.) was first domesticated. We argue that kava is a Pacific domesticate that originated outside Southeast Asia and New Guinea. We provide botanical, chemical, genetic and cultural evidence to suggest that farmers in the northern part of Vanuatu were the first to select the species as an asexually reproduced root crop. From Vanuatu, cultivars were carried eastward into Polynesia and westward into areas of New Guinea and Micronesia. Using herbarium data, isozyme and AFLP markers, we correlate the information gained from field surveys to HPLC analyses and attempt to demonstrate that chemotypes result from a selection process that is still active. The selection of particular mutants by farmers must have been, and still is, a rational process to preserve new characters when they appeared. Growers have selected cultivars to improve the chemical composition responsible for the physiological effects. Recent field experiments demonstrate that the chemotype is genetically controlled although the content of kavalactones is determined by both genetic and environmental factors. The control and improvement of quality is therefore a cultural approach that aims at the identification of soils suitable for kava cultivation. However, the appreciation of quality appears to reflect the different cultures within Melanesia and differences between Micronesian, Polynesian and Melanesian consumers. Different ways of benefiting from the psychoactive properties of the plant explain the use of particular chemotypes and therefore the selection operating to preserve them.

Roberta Lee, New York, New York, USA. Lessons from the field – a multidisciplinary perspective on ethnomedical interviewing.

In the medical world, health and healing have become concepts of debate among practitioners who seek to include Traditional Medical Systems in their medical practices. Is it legitimate to separate the mind and the body in matters of health or it is a continuum? Where does placebo fit in healing and health? What are the significance of dreams and spirituality in traditional medicine? What is listening? How do I optimize my ability to communicate with someone whose medical beliefs are distinctly different from my high technology western medical training? These are questions I have struggled with as a medical practitioner in the field in Micronesia and as a collaborator in exploring medicinal and ethnobotanical plant use in the Oceania.

In this talk I will explore and discuss insights I have learned along the way in optimizing the cross-cultural medical interview. As explorers of Traditional cultural knowledge ethnobotanists and physicians interested in Traditional Medical knowledge share common challenges in enhancing cross cultural communication. For instance, what are the optimal tools for creating an environment where the ‘ethnobotanical’ interview becomes an engaging conversation? Are non-verbal cues important and what happens when the interview is cross cultural? How does intuition affect us and can we use it in the context of the ethnobotanical interview? Finally, what are the ways to get the most information out of a medical interview? For instance back pain can have 15 different causes – if you are not a physician what kinds of questions can you ask in the field to accurately document medical symptoms.

Walter H. Lewis, Washington University, Department of Biology, St. Louis, Missouri, USA. Traditional and Western Medicine: How Bridges can lead to New Therapeutic Discoveries.

The Aguaruna Jivaro of the Amazon basin of northern Peru possess a rich pharmacopeia chosen from a highly diverse flora. Partnership with this indigenous group provides an opportunity to conduct research using their knowledge of medicinal plants to target, for example, uses involving specific infections. For one major infection, malaria, there was a significant correlation between the Aguaruna preferred plant treatments and *in vitro* experiments inhibiting chloroquine-sensitive and -resistant strains of *Plasmodium falciparum* using extracts from the same species. This procedure thus allows a rapid targeting of active extracts and their compounds of potential value as new therapeutics. Tuberculosis inhibition *in vitro* using plant extracts was also marked. Because recognition of this infection is rare among the Aguaruna, very few species are specifically targeted for treatment. However, a species subset of the flora consisting only of medicinal plants proved valuable in inhibiting tuberculosis *in vitro*. Thus by establishing communication and partnership, i.e. bridges, between those involved in traditional and western medicines, opportunities exist to discover new and important therapeutics to improve human health when indigenous know-how is combined with biomedical research.

Lummi Elders, Lummi Nation, Washington, USA. Songs on the Wind: The Arlecho Creek Story.

Five years ago Lummi elders and traditional leaders blocked the logging roads to the old growth forests in the Arlecho Creek watershed, an area of cultural and historic significance to the Lummi Indians of northwest Washington State. Since that time they have raised \$5.5 million to purchase and preserve the 2,250-acre watershed that will be dedicated as a healing and learning landscape where traditional cultural values and conservation science will meet on common ground. The film documents the cultural and spiritual significance of the watershed to the Lummi Indian people, their success at building partnerships that bridge cultures and span the continent, and how it will be used to benefit, and build understanding between, Indian and non-Indian peoples. [film]

Linda M. Lyon, Department of Natural Resource Sciences, Washington State University, Pullman, Washington, USA. Is Traditional Culture a Tool for Medicinal Plant Conservation with the Antanosy of Madagascar?

This research will investigate the role of cultural change among the Antanosy of Madagascar and whether this change lessens conservation of medicinal plants. My previous research with the Antanosy suggested that particular forest products, specifically medicinal plants, are integral to the traditional culture (Lyon 1999). In terms of natural resource conservation, villagers explained that forested land was becoming scarce due to its conversion for agriculture resulting from population increase. Villagers also saw a decrease in particular forest products, such as trees used for construction purposes. I propose that the Antanosy are preventing the loss of medicinal plants in order to preserve their link between medicinal plants and their traditional beliefs. In order to test this hypothesis and aid in local conservation of medicinal plants. I will conduct an ethnobotanical investigation to determine the relationship between land tenure politics, gender, kinship, local conservation practices, and shamanism; and medicinal plant use and conservation. [poster]

Domingo Madulid, National Museum of The Philippines, Manila, PHILIPPINES. Conservation Strategies for Native Philippine Fruits.

The Philippines is one of the richest and most diverse floras in the world, with a great percentage of its estimated 8,000 flowering plant species endemic to the country. Yet it is also one of the most threatened biotas ranking second of the hottest of the hotspots of the world thus deserving global attention for urgent conservation. Among the important economic plants of the Philippines

that deserve conservation actions are the native fruiting plants. Estimated to number more than 100 species these native plants are found in various habitats mostly in primary forests. Of special conservation interests are native plants of rather limited distribution and those that occupy specialized habitats such as those in limestone, ultrabasic soil, swamps, etc. Causes of endangerment of native fruits are overexploitation, unregulated harvesting, habitat destruction, conversion of land to agriculture, and natural calamities. There are few conscious efforts to conserve the endangered native fruits of the Philippines yet forest destruction is going on at an accelerated rate. The government and private sectors as well as the indigenous peoples have important roles to play in the conservation of native fruits and they have to get their acts together soon to prevent more species to get extinct in the near future.

Sheri S. Mann, Territorial Forestry, ASCC Forestry Program, AMERICAN SAMOA. Gender Roles in Forestry Around the World.

This presentation will review accepted definitions of Gender Roles in Forestry, as opposed to Women in Development, Social Forestry or Indigenous Knowledge. Issues such as land tenure, intellectual rights, indigenous knowledge and religion will be discussed as they relate to gender roles in forestry. Examples of forestry gender role divisions will be made for Niger (West Africa), Bolivia, Hopi Indian and American Samoa. Finally, strategies to consider when developing projects where distinct gender roles in forestry exist will be offered.

Gary J. Martin, The Global Diversity Foundation, Marrakech-Medina, MOROCCO. Mutual impact: the relationship between ethnobiological research and the Convention on Biological Diversity.

Ethnobiologists are playing an important role in the implementation of the Convention on Biological Diversity, especially Articles 8 (on in situ conservation), 10 (on sustainable use of resources) and 15 (on access to plant genetic resources). Ethnobiological research and training has particular relevance for application of Article 8j, which calls for finding ways "to respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity". Progress on some ethnobiological projects is being slowed by uncertainty over how to implement provisions on the protection of genetic resources and traditional resource rights contained in the CBD and in the national laws, codes of conduct and local interpretations it inspires. Mutually acceptable ways of enhancing the practice of ethnobiology while respecting the intent of the CBD are to be found in sustained programs of applied research and training in areas of high biocultural diversity. This is the longterm goal of The Global Diversity Foundation (GDF), which was created in the United Kingdom in 1999 with the support of professionals from various academic disciplines. GDF's goal is to document, monitor and promote agricultural, biological and cultural diversity around the world, particularly through training and research. The Foundation is implementing its first field program in Morocco, where practical 'community and conservation' projects are underway. In one project, GDF is working with the ARCH Foundation to document and restore the vegetation of the Marrakech Medina, a World Cultural Heritage Site. In another project, GDF has joined forces with Beldia (a non-governmental organization that focuses on conserving Morocco's agricultural and biological diversity) to sponsor the Dar Taliba educational project. In addition to covering the boarding school costs of Tachelhit (Berber) girls from remote villages near Toubkal National Park in the High Atlas mountains, we are developing methods for integrating traditional ecological knowledge in the natural science curriculum of the local secondary school. Using these applied initiatives as a starting point, we plan to implement a research and training program on the interaction of agricultural, biological and cultural diversity in drylands of southern Morocco. Initial studies will generate baseline data on: (1) the dynamics of change in local ecological knowledge; (2) community access to and management of biological resources; and (3) valuation of subsistence and commercial uses of biodiversity. The project will employ standard and innovative qualitative and quantitative techniques from the natural and social sciences, including one-hectare plots, tree trails, plant demography studies, biodiversity inventories, life histories and interviews. The longterm goals of the program are to enhance community-based biodiversity inventories (as called for under the CBD's Global Taxonomy Initiative), collaborative management of protected areas - including World Heritage Sites and Biosphere Reserves - and capacity building programs for young Moroccan researchers.

Theresa Martinson, Kamehameha Schools, Kapalama, Oahu, HAWAI'I. Kalo and `Awa: Antibiotics in Traditional Hawaiian Medicine. [poster]

Mary Maruca, United States Fish and Wildlife Service and **Trish Flaster**, Botanical Liaisons, Inc., Boulder Colorado, USA. Green Medicine—Shared Commitments to Medicinal Plant Conservation.

Concern for U.S. native medicinal plants in trade and a desire to support sustainable use led the U.S. Fish and Wildlife Service International Affairs Program to facilitate the Medicinal Plant Working Group (MPWG), one of four efforts under Plant Conservation Alliance (PCA). PCA is a consortium of U.S. government agencies and non-federal cooperators interested in plant conservation. PCA-MPWG cooperators include federal agencies, industry, academia, non-profits, state agencies, international organizations, and Tribes. MPWG helps balance biological and cultural diversity with commercial interests in U.S. native

medicinal plants to minimize regulation in the long term. Toward this goal, the MPWG supported establishment and implementation of a protocol to monitor black cohosh in North Carolina. Garden Clubs, industry members, Forest Service and Fish and Wildlife Service representatives volunteered. The success of the project and the enthusiasm of the volunteers led MPWG to expand sites and geographic areas in 2001. As part of this process, MPWG also feels it is critical to honor and ask guidance from those who have long safeguarded medicine plants. Therefore, concurrently, it is facilitating a council of indigenous elders to offer advice, and work with other plant conservationists. Strengthening ties between the PCA-MPWG and the tribes through a tribal council will help facilitate goals important to native people conserving indigenous medicine plant communities. Projects may include training in conservation and cultivation techniques to help ensure medicinal plant sustainability on tribal lands; and development of new partners interested in supporting tribal projects benefitting medicinal plants, as well as tribal economic development.

Peter J. Matthews, Associate Professor, National Museum of Ethnology, Senri Expo Park, JAPAN. Genetic diversity in taro, and the preservation of culinary knowledge.

In a recent and major survey of isozyme variation in taro, Lebot et al. (2000) concluded that there are two distinct gene pools in Southeast Asia and Melanesia, and that these probably reflect natural differentiation of the species on each side of the Wallace Line. Recently, I concluded that 'because different cultivars are used in different ways, preserving culinary knowledge is very important for preserving genetic diversity in taro, and vice versa: without the one, the other may become irrelevant'. Here I will consider the implications of genetic and ethnographic data for the future of taro in the Pacific. Analyses of chromosome number and morphology, DNA polymorphism, and isozymes have firmly established that taro has a complex genetic history resulting in the production of phenotypically diverse diploid and triploid cultivars. Biochemical studies show that the food qualities of taro also vary. Worldwide, methods for preparing taro as a food are very diverse. Preparation methods vary when only one clone of taro is involved, and they also vary according to the particular qualities of different clones. Although the gene pool of taro in Remote Oceania has probably always been narrow, it is likely that traditional preparation methods varied more in the past than at present. Interest in local cultivar diversity may increase in the future if interest in traditional foods is sustained, or if new ways of using taro become popular.

Kamau W. Mbuthia, Miami University, Botany Department, Oxford, Ohio, USA. Ethnobotanical and ecological analyses for forest restoration in the Taita Hills, Kenya.

The Taita Hills forests, measuring < 3 km² in about 10 fragments, forms the northern most part of the Eastern Arc Mountains, one of the 25 globally recognized biodiversity hotspots. We sampled a total of 51, 0.1 ha plots in Mbololo (200 ha) and Ngangao (92 ha) to quantitatively describe the plant communities. Ordination (DCA) and classification (TWINSPAN and Cluster Analysis) techniques were used to determine the pattern of species, stands and community types. There seems to be a compositional gradient on east and west facing slopes of these forests. Structural data on density, basal areas and frequency identify *Tabernaemontana stapfiana*, *Macaranga conglomerata* and *Albizia gummifera* as the important species in defining the structure of these forests. These are broadly distributed, successional species known to occur in disturbed forests. Overall basal areas of 45.1 and 46.5 sq. m/ha for Ngangao and Mbololo respectively, are higher than expected of these 'pristine' primary forests, indicating these are more highly modified forests than previously thought. Important timber species to the local people, namely *Strombosia scheffleri*, *Podocarpus latifolia*, and *Ocotea usambarensis* once reported to have been common are noticeably absent in the forest as a result of commercial extraction. Many species show affinities with other eastern arc forests supporting biogeographic linkages. The occurrence of 8 endemic and numerous rare species substantiate the conservation value of the Taita Hills.

Aroha Te Pareake Mead, International Institute for Indigenous Resource Management, Denver, Colorado, USA, Cultural Heritage & Indigenous Issues Unit, Ministry of Maori Development, Wellington, AOTEAROA, Maori Business, Faculty of Commerce & Administration, Victoria University of Wellington, AOTEAROA. Are Human Genes 'Property'? Human Genetic Research and the Pacific.

This presentation is but one component of a sustained research interest in the principle of 'informed consent' in the consideration of indigenous peoples' rights, specifically as this principle is applied to human genetic research involving indigenous peoples. I have a particular focus on research conducted in the Pacific region as it is my contention that Pacific indigenous peoples and Pacific developing countries have been targeted by the gene technology industries as highly desirable subjects for such research for a range of reasons. But as with other regions where population-based human research is being conducted, there are significant ethical, social and legal issues which have yet to be resolved. In 1995 I co-authored a paper in the New Zealand Environmental Law Reporter, asking the question '*are human genes biological resources*'? The paper tracked the developments occurring at meetings of the Conference of the Parties to the Convention on Biological Diversity at which countries were beginning the daunting task of implementing the articles of the Convention, including Article 8(j) which relates to the access, utilization and equitable sharing of benefits of the '*knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles*' relating to biological diversity. There was a strategic reason in asking the CBD state parties this question in

1995. At that same time, right here in the Pacific, we were struggling to comprehend the implications of two intellectual property patents that had been taken out on the cell lines of Pacific indigenous peoples from Papua New Guinea and the Solomon Islands. While the international community had set legal norms and standards for access, utilization and equitable sharing of benefits of genetic resources in biodiversity and micro-organisms [the CBD], or for the conservation and illegal trade in threatened animal species [CITES], we quickly discovered that there were no international legal norms governing human genetic research or the trans-boundary movement of human genetic materials and/or the trade in human genetic materials. The 'Pacific' patents brought to the forefront a substantial dilemma, **'if human genes are not biological resources and therefore subject to the norms of the CBD, what are they?'** Are they 'property' subject to property rights? Or are they non-property? in which case what norms and standards are they regulated by? My presentation will provide a context to these questions and share some insights I have gleaned from my research to date.

Karen Meech, Institute for Astronomy, University of Hawaii, Honolulu, HAWAI'I and **Clive Ruggles**, School of Archaeology and Ancient History, Leicester University, England, UNITED KINGDOM. Blending Modern and Ancient Astronomical Searches for Origins as a Means of Teaching Astronomy to Culturally Diverse Groups.

As an outgrowth of astronomy outreach programs at the Institute for Astronomy, we are beginning interdisciplinary investigations into the astronomical knowledge in ancient Polynesia and Hawaii. The nature of ancient and traditional peoples' interest in the skies, and how this was reflected in the design of some of the most famous monuments in the world, is something that continues to engender a remarkable degree of popular interest. By studying how spatial patterning in the archaeological record relates to the motions of the heavenly bodies, together with other forms of archaeological and cultural evidence, we can gain valuable insights into how groups of people in the past interpreted what they saw in the skies and framed their own actions in harmony with that understanding. This is of central importance in trying to address a variety of broader questions concerning people's perceptions of the world and the ways in which they manipulated their "cosmological" (e.g. astronomical origins, place) knowledge for various purposes. This paper will report on some of the preliminary field work being done in Hawaii, and how this is being used to teach astronomy through summer student/teacher workshops. We will report on the results of field work conducted at Cape Kumukahi on the big island, which suggests the presence of a summer solstic alignment at this important navigational site.

Mark Merlin, Biology Program, University of Hawai'i at Manoa, Honolulu, HAWAI'I and **William Raynor**, Field Director, The Nature Conservancy, Pohnpei Island, FEDERATED STATES OF MICRONESIA. Contemporary use and environmental impact of the kava plant, *Piper methysticum* Forst. f., in Pohnpei, Federated States of Micronesia.

The kava plant, *Piper methysticum* Forst. f., is probably a series of sterile clones of the truly wild *Piper wichmannii* C. DC., which was originally domesticated in Vanuatu. For many generations (1000-3000 years) its use was largely restricted to chiefly, priestly, and selected medicinal use. In modern times it has become abandoned on some islands because of colonial suppression and/or the use of other non-indigenous psychoactive drugs. On other islands, its use has increased greatly, with significant changes in rank, gender, motivation, time, and place. The steep rise in its use in some areas of the tropical Pacific, as well as in parts of North America, Europe, and Australia has resulted in a large increase in its insular cultivation. On some islands, such as Pohnpei in the Federated States of Micronesia, its cultivation has already appears to have had an important impact on the remaining native tropical rainforest.

Malala Malaetia Misa, ASCC AHNH Land Grant Forestry Program, Mapusaga, Pagopago, AMERICAN SAMOA. Malae, The Sacred Ground of Samoa.

American Samoa, a territory of the United States, is experiencing intense population pressure. The population density exceeds 5.1 inhabitants per acre, and annual growth rate is 3.86 percent. Forests and trees adjacent to population centers and community open space are rapidly being converted to agricultural and urban uses respectively. One component of open space, the Samoan malae, has high value. The traditional malae of Samoa is owned by the people and council of chiefs which serve as a center for cultural, social, political, and spiritual activities. The Forestry Section of the American Samoa Community College, Land Grant Program has taken the initiative to remind the people of the historical and cultural importance of the malae. The malae helps to bring families, and village communities together, in order to preserve open space, forests and trees. The traditional importance and usefulness of the Samoan malae will be explained as it was in the past, present, and the future.

Cecelia Mitchell, D. Mitchell, River Road, Roosevelt Town, New York, USA and **C.R. Ramirez-Sosa**, Department of Biology, St. Lawrence University, Canton, New York, USA. Recovering Traditional Knowledge of Medicinal Plants at Akwasasne Mohawk Reservation, Akwasasne, New York.

A medicinal plant project is underway at the Akwasasne Mohawk Reservation, Akwasasne, NY. The main objective is to catalog and preserve medicinal plants to be used for teaching at the Akwasasne Freedom School in collaboration with the Department of Biology at St. Lawrence University. Two years of plant collecting in the Mohawk Territory and adjacent areas, including the university woodlands, have yielded 43 families and 89 species. Vouchers have been prepared and deposited at the Freedom

School and at the Olive Gunnison Herbarium of the Biology Department, S.L.U. All plants collected to this date have been done as part of the laboratory of Biology 258, Ethnobotany. Workshops with the elders, teachers and community members have been organized to obtain the Mohawk name and uses. At least 20 plants have been given the Mohawk name by elders and language teachers. Plant collecting material (plant presses, drying paper, mounting paper, and pruners) and a herbarium cabinet have been donated to the Freedom School. As in many parts of the world, the younger generations are losing interest in traditional knowledge and we see this in the reservation. We consider that working together and sharing traditional and scientific techniques ones would eventually reverse such a trend. This study is one of its kind and first ever done at Akwasasne. We believe that it has been successful and can serve as a model for other institutions. This project is a true example of “Bridging Traditional Knowledge” with science.

HS Modesto and S. Niessen, Department of Human Ecology, University of Alberta, Edmonton, CANADA. The revival of traditional practices as a response to outsiders' demands: the resurgence of natural dye use in San Juan La Laguna, Guatemala. For many centuries the Mayan people used natural dyeing techniques in textile production, before natural dyeing was abandoned in Guatemala at the beginning of this century. Over the last two decades increased interest in “natural” products in North America has, along with the banning of Azo dyes in Germany, helped expand market demand for naturally dyed textiles. The production of naturally dyed textiles by indigenous artisans, subsequently, has been promoted more and more by NGOs worldwide. The use of indigenous dyeing techniques in the production of textiles for international consumers has been endorsed as a means of expanding textile sales and increasing artisans’ returns. The resurgence of natural dyes has also been associated with the revival of ethnic traditions, differentiation of textiles, and increased connection between the artisan and the environment. Moreover, textile consumers and promoters of natural dyeing have heralded this technique as a way to reduce the threat to the physical environment.

This paper explores natural dye use among the members of a Mayan women’s artisan group in San Juan La Laguna, Guatemala – one of the only Guatemalan groups that is presently using natural dyes. It evaluates the artisans' motivations to use natural dyes and the socio-economic impacts of its use. Women control textile and dyeing activity in San Juan, and the returns play an important role in complementing household income.

Daniel E. Moerman, University of Michigan, Dearborn, Michigan, USA. "Prescription sticks": Indigenous 19th Century Pharmacopoeias.

In the mid 19th century, in the aftermath of the Civil War, as the American government consolidated its hold over the central mass of North America, most native societies in the region, under inconceivable military, political, and cultural pressure, effectively collapsed. In the face of this genocide, some people – mostly Potawatomi, Anishinabe, and Fox Indians – attempted to save their knowledge by using an idea generally unprecedented in native history: writing. Various medicinal formulae, usually combinations of from 2 to 6 or 8 plants, were recorded by carving images of the plants on wooden sticks. About a dozen of these sticks are currently known to exist in public or private collections. This illustrated talk will describe the 11 sticks the author has examined, will place them in an historical context, and will describe attempts to "translate" the images into a contemporary idiom.

Natalia Molina-Martínez and **Francisco Basurto-Peña**, Jardín Botánico, Instituto de Biología, Universidad Nacional Autónoma de México, Coyoacán, México D.F. MEXICO. Milpa and Quelites in a Nahuat Community of the Sierra Norte de Puebla, MEXICO.

The Sierra Norte de Puebla has an inventory of 80 species of plants used like quelites or pot herbs. Some thirty of these can be recognized and used in this community (Basurto, Martínez & Villalobos, 1997; Castro, 2000; Molina, 2000). Zoateopan is a nahuat village with nearly 2500 inhabitants where the quelites are part of the traditional diet with a frequency of consumption of 34 days in a record of 120 days (28%) and an average consumption *per capita* of 129.4 g per portion (Molina 2000). Many of these plants are integrated as part of the milpa or traditional crop systems and have evolved with these through time under management by man, integrated to the culinary and food tradition. The use of these plants represents a greater single use of the agricultural land since they present the opportunity to have several crops in a same plot at different times without increasing work, nor do they require incomes. Additionally, they are a source of vitamins and minerals at the same time that they contributed to the family income by their sale in local markets.

Henrik Moller and **Christine Hunter**, Zoology Department, University of Otago, Dunedin, NEW ZEALAND. Harvest rate to guide customary use of wildlife: is it a reliable population monitoring index to guide traditional harvest management?

This study evaluates the utility of harvest rate measures to monitor trends in abundance of sooty shearwaters (*Puffinus griseus*; tītī) harvested by Rakiura Māori, New Zealand's southern-most Indigenous people. Harvest rates from 211 hunts by 10 birders were monitored in 3 tītī harvest seasons on Putauhinu Island. The birders search the breeding colonies under forest at night and catch chicks that emerge from breeding burrows to lose down, flap wings and fledge. The rate of finding, killing and retrieving chicks varied markedly between individual birders, family birding territories, years and with weather. The very high variability in catch rate prevents use of the harvest rate index for close comparisons of density between islands or years, but a fixed panel of harvesters that record harvest rates will allow better statistical power to detect long-term trends in fixed places. There was clear evidence that a single linear model does not pass through the point of zero harvest rate and zero density, so marked inflection or curvilinearity between the two measures must occur at low abundance. This leads to non-proportionality in changes between the two measures so that a halving or doubling in density will not be reflected in a halving or doubling in harvest rate. Selection of particular times and places to maximize harvest rate probably caused this inflection in the calibration relationships. Curvilinear relationships between harvest rate indices and actual density may be commonplace amongst customary wildlife uses. Harvest rate is a cheap and simple measure of natural interest to wildlife harvesters, but it must be used with extreme caution to guide management of long-lived, slowly reproducing vertebrate populations like the seabird we studied. [poster]

Timothy Motley, The Lewis B. and Dorothy Cullman Program for Molecular Systematics Studies, **The New York Botanical Garden, Bronx, New York, USA.** The Ethnobotany of *Fagraea*: The Timber of Malesia and the Scent of Polynesia.

The genus *Fagraea* comprises a diverse group of woody gentians that are renowned for having hard wood and fragrant, showy flowers. This diverse assemblage (35-70 species) is distributed from Southeast Asia, Malesia, to the many islands of the Pacific Ocean. *Fagraea* species occupy important niches in forest ecosystems. These fast growing, pioneer species are an important component in natural succession after forest disturbance and provide food and shelter for many other forest species. The plants have also played an important role in the lives of man and have made their way into legends of Polynesia. *Fagraea* plants are utilized by the Asian, Australian, Malesian, Melanesian, Micronesian, and Polynesian cultures for timber, weapons, crafts, medicine, and adornment. This paper is a comprehensive survey of the past and present uses of the species by these cultures and identified the need for future scientific research on *Fagraea*.

Jon Mozena, University of Iowa, College of Medicine, Iowa City, Iowa, USA. Traditional medical systems of the Ririo tribe on the Island of Luru in the Western Solomon Islands.

Preliminary studies of the traditional medical systems of the Ririo tribe in the Western Solomon Islands reveals that local healers possess a sophisticated knowledge of human anatomy, disease states and medical treatments. Practitioners of traditional medicine are recognized by the community as possessing the medical and spiritual power necessary to effectively combat disease. Healers utilize a vast pharmacopoeia of plants, animals, minerals, and medicinal waters in specific ways in order to treat recognized disease states and symptoms. Healers were interviewed about various aspects of ethnomedicine including anatomy, traditional medical treatments, beliefs relating to etiology and medical treatment, symptom/disease recognition and nosology. Knowledge of traditional medical systems is important to the Western health care worker in that it provides a framework for improved understanding of health-related decisions made by indigenous peoples. Furthermore, the understanding of indigenous healthcare paradigms facilitates the establishment and strengthening of future collaborations between modern health care providers and traditional healers.

Hinano Murphy, Centre Territorial de Recherche et Documentation Pédagogique (CTRDP), Moorea, POLYNESIE FRANÇAISE, **Neil Davies**, Polynesia Research and Education Laboratories (PEARL), University of California Berkeley, Pirae, Tahiti, POLYNESIE FRANÇAISE, **Tom Carlson** Center for Health, Ecology, Biodiversity, and Ethnobiology (HEBE),

University of California Berkeley, Berkeley, California, USA and **Brent Mishler** University and Jepson Herbaria, University of California Berkeley CTRDP, Pirae, Tahiti, POLYNESIE FRANCAISE. Ethnobiology in Tahiti: Culture, Science, and Education.

The Polynesia Education And Research Laboratories (PEARL) and the Center for Health, Ecology, Biodiversity, and Ethnobiology (HEBE) of the Berkeley Natural History Museums are starting an initiative in Tahitian ethnobiology. Scientists from the University of California and other universities will work with researchers and local people in French Polynesia to explore how traditional knowledge can be combined with scientific expertise. Through research projects, workshops, and outreach activities centered at the UCB Gump Research Station in Moorea, the initiative is intended to (i) aid biological and cultural conservation/rejuvenation, (ii) understand the historical interaction of humans and the environment, and (iii) to generate information that will be useful for local industries based on natural products. An important goal of this initiative is to disseminate the results to local people, especially via the schools. To that end, collaboration between the researchers at the UCB Gump Research Station and the French Polynesia Ministry of Education will be promoted in order to integrate the new knowledge generated by this initiative with the appropriate academic curricula, such as the successful Reo Maohi program.

Anona Napoleon and Norma Jean Stodden, University of Hawai'i, Honolulu, HAWAI'I. Ho'oponopono Curriculum For Secondary Teachers and Counselors.

Ho'oponopono Curriculum For Secondary Teachers and Counselors Ho'oponopono is the Hawaiian word for making things right. This Native Hawaiian healing/harmonizing process is used to resolve interpersonal conflicts and emotional hurts within familiar and/or between individuals. Harmony is achieved by making things right with one's body, mind, emotions, spirit, family, associates, and environment. High-risk behaviors, that lead youths to dropping out of school, becoming involved in crime, and not attaining self-reliance, are seen as symptoms of deeper emotional hurts within this context. When those hurts are healed, harmony is achieved and symptoms subside. Ho'oponopono has been incorporated into a highly successful intervention program for Native Hawaiian youth offenders by Auntie Abbie Napeahi, widely recognized as the most accomplished master of ho'oponopono, and Uncle Howard Pe'a at Alu Like, in Hilo, Hawai'i. The success of this project is due to the fact that participants receive culturally sensitive harmonizing services involving the whole family in combination with education and job training/placement services. Recidivism data shows that this combination is extraordinarily successful in reducing substance abuse and criminal behavior while making significant gains in education and/or employment for juvenile offenders. This session will describe a teacher training curriculum that was developed for secondary teachers and counselors in Hawai'i Public Schools to significantly improve their interactions and level of instruction and learning with at-risk Native Hawaiian youths. Based on Auntie Abbie's work with youth, the curriculum is designed to train teachers and counselors to be more culturally sensitive to high-risk Native Hawaiian youths in particular and youth in general, so they interact with youths in a way that gives them dignity in the school setting. The curriculum reflects the traditional Native Hawaiian values of "ohana" (family), "lokahi" (harmony), "kokua" (help, assistance with no expectation of something in return), "laulima" (working together), "mo'oku'auhau" (genealogy), "aloha 'aina" (love of the land and its people), "ho'iho'i" (giving back), and "ho'oponopono" (making things right) and is sensitive to Hawaiian cultural/social patterns, rituals and beliefs.

Joe Ngallametta, Ron Yunkaporta, Morris Holroyd, Cecil Walmbeng and Nick Smith. C/- Balkanu Cape York Development Corporation, Cairns, Queensland, AUSTRALIA. Ethnobiology and Collaborative Science in the Wik Nation, Cape York Peninsula, North Australia.

Wik, Wik Way and Kugu people from the Wik Nation are engaged in a major ethnobiological research project in collaboration with the Aurukun Shire Council, the Northern Territory University and Balkanu Cape York Development Corporation. The primary aim of this project is to document ethnobiological knowledge before this is lost through acculturation processes. This project also set out to investigate and describe how people in the Wik people can employ western science in addressing change in their lands, to see if western science can be useful or relevant to any other parts of land management and how any processes of collaboration could be established. Information about the role of western science was recorded while carrying out the ethnobiological component of the project. The ethnobiological research was the vector project that facilitated the work out on "country" and engaged traditional owners. Ethnobiology is one of the western type research approaches that Wik people felt comfortable with because ethnobiological knowledge is both economic and political, fitting in well with existing social structures.

A number of key areas have been identified as priorities for the collaboration of western and indigenous science such as the management of fire, weed and feral animals, marine turtles, tourists and with knowledge transfer. Results indicate if western scientific researchers are to form collaborative research relationships with Wik people then new, socially relevant methods of doing research must be undertaken. To date western scientists have tended to force onto indigenous people culturally specific scientific ideologies and methodologies which are generally inappropriate, resulting in poor research, worthless outcomes and wasted resources. The challenge is now for western scientists and indigenous people to engage with each other in more efficacious processes. [Poster]

My Lien T. Nguyen, University of Hawai'i at Manoa, Honolulu, HAWAI'I. Use of *Artemisia vulgaris*, Mugwort, in a Vietnamese practice of acupuncture and moxibustion

Artemisia vulgaris, mugwort, is used in a Vietnamese practice of acupuncture and moxibustion. Through participant observation, the preparation and application of *A. vulgaris* in acupuncture and moxibustion was documented. Contemporary materials are substituted for and used with traditional materials, including tapioca flour, to produce moxi "cigars". [poster]

My Lien T. Nguyen, University of Hawai'i at Manoa, Honolulu, HAWAI'I. Comparison of Food Plant Knowledge between Vietnamese living in Vietnam and in Hawai'i.

Ethnographic interviews using photographs of 10 Southeast Asian fruits and vegetables were used to compare the knowledge level and use of food plants between Vietnamese in Bien Hoa, Vietnam, and in Honolulu, Hawai'i. In both communities, there was a positive correlation between age and knowledge (as measured by correct identification, number of varieties named, and number of food uses for the plants). Those interviewed from Vietnam named more varieties per food plant than those in Hawai'i. Vietnamese immigrants in Hawai'i listed more food uses as a result of acculturation to Hawai'i. Food plant knowledge was negatively correlated with the length of time immigrants lived outside of Vietnam. This preliminary study field-tests interview questions and the use of plant photographs to conduct interviews.

Mark Nickum, University of Hawai'i, Department of Botany, Honolulu, HAWAI'I. The Ethnobotany of Tongan Voyaging Canoes.

The last *kalia* canoes went out of existence in the early 1900s, leaving none in the living memory of the Tongan people. Tuione Pulotu's construction of the *Millennial Kalia* and two smaller *kalia* out of native woods, cordage and other natural materials therefore provided a marvelous opportunity to study the ethnobotany of Tongan voyaging canoes. Canoe design, timber species used, and construction procedures will be shared and illustrated.

Michael North, Greenstar Corporation, Los Angeles, California, USA. Digital Culture: A New Business Model for Villages in the Developing World.

Greenstar delivers solar power, health, education and environmental programs to small villages in the developing world -- and connects people in those villages, and their traditional culture, to the global community. We work with people in traditional cultures to record the voice of the community, expressed in original music, artwork, photography and video and other arts. A voice that is connected with respect and dignity to the land, to families, to language, tradition, to the past and to a clear vision of the future. Income from this priceless "digital culture" is used to fund an ongoing, community-driven process of literacy, local business, education and training, public health, and environmental programs. To deliver these services efficiently and quickly, Greenstar has designed a portable community center. Using solar power generated by large photovoltaic panels, we can drive a water purifier, a small clinic, a vaccine cooler, a classroom, a digital studio and a satellite or wireless link to the Internet. We work with the people of each village to develop an e-commerce website, employing local musicians, teachers and art professionals to record the voice of the community. Greenstar packages the materials for various markets, both direct to the consumer, and through licensing to businesses. This formula provides new jobs and skills, strengthens local culture and language, and affirms people's independence. To date, we have completed pilot installations in a Bedouin settlement on the West Bank in the

Middle East; in a small community in the Blue Mountains of Jamaica, and in the central India village of Parvatapur. New launches are planned for Ghana, Tibet, Peru, and over 60 other communities on all continents of the world.

Monica Opole, Center for Indigenous Knowledge Systems and Products (CIKSAP), P.O. Box 66344, Nairobi, KENYA. Indigenous Food Crops and Traditional Farmers Wisdom.

The program on indigenous food crops emanated from the fact that they have received little research attention when compared to the modern varieties of crops. *Indigenous vegetables* or land races in spite of their popular use in many rural communities were not getting the necessary research and development support to enable them to be available to the majority of potential urban consumers. The trend in agricultural research over the last decades had focused both on improvement of yield as well as improving marketing of exotic crops meant that *indigenous food crops* (vegetables) were relegated as marginal foods which had a cascading effect on their use. Because indigenous vegetables are ignored by agricultural research and development, most of the younger generation have assumed that:

- * They could be poisonous, as their food/medicinal, values were unknown.
- * They were food for the poor, since mainly the rural poor who gathered them from the wild consumed them.
- * They had no known nutrient values, since little product development research is conducted on them.
- * They had low-income potential-since they are sold mainly by poor rural vendors and women.
- * They could not be produced on a large scale-as their seeds were not available at the same commercial rate, when compared to exotics.

Since its implementation, the program has developed a *process approach* of incorporating as well as validating the indigenous knowledge of farmers. This process or model of the integration of traditional wisdom and science (into modern day development needs of both farmers as well as consumers) has resulted in new challenges of perspectives of crop development. The emerging issues of the wisdom of farmers in the light of modern science leads to the questions such as whose research agenda do we set when we attempt to develop ourselves through modernization. In my presentation, I am interested in exploring the possible implications of up-scaling this model or thinking amongst other world cultures as well as getting some feedback as to what challenges exist for this way of thinking or model of development. My name is Monica Opole; I work for a developmental Non-

governmental organization called CIKSAP (Center Indigenous Knowledge Systems And Products). I started work in the area of indigenous knowledge of vegetable crops from the late eighties. At the start, the interest was purely on the scientific values of indigenous wild weedy crops. Later on, I realized that a scientific thinking and development process are alienated so far and are removed from the reality of the needs of people and their lifestyles or ecological-culture. More often science tended to generate research results for itself, resulting in useful results left lying on research shelves. An often result is that the stakeholders of research are not party to the results, thus stemming the free flow of further development of new perspectives for research from the human, or development perspective.

Patrick L. Owen, School of Dietetics and Human Nutrition, McGill University, Montreal, CANADA. Graduate Studies in Ethnopharmacology: Building Bridges Between Disciplines.

Analysis of recent articles in the *Journal of Ethnopharmacology* reveals a trend of poor integration of pharmacologic data with adequate ethnographic background. This is inconsistent with the objectives set out by the *Journal*, which clearly define ethnopharmacology as "a multi-disciplinary area of research." Although multifactorial, I argue here that perhaps the most important contributing factor stems from the socio-educational structure of contemporary academia. Universities are responsible for the professional preparation of future ethnopharmacologists, yet its relevance to the education of students is likely inadequate vis-à-vis multidisciplinary training. The social and laboratory sciences comprising ethnopharmacology each have particular methods, requirements, time allocation and sources of funding. With such contrast, ethnopharmacology students are unlikely to successfully integrate both while conforming to university parameters. Three factors are discussed. First, a disjunction between the multidisciplinary nature of ethnopharmacology and the rigid departmental structures of university curricula compromises the breadth of projects. Second, graduate students, although important contributors to the creation and dissemination of knowledge, have significant time and financial limitations imposed upon them by the university and funding sources. Third, pressure to publish (from publishers, academic institutions and funding agencies) leads to fractionation of findings and diminishes the incentive to produce well-integrated, all-encompassing papers.

Honorato G. Palis, Ecosystem Research and Development Bureau, UPLB Campus, College, Laguna, PHILIPPINES. Indigenous Non-Timber Forest Products Management System Practice: The Case of Batak Tribe in Palawan, Philippines.

The forest management system of the *Bataks*, one of the dominant tribal groups in the island-province of Palawan, is deeply rooted in their culture. Their beliefs and traditions are closely embedded in their practice such as no tapping on a particular sacred tree, area compartmentalization and observance of long fallow period, among others. Thus, even after decades of adopting pure extractivism as a local resource management system, forest resources' state of ecological health and sustainability in terms of biodiversity and productivity remain. However, the gradual inching of civilization in the recent years through intermarriage and outside interventions led to changes in their management practices. From being hunters and pure gatherers of Non-Timber Forest Products (NTFPs), they diversified their source of economic sustenance by gradually shifting to primitive agroforestry system. Forces that led to system stability and sustainability from economic to political factors are highlighted as well as evolutionary determinants into current forest management system.

Fredric J. Pashkow, Medical Director, Heart Institute, The Queen's Medical Center, Honolulu, HAWAII. Nature vs. Nurture: Lifestyle & Diet in Contemporary Life.

There was a time in our history as a species when fat was hard to get. It probably explains the evolution of a nutritional feedback loop controlling LDL receptor site activity. When fat is scarce in the diet, these receptor sites up-regulate. When fat is present in large amounts, the opposite occurs. The survival advantage in Paleolithic Stone-Age times was most likely related to the scarcity of fat, not to its excess. Mother Nature never expected that the extraordinary amounts of fat present in a jumbo fries or a double cheese burger would be as easy to find as your corner McDonald's, nor that diseases of excess, not starvation would be a greater threat to our species. How these issues play out is an important chapter in the "Nature vs. Nurture Controversy and reflects another important aspect of the metabolic equation: expenditure.

Learning Objectives:

- Compare and explain important differences in contemporary diets versus the diet of our Paleolithic ancestors.
- Discuss the implications of diet and genetically transmitted lipoprotein disorders and how it relates to the current epidemic of cardiovascular disease.
- Relate newer findings regarding lifestyle, particularly exercise, to the nutritional question.

Paul Ka'ikena Pearsall, PhD is one of the world's most sought after speakers, the author of 14 international best selling books including *The Pleasure Prescription*, and has three new books coming out. A licenced psychoneuroimmunologist, his research is on the interaction between the mind, body, and stress. Dr. Pearsall recently was selected by Oxford University as one of the most influential scientists of the 20th Century. He lives in Hawaii and is president of Ho'ala Hou, dedicated to studying the application of ancient Hawaiian Principles to modern living.

Sibongile Pefile, University of Cape Town/Medical Research Council, Tygerberg, SOUTH AFRICA. Indigenous Knowledge Systems Strategy: The Development of a Traditional Medicine Database.

The emergence of internet technology has revolutionised the information industry by providing an ideal medium for organising, presenting and disseminating information. Traditional health systems are an integral part of rural and urban society in South Africa. Due to urbanisation, indigenous practices are continually influenced by external modern systems. To survive these dynamic changes in the natural, economic, political, social and cultural environments, local traditional knowledge systems have had to adapt to modern technologies. The challenge for the traditional health system is to maintain and promote its value-addition to a more technologically advanced and information conscious society. This paper details the strategic approach used to exploit modern technology to corner unique market opportunities for people who utilise and generate traditional health knowledge. Collaborative partnerships with traditional practitioners ensure that indigenous peoples maintain control over the recording and dissemination of their knowledge. Through this initiative income-generating solutions were created and programme activities enhanced the connectivity, network and exchange of indigenous knowledge. [poster]

Shengji Pei, Department of Ethnobotany, Kunming Institute of Ethnobotany, Chinese Academy of Sciences, Kunming, Yunnan, P.R. CHINA, Applied Ethnobotany: Participatory Approach for Community Development and Conservation.

Applied Ethnobotany is a new subject in ethnobiological sciences. Much research related to biodiversity in many countries is largely devoted to the gathering of more academic information, rather than to more incisive studies aimed centrally at finding answers to pressing challenges relating to the use of plants by communities. China is a country possessing rich biodiversity and cultural diversity. The long history of Chinese traditional medicine, diversity of cultivated crops and utilization of wild plant species are great cultural traditions to the country. Today many societies of the country are still intricately linked to the natural environment economically as well as socially and culturally. However, China is facing major changes in modernization of the country's economy, and globalization to form part of the world exchange system. Increasingly high levels of consumption of natural plants and, national and international trade on plant products have resulted over-harvesting of wild resources and accelerated environmental degradation. Local social structures and cultural traditions have been changed in cope with policy changes. With this background, application of ethnobotany to rural community development and conservation was employed in different field projects and ethnic minority communities in Yunnan of China since the last decade. The applied ethnobotany has focussed on work at community level to achieve sustainable use of natural resources and conservation. This presentation discusses findings and lessons learned from the exercise.

Maren B. Peterson, Bryan A. Endress and Simon Montagu, Miami University, Oxford, Ohio, USA. The Impact of Biosphere Reserve Policies on Natural Resource Use and Livelihood Strategies of Local Communities in the El Cielo Biosphere Reserve, Tamaulipas, Mexico.

Despite many criticisms, nature reserves remain one of the primary methods for the conservation of biodiversity. In recent years, conservation strategies have incorporated local peoples into the conservation process. However, even with community participation, many conservation strategies alter either, directly, or indirectly, resource use patterns of local communities. This not only affects community resource use and livelihood strategies, but also the successfulness of conservation activities. In response to concerns about the effects of reserves on livelihood strategies and conservation, we initiated a project in conjunction with two communities within the El Cielo Biosphere Reserve, Tamaulipas, Mexico to: 1) document natural resource use and livelihood strategies, 2) determine if, and to what extent, social, environmental, political, and economic factors influence resource use, and 3) ascertain locally based adaptive strategies relative to different resource uses and livelihood strategies. Results indicate that reserve policies have led to drastic changes in resource use patterns in these communities. Prior to the reserve, the communities relied on numerous resources including logging and *milpa* agriculture, to meet their livelihood needs, while today, communities have a relatively un-diversified resource base focused primarily on the harvest of leaves from the palm, *Chamaedorea radicalis*. As a result of a non-diverse resource base, local populations of *C. radicalis* are thought to be in decline due to overharvesting, thereby undermining some of the objectives of the biosphere reserve. This data shows that reserve policies created to conserve biodiversity may have unintended consequences, affecting livelihood strategies and conservation processes.

Jeanine Pfeiffer, University of California at Davis, Davis, California, USA and **Andreas Ambé**, Nampar Macing Village, Flores, INDONESIA. Malesian Fruit in Kempo Manggarai Traditions and Ecosystems, East Nusa Tenggara (Indonesia). Amongst the 700 recorded ethnobotanically important plant taxa of the Manggarai region, over 100 edible native fruit taxa are being studied in the managed and unmanaged ecosystems of the Tado Community, Flores Island. The range of utilitarian, ceremonial, social, narrative and medicinal uses of edible native fruit taxa will be discussed; and a comparison of the relative importance and use frequency by twelve settlements transitioning from isolation to incorporation into the modern socio-economy will be presented. The degree of *in situ* and *ex situ* conservation of the edible native fruit taxa in the surrounding forest fragments (dryland monsoon, montane, riparian) and agroforestry systems (household garden, smallholder plantation, field plot margins) by the Tado Community will be outlined, and the relationship between biodiversity conservation and cultural survival of the Tado will be analyzed.

Elisabeth Poscher, Office of Arid Lands Studies, University of Arizona, Tucson, Arizona, USA. Healing with Halophytes: A Case Study of the Seri Indians.

People around the world have traditionally harvested and used halophytes for medicinal purposes. Halophytes are salt-tolerant plants which have adapted to salt-affected soils, thus growing and reproducing in such habitat. Along the Gulf of California, the Seri Indians have used for example Eelgrass (*Zostera marina* L.) as a remedy for diarrhea or Woolly Plantain (*Plantago insularis* Eastw.) to cure stomachache. The Seri Indian Pharmacopoeia includes 95 plant species in 80 genera—at least 13 species are considered halophytes. In some regions of the world, millions of hectares of salt-affected farmland have resulted from poor irrigation practices, lying barren due to the failure of salt-sensitive, conventional crops. Halophytic crops could be productively grown on these lands for food, fuelwood, fodder, fiber, resins, landscaping, and other products. Specifically, the use for medicinal purposes should be highlighted as a viable option since only minor attention has been drawn on medicinal halophyte use in the past. As a result, the traditional plant knowledge of people acts as the linking bridge between halophyte agronomy and drug research. The scientific tool of Ethnobotany preserves invaluable, traditional knowledge. This presentation will analyze the importance of halophytic herbs for therapies among the Seri Indians. It will attempt to describe the interdisciplinary approach of medicinal halophyte production in the future, discussing its complex nature.

Ghilleen T. Prance, National Tropical Botanical Garden, Kalaheo, HAWAI'I. Ethnobotanical studies of the Yanomami people.

Given the recent publicity about whether or not the Yanomami are a “fierce people”, it seems a good time to review their ethnobotany. This paper concentrates on the aspects which I have studied especially their use of edible fungi (over 25 species), their arrow poisons and their use of various narcotics. Although I have seen episodes of violence they appear to be no more violent than many other indigenous groups of the Amazon Basin. One of the purposes of this paper is to show the other side of these people and draw attention for the need to protect them from the incursions of western society in ways which the Yanomami do not wish. Although their large territory is partially protected in both Brazil and Venezuela their way of life is still under threat. It will be shown that the Yanomami have make use of an extremely large diversity of the plant species that occur in their territory.

Tuione Pulotu, Brigham Young University-Hawai'i, Center for the Hawaiian Language & Culture Studies, Laie, HAWAI'I. Rediscovering the Tongan Kalia.

Although I was born and raised in Tonga, for the last thirty-five years I have lived and worked here in Hawai'i. When I was growing up in Tonga I heard the old stories about Tongans sailing around the islands in large canoes, but there were none left for me to see. While I was living in Hawai'i, the launching of *Hokule'a* inspired me to start building Tongan sailing canoes. First I made model canoes, and then small sailing canoes. In 1998 I returned to Tonga with drawings and plans and proposed to the King that I build a *kalia* voyaging canoe for the coming Millennium. Using logs from nearby Fiji, we carved the hull sections, and joined them together end-to-end to make the hollow keels of two hulls. After completing the hulls by adding side planking and top covers, we then joined them together using crossbeams and lashings. In mid-2000 we launched the canoe at Nuku'alofa, on the main Tongan island of Tongatapu. At 108 feet long, the *Millennial Kalia* is the largest of the new canoes that have been built around Polynesia.

Nat Quansah, Ambodisakoana Clinic, Sovinasoandro, MADAGASCAR. The Neglected Key to Successful Biodiversity Conservation and Appropriate Development: Local Traditional Knowledge.

The need to conserve the worlds' biodiversity is no more an issue but the how is. The evidence of this is seen in the continued loss of biodiversity, especially in the rich biodiversity countries of the world, despite the efforts by many a government and their agencies, non-governmental organizations as well as individuals. Similarly, the need for countries to develop is not an issue but which type of development and the how are. So how do we arrive at successfully conserving biodiversity and achieve appropriate development programs?

This paper presents local traditional knowledge as the neglected key to successful biodiversity conservation as well as appropriate development programs. The how to successful biodiversity conservation and the implementation of appropriate development programs, it is suggested, is to consciously target and harness local traditional knowledge based on the various relationships that exist between people of diverse cultures and the other elements of biodiversity in their respective areas.

Nat Quansah, Ambodisakoana Clinic, Sovinasoandro, MADAGASCAR, **Herlyne Ramihantaniarivo**, HIS University Training Hospital, Antananarivo, MADAGASCAR. Integrated Health Care System: Meeting Global Health Care Needs in the 21st Century.

The Integrated Health Care System is presented as an appropriate system capable of helping meet global health care needs in a satisfactory manner. It is a system that consciously targets and harnesses peoples' links with biodiversity for health reasons as a positive tool to arrive at meeting the health, economic as well as the biological and cultural diversity conservation needs of people and their area, all at the same time. The results from 1993 till end 1997 obtained at the 'Clinique de Manongarivo' a pilot rural

health center in northwest Madagascar practicing the Integrated Health Care System approach is provided in support and as a real life example of the viability of this System. A call for a re-think and re-act of health policies so as to make it possible for health care providers prepared to adapt and implement this System in various countries to do so is made.

E.C. Quaye, Department of Botany University of Cape Coast, Cape Coast, GHANA. Conservation of Biodiversity in a Developing country: An Ethnocultural Approach.

Tropical rain forests are vast repositories of biological resources of immense value to humankind. However, insufficient knowledge regarding the structure and functioning of these complex ecosystems has led to their mismanagement and subsequent unsubstantial utilization, of ten culminating in the loss of biodiversity. This study has been undertaken as a part of a continuous search for appropriate conservation methods to sustain tropical forest ecosystems and to safeguard their key species. The role indigenous knowledge can play in the conservation of tropical rainforests has been investigated among two major ethnic groups in Ghana. The value of this approach, which examines the spiritual, emotional and/or psychological values of indigenous peoples vis-a-vis biological resource utilization, lies in the significance, utility, and requirements of local naturalist folkscience in the recognition of different categories of biodiversity. The study has revealed that as ethnocultural approach to biodiversity conservation is practicable in areas where the people have had a long period of life in the forest boundary as shown by their degree of integration into a relatively stable forest ecosystem. This relative stability is entrenched in the concept of cultural inertia which tends to perpetuate cultural rules and social benefits, which could very well have risen as rationalization of people's natural preferences or as adaptations to surrounding conditions.

Diane Ragone, National Tropical Botanical Garden, Kalaheo, HAWAII, **Paul Matthew Cox**, Brigham Young University, Provo, Utah, USA, **Joan M. Stevens**, Department of Biological Sciences, California State University, Fullerton, California, USA, **Patricia Ann Stewart**, West Dermatology, Santa Barbara, California, USA, **Rebekka Stone**, New York Botanical Garden, Bronx, NY, USA, **Gaugau Tavana**, National Tropical Botanical Garden, Kalaheo, HAWAII, and **Paul Alan Cox**, National Tropical Botanical Garden, Kalaheo, HAWAII. Using Traditional Knowledge to Conserve Breadfruit Diversity in Samoa. Breadfruit is an important staple crop in the Pacific islands and an integral part of the culture and subsistence economy. More than 2,000 cultivar names have been recorded for the region. However, few quantitative studies have been conducted to determine how many cultivars of breadfruit there are and their relative abundance or rarity. An ethnobotanical study of local breadfruit names in Samoa can serve as a model for using traditional knowledge as a strategy for documenting and conserving crop biodiversity. We interviewed 354 Samoans in American and Western Samoa in urban and rural areas and recorded more than 40 cultivar names. Six cultivars were known by more than 50 % of the respondents. Since these cultivars were widely grown in or around the villages they are being conserved *in situ*. However, close to 20 cultivars were known by only one person, each of whom was identified as an expert informant. Many of these cultivars could not be located and a more thorough inventory of breadfruit trees is planned as part of a village-based conservation initiative to determine their frequency and conservation status. Rare cultivars will be propagated and multiplied to ensure that they do not disappear.

Diane Ragone, National Tropical Botanical Garden, Kalaheo, HAWAII. Conservation Status and Traditional Uses of Breadfruit in the Pacific Islands and Indo-Malay Region.

Artocarpus is an important native genus in the Indo-Malay and Indo-Pacific region. Several of the approximately 50 species are important for their timber, fruits, and seeds. Of these, breadfruit is the most widely distributed and used, especially in the Pacific islands. Its importance as a staple food and integral component of traditional agroforestry systems in Oceania will be presented. The myriad ethnobotanical uses and cultural significance of breadfruit will be reviewed and the methods of preparation and storage of fruits, such as drying and pit-fermentation, will be compared and contrasted for Polynesia, Micronesia, and Melanesia. Cultural and environmental factors are eroding the diversity of this essential crop and the current status and needs for breadfruit conservation, both *in situ* and *ex situ*, will be discussed.

Rakiura Titi Islands Committee, Invercargill, NEW ZEALAND. Kia Mau Te Titi Mo Ake Tönu Atu: a research project to assess the sustainability of a traditional harvest of sooty shearwaters (*Puffinus griseus*) by Rakiura Mäori.

The harvest of titi (*Puffinus griseus*; "muttonbirds") on islands adjacent to Rakiura (Stewart Island) is one of the few remaining wildlife harvests managed entirely by Mäori. The harvest is of great social and cultural importance to Rakiura Tangatawhenua and Mäori in general. The muttonbirders have requested this study to examine the sustainability of the harvest to ensure that the birds remain plentiful for their mokopuna (grandchildren). This study also records and compares the understanding of titi ecology, harvest impacts and management practices generated from Mätauranga (Mäori Traditional Environmental Knowledge) and kaitiakitanga (Mäori conservation management) with that from ecological science. Mätauranga is being recorded using oral histories of experienced muttonbirders and questionnaires. Kaitiakitanga and eurocentric conservation philosophies are being compared using records of discussions at hui (conferences) of titi harvesters, environmental managers and conservation stakeholders. The research is conducted by the University of Otago, but is directed by the Rakiura Titi Islands Committee.

Herlyne Ramihantaniarivo, HIS University Training Hospital, Antananarivo, MADAGASCAR, **Richard F. Ramambazafy**, and **Nat Quansah**, Ambodisakoana Clinic, Sovinasoandro, MADAGASCAR. Medicinal Plants Used in Reproductive Health Disorders.

Information gathered on the behavior of outpatients with regards to treating reproductive health disorders is reported. The information was gathered at the Reproductive Health Unit, University Training Hospital / 'Institut Hygiene Sociale', Antananarivo, Madagascar during the six-month period of May – October 1999. Gonorrhoea (42.51%) and genital ulcer (13.18%) of cases were the dominant reproductive health disorders presented by patients. 50.83% of the 358 patients suffering from gonorrhoea and 39.63% of the 111 patients with genital ulcer used medicinal plants to treat their disorders. The results obtained from examining these patients at the hospital seem to reveal a justification of their use of medicinal plants for these reproductive health problems. All patients who took medicinal plants in both cases of gonorrhoea and genital ulcer showed none of the reported disorders. The need to identify the plants used by these patients in order to explore the wider and safe use for these reproductive health disorders is called for. Similarly (and probably more importantly) is the need to look for those prescribing these plants (the traditional medical practitioners) so as to find out ways to enable them work in partnership with the modern medical practitioner in the area of reproductive health.

Carlos R. Ramírez-Sosa, Department of Biology, St. Lawrence University, Canton, New York, USA. Market Ethnobotany of medicinal Plants in el El Salvador, C.A.

Medicinal plants are an important part of the treatment of illnesses in El Salvador, C.A. All markets in urban and rural areas contain medicinal plants stands that provide many kinds of medicinal remedies. Other vendors travel throughout the country prescribing and selling them. A recent trend, however, has been the introduction of plants from other countries such as Mexico, Guatemala, and Honduras. Although there has always been a presence of such imported plants, this has tremendously increased in the last couple of decades. Today, in an average market stand in El Salvador, approximately 80% of the plants are from outside El Salvador. With the introduction of medicinal plants comes new knowledge and new treatments. The main objective of this study is to answer is where do the plant dealers get the knowledge about use and preparation? This report will present the results of several interviews of urban market medicinal plant vendors and prescribes in El Salvador, C.A. Plant material was collected for identification and voucher specimens have been deposited at the Olive M. Gunnison Herbarium of the Department of Biology at St. Lawrence University. This study will elucidate what is happening to the native medicinal plants in this country s they are replaced by imported species therefore replacing local original knowledge.

R.R. Rao, National Botanical Research Institute, Lucknow, INDIA. Role of Traditional Knowledge in Bioprospection in Developing Countries.

Developing countries are rich in Biodiversity but poor in Biotechnology. Interestingly, the developing countries have also a high percentage of indigenous people or ethnic groups concentrated in and around biodiversity-rich areas. Living among the forests these ethnic communities have acquired immense knowledge about the surrounding biodiversity. Traditional knowledge is crucial for bioprospection. The latter involves the scanning of biodiversity for search of better molecules/genes/chemical strains of a particular resource while traditional knowledge helps in identifying a particular resource from among the wide array of flora and fauna. The paper highlights the problems of blind scanning of the whole biodiversity through biotechnological means which a developing country can not afford. Scanning of biodiversity through ethnobiological investigations can help in short-listing of biodiversity for a particular purpose. Ethnobiology helps in bioprospection of flora at the species level whereas biotechnology helps in bioprospection of flora at the molecular/chemical level within a species. Some examples from Indian flora where traditional knowledge has played a key role in bioprospection are: *Phyllanthus amarus* complex for Hepatitis 'B' virus, *Trichopus zeylanicus* for invigoration, *Podophyllum hexandrum* for liver disorders, *Arnebia benthami* for cardiac disorders, *Coptis teeta* for stomachic, debility, *Hydnocarpus kurzi* for leprosy, febrifuge, *Aconitum chasmanthum* for rheumatic fever and a few others. Finally the Author advocates all developing countries to undertake bioprospection of their biodiversity through ethnobiological tools so that the rich biodiversity is quickly scanned for short-listing all species of economic potential before these are subjected to much expensive, time-consuming, expertise demanding biotechnological investigations.

John Rashford, Department of Anthropology, College of Charleston, Charleston, South Carolina, USA. Seasonal Hunger in Jamaica: the Contribution of Traditional Knowledge to Research, Development and Conservation.

A growing body of research in anthropology and in other fields suggest that seasonal food insecurity is a problem for poor households in most parts of the world. Even in areas of the world where scholars have not focused on seasonal hunger as important in its own right, as is the case with the Caribbean, the subject comes up in significant ways in their discussion of a variety of other topics. This paper examines the idea of seasonal hunger recorded in Jamaica's traditional knowledge and its relevance to research and development, especially development concerned with conservation.

Bill Raynor, Country Program Director, The Nature Conservancy, FEDERATED STATES OF MICRONESIA, and **Mark Kostka**, Community-based Enterprise Development Coordinator, The Nature Conservancy, Pohnpei, FEDERATED STATES OF MICRONESIA. Back to the Future: Using Traditional Knowledge to Strengthen Biodiversity Conservation in Pohnpei, Federated States of Micronesia.

Pohnpei's traditional belief system strongly supports conservation, but years of foreign rule and influence, population growth, excessive US aid, shift to a cash economy and other factors have combined to weaken the islanders' conservation ethic. The result has been a rapid decline in biodiversity health, which has in turn led to a decrease in quality of life and increased dependence on outside assistance. Conventional government-led western style approaches to resource management were clearly failing, and in 1990, The Nature Conservancy, the local government, and other partners embarked on a program to involve the island's traditional leaders and other cultural experts in the protection of the island's upland forest watershed. After a difficult start, the program has focused on combining Pohnpei culture and traditional knowledge with modern conservation planning and management practices with some success. The result has been a unique community-based management approach that establishes local control over spatially discrete resources that are legitimately considered to belong to the community and the return of resource management and use to an autonomous, consensus-based decision-making process. In a sense, the approach is an act of reconciliation, reconfirming those aspects of both political systems that are considered legitimate. For the participants, it has been a valuable learning experience through which a uniquely "Pohnpei-style" approach - suited specifically to the island's social and political conditions - is being developed.

Kurt A. Reynertson and **Edward J. Kennelly**, The Graduate Center, City University of New York, Lehman College, Department of Biology, Bronx, New York, USA. Antioxidant Polyphenols from Fruits of the Myrtaceae: A Chemotaxonomic and Ethnomedical Approach to Discovery.

Many fruits of the Myrtaceae have a rich history of use both as edibles and as traditional medicines in divergent ethnobotanical practices throughout the tropical and subtropical world. From South America to Southeast Asia, these fruits have been used for a wide variety of ailments, including diabetes, inflammation, dysentery, ringworm and cough. These same fruits are also used to make tasty desserts and attractive hedgerows. Based on their popularity as edibles, ethnomedical use and fruit color, the fruits of ten edible species from the subtribe Eugeniinae have been selected for phytochemical analysis in an attempt to discover new antioxidants. Thus far, the fruits of two species of *Eugenia* have shown a strong antioxidant activity in the 1,1-diphenyl-2-picrylhydrazyl *in vitro* assay. The UV absorbance spectrum of the most active compound in *Eugenia uniflora* suggests that it is likely a flavonoid. Polyphenolic compound like flavonoids have an enormous range of biological activity and are known to inhibit oxidative damage *in vivo* better than the classical vitamin antioxidants. In plants, they protect against lipid peroxidation and UV damage that can affect tropical fruits growing under severe conditions including high heat and intense sunlight. Current work is being done to isolate and identify the most active compounds in these ten species.

Xanic J. Rondón, Department of Biological Science, California State University, Fullerton, California, USA, **Sandra A. Banack**, Department of Biological Science, California State University, Fullerton, California, USA. and **Wilfredo Diaz** Huamanchumo, Huanchaco, PERU. The Ethnobotany of Totora (*Schoenoplectus californicus*) Sea Craft Vessels in Huanchaco, Perú.

The fishermen from Huanchaco are the contemporary descendants of the Mochicas and Chimús, both pre-Inca cultures. They have continued using traditional fishing techniques and sea craft vessels made of totora (*Schoenoplectus californicus*) that are known as *caballitos*. Huanchaco fishermen have played an important role in preventing ancient Mochica-Chimú traditions from becoming extinct. Nevertheless, *caballito* use and construction are declining. Many fishing towns along the Peruvian coast no longer use *caballitos* due to a scarcity of totora marshes, the introduction of wooden boats to the fishing community, and various economic factors. Traditional plant materials and construction techniques used to build *caballitos* are changing. We investigated the current knowledge of ancient plants used for *caballito* construction, described the processing of plant materials, and recorded the construction methods. This study provides valuable ethnobotanical information and shows the interrelation of cultural and biological conservation.

Lauren Roth, Ecological Designer, Ocean Arks International, Honolulu, HAWAII 'I. The Living Machine: bringing together traditional knowledge with bioremediation.

Traditional Hawaiian land and watershed management practices are a model for modern design of ecologically engineered systems for remediation and restoration. Hawaiian traditional conservation and management values were based on the respect for nature; regulation of land, water, and resources; an indigenous knowledge base, and a search for balance and harmony with nature (Minerbi 1999). Similar to other Polynesian groups, Hawaiians cultivated numerous species of plants for food, clothing, and medicine. However, the physical and social management of the *ahupua'a* system (land division from mountain to sea) marks Hawaiian culture. Although land was divided into distinct *ahupua'a*, the whole *ahupua'a* social and ecological system acted as a unified unit. Within an *ahupua'a*, Hawaiians shared resources for subsistence and engineered food production. Similar to the Hawaiian *ahupua'a* system, Ocean Arks Int. designs modern ecologically engineered systems, such as the Living Machine, to encompass whole systems approaches for sustaining and restoring water quality within watersheds. In designing a Living Machine, an ecological engineer strives to emulate the following ecological principles: recycling of elements, waste and energy; self-organization; adaptive capabilities; and natural treatment processes. The ecological benefits of diversity, pulsing patterns, and ecotones are also maximized in the design process (Jørgensen and Mitsch 1989). Ecologically engineered systems harness the natural abilities of living organisms to break down macromolecules, metabolize organic nutrients, and self-organize into robust contained ecosystems. Seeded with hundreds of species of plants, animals, and microbes, the entire ecology acts as a self-sustaining unit that has the ability to self-organize, capture solar energy, and concentrate nutrients in a food web. These complicated biological processes are engineered simply to maximize biological degradation of contaminants with minimal energy. The biodiversity within ecologically engineered technologies relies upon diversity. Numerous species of active-microbes, plants, snails, and fish are usually seeded into the system. After seeding the habitat, the laws of succession and evolution initiated the growth of the biological system. The first Living Machine in Hawaii is currently treating agricultural wastewater from the Farmers' Livestock Cooperative in Ewa Beach, Oahu. Although other Living Machines have grown tropical varieties of plants, the Pilot Living Machine in Oahu, was the first engineered ecology to test specifically native Hawaiian and Polynesian plants for bioremediation. Growing native Hawaiian and Polynesian flora is significant for both promoting sustainable ecologies and for preserving Hawaiian culture. Plants were selected from the field and local nurseries with the help of the Bishop Museum, the University of Hawaii, the US Fish and Wildlife Service, local nurseries and the Lyon Arboretum. Over the course of a year of operations in Ewa Beach, Oahu, the Living Machine Pilot has succeeded in both initiating and producing sustainable design for remediating agricultural wastes, while acting as a model for design for future water quality initiatives for the Hawaiian Islands, and has provided a solid educational foundation for local Hawaiian schools and local, national and international businesses and governments. Due to the success of the Living Machine Pilot, a three year United States Department of Education grant was awarded to develop a Hawaiian, curriculum that synapses Living Machine concepts with traditional, Hawaiian cultural practices. The curriculum is being designed based on USDOE standards. Ocean Arks is partnering with the University of Hawaii to transcend the present educational program into a Hawaiian curriculum. Traditional, Hawaiian cultural values associated with conservation, preservation, and sustainable agricultural practices are being incorporated into the existing program to promote high environmental and cultural values to future generations.

Sonali Saha, University of Illinois at Chicago, Department of Biological Sciences, Chicago, Illinois, USA.

Effects of fire and fire-exclusion on *Diospyros melanoxylon*, a NTFP species, phenology and growth in central Indian deciduous forests.

Deciduous forests of India experience anthropogenic fires that are accidental, or ignited for collection of Non-Timber Forest Produce (NTFP), and several other reasons. The fires in central and parts of Peninsular India are common because people believe that fires enhance the growth of *Diospyros melanoxylon*, (Ebenaceae) the most important NTFP species forming the backbone of the indigenous tribal economy. A study monitoring the growth, mortality, stem die-back and phenology patterns of tree juvenile in plots subject to three fire treatment levels (April fires, March fires and fire-exclusion) was initiated in February 1999. Fire retarded the growth of *Diospyros* and other common species, with greatest relative growth rate occurring in fire-exclusion treatments while no significant difference between March and April fire treatments was found. The leaf-phenology showed interesting trends with sprouting and leaf-flushing shifted to April and early May in burned plots, while in unburned plots juvenile *Diospyros* did not flush new leaves until mid-May and the leaf-expansion was completed only in the last week of May. It is the trend in the phenology patterns that plays an important role in ignition of the deciduous forests in central India. Fire expedites the NTFP collection, and processing so that it does not interfere with the monsoonal rains starting early June. While fires are harmful for the forest stature and diversity, the economic benefits to the indigenous people can not be overlooked. Onus is on government and indigenous people supported by Non-profit organizations to make a case for fire-protection, and push the contractors to bear extra costs involved in late collection as opposed to early collection of the *Diospyros* leaves.

Sylvia H. Salcedo, Department of Botany, University of Hawai'i, Honolulu, HAWAI'I. Preliminary Data Gathered for the Preparation of a High Altitude Medicinal Garden in Namche Bazaar, NEPAL.

Ethnobotanical methods employed to analyze the medical system preference of two villages of Solu Khumbu, Nepal will be presented. The presentation will include research conducted in the fall of 2000 in Namche Bazaar and Tengboche.

Ethnobotanical methods used to formulate a high altitude medicinal plant garden will be discussed. The content of a proposed garden will be then be presented

Jan Salick, Missouri Botanical Garden, St. Louis, Missouri, USA. Process, Variation and Change in Ethnobotanical Research: Examples from the Peruvian Amazon to the Tibetan Highlands.

Praveen K. Saxena, Department of Plant Agriculture, University of Guelph, Guelph, Ontario, CANADA. Plant-based medicines: Application of in vitro production technologies.

International trade in medicinal plants is a major force in the global economy and demand is increasing in both developing and industrialized nations. The major problems that have arisen in the commercial production of plant-based medicines have resulted from the lack of solid scientific information. In most cases, the identity, physiology, phenotypic and genotypic variability of individual medicinally active constituents have not been characterized. Many problems have arisen from the adulteration of medicinal plant preparations with misidentified plant species, contamination with insects, bacteria, fungi, environmental pollutants, and deliberate consumer fraud compromising the safety and efficacy of medicinal plant preparations. The development of in vitro culture technologies has the potential to solve many of the problems associated with production of medicinal plant species including: a) rapid en masse production, b) genetic and physiological uniformity, and c) the possibility of selection of superior, novel plant-types. The large-scale in vitro cultures of medicinal plants is expected to provide high-quality plant material for biochemical analyses and the determination of efficacy in mammalian cell cultures. Recently, in vitro production systems have been developed in our lab for several medicinal plant species including neem, St. John's wort, Echinacea sp., feverfew and huang-qin and are being used for biochemical characterization and evaluation of efficacy.

Sue Scheele, Manaaki Whenua, Lincoln, NEW ZEALAND. Weaving people together - the harakeke (New Zealand flax) evaluation trial.

In New Zealand, harakeke (New Zealand flax or Phormium spp.) is the most important of the fibre plants used in traditional plaiting and weaving. Over generations, Maori weavers have selected and cultivated forms of harakeke best suited for particular purposes. Anecdotal evidence suggests that varieties that grow and perform well in some areas do not do so well in others. Since 1995, Manaaki Whenua scientists have been working in partnership with weavers to find out what effect soil and climate conditions have on the growth and weaving qualities of harakeke varieties. The trial was originally proposed for three sites. The enthusiasm and active involvement of local weavers, marae, schools and tertiary education institutions saw the experimental plantings of 12 varieties established in 10 locations throughout New Zealand. Weavers from Te Ropu Raranga/Whatu o Aotearoa, the national association of Maori weavers, used traditional techniques to systematically evaluate the quality of leaf and fibre samples from all the sites. When collated with the information on plant growth, we will know more about how to grow the very best selection of harakeke for particular purposes in any location. The trial sites themselves remain as a teaching resource and as a source of quality weaving material for local communities.

Judith Schmidt, Maryland, USA. Respect in Building and Crossing Bridges.

A reflection on how some bridges were built & crossed during non-traditional doctoral research. An exploration of the effectiveness of this method, and its continued implementation in other journeys of learning and successful accomplishments today. Respect was a prime quality expressed by the indigenous peoples of North America. It is now evident to this ethnobotanist that respect was key to the bridge building for this particular research with some of those members of the First Nations. It was key to subsequently crossing the bridge from science to the public, through slide shows, to share traditional knowledge gained from another culture in our midst. Respect should be increasingly vital in our contacts, locally and internationally, as globalization increases the speed and frequency of contacts between cultures. Postulate: Crossing bridges with respect and humility should be our goal as research biologists and educators, and, it bears fruit continuously throughout one's life.

Leon Secatero, Spiritual Elder of the I'inebeho (Navajo) of Canoncito. Spirit Walkers Of Turtle Island-Unifying North & South, East & West.

Leon Secatero, elder and chief of the Cannoncito Band of Navajo, has worked many years for indigenous tribal sovereignty. In concert with Mayan, Navajo and other tribal prophies, he has sought out and been invited by indigenous spiritual leaders in the Western Hemisphere and elsewhere to advance the cause of tribal sovereignty and unification. In 1999, Mr. Secatero and others organized a Gathering of Elders, which brought together elders from North and South America. Since that time, under Mr. Secatero's leadership, the commitment of these elders has solidified into a council of 15 elders from American Indian tribes: Spirit Walkers of Turtle Island. Mr. Secatero hopes to link these 15 with counterparts in South and Central America. It is

envisioned that this 15-member component will become part of a 45-member council of North, South and Central America to represent unified First Nations at the UN. Although this has not yet been accomplished, in August of this year, Mr. Secatero took part in the Sixth Commemoration of the International Day of the World's Indigenous Peoples, where he delivered a special blessing.

As keepers of knowledge, indigenous leaders are accountable to their communities, and are connected to the sacredness of the Earth. Their ability to travel in sacred territory affords them insight into making appropriate decisions, based fully in integrity. They are the key to providing solutions to poverty and illness in our world, and their knowledge and medicine should be considered as a matter of national security, for the survival of future generations. It is toward the fulfillment of these goals, which originate out of tribal sovereignty and unification, that Mr. Secatero has dedicated himself and his work.

Cristiana Simão Seixas, Natural Resources Institute, The University of Manitoba, Winnipeg, CANADA. [Fishery Management Crises and Adapting Mechanisms in a Traditional Society: The Case of the Ibiraquera Lagoon, Brazil.](#)

To analyze how traditional societies may build mechanism for maintaining resilience in both social and ecological systems, this paper explores the case of the Ibiraquera lagoon management system, in the southern Brazilian coast, which has gone through cycles of management crisis and recovery in the last four decades. The pre-commercial, pre-modern management system of the early 1960s was disrupted in the mid 1970s due to several changes in the local socio-economic system. These changes culminated in a crisis of the fishery management system in the late 1970s. To deal with this crisis, major changes in fishing regulations and rule enforcement occurred in the 1981-1994 period, recovering the management system. Since 1994, however, a new crisis started to emerge after the enforcement of fishery management broke down. Facing a new crisis, local communities started to re-organize themselves to respond to this situation. In this scenario of dynamic social-ecological changes, this paper aims to investigate the use of traditional ecological knowledge, changes in the institutional setting, and other human responses used to manage crises and to maintain (or rebuild) social-ecological resilience.

S. Semple and M. Barton, School of Pharmaceutical, Molecular and Biomedical Sciences, University of South Australia, Adelaide, South Australia, AUSTRALIA. [Ethnopharmacological investigations of the antimicrobial activity of some Australian Aboriginal medicinal plants.](#)

A limited number of ethnopharmacological studies have been carried out on the plant species used as medicines by the Australian Aboriginal peoples. The focus of our research is the investigation of the antimicrobial activity and chemical constituents of some Australian medicinal plant species. Previously we have identified antiviral compounds in plant species used traditionally by Aboriginal peoples for treating symptoms indicative of infection. Currently we are investigating the antifungal and antiviral activity of plants used for the treatment of skin, respiratory and enteric infections. Over 40 plant species are being investigated including members of the genera *Acacia*, *Alphitonia*, *Cymbopogon*, *Eremophila*, *Mentha* and *Pterocaulon*. Plant extracts are being screened for antiviral activity against herpes simplex virus, human rhinovirus and enteroviruses using inhibition of viral cytopathic effect assays. Extracts will be screened for antifungal activity against *Candida* and dermatophyte species using disc diffusion, bioautography and broth dilution assays. This research aims to identify herbs that may be formulated as new herbal products for the management of infections caused by these organisms. It is hoped that this research will also provide opportunities for developing new crops and collaborative links with Aboriginal Communities.

Wesley Sen and Lehua McCandless-Sen, HAWAI'I. [The ancient art of the foot walking lomi lomi and the revival and restoration of ancient Hawaiian physiotherapy and its practice in the Spa Industry in Hawaii.](#)

My presentation will be to introduce the ancient healing art of the footwalking lomi lomi and include the topic of the revival & restoration of ancient Hawaiian Physiotherapy in Hawai'i and its practice in the Spa industry in Hawai'i. Also the expansion and practice of Lomi Lomi outside Hawai'i, in the Continental U.S., Europe, and Japan. My wife and I have traveled to Europe, U.S. mainland and this Summer to Japan to teach Lomi Lomi and do treatments. I will be sharing my 6 years of experience in Hawai'i's Spa industry as one of the first traditional practitioners to formulate standards of practice of Lomi Lomi at the Ihilani Resort & Spa. I have also been involved in educating the public and our visitors to Hawai'i about what traditional Lomi Lomi's role is in the past and its present medicinal application among Hawaiians today.

Mario Serracin, Department of Plant and Environmental Sciences. University of Hawaii at Manoa, Honolulu, HAWAI'I. [The History, cultivation and science of coffee in the Hawaiian Islands.](#)

Coffee is among the primary commodities produced and traded worldwide. It was introduced to Hawaii around 1815. Successful cultivation led to the selection of specialty coffee graded beans from *Coffea arabica* which produce a fine beverage with unique organoleptic properties. Today, traditional and innovative coffee farming techniques bring sustainable economic returns to several communities in the state. The implementation of research and marketing concepts such as selection of new varieties, prevention and control of pests and pathogens and optimum mechanization of cultural activities have resulted in the rapid adaptation of coffee to a wide range of climates in different islands. Hawaiian coffee are produced and marketed with social and

environmental stewardship. These approaches, in addition to maintaining the quality of the beverage, has helped coffee growers to overcome the current low prices offered of the international markets.

Gamaniel K. Shingu, National Institute for Pharmaceutical Research and Development, Department of Pharmacology and Toxicology, Abuja, NIGERIA. Ownership and Sustainability Issues in Botanical Medicine.

The World Health Organization estimates that more than 70% of the world's population, especially those who reside in the tropics, rely almost exclusively on plants as a primary source of medicines. Over the last decades there is growing awareness of the pharmacological potential of medicinal plants, and a potentially bright future for drugs developed from natural products. At the same time, the use of plants in medical practice contributes to the growing threat to species and ecosystems preservation. This paper expands the narrow view of plants as sources for pharmaceutical development to discuss botanical medicine from an economic and human development perspective. I consider strategies that can ensure that the benefits that accrue from utilization of indigenous plant knowledge become the positive forces for human development. Issues of sustainability are discussed vis à vis poverty, protection of ecosystems, and the potential for future use and long-term viability of medicinal species. Issues of ownership also are presented in the context of intellectual property rights, with particular reference to the inadequacy of patent rights to protect indigenous knowledge. The experience of the NIPRD in access and benefit-sharing arrangements is reviewed.

Krishna K. Shrestha, Central Department of Botany, Tribhuvan University, Kirtipur, Kathmandu NEPAL, **Narendra N. Tiwari**, Ayurveda Campus, Institute of Medicine, Tribhuvan University, Kathmandu, NEPAL and **Suresh K. Ghimire**, Central Department of Botany, Tribhuvan University, Kirtipur, Kathmandu, NEPAL. Ethno-medicine and Conservation of Traditional Knowledge in Nepal.

The Himalayan kingdom, Nepal has always been a centre of attraction for naturalists, tourists and mountaineers due to its diverse ecosystems, rich bio-diversity, unique phytogeography and tremendous altitudinal range. The country is characterized by the presence of 75 Vegetation types and 35 forest types within 10 different bio-climatic zones. The country comprises about 6,500 species of flowering and over 4000 species of non-flowering plants, out of which about 1,600 species of plants have been estimated to be used in traditional medicinal practice and a majority of which awaits proper documentation. Medicinal and aromatic plants (MAPs) in Nepal have been considered as one of the important non-timber forest products (NTFPs) contributing significantly to the economy as well as have served important role in the rural health care. Nepal is also well known as a multiethnic and multilingual country having more than 60 ethnic groups, speaking over 100 native languages. Medicinal plants in the Nepal Himalaya serve as the basic raw materials for Ayurvedic, Homeopathic, Naturopathy, Tibetan, Chinese and even modern Allopathic medicines. Besides these formal systems of traditional medicine, there are a number of indigenous healers in the rural areas practicing folk healing system using a number of medicinal plants. Similarly, a large number of elder people in the Nepalese rural societies have rich knowledge regarding the medicinal uses of a number of plants and they practice home remedy for human as well as animal ailments. Obviously, indigenous medical knowledge is deeply rooted in the tradition and culture of Nepalese society. Owing to the poor economy, lack of transportation, communication and health care facilities, about 80-90 % people living in the rural areas depend directly or indirectly on the formal and informal systems of traditional medicines.

Traditional practitioners or healers are found in every rural villages of the country and they occupy an important position in the Nepalese societies. The traditional healers are classified as *Baidhyas* or *Kaviraj* (Ayurvedic medicinal practitioner of mid hills and low land who uses herbal remedies), *Dhamis and Guruwas* (indigenous healers of mid hills and low lands respectively, who uses herbal remedies as well as faith healing methods), *Jhankris* (Traditional spiritualists who uses faith healing methods), *Sudenis* (Traditional midwives), *Amchis* (Tibetan medical practitioner of high Himalaya who uses herbal remedies), etc. However, the status of the traditional practitioners is not well known and their knowledge is not properly documented. Although they constitute an important part of local healthcare, traditional healers lack any recognition and assistance from the government. At the present situation it appears that the traditional medicinal practices as well as the medicinal resources are seriously under threat. The traditional practices are not economically viable in the current socio-economic situations and there is a lack of interest in this tradition by the younger generation. Moreover, the elderly people and the practitioners containing traditional knowledge of folk medical practice usually hesitate to transfer their knowledge to the younger generations due to their strong cultural beliefs. On the other hand, the conservation of medicinal plants is seriously threatened due to indiscriminate and unsustainable harvesting for trade, as well as due to deforestation, habitat destruction, and overgrazing. Therefore, there is an urgent need for improved management of MAPs and proper documentation and conservation of associated traditional knowledge for the efficient use by the future generations. In order to fulfill the objectives of Convention on Biological Diversity (CBD), medicinal plant resources could be better conserved by their sustainable uses and equitable sharing of benefit; and emphasis should be given to protect intellectual property rights (IPR) of the local people as well.

Noenoe Silva, Department of Hawaiian and Indo-Pacific Languages, University of Hawai'i, Honolulu, HAWAII. The Importance of Hawaiian Language Sources in Understanding the Hawaiian Past.

Most historiography, political analysis, and anthropology concerning Hawai'i is done without consideration of the wealth of material written and otherwise recorded in the Hawaiian language. This lecture demonstrates the value of these archives in Hawaiian, and shows how refusal to make use of them creates misunderstandings and gaps in understanding both traditional Hawaiian society and recent history. Although scholars have made use of translated materials, serious problems exist in the translation process, including the dividing of manuscripts such as Samuel Kamakau's into such English language categories as "history," "tales and traditions," and "religion." The carving up of manuscripts in this fashion itself creates misunderstandings of the Hawaiian language and world views. We are now entering a new era in which much exciting work on Hawai'i is being done by Hawaiian language scholars, who seek to understand the past, as well as to sustain the life of the language in the present and for the future.

L. Jan Slikkerveer, Leiden University, CA/SNWS, Leiden, NETHERLANDS. Building Bridges between Knowledge Systems: Towards a Multi-variate Model of Biocultural Conservation of Medicinal, Aromatic and Cosmetic (MAC) Plants in Indonesia. One of the major contributions of quantitative ethnobotany as a relatively new approach to the study, analysis and interpretation of ethnobotanical field data refers to the provision of valuable information on complicated human-plant relationships, particularly relevant for improved policy planning of plant resource management in the tropics. In addition, quantitative ethnobotany has shown to facilitate the truly comparative study of indigenous knowledge and use of plants by different socio-cultural groups and to provide a reliable basis for the assessment of quantitative impacts of human activities on plants and ecosystems. In light of the efforts to build bridges with traditional knowledge, another significant, albeit less studied aspect of the application of a quantitative approach in ethnobotany refers to its increased capacity to strengthen the 'scientific' value of results for the interpretation, understanding and predication of patterns and processes in human-plant interactions. As in the local 'knowledge-practice-belief' complex of biodiversity conservation, the latter component still remains problematic for many Western-trained scientists. This paper seeks to further develop a multi-variate model of biocultural conservation behavior on the basis of ongoing research on traditional knowledge and use of MAC plants - jamu - in Sunda, West Java, that could help to bridge the gap. In this model, such 'subjective' individual factors of perceptions, cosmologies and belief systems are statistically transformed to 'objective' system variables for analysis that eventually will enhance the applicability of the outcome variables for improved biocultural conservation in the research area, and as such, advance its 'scientific' representation.

Wynet Smith, World Resources Institute, Washington, DC, USA. Incorporating Traditional Knowledge in Conservation Planning and Resource Management: Key Lessons from the Gwich'in and Nunavut Settlement Areas, Canada. There is great interest in incorporating indigenous knowledge into conservation and development planning. There are, however, a number of challenges and barriers to achieving this goal. In northern Canada, modern comprehensive land claims have been negotiated and signed with the intent of transferring lands, right and resource management responsibilities. Many important lessons can be derived from the resource planning and management experiences in the Gwich'in Settlement Area and the Nunavut Settlement Area. The paper will outline the key planning and management structures and the processes developed to try and incorporate traditional knowledge. Successes and failures will be highlighted. Key strategies and tools will be outlined as well. It will be argued that the setting of research agendas, cultural appropriate planning approaches, community groups, and other concrete mechanisms for incorporating local values and knowledge are essential.

Phosiso Sola, Research and Development Section, SAFIRE, 10 Lawson Ave. Milton park, Harare, ZIMBABWE. THE COMMUNITY RESOURCE MANAGEMENT PLAN (CRMP): a tool for integrating IKS into resource assessment and management Experiences from the SAFIRE MITI Project. Resource management strategies are attempts to address the challenge of balancing resource conservation and utilisation. The state of resources and how they are used are inseparably linked to ecological processes. As such sustainable resource use should be based on socially responsible economic development while promoting the resource base and the status of the ecosystem. The efforts to attain social responsibility make indigenous knowledge systems (IKS) a crucial component of any development and conservation intervention. SAFIRE, an environmental local NGO muted the idea of a community resource management plan (CRMP) during the implementation of the MITI project. A CRMP consists of the assessment of livelihood systems and resources on which they are based as well as the development of strategies aimed at promoting and enhancing livelihoods and key natural resources. In addition, the plan has an adaptive management component based on a monitoring and control system to ensure sustainable use of resources. IKS integration was done through the participatory development of resource management strategies, by promoting best practices and mitigating negative impacts on resources and livelihoods. In Gudyanga village the main adaptive strategy for livelihoods was craft making. Initially the community used *Sansvieria personii* which went locally extinct and they shifted to *Adansonia digitata*. This is now equally threatened and resource management strategies to enhance this species and the ecosystem at large were being developed. Most of the strategies adopted were centered around the traditional harvesting techniques and the response indicators.

Robert Stauffer, Hawaiian Language Legacy Program, Alu Like, Honolulu, HAWAI'I. Bringing the Legacy of 19th Century Hawaiian Language Material to the Public.

Orlo Colin Steele, Department of Botany, University of Hawai'i, Honolulu, HAWAI'I. Ecological and Cultural Influences on Samoan Mangrove Bio-geography.

This study integrates ecological, ethno-botanical, and molecular methods to explain the occurrence of three mangrove species in the Samoan Archipelago. The American mangrove *Rhizophora mangle*, originated in the New World tropics, and has spread to the islands of Samoa, Tonga, Wallis, Fiji and New Caledonia. Several researchers speculate that movement of this geographic outlier is due to human influence during the pre-European era. The Oriental mangrove, *Bruguiera gymnorrhiza*, and the puzzlenut tree, *Xylocarpus moluccensis* are two widespread Old World mangroves which reach their easternmost limit on the island of Aunu'u in American Samoa. Both *B. gymnorrhiza* and *X. moluccensis* are culturally very important in Tonga and Fiji and may have been carried to Samoa by early seafarers. To explain this distribution and why other species further west did not arrive in Samoa, mangrove seeds or propagules of the eight species found in Fiji and Tonga were collected and placed in seawater for up to seven months to determine how long they would remain viable. Concomitantly, residents of mangrove areas in Samoa, Tonga and Fiji were interviewed to assess the cultural importance of local mangrove species. Preliminary results showed that propagules of *R. mangle* were still viable after 20 weeks of floatation, whereas those of its congener, *Rhizophora stylosa*, were no longer viable after 10 weeks. Residents near mangrove areas in Tonga and Fiji do not distinguish between the two species of *Rhizophora* and their hybrid *Rhizophora X selala*. This suggests that *R. mangle* is not preferred for any particular use and may have had the ability to become established in the Southwest Pacific naturally. *B. gymnorrhiza* propagules were not viable after two months of floating in seawater, and *Xylocarpus granatum* seeds were not viable after two weeks (floatation of *X. moluccensis* is currently underway).

The cultural use and level of harvesting of *Bruguiera* and *Xylocarpus* appears to be highest amongst the Tongans, followed by the Fijians, and least by the Samoans. Continuing ethno-botanical research and a forthcoming molecular analysis of these three mangrove species may help to clarify their relationship to other Pacific populations.

John R. Stepp, University of Georgia, Athens, Georgia, USA. Ethnoecological Distribution of Highland Maya Medicinal Plants.

The Highland Maya utilize over 1500 plant species for medicinal purposes. 600 of these species are widely known and utilized. Research was conducted on the ethnoecological distribution of 203 plants with the highest consensus regarding their status as medicinals. Ethnoecological distribution was determined through interviews with 14 adult individuals knowledgeable about medicinal plants in the municipality of Tenejapa. Informants were shown voucher specimens without any identifying labels. They were then asked to provide the Tzeltal name for the plant. Knowledge of these plants was very high, with a 98% identification rate. If a positive identification was made then they were asked detailed questions regarding the distribution of the plant across gross climatic zones and successional stages based on ethnoecological classification. These data support an earlier study with a limited set of 40 plants conducted by Stepp (1998) that found that early successional stages were the most common habitats for medicinal plants and that distribution falls off sharply in forested areas. Some important plants have a restricted distribution across the landscape and this could reflect increasing human population pressures in the region. The methodology utilized in this study is potentially useful in an appraisal of ethnobotanical resources prior to more detailed vegetation studies and can also indicate plants that are of high cultural significance but are potentially threatened.

Michelle L. Stevens, Jones & Stokes, Sacramento, California, USA. Traditional Resource Management of wetland and riparian plants by California Indians.

In this paper, I will discuss the Traditional Resource Management (TRM) and ethnoecology of selected wetland and riparian plants in central California. Riparian plants and ecosystems were tended by California Indian people in a manner that shaped ecosystem species composition, species diversity, function, and dynamics. Before European settlement, hundreds of thousands of white root (*Carex barbarae*) rhizomes were annual sustainable harvest by California Indians. The gathering and tending of white root created homogeneous patches of white root throughout the low-elevation riparian forests of California, maintaining a lawn-like understory and park-like physiognomy. Similarly, willow (*Salix* spp.) stems are coppiced and pruned to create large areas of long, straight wands for basketweaving. Bulrush (*Schoenoplectus* spp.), cattail (*Typha* spp.), and rush (*Juncus* spp.) stands were burned, the stems pruned, and the rhizomes harvested extensively in pre-European settlement times. Both wetland and riparian areas in California have been diminished to less than 5% of the pre-European settlement area. Restoration of traditional tending practices in wetland and riparian areas is important to modern Indian basketweavers. The modern challenge is to restore both cultural and ecological health through understanding the relationship between humans and the ecosystems they manage. Restoration of TRM is particularly challenging given the ecological and cultural modifications existing in the modern landscape.

Fred D. Stone, Hawai'i Community College, Math & Natural Sciences, Hilo, HAWAI'I and **Kekuhi Kanahale-Frias**, Hawai'i Community College, Hawaiian Studies, Hilo, HAWAI'I. Ahupua'a: Ma Uka to Ma Kai.

Ahupua'a: Ma Uka to Ma Kai builds bridges between traditional knowledge about the Hawaiian environment with scientific understanding of Hawaiian geology and ecosystems. This Hawai'i Community College Learning Community combines Hawaiian Plants and Their Uses and Hawaiian Natural History in order to offer the best of two worlds. Hawaiian Plants and their Uses is an action oriented course that studies and puts into practice some occupational, domestic and ritualistic uses of ethnic, indigenous and endemic plants of Hawaii. Hawaiian Natural History is a field course that involves students in direct experience to learn about the formation of the Hawaiian Islands and their native ecosystems. These traditional and scientific approaches are combined to achieve a synthesis of understanding. [poster]

Fred D. Stone, Hawai'i Community College, Hilo, HAWAI'I. Development of an A.S. and Certificate Program in Forest Ecosystem Management and Agroforestry at Hawai'i Community College.

Hawai'i's native forests are declining due to introduction of alien species, over-harvesting of some species, and increasing use of forest land for other purposes. Former sugar land is being converted to commercial forestry and agroforestry operations. Management of both native forest ecosystems and agroforestry is creating a demand for more technicians trained in these areas. Hawai'i Community College has been working in partnership with the Hawai'i Community Forestry Initiative, the Workforce Development Council and the Department of Education's Natural Resources Career Pathway to develop a Certificate program and a two year A. S. degree to help meet this demand. A major goal of the grant is training in management and regeneration of Hawai'i's native ecosystems. Women, Hawaiians and other minority students will make up a significant proportion of the enrollment, and specific efforts will be made to attract these students into the program through high school recruitment and publicity aimed at the target population. A significant part of the Certificate program will be internships with partners in government agencies and the private industry. The curriculum is focused on Hawai'i, but is transferable to other areas in the tropical Pacific. The program will start in Fall, 2001. [poster]

Sylvia Stone, Yale School of Forestry and Environmental Studies, New Haven, Connecticut, USA. Economic, Ecological and Social Implications of the Betel Production, Consumption and Market System of Yap, Federated States of Micronesia.

The custom of betel chewing is a significant aspect of the culture, society and economy of the island of Yap, Federated States of Micronesia (FSM). I focus on several of the economic, ecological and social implications of the rising export levels of the betel chew components. The overall sustainability of the betel production, consumption and market system for the people and island of Yap is also considered. On Yap, the betel chew is composed of areca palm fruit (*Areca catechu* L.), betel pepper leaves (*Piper betle* L.), slaked lime produced from coral (*Acropora* spp.) and imported tobacco (*Nicotiana* spp.). The economic and social implications to Yap of this fourth major component of the betel chew, imported tobacco, is also discussed. [poster]

Lilette A. Subedi, Ka'ala Farm, Inc., Wai'anae, HAWAI'I. 'Imi Ao-Seek Knowledge: Kalo, Kapa, Pohaku.

Ka'ala Farm, Inc. is a Native Hawaiian cultural education organization. The Cultural Learning Center sits at approximately 400 feet above sea level on the gently sloping foothills of Mauna Ka'ala, the oldest and tallest peak on the island of O'ahu. Ka'ala's mission is to reclaim and preserve the living culture of the *po'e kahiko*, people of old in order to strengthen the kinship relationships between the 'aina (land, that which nourishes) and all life forms that it supports. To accomplish this mission, we teach the traditional Hawaiian concept of the *ahupua'a* (a fundamental cultural practice governing the care and management of land and resources from the mountains to the sea). The Hawaiian values and practice of aloha 'aina, love of the land, and *malama 'aina*, taking care of the land, guide us in this teaching. Our *kuleana*, or responsibility, is to help recreate the *ahupua'a* for our time. Teaching the children is central to this task. Ka'ala will demonstrate elements of the curriculum we have developed in collaboration with the Hawaiian Studies Program at Wai'anae High School and with the community elementary schools. Traditional Hawaiian values and vision are the foundation of learning, whether it be botany, ethnobotany, agriculture, archaeology or ecological sustainability. Demonstrations will be given in the art and science of Kapa making; Pohaku - origins and uses; Kalo - cultivation and preparation.

Margaret Swan, Grand Chief, Southern Chiefs Organization, Winnipeg, Manitoba CANADA. Requirements and Expectations of a First Nations Leader.

First Nations people are taking great strides to develop their own agendas toward self-government. In dealing with governments at both provincial and federal levels, First Nations are forced to compromise their rights due to conflict between the designated jurisdictions of government regarding First Nation people. As a leader of Southern Chiefs Organization (SCO) representing 34 First Nation communities in Southern Manitoba, SCO has the mandate to speak and advocate on behalf of its First Nations members. The expectations of First Nations leaders are enormous, and in this presentation, I will address some of these expectations.

Traci Sylva, College of Tropical Agriculture and Human Resources, University of Hawai'i at Mānoa, Honolulu, HAWAI'I, **Pauline Chinn**, College of Education, University of Hawai'i at Mānoa, Honolulu, HAWAI'I, **Lillian Yanagawa**, Kalani High School, HAWAI'I, **William McFeeley**, Maryknoll High School, Honolulu, HAWAI'I, **David Hanaïke**, Kawanānakoā Middle School, HAWAI'I and **David Fuertes**, Kohala High School, HAWAI'I. Hawaiian Style Bioremediation. Through a class, "TECS 433: Interdisciplinary Science Curriculum: Bioremediation in the Environment and Agriculture," teachers from elementary, middle and high schools learned about bioremediation and how many ancient Hawaiian practices were based upon the same principles that this new technology is based upon. Bioremediation is the use of biological processes of microorganisms and plants to remove environmental waste problems. Teachers learned about the science behind this new technology as applied to waste related problems in agriculture, sewage treatment, and modern industrial processes; as well as an interesting relationship to Hawaii's unique ecosystem, and indigenous cultural practices and values. Teachers learned about the Ahupua'a land division system as a natural resource management tool, how ancient practices within the lo'i parallels modern knowledge of composting and nutrient needs of plants and animals, and how the complete carbon and nitrogen cycles can be taught within a functional traditional Hawaiian fishpond. Teachers who enrolled in TECS 433 were required to develop activities and carry these out within their own classrooms. Their classroom activities and projects will be described, as well their personal experiences with students and these Hawaiian-style bioremediation activities in the classroom. A new grant, "Malama I Ka Aina: Using Traditional Hawaiian and Modern Environmental Practices to develop Standards-based K-12 Science Curricula for Teachers of Hawaiian and Part-Hawaiian Students," aims to develop culturally relevant science curricula, provide professional development, and work with some of these same teachers to develop their classroom and school projects as model sites for other teachers.

Todd Taiepa, Ngai Tuhoe, The School of People, Environment and Planning, Massey University, Palmerston North, NEW ZEALAND. Weaving our stories world-wide: An indigenous approach to global economics and ecology. 'Eco-imperialism' - the transfer of species across the world, has distorted the environmental and cultural landscape of New Zealand. The significant physical reconstruction of the natural landscape combined with the destruction of indigenous flora and fauna and replacement by the exotic has created a cultural montage that often bears little resemblance or trace of evidence of the tribal narratives associated with particular areas. This has exacerbated the alienation of Maori - the indigenous people of New Zealand, from the land and from each other. In fact the global economic practice of taking resources from around the planet, repackaging them according to function and economic opportunity is an overly simplistic and functional approach that fails to recognize the nature of species or the traditional stories and relationships with peoples around the planet. This paper argues that deconstruction of this landscape is achievable through a Maori centered framework that emphasizes traditional concepts and relationships with other indigenous people. This framework is used to re-explore the link between resources, cultural and spiritual rights and perspectives of indigenous and traditional peoples.

Vicky Holt Takamine, Kumu Hula of Pua Ali'i 'Ilima, University of Hawai'i at Mānoa, Leeward Community College, and the University High School, Honolulu, HAWAI'I. 'Ilio'ulaokalani: Political Empowerment through Cultural Practices. 'Ilio'ulaokalani Coalition, a coalition of kumu hula and traditional Hawaiian cultural practitioners emerged in February 1997 after the State Legislature introduced bills that would restrict Native gathering rights. Since then, 'Ilio'ulaokalani has been politically and culturally active in Hawai'i politics. Vicky Holt Takamine, president and founder of 'Ilio'ulaokalani, will share the history of 'Ilio'ulaokalani and share mele and hula that have been instrumental in strengthening the Hawaiian community in their fight to preserve and protect their native gathering rights, cultural traditions and natural resources.

Sharon Tang, Centre for Pharmacognosy and Phytotherapy, the School of Pharmacy, London UNITED KINGDOM, **Christina Schlage**, Institut für Pharmazeutische Biologie, Heidelberg, GERMANY, **Simon Gibbons**, and **Michael Heinrich**, Centre for Pharmacognosy and Phytotherapy, the School of Pharmacy, London UNITED KINGDOM. *Ochna macrocalyx* - A Medicinal Plant from the Usambara Mountains of Tanzania: Ethnobotany, Phytochemistry, and Biological Activity.

Ochna macrocalyx Oliv. (Ochnaceae) is one of the medicinal plants used by the Washambaa, the main ethnic population of the western Usambara mountains. Its main uses are for female disorders and gastrointestinal problems. Only the powdered yellow bark is used, and according to different healers boiled with milk, taken with tea, warm water, or maize porridge. The ethnobotanical importance of this species merited a detailed biochemical and phytochemical investigation. At a concentration of 200 µg/ml the crude ethanolic extract of the powdered bark was found to act as an NF-κB inhibitor, using an electrophoretic mobility shift assay with HeLa cells (EMSA)². At this concentration the extract also showed some cytotoxic effects. The ethyl acetate extract of the powdered bark was fractionated using a Sephadex-LH20 column. Several compounds were isolated from the fractions using preparative TLC. Four compounds have so far been identified using 1D and 2D NMR (¹H and ¹³C) experiments an FAB mass spectroscopy. These are bioflavonoids calodenin B and its trans-dihydro derivative, cordigol and a cordigone³ like compound. So far biochemical investigations have been carried out on calodenin B, shown to have significant activity against a strain of methicillin resistant *Staphylococcus aureus* (MRSA) with a minimum inhibitory concentration of 0.5 µg/ml, compared with that of tetracycline which had an MIC of 128 µg/ml. But it also been found to be cytotoxic to HeLa cells, down to 80 µg/ml

with no NF- κ B inhibition observed. The antibacterial activity may partially explain the traditional use of the plant for treating diarrhea.

Maria Tengö and **Monica Hammer**, Natural Resources Management, Department of Systems Ecology, Stockholm University, SWEDEN. Local knowledge on ecosystem processes - nutrient management among the Iraqw of Northern Tanzania. The agroecosystem of the Iraqw in Northern Tanzania is used as a case for studying mechanisms for the build-up of local ecological knowledge in a linked social-ecological system. The soils of Iraqw'ar Da/aw, the core area of the Iraqw, has sustained relatively high populations for at least 200 years through a highly integrated agro-pastoralistic farming system, using local resources and a limited supply of arable land. In light of the dynamic nature of ecological and social systems, we emphasize the content of local ecological knowledge and focus on critical ecological processes, such as nutrient circulation. In this paper a quantitative analysis of nutrients fluxes, especially nitrogen, is linked to a qualitative mapping of local knowledge as expressed in nutrient managing practices performed by the farmers. Other institutions (sensu North, 1990) that regard the use of natural resources, such as systems of rotational grazing, are also analysed. Farm visits and semi-structured interviews and discussions with farmer families, single-handed and in groups, and key informants, were performed during two field periods. The study reveals a system of practices and nested institutions regarding nutrient management, characterized by knowledge of critical processes on several levels. However, neither the ecological system that provides the service of nutrient recycling, nor the institutional structure that maintains the process knowledge, remains constant over time. The significance and possibility of developing and sustaining such local and traditional knowledge and practices for building resilience in situations of socio-economic and technical change is discussed.

Jeffrey Thomas, Puyallup Tribal Forest Resources Program, Puyallup, Washington, USA. The Eco-Centric Subsistence Model: A Tool for Environmental Education.

Central linkages existing between ecosystem health, individual psychological health, and community socio-cultural health are emphasized. Subsistence life ways, healthy local ecology, and traditional knowledge-perspectives are recognized as cultural-public health factors of crucial social and financial importance. Ecological systems role at the center of a community and their inherent cultural and spiritual realms is depicted. Typical families (made of individuals - husband, wife, children, elders), and communities (friends, needy, relatives) constitute a community universe where families and community members go into the ecological system together as task groups to obtain materials through hunting, fishing, gathering and/or processing so the items can be brought back to the community for sharing and redistribution. Interactions here emphasize individual specialization (that in turn fosters self-esteem, self-image and self-worth), and reciprocal relationships. Inherent cultural perspectives of the community (e.g. world views, ancestors, myths, guardian spirit helpers, songs, dances, customs, beliefs, values) important to community norms are featured as a cultural realm surrounding the community. Enveloping both the cultural and the community realms then is found a realm of spirituality-ancient concepts – with ecological systems still being at the center. Poised atop of the community system is cultural survival that tips out of balance upon collapse or deterioration of the ecological systems. Emphasis is upon socio-cultural features useful for characterizing local eco-centric subsistence systems. Related tools are the “Eco-Cultural Restoration Concepts”, “Eco-Cultural Systems Management”, and “Ecological-Human Cultural Systems Interface” models.

Nainoa Thompson, Polynesian Voyaging Society, Honolulu, HAWAI'I. Malama Hawai'i.

Alain Touwaide, University of Oklahoma, Department of History of Science, Norman, Oklahoma, USA. Building Bridges between Past and Future: The Materia Medica Mediterranea Database.

In present research, it is admitted that the drug lore of the ancient world largely influenced Western therapeutic practice until a recent time (16th century and even, according to some authors, beginning of the 19th century). However, in the current state of bibliography, scientists have no direct access to the data of ancient Mediterranean, due to the absence of translations, inventories or other reference work dealing with the topic. As a consequence, this body of knowledge is known by the reduced number of specialists of antiquity able to directly work on ancient languages. To fill this lacuna, a major research project has been launched: The Materia Medica Mediterranea Database. It aims to make available to scientists the traditional knowledge of the ancient Mediterranean in the field of natural substances used for therapeutic purposes. The paper will discuss all the elements of the Database, focusing on its actual contents, its method of elaboration and its potential. A first prototype of the site will be presented on this occasion.

Ronald L. Trosper, Applied Indigenous Studies, Northern Arizona University, Flagstaff, Arizona, USA. United States Relicensing of Hydroelectric Dams Resembles Contingent Tenure, An American Indian Way to Preserve Resilience.

On streams in Kootenai lands in the Pacific Northwest, a Guide Chief allowed the construction of fish weirs subject to weir operators sharing their catch and not harming the stream. The Federal Power Act allowed licensing hydroelectric dams; section 4(e) declared that federal reservations were to be protected. In 1930, the Montana Power Company received a license authorizing construction of Kerr Dam on the Flathead Indian Reservation. The license expired in 1980. When the Company applied for renewal, the Confederated Salish and Kootenai Tribes insisted the license address environmental concerns. In addition, the Interior Department began to use its section 4(e) enforcement powers. FERC prepared an environmental impact statement. After starting litigation, the parties reached settlement in 2000. This paper examines the extent to which the settlement's governance structure approximates governance principles used by Northwest Indians in managing fisheries and other resources. In addition to a land ethic, these principles included exchange systems based on reciprocity. Chiefs and titleholders had to be generous. Leadership authority over land was contingent upon adherence to ethical and generous behavior as well as good management. Parts of these ideas are at work in the new Kerr license. The net value of the Kerr site is spread among several parties. The licensees must comply with restrictions to protect the lake and river as well as mitigate effects of the dam. Co-management may invoke reciprocity. The experience of relicensing Kerr Dam shows that contingent tenure provided leverage to move ecosystem management toward resilience.

Nancy J. Turner, School of Environmental Studies, University of Victoria, Victoria, British Columbia, CANADA, **Fikret Berkes** and **Iain Davidson-Hunt**, Natural Resources Institute, University of Manitoba, Winnipeg, Manitoba, CANADA. Cultural Edges and Ecological Edges: Diversity in Traditional Knowledge Systems.

A well-known facet of ecosystems is that the edges - the boundaries or transitions from one ecosystem to another - often exhibit high levels of species richness or biodiversity. These transitional areas often show features of species composition, structure and function representative of the ecosystems they transcend, as well as having their own unique array of species and characteristics. Cultural transitional areas - zones where two or more cultures converge and interact - are similarly rich and diverse in cultural traits, exhibiting cultural and linguistic features of each of the contributing peoples. This results in an increase in cultural capital, and resilience, by providing a wider range of traditional ecological knowledge and wisdom on which to draw, especially in times of stress and change. We also propose that indigenous peoples whose living territories traverse ecological edges have a correspondingly increased access to culturally important resources and therefore have a greater capacity for flexibility. Finally, we suggest that indigenous peoples are drawn to areas having a high incidence of ecological edges, and furthermore, that they actively create and maintain ecological edges. This practice provides them with a higher range of cultural capital and helps to maintain their flexibility. Examples from several regions of Canada are provided, from the Southern Interior of British Columbia, to the Lake Winnipeg region of Manitoba and Ontario, to James Bay.

Ina Vandebroek, Laboratory of Tropical and Subtropical Agronomy and Ethnobotany, Faculty of Agricultural and Applied Biological Sciences, Coupure Links, Ghent, BELGIUM. Qualitative and quantitative analysis of traditional medicinal plant use by Quechua healers in the Bolivian Andes (Apillapampa, Department of Cochabamba).

Bolivia is rich in biodiversity (an estimated 20.000 plant species) and cultural diversity (around 30 different ethnic groups account for 54 % of the population), which is an interesting combination for ethnobotanical research. Nevertheless, few studies have documented traditional botanical knowledge in this country up to date. In the present study, plants used in ethnomedicine were studied over a 3 months' period in Apillapampa (3230 m.a.s.l.), a relatively isolated Andean community in Cochabamba, through field collecting trips with eight traditional village healers and semi-structured interviews. This approach allows to make inventories of medicinal plant species (qualitative research) and to distinguish different knowledge patterns among healers (quantitative research) on the basis of their information given on plant use (knowledge score is defined as percentage of local plant names and medicinal plant preparations known out of the 104 different medicinal plant species collected). Although the

highest knowledge score coincided with the two oldest healers (87 and 70 %, respectively), neither age nor number of years spent as an apprentice seem to be the sole common denominator for a high level of medicinal plant knowledge among healers. Other important factors are a combination of the number of years practicing as a healer and the number of extended family members engaged in ethnomedicine since highly experienced but autodidact healers, together with less experienced healers supported by many family members practicing ethnomedicine, have high knowledge scores ($p < 0.05$; Pearson Correlation). When selecting adequate informants for ethnomedicinal studies, these variables should be taken into account.

Julie Velásquez Runk, Yale School of Forestry and Environmental Studies and The New York Botanical Garden, New Haven, Connecticut, USA. Sustainability and Management of Tagua Palms in Ecuador: Did a Management Manual and Six Years Make a Difference?

In 1993 and 1994 I researched the ecological sustainability of harvesting seeds from the dioecious palm *Phytelephas aequatorialis* (tagua) in northwestern Ecuador. Tagua nuts are a non-timber forest product commonly known as vegetable ivory and used to make buttons, carvings, and jewelry sold on domestic and international markets. Ecological data were collected for one year and local harvesters were interviewed and observed on tagua extraction. Data were applied to an individual-based model on palm sustainability. Research results revealed heavily managed tagua populations with few subadult palms and many more reproductive female than male palms. Population modeling indicated that tagua extraction was largely unsustainable under current management regimes. These results were incorporated in a picture-based tagua management manual distributed to local communities in 1995. In 2001 I returned to the research site to assess community members use of the tagua management recommendations of 1995. I conducted semi-structured interviews to assess whether harvesters altered their management based on the manual's recommendations. The interviews were compared with demographic data from tagua plots to determine whether management had increased recruitment into the sensitive subadult life stage. In this paper I report my results and consider how to facilitate management of non-timber forest products at the local level.

Bernardo Peredo Videá, Representative of the Indigenous Center of Aboriginal Communities in the Amazon, Pando, BOLIVIA. Sustainable Production of Medicinal Plants for the Local Development of Indigenous Communities and Conservation of Natural Resources in the Bolivian Amazon.

Located at the North of the country, the Pando Province limits at North and East with Brazil, at South with La Paz and Beni and at West with Peru. Crossed from West to East by rivers from the Amazon Basin, which runs over the Department. The local economy was based on the exploitation of natural resources. Rubber during the first part of past century, Brazil-nuts nowadays, which is the main economical activity in the region, producing the main income for the region, and recently logging and cattle activities are part of the main economic activities. Although, this region still have many pristine areas, involving one of the highest biodiversity rates in the country has many threats for the future. Local people is looking forward new alternatives, based in the conservation and sustainable use of natural resources, and new ways of generating local income for their families. The scope of the work is approaching a new target: indigenous communities and sustainable use of natural resources as part of the conservation of the Amazon Forest, based on five parameters:

- 1) Management and use of tropical Amazon forest resources, supporting the limited extraction of forest resources as medicinal plants for sale to local, national and international markets.
- 2) Promotion of the sustainable use of natural resources through research on medicinal plants process for commercial activities.
- 3) Conservation of the biodiversity and forest in the Pando Province, through using sustainable resources and providing alternatives for local communities.
- 4) Development of indigenous communities through medicinal plants production, providing new opportunities that would benefit the communities within a sustainable use of natural resources, in order to provide alternative income sources for communities living in or near tropical forests.
- 5) Empower of local people through strengthening education and training.

Research of natural medicinal products based on the knowledge of indigenous people, from existing medicinal plants and products. For this purpose, the research will start with the Cat's Claw. [poster]

Christian R. Vogl, Institute of Organic Farming, University of Agricultural Sciences, Vienna, AUSTRIA. Standards and Regulations of Organic Farming: Moving Away from Small Farmers Knowledge and their Spirit of Ecologically and Culturally Sound Innovations.

During the last decade many countries of the European Community, but also countries in Latin America, Africa and Asia faced a significant increase in the numbers of certified organic farms. The driving forces have been the raising demand for organic produce by consumers in the North, the interest of mayor retailers to distribute it. All organic farmers working in the EC and exporting into the EC have to fulfill the requirements of Council Regulation 2092/91 and all monitoring bodies, which certify products grown within the EC or exported into the EC have to work according to European Norm 45011. These two standards and its strict control have led consumers to be confident with organic products. But the global implementation of these standards can be seen as an attempt to gain universal homogenous rules for growing and trading organics. This trend neglects and ignores

the origin of organic farming, which lay in the hand of many innovative farmers worldwide, and not in the hands of lawyers nor scientists. This trend ignores the ecological and cultural necessity of locally adapted management systems for natural resources too. It also hampers farmers innovations and experiments. Instead, the further development of organic farming and its standards needs to respect the traditional ecological and technological knowledge of farmers (see examples) and it needs to encourage innovations of farmers (see examples) in the management of natural resources.

Brigitte Vogl-Lukasser & Christian R. Vogl, Institute of Ecology and Landscape Conservation University of Vienna, Vienna, AUSTRIA. The Management of Homegardens on small farms in the Alpine Region of Osttirol (Austria) by farmers women: An Example of Change in Traditional Local Knowledge.

Ethnobiological research is rare in Western Europe, even though thousands of farmers manage their farms using local knowledge and technologies. Alpine small farmers have formed a typical landscape, which is the result of an adaptive management of natural resources. Homegardens are part of this landscape. 196 homegardens from 12 communities were investigated in 1997 and 1998. Both, cultivated plant species and weeds were surveyed three times a year. Interviews were also carried out with the women responsible for these homegardens. Until now modern horticultural methods and technologies do not have a significant impact in homegardening in East-Tyrol. Harvested products are consumed on-farm. Proactive replanting of traditional local varieties can still be found. The total population of cultivated plants were made up of 587 species. 79 cultivated species have some kind of endangered status and can be found on the Austrian red list of endangered ferns and flowering plants. The total population of weeds is made up of 133 species. 16 of these can be found on the red list of endangered plants in Austria. Plants are used in a variety of different ways, whereby the plants grown have undergone significant change. New species have been introduced in homegardens in the last 20 years (e.g. about 400 species used for decoration, 45 used as spices, and 38 used as vegetables). Homegardens with high agrobiodiversity in the Alps are a result of recent years. Creating awareness of the high value of homegardens will be a major challenge, both for ethnobiologists and for European policy-makers seeking to preserve biodiversity and the smallholder structure of agriculture.

Charles Wambebe, Director, National Institute for Pharmaceutical Research and Development Abuja, NIGERIA. Bridging Research to the Clinical Use of Plant Medicines.

Anecdotal evidence abounds in China, India, Africa, the US and Europe regarding the efficacy and safety of plant medicines used routinely over many centuries for the treatment of prevailing ailments. Yet these valuable plant medicines are not found in the hospitals of most parts of the world. Even in developing countries where more than 70% of the population relies on plant medicines for primary health care, these products are generally not registered for public use by health regulatory agencies. What factors are responsible for the status quo? Can we learn some lessons from the renaissance of knowledge and use of plant medicines during the last decade? This paper focuses on one of the key elements for bridging research data to clinical use of plant medicines – *double-blind, placebo-controlled, randomized clinical trials of plant medicines*. I will discuss, among others themes, rational clinical protocol design; resources; monitoring; and expected outcomes of such clinical studies. Two examples involving the use of plant medicines for treating HIV/AIDS and sickle cell anemia in Africa will be cited.

Deborah J. Ward, College of Tropical Agriculture and Human Resources, Natural Resources and Environmental Management, University of Hawai'i, Hilo, HAWAII. Grow the Child with Love for the Land: Experiential Learning-Environmental Literacy. Extension Educator Deborah Ward with Hawaii's 4-H Youth Development Program will share experiential learning techniques focusing on agriculture and the environment for classroom, garden and educational off-school sites. In traditional Hawaiian culture, the child learns from birth to appreciate and care for the land. By taking part in all aspects of traditional planting and harvesting, child's mind and senses grow together. We build on this tradition by integrating the sensory and intellectual education in the classroom and garden setting. We expand on the traditional makahiki gathering by offering festivals that focus on motivating the youngsters to want to know more about agriculture and the environment. Extension educators find that learners are enthused about hands-on, learning-by-doing activities. [poster]

Alice Warren-Bradley, Department of Biology, Florida International University, Miami, Florida, USA. Sustainable Harvest of Irapai (*Lepidocaryum tenue* Mart.) In the Peruvian Amazon.

Irapai (*Lepidocaryum tenue*, Arecaceae) is a small, under story palm used for roofing thatch by Amazonian people. Rapid population growth in the Peruvian Amazon has led to an increased harvest of fronds. In recent years, larger numbers of leaves have been collected to construct lodges and other ecotourist facilities. Cultivation does not occur. The purpose of this study is to evaluate the impacts of frond harvest. Population stability and yield continuity were used to determine harvest sustainability. This study (1) examines matrix models to determine population stability; (2) documents abundance of stems and production of leaves; (3) simulates frond harvest levels; (4) provides data on resource use by humans; and (5) makes recommendations for local resource management. In this poster I report initial findings from five study sites within two-day's travel outside Iquitos, Peru. Study sites included harvested and non-harvested areas. In multiple plots per site, all stems were tagged, measured and monitored for one to three years. To describe the population structure, I defined four size class categories. I recorded changes in

palm size and numbers of new fronds produced per stem for each of the four size classes. From these data I calculated life tables and growth rates of individuals. In addition, I conducted a market survey in Iquitos to document the number of irapai fronds harvested and products made from the palm. Preliminary results indicate that harvest affects both new stem and new frond production. Initial findings show an elevation of new leaf production rates within six to twelve months following harvest by selective means. Results suggest that total stem and leaf production are negatively affected by predatory or indiscriminate harvest methods. Maintaining viable population levels will depend on understanding the biological needs of the resource and the long-term economic requirements of area residents.

Coral Wayland, Department of Sociology and Anthropology, University of North Carolina, Charlotte, North Carolina, USA. The Power and Politics of Plants: Critical Approaches to Ethnobotanical Knowledge.

In the 1970's, development practitioners realized what anthropologists had long known: that many local populations have an astute understanding of their environment that has evolved over generations. With this new appreciation of what is known as local or indigenous knowledge came a proliferation of research on the subject. Anthropologists joined ethnobotanists, ethnopharmacologists, and biologists in their efforts to catalogue the local ethnobotanical knowledge of various groups around the globe. Many of these studies were undertaken in the hopes that the ethnobotanical knowledge they collected could inform locally situated development projects in areas such as health care, agriculture, forest management and income generation. The papers in this session attempt to further our understanding of ethnobotany by employing a critical perspective. Moving a step beyond traditional ethnobotanical studies of what people know about plants and how they use them, the papers in this session examine the contested and politicized aspects of ethnobotanical knowledge. Among the specific topics addressed in this session are: medicinal plant discourse as a form of resistance in the Amazon; the changing meaning of maize agriculture among the Lacandon Maya; the creation of a new discourse on the healing potential of plants in Ecuador; the promotion of medicinal plants by state sponsored clinics in Brazil; the changing and contested meanings of cultivated plants in Thailand; the political and economic struggles over forest resources in post-revolutionary Nicaragua; the social and economic power of biotechnology in society; the marketing, protection and meaning of medicinal plants in Nepal; disparate forestry programs implemented in New Zealand's South Island; and bamboo cultivation as a subversive activity in Vietnam. The use of a critical perspective highlights a number of issues that are currently of interest in anthropology: the meaning, the uses and the power of knowledge. First, plants not only have specific uses in a given culture (e.g. food, medicine, lumber), they also have meaning for the people who use them. The papers in this session explore some key issues in this area including how meaning is created, contested, and changing in local knowledge systems. Second, local ethnobotanical knowledge can be put to a variety of politicized uses. Within development, different groups (such as NGO's, farmers, government agencies, indigenous groups, etc.) have different agendas. At times, ethnobotanical knowledge is involved in the struggle to achieve these agendas. Therefore, some of the papers in this session explore the role of ethnobotanical knowledge in local power struggles, the appropriation of local plant-centered discourses, the commercialization of local knowledge, and the state's relationship to ethnobotanical knowledge. Finally, with the growing importance of ethnobotany, those who have and control local knowledge can gain access to power. In this vein, the papers in this session explore how ethnobotanical knowledge empowers various groups, and how plants gain and lose power within a culture.

Lyndon Wester, Department of Geography, University of Hawai'i, Honolulu, HAWAI'I. and **Sekson Yongvanit**, Department of Humanities and Social Science, Khon Kaen University, Khon Kaen, THAILAND. Forest Temples and Forest Conservation in North East Thailand.

Forest reserves declared by the Thai government in the 1960's and 1970's have, in many areas, been degraded as forests or completely converted to agriculture. In the Dong Mun Forests of Northeastern Thailand, the combined effects of economic development, greatly improved transport and communication systems, coupled with rapid population increase, overwhelmed the weak government institutions that existed to manage the forests. Although the situation is now more stable, the indigenous conservation ethic still provides significant protection for the remaining forests. This takes the form of prohibitions by monks against cutting of trees and hunting of wildlife in the land around "forest temples". These institutions may range from a single monk living in a cave or the simplest of wooden hut, to a religious community with a complex of ornamented brick and cement structures that are centers of regional or national religious pilgrimage. As many of 33 such temples have been identified in an area of 100 square miles. The words of venerated monks against forest degradation, are far more effective than restrictions imposed by the central government. Despite similarity of goals for the forest, there is considerable tension between the Royal Forestry Department and the monks who have created the forest retreats and who live onsite with the assistance of the local rural population.

Art Whistler, Isle Botanica, Honolulu, HAWAI'I. The Dark Side of Politically Correct Science in Polynesia.

Biological research in Polynesia has recently hit a major roadblock because of politically correct lobbying and by unrealistic local expectations of financial gain. Scientific projects in genetics, zoology, and botany that have no possibility of generating foreign wealth have been extorted from, hampered, and even prohibited because of suspicion, insurmountable bureaucracies, and greed. What needs to be debated in the case of Polynesia, where few if any native species are likely to have outside commercial value,

are questions like, "what is an intellectual property right", "can a country own a species", "are current local guidelines for controlling in-country research harming science and ultimately even the people of the region", and "what can be done to make it a win-win situation".

Hans Wohlmuth, School of Natural and Complementary Medicine, Southern Cross University, Lismore, AUSTRALIA. Herbal Medicine in Contemporary Australian Society.

About half the Australian population use some form of 'alternative' medicine and Australian consumers spend more on 'alternative' medicines than on pharmaceutical drugs. Many 'alternative' therapies are based on traditional medicine. This presentation will focus on Western herbal medicine (as distinct from Traditional Chinese Medicine), trace its roots and history and describe its current status in Australia. Herbal medicine as practiced in Australia today has its roots in the European and North American herbal traditions, but is continuously being enriched with plants from other traditions, in particular Traditional Chinese and Ayurvedic medicine. In contrast, Australian aboriginal medicine has had almost no impact on the practice of herbal medicine in mainstream Australian society. Herbal medicine in Australia appears to be at a turning point. As research increasingly provides evidence for the clinical efficacy of traditional herbal remedies, increased attention is being paid by pharmaceutical companies, medical practitioners and government regulators. Herbal medicine is now offered as part of a 4-year naturopathic bachelors degree programme at Southern Cross University, a publicly funded Australian tertiary institution. Herbal medicine in Australia appears to be on the brink of moving from being 'fringe' to become part of mainstream healthcare. Can it survive this process as a traditional system (which is an important part of its consumer appeal), or is traditional herbal medicine about to disappear from the Australian society, to leave only plant-based pharmaceutical drugs?

Laiana Wong, University of Hawai'i, Department of Hawaiian and Indo-Pacific Languages, Honolulu, Hawai'i, USA. The Cost of Language Lost.

Linguists have generally maintained that language change is a natural phenomenon and that efforts to maintain the "purity" of a language are for all intents and purposes futile. Nonetheless, there are those who are growing increasingly concerned with the precarious positions of many smaller languages which are currently faced with impending doom. Their arguments for maintaining such languages are motivated primarily by their goals of advancing human understanding of the nature of language itself. That is, if a particular language is lost, so will be lost the answers to some of our questions about language in general. This argument is analogous to the argument for preserving endangered species of living organisms. Other arguments for preserving endangered languages have focused on inherent human rights to maintain and practice one's language of heritage. An individual or a people would strive to maintain their identity and have that identity be made manifest through the active use of their language of heritage. Despite the undeniable fact that languages change over time and that the speakers of those languages are complicit in effecting that change, there are still many reasons to support the preservation of any part of one's language that is in danger of being lost. My focus with regard to the preservation of Hawaiian deals with worldview issues and the attempt to maintain a separation between Hawaiian worldview and the ever pervasive English worldview towards which the Hawaiian language is shifting. For this talk I will focus on the Hawaiian terminology that was employed (according to Pukui) in indexing the kinship system in Ka'ū, Hawai'i. Terms traditionally used to describe family relationships are giving way to transliterated English terms such as 'anakē 'aunty' and 'anakala 'uncle'. The consequence of such a shift is that a Hawaiian way of looking at family relationships will be forgotten in favor of the English. The relationships and the responsibilities that accompany them will be forgotten in favor of an introduced system; a system which has already supplanted the traditional one for most Hawaiians. Thus, in the effort to revitalize or reactivate Hawaiian language, many such losses are occurring. My argument for preserving the traditional language system is that in doing so speakers will have repertoires that include language use patterns in Hawaiian that can perform for that speaker functions inaccessible to English. This in itself represents a compelling reason to preserve the traditional language. That is, why bother making the effort to learn a second system that can offer no further versatility than already available through the first system?

Michael Wysong, Department of Botany, University of Hawai'i, Honolulu, HAWAI'I. Quantitative ethnobotanical study of plant resource usage in Manu'a, American Samoa.

The purpose of this presentation is to discuss quantitative data that explores the level of selected plant usage by the average American Samoan household in Manu'a, American Samoa. Approximately 29 different species were targeted for study. These include native species, Polynesian introductions and modern introductions. The traditional uses of these 29 species vary greatly and include such use categories as construction, food, medicinal, fiber, personal decoration, carving and handicrafts, and firewood. Data on frequency of usage as well as location of harvest of these species is presented. Different quantitative ethnobotanical methods used for data collection are also discussed as well as data analysis. General conclusions are discussed about the use of these plants today in American Samoa and how this pattern of usage compares to recorded traditional uses.

Jonathan Yee, Hawaiian Kava Center, Honolulu, HAWAI'I. 'Awa's (kava's) dual role as a sacred plant and commercial product – a Hawai'i perspective.

Hawaiian kava, or 'awa, has been grown in Hawai'i by Hawaiians since time immemorial as suggested by cultural evidence and recordings. Because of Western colonization of Hawai'i, and its consequence of marginalizing Hawaiian culture in the past, much knowledge about 'awa has probably been lost. What we do have are over 14 varieties of 'awa collected from old groves in isolated areas, families, and areas of known historical significance. Continuing ethnobotanical research suggests there are more Hawaiian kava varieties still. Now with worldwide interest in kava as a therapeutic, social, and recreational plant, and the continued growth of Hawaiian culture and its desire to understand and/or incorporate its heritage into practice, the demand for kava is very high. Yet, because of 'awa's commercial value and ignorance, theft and extirpation of old 'awa groves are occurring. Hawaiian kava is also grown commercially in Hawai'i with the large productions already in harvest and re-plant cycles. Distribution is worldwide and growing. There is much corporate and university research potential to develop new strains and technologies. With these dynamics in play, issues concerning 'awa as a sacred plant and commercial product arise, some of which are addressed here:

How is 'awa being re-incorporated into Hawai'i society?

Who are the beneficiaries?

What are our concerns and/or potential outrage?

What can we do?

Eglé L. Zent and Stanford Zent, Departamento de Antropología, Instituto Venezolano de Investigaciones Científicas (IVIC), Caracas, VENEZUELA. The Hoti: Botanically Knowledgeable Trekkers of the Venezuelan Amazon.

This paper explores the claim that human groups defined as hunter-gatherers or trekkers know less plants of their environments than their horticultural counterparts. Fieldwork was carried out during twenty months among the Hoti, a little acculturated trekker group who inhabit the Sierra Maigualida, Venezuelan Amazon. A replicable, multifaceted methodology was used, relying on both quantitative and qualitative data analysis, in order to test the hypothesis in ideological, utilitarian, and theoretical terms. Four Hoti communities with different social and ecological circumstances were selected for the intensive study. Four 1-ha botanical plots were laid out in each community, all individuals = 10 cm dbh were tagged, and voucher specimens were collected. A total of 169 Hoti of different ages and gender were interviewed about the 2012 tagged plants. Both names and uses were elicited. Participant and focal-follow observations were also conducted. The results were compared with those available in the literature where similar methods had been applied. It is shown that the Hoti: (1) know the same or more than the horticultural groups (11 life forms; 565 folk generics, 108 of which are polytypic; 509 folk specifics; 5 varieties); (2) are dynamic ecological agents essential in the configuration of the forest they have been inhabiting; (3) Hoti knowledge, exploitation and management of plant and animal habits indicate potential co-evolutionary processes among humans-plants-animals; and (4) plants permeate Hoti culture on ideological and economic planes to such an extent that they have been active agents in the definition and biological reproduction of this ethnic group.

Stanford Zent, Departamento de Antropología, Instituto Venezolano de Investigaciones Científicas (IVIC), Caracas, VENEZUELA. Indigenous Knowledge (IK) Dynamics: A Critical Methodological Perspective.

A very recent trend in Indigenous Knowledge (IK) research is to focus on the dynamic aspects of IK such as innovation, erosion, transformation, transmission, and acquisition. One of the hottest topics of discussion in this emerging line of inquiry concerns the appropriateness, adequacy, and determinacy of the methods which are employed to represent and explain these dynamic processes. A number of different research methods, field and experimental, quantitative and qualitative, have been tried out. Descriptive methods include: structured interviews, plant trails or plots, drawing or picture cues, map making, story-telling, dialogue recording, context-sensitive participant observation, behavioral sampling, and video-recording of knowledge interaction events. Analytical methods include: informant indexing, consensus analysis, controlled comparison, contingency tables, simple regression, multiple regression, multi-dimensional scaling, cluster analysis, network analysis, discourse analysis, and historical interpretation. The present paper reviews the applications of these different methods, reflects on the pros and cons of each one, and provides some suggestions for advancing our methodological perspective of IK dynamics.

Nyree Conard Zerega and Timothy J. Motley, Lewis B, and Dorothy Cullman Program for Molecular Systematics Studies, The New York Botanical Garden, Bronx, New York, USA. Identification of black cohosh (*Actaea racemosa*) using DNA fingerprinting (AFLP).

Black cohosh, *Actaea racemosa* (Ranunculaceae) is a North American perennial and the rhizomes of this species have been used for centuries to treat a broad range of ailments. Both native North Americans and Europeans have employed it to treat conditions from rheumatism to female health concerns. Today black cohosh is still touted as a treatment for a wide range of health concerns, but it is used as an alternative to hormone replacement therapies. In the United States it is a popular botanical dietary supplement and the laws regulating such supplements are less stringent than those regulating drugs. The rhizomes for the black cohosh products are often collected from the wild and to insure quality control, it is imperative that plants be correctly identified. We examined the use of the DNA fingerprinting technique, amplified fragment length polymorphism (AFLP), as an analytical means of identifying *A. racemosa* from three other closely related sympatric species. To this end, 262 AFLP markers were

generated, and unique fingerprints were identified for *A. racemosa*, and the closely related species *A. pachypoda*, *A. cordifolia*, and *A. podocarpa*. Additionally, two commercial black cohosh products were subjected to AFLP analysis and shown to contain only *A. racemosa*. The results of this study suggest that AFLPs may offer a useful method for quality control of black cohosh and possibly other species in the botanical dietary supplements industry.

Nyree Conard Zerega, Diane Ragone, Timothy J. Motley, Lewis B. Garden, and Dorothy Cullman, Program for Molecular Systematic Studies, The New York Botanical Garden, Bronx, New York, USA, and The National Tropical Botanical Garden, Kalaheo, HAWAII. Hybrid origin of breadfruit, *Artocarpus altilis*.

Breadfruit, *Artocarpus altilis* (Moraceae), has long been a traditional staple crop in the islands of the Pacific where seedless varieties are prized for their starch, and the less common seeded varieties are eaten for their proteinaceous seeds. Breadfruit has been cultivated and improved upon by human selection for millennia throughout the Pacific Islands, and early voyagers extensively transported the resulting cultivars among the islands. Both widespread movements of the crop as well as the great morphological variation existing among the many breadfruit cultivars have confounded its origin and taxonomy. Two additional closely related species, *Artocarpus mariannensis* and *A. camansi* further complicate matters. *Artocarpus camansi*, often referred to as breadnut, is circumtropically cultivated for its seeds and is probably native to New Guinea. In the most recent revision of the genus all three species are lumped into one breadfruit species complex, *A. communis*. We recently undertook investigations using molecular techniques to help elucidate the relationships among these three species. Morphologically they are quite distinct and our DNA sequence and fingerprint data support this view. Additionally, our data suggests an origin for the cultivated breadfruit, *A. altilis*. It appears to be the product of a hybridization between *A. mariannensis* and *A. camansi*.

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The mbira, a musical instrument of great antiquity, has been an integral part of African culture throughout history. In its myriad shapes, sizes, and forms, the mbira illustrates the great diversity that can occur within African culture and tradition. Common to all Africans, though, is the idea that the mbira can offer voice to the indigenous experience, and the distinctive African interweaving of rhythm, music, and medicine. Yet, local knowledge of mbira construction, performance, and usage within African traditional medicine is being lost, as globalization brings new technologies and new ways of life to Africa. Our research: 1) addresses the inherent nature of the mbira instrument as a cultural root of the African heritage, 2) recognizes that this and other musical instruments are derived from plant life and that music often arises from cultural practices interconnected with the environment, 3) provides a scientific study of the mbira through mathematical, acoustical, and physical analysis, 4) proposes an integrated curriculum through which mbira studies may be incorporated into mainstream educational systems, and 5) attempts to preserve traditional knowledge relating to mbira construction, performance, and usage, while applying conventional technology towards the evolution of a digital mbira.

Germán Zuluaga Ramírez, Amazon Conservation Team, Colombia Program, Bogota, COLOMBIA. The Biological And Cultural Conservation Of The Amazon Piedmont In Colombia: Dr. Schultes' Heritage.

Richard Evans Schultes, the father of modern ethnobotany, arrived in Colombia in 1941. Over a period of 50 years, Schultes carried out the most extensive research of his era on the plants and cultures of the Colombian part of the Northwest Amazon. His invaluable work stands out not only for its scientific excellence, but because he was the first researcher to emphasize the important role to be played by ethnobiology in the coming years. Even in Schultes' time, ethnobotanists across the world were pressed to recognize the importance of focusing on both the conservation of the Amazon jungle and of its inhabitant cultures, societies which serve as repositories of knowledge about many medicinal substances with great potential application for the Western world. Schultes took direct action, strongly urging the research community to cease expeditions having the sole purpose of searching for new medicines; instead, he insisted on the need to train professionals willing to share life with the peoples of the tropical jungles. Dr. Schultes worked to transform a botany increasingly concerned with economic potentials into an ethnobotany with heart. The Amazon piedmont is the world's region of greatest biodiversity, as well as home to one of the last surviving ancient shamanic traditions, the yagé culture, which comprises five distinct ethnic groups. The yagé culture preserves a comprehensive set of shamanic practices, including the ritual use of their sacred plant, yagé or ayahuasca (*Banisteriopsis sp.*), alongside a vast knowledge of the jungle and its medicinal plants. With the enthusiastic support of ethnobotanist Mark Plotkin, one of Schultes' dearest disciples and President of The Amazon Conservation Team, we have implemented a program that seeks the protection, recuperation and strengthening of the indigenous cultures of the Amazon piedmont. We believe that their knowledge and practices, as well as their shamanic systems, are extremely important and useful for biodiversity conservation and for expanding the scope of health models around the world. The diverse programs of the Amazon Conservation Team have a common objective: to engender a true intercultural dialogue between traditional indigenous knowledge and Western science. Thus, our program in Colombia has developed an integrated strategy for biodiversity and cultural conservation that includes shamans and apprentices programs, construction of ceremonial houses, planting of medicinal gardens, sacred lands reclamation,

ethno-education and sustainable production projects, in each case in concordance with the shamans' guidance. The culmination of our recent work was the historic gathering of forty indigenous healers from 7 tribes across the Colombian Amazon, surviving practitioners of one of the last great shamanic traditions. The participating elders produced the first code of ethics of traditional medicine of the Colombian Amazon, which was published with the title "The Beliefs of the Elders."