

Michael J. Balick, PhD

Ethnomedicine:

Ancient Wisdom and Modern Science

Interview by Bonnie Horrigan | Photography by Muriel Weinerman and Jim Wiseman

Michael J. Balick, PhD, is the philecology curator of economic botany and the director of the Institute of Economic Botany at The New York Botanical Garden. For over three decades, he has studied the relationships among plants, people, culture, and conservation. He works with traditional peoples to document their plant knowledge and to understand how they have traditionally managed their natural resources, helping to develop sustainable utilization systems for these resources while always ensuring that the benefits of such work are shared with the local communities. His 56 international expeditions to date have taken him to places such as Belize, Bolivia, Brazil, China, Colombia, Costa Rica, Ecuador, Egypt, Federated States of Micronesia, Haiti, Honduras, India, Israel, Jamaica, Mexico, Palau, Peru, Sri Lanka, Trinidad, Thailand, and Venezuela. Dr. Balick, who received his PhD in biology from Harvard in 1980, also conducts research in New York City, studying traditional healing practices in ethnic urban communities.

In 1981, he cofounded The New York Botanical Garden's Institute of Economic Botany with Sir Ghillean Prance, devoted to furthering knowledge of the relationship between plants and people. It has become the largest and most active program of its kind in the nation.

Of particular interest to *EXPLORE* readers, Dr. Balick has been active in several ethnopharmacological investigations—the search for plants with medicinal properties—particularly in Belize where his research with Dr. Rosita Arvigo aided the for-

mation of the world's first ethno-biomedical forest reserve. He cofounded the Ix Chel Tropical Research Foundation, with Drs. Arvigo and Gregory Shropshire, a center in Belize devoted to traditional healing and cultural preservation, and, from 1986 to 1996, he helped lead a collaboration between The New York Botanical Garden and the US National Cancer Institute to survey Central and South America and the Caribbean for plants with potential applications against cancer and AIDS. He is currently involved in an ethnobotanical survey of the Federated States of Micronesia, in particular the island of Pohnpei and its outer atolls, in collaboration with the National Tropical Botanical Garden, The Nature Conservancy, the Beth Israel Continuum Center for Health and Healing, The College of Micronesia, local government offices, and the Pohnpei Council of Traditional Leaders. A major effort in this work is to study the devolution of traditional knowledge and its impact on the local environment and to take initial steps to reverse the trend.

Dr. Balick currently serves as an adjunct professor at Columbia University, New York University, Yale University, and City University of New York and is vice president of botanical research and training at The New York Botanical Garden.

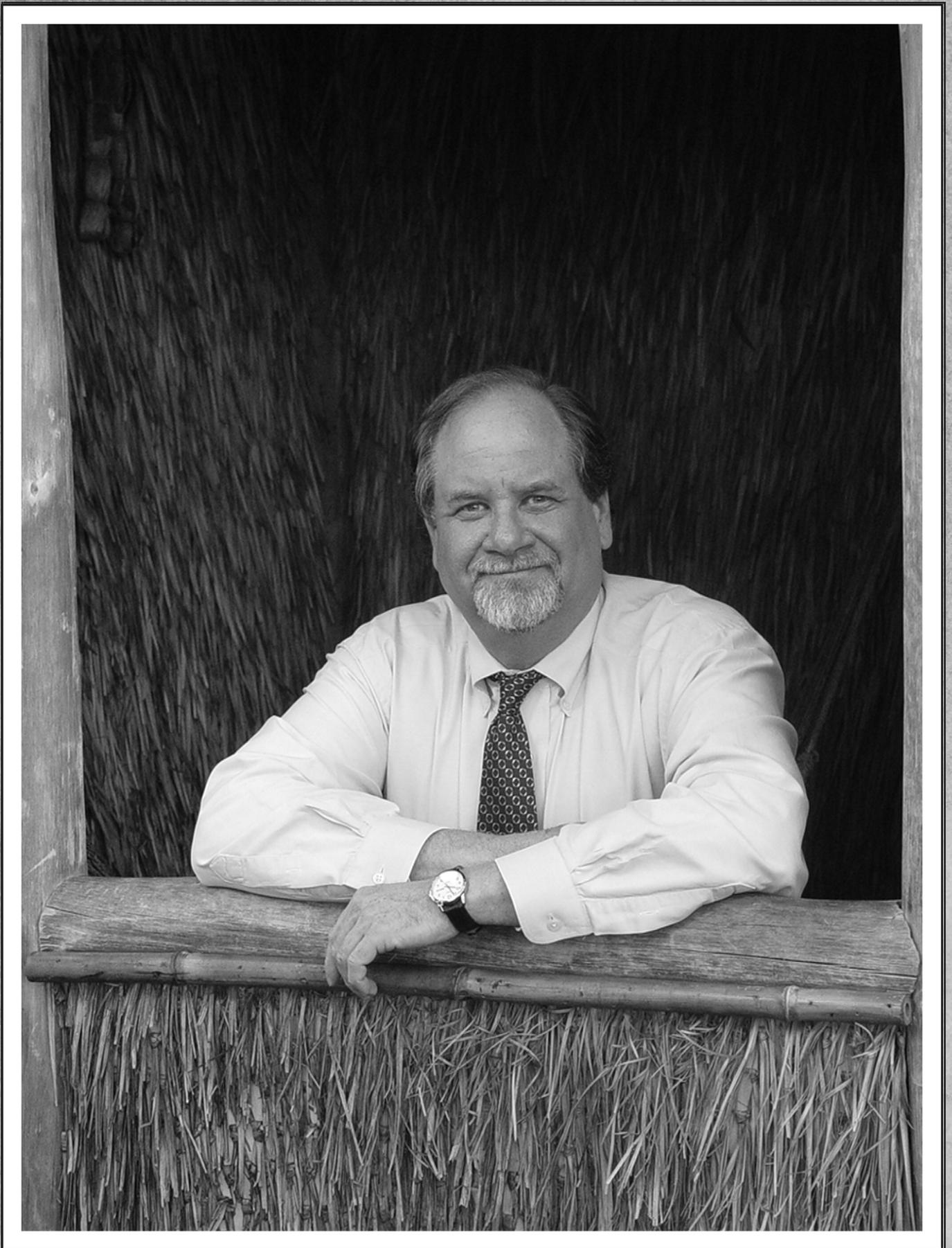
EXPLORE interviewed Dr. Michael Balick at his office, both indoors and outdoors at the magnificent setting of The New York Botanical Garden during the winter of 2005, surrounded by photographs and ethnographic specimens obtained during his field studies and warmed by cups of exotic herbal teas.

Ethnobotanist Michael J. Balick, PhD, stands framed by a window of a traditional healer's house surrounded by a forest of guava, avocado, coconut, mango, and annatto trees in the Enid A. Haupt Conservatory at The New York Botanical Garden. The healer's house presents the use of plants as medicine by the Mayan people of Belize to hundreds of thousands of visitors a year. Photo by Muriel Weinerman.

EXPLORE: Let's start with ethnobotany. What is it?

MICHAEL BALICK: Ethnobotany is the study of the relationship between plants

and people, which involves aspects of their culture as well. So it is the study of plants, people, and culture. It's the science of understanding how people relate to the



environment around them. How they have related to it historically, how they interact with it in the present, and perhaps how they will in the future. We are interested in learning about topics ranging from how people made and sailed canoes in ancient times, and the rate at which skills and practices such as these are disappearing today as more and more voyaging peoples buy fiberglass boats with motors that are made in another part of the world, to how they gather, grow, and prepare the plants used in their healthcare or diet. We study how globalization erodes knowledge of these skills—perhaps readers of this journal would be most interested in the ethnomedical aspect of ethnobotany, how people use plants for their primary healthcare—what their beliefs are, and what science is behind those beliefs. We then try to see how those ancient beliefs that sustained entire cultures for thousands of years can serve as a bridge to the present, to help address some of the issues that society faces today—such as in modern healthcare and natural resource management.

The New York Botanical Garden is one of those great centers of research and learning worldwide where studies are conducted not only in ethnobotany but also in a broad range of other areas within the plant sciences—from studies of the flora of North America to exploration of remote wilderness areas in the Amazon and Andes in the search for new species of plants and fungi, to laboratory studies that allow for the classification and understanding of the evolution of plants based on their molecular structure, and to genomics, with its search for the genes that control expression of a certain trait; for example, whether the texture of a fruit is hard or soft. The Botanical Garden's research collections include a herbarium—a collection of preserved plants for scientific study—of 7.2 million specimens, one of the world's finest botanical libraries, and 50 gardens and collections of living plants across 250 acres. Our research agenda comprises basic and applied botanical science, with a great deal of crossover and high degree of collegiality, and it is only in an atmosphere such as this that a program in ethnobotany can reach its full potential.

EXPLORE: Can we talk about things you have learned during your expeditions to

some of the more remote areas of the world?

BALICK: Back in the 1970s, I was fortunate enough to experience an event that was rather extraordinary and convinced me that the mind-body connection was in many ways key to the healing process. I was working in the *Llanos* of Colombia, the grassy savannah regions populated by the *Guahibo* people when a young man was brought in with a *montonosa* (*Bothrops* sp.) snakebite of a very serious nature. The *Guahibo* people are hunters, particularly nocturnally, hunting deer, alligators, rodents, and pigs, and this deadly snake can be found all over those grasslands. The young man had been bitten in the calf. His friends had carried him from their savannah hunting ground to our field hospital in the development community, “Las Gaviotas,” a trek of several days, and he was in a toxic delirium. He had severe edema, blood was coming through his pores and was in his urine, and he was in this terrible state of decline. Basically, he was incoherent and dying.

“It was a seminal moment in understanding that if you could somehow harness the mind of the patient as well as the physical being, you would probably get better results.”

Dr. Zethelius, a gifted Colombian physician, who was fulfilling his national service in this remote part of his country, immediately injected him with enough antivenom to neutralize any serious bite. But it didn't help. Now, there happened to be a *Guahibo* shaman in the field hospital, who was there being treated for tuberculosis. So the shaman went to the doctor and said, “He is one

of my people, and he has no idea of what you are doing. Those needles mean nothing to him. Let me do my traditional snakebite treatment.” So Dr. Zethelius, who comes from a family of great humanists and intellectuals and who understands the importance of traditional medicine, agreed to let the shaman perform the tobacco ceremony, which is very common and very tightly embedded into South American cultures.

The smoke blowing treatment involved singing a song similar to that of a nocturnal bird (*Uculi, Uculi, Uculi. . . Uruba, Uruba, Uruba. . . Chogue, Chogue, Chogue. . .*) while blowing tobacco smoke and splashing tobacco water on the patient's extremities. There is nothing invasive about it. Shortly after the treatment, the young man came back into consciousness. Doctor Zethelius was monitoring his vital signs, and I was sitting there monitoring Doctor Zethelius because, while I had been working with traditional healers for many years, I had never seen anything like this. After a short while, the young man's vital signs returned to normal, and, within four days, the problem was confined to his leg.

Dr. Zethelius observed in a paper that we published together in the *Journal of Ethnopharmacology* (Modern medicine and shamanistic ritual: a case of positive synergistic response in the treatment of snakebite, May 1982 [accessible via http://sciweb.nybg.org/science2/Profile_15.asp]) that he had never seen such a profound shift from a toxic state to a healthy state using allopathic medicine alone. He was convinced that the patient would have died had not the shaman intervened. Our stated hypothesis in that publication was that the synergistic response obtained through treatment of both the mind and the body simultaneously was responsible for the patient's recovery in this very traumatic case. Obviously, the patient had strong beliefs and trust in traditional shamanistic medicine.

For me, it was a seminal moment in understanding that, in the delivery of healthcare, if you could somehow harness the mind of the patient as well as the physical being, you would probably get better results.

So over the next few years, I thought about this type of synergy—as well as did many others involved in the growth of the mind-body movement in the 1980s and 1990s—but it was the realization that this

connection has been recognized and used by nearly all traditional cultures (but our own) that helped set the trajectory of my research interests and career.

EXPLORE: That experience changed your research?

BALICK: It did. At the time, I was conducting research on native Amazonian palm trees and their value in nutrition and utilization. My mentor at Harvard was Professor Richard Evans Schultes. He was the director of the Harvard Botanical Museum and was of the belief that the greatest opportunities for scientific discovery in botany and pharmacology were to be found in the remote and poorly studied regions of the world. His focus was on the Amazon Valley. A dozen or more students and research associates were based at the Museum, and there were always people coming from somewhere interesting and exotic or about to take off on a lengthy period of fieldwork. New discoveries—of plants, fungi, and their traditional uses or chemical composition were the topic of daily conversation, along with tales of adventure and unusual experiences while in the field.

While most of the Museum students studied psychoactive plants, I and one other person studied food plants. My goal was to work with indigenous cultures to identify plants with potential for widespread use in addressing human hunger and poor nutrition. During my undergraduate years, I had undertaken botanical research in a small village where children died of malnutrition, something I can never forget. So there were no chemically induced visions as part of my studies, only consumption of unusual foods in their native setting. I was looking at diet and nutritional habits and discovered a palm-based protein from the fruit of a plant known as *Oenocarpus bataua*, with a biological value equivalent to mother's milk or meat. This was a significant discovery, one that put scientific rationale behind the fact that the people who ate this fruit gained weight and were healthier and more resilient during its season of abundance than the people who did not. But the experience with the *Guahibo* people, and the realization of its powerful message, turned my attention from a tight focus on agriculture and nutrition to a broader ethnobotanical interest, including the study of

plant-based medicines and medicinal cultural traditions.

EXPLORE: Let's go back to the tobacco ceremony and the theory that it took both the conventional and the traditional intervention to work.

BALICK: The antivenom was given first, but it didn't do anything by itself. The patient was still declining rapidly.

EXPLORE: But a hundred years ago, if someone had been bitten by a *montonosa*, they would not have had the antivenom. They would have only had the traditional healing method. So does the traditional method work by itself?

BALICK: Since that time, I have come into contact with a great number of snakebite healers in various places, who tell me that conventional physicians often release patients from hospitals into their care, and they succeed in curing them. However, I once had a conversation with the late Roger Caras, internationally recognized as an expert on animal life, while we traveled in Belize together, and he had a most interesting explanation of how indigenous snakebite healers have such a high claim of success. He explained that he was given a sacred rock in one of his travels to the rainforest and was told it could cure snakebite 90% of the time by keeping it in his pocket. It worked, Roger said, because 50% of the time, the snake was not poisonous. Then, 30% of the time, it was a dry bite—the snake had already eaten and there was no venom left. And then for 10% of the bites, there was not enough venom injected to be deadly, or the bite was in the wrong (right?) place. Of course, 10% of the time it doesn't work. However, through belief in this system, perhaps the placebo effect impacts the latter 10% of the victims as well. I found Caras' story of how a rock in a person's pocket could cure snakebite the majority of the time to be fascinating and worthy of further thought.

But the Colombia case was clearly different. And there are other cases where people are dying or declining, yet when they are released into the care of the healers who then use plants, they get well. There are many poisonous snakes in Central America, and, in the book that Dr. Rosita Arvigo and I are writing about our ethnobotanical studies in Belize—which contains information on 950 different species of plants used by Maya, East Indian, Creole, and other healers—we identified

the plants used for snakebite treatments. Buttonwood, cockspur, *culantro*, snake plant, and *susumba* are examples of local species used in some part of a traditional snakebite treatment.

EXPLORE: So there is a biological aspect to the native healing and not just a psychological aspect.

BALICK: Absolutely. The people we work with in Central America have taught us a wide range of plants designed to calm people down, delay movement of toxins, neutralize venom, and things like that. In fact, reserpine, a drug initially prescribed for lowering blood pressure, was derived from the root of *Rauwolfia serpentina*, a snakebite plant treatment found in India. Within Ayurvedic medicine, one of the remedies is to give the victim a piece of snake plant root to chew on because it slows you down, calms you down. Think of it. There's a snake under the branch you are sitting on and you get bitten in the calf. What is the first thing you do? You would be pretty upset, and you'd probably jump around. But that would get the venom moving around in your blood, so the traditional idea was to slow a person down, calm them, and give the culturally based therapies a chance to work.

EXPLORE: How did the indigenous tribes find out what worked?

BALICK: There are many ways. One is trial, error, and success. Traditional cultures are consummate experimentalists. They are always looking and thinking, trying and testing, and trading with the people they meet. I once lived with a group of indigenous people who used both the *jaborandi* and ipecac plants. *Jaborandi*, when chewed, promotes salivation, whereas ipecac, as you know, promotes vomiting. Now why would a group of people identify plants with the specific properties of promoting salivation and vomiting? Perhaps if you are experimenting with the plants in your environment and eat a red berry that looks like all the other berries you have eaten in that area but this specific one gives you terrible stomach cramps instead, you need something to get the substance out of your body. You want to salivate it out, and you want to vomit it out. So they had plants to do that, just as we keep ipecac in the medicine chests of households with small children, who, too, are consummate experimentalists in their own right. So traditional peoples are al-



In the local festive garb of the Micronesian island of Pohnpei, Dr. Balick sports a traditional head garland (*mwaramwar*) made of ylang-ylang flowers given to people who are traveling or attending harvest festivals. Photo by Jim Wiseman.

ways experimenting in this way, with the confidence that they can address the adverse reaction if it occurs.

These lessons are transmitted orally, from teacher to student, and so a base of knowledge, which is dynamic in nature, begins to grow and develop. Another way that people learn about the therapeutic use of plants is to

observe the animals in their environment—watch how they use plants for self medication. I met a man in Belize who looks after horses and knows many plants they graze on when they are not well. A copious, fascinating literature is developing on the topic of zoopharmacology—the use of medicinal plants by animals.

EXPLORE: I have heard stories of plants talking to people in a trance, communicating how they should be used. Did you find that practice as well?

BALICK: One of the fascinating aspects of my work as a scientist is learning about diverse cultures and traditions, including many things we normally consider spiritual and philosophical rather than scientific. Many of the traditional cultures with which I have worked have a philosophy that everything, whether human or not, has a soul. They attempt to relate respectfully with all of their surroundings, including human, rock, plant, animal, bird, ancestral, and others, and consider them part of the wider community of life. These beliefs can be powerful forces, in surprising ways.

We were making a videotape as I interviewed this one Maya healer, because that is the medium I often use in interviews, and he told me about working with a woman who had blindness caused by a blood sugar problem. She had several other conditions, but she'd been released from the hospital as untreatable. He gave her certain mixtures of food for the other conditions, but he did not know what to do for the blindness. So he went into the forest and sat by a stream for what he called a "meditation." Around midnight, an idea, a vision, came into his head. The visual was of a freshwater snail. So he took some snails and cut their heads off and cooked them, putting the resulting mass on the woman's eyes a couple of times a day to clean them. And slowly her vision came back.

The late Dr. Jin-Huai Wang, a friend and Taoist philosopher from Beijing, was at my house in New York one day, watching the tape of that interview when he started getting very agitated and excited—in a positive way. He ran off into the guest room in our house and brought back a well-thumbed book that was several hundred years old. Then he showed us that, in his traditional Chinese medicine book, the treatment for this same sort of eye problem was the extract of a snail.

That really troubled me, because as a scientist, it seemed too much of a coincidence. I couldn't get my mind around it. And the Chinese healer was equally amazed that the treatment was identical to what he had been taught decades ago, based on practices that were thousands of years old. Now, perhaps some of our col-

leagues would tell us was that the Maya healer had keyed into the cosmic consciousness through his meditation. But I have never been able to do that personally, so I don't understand those things. Or, perhaps the healer was a great storyteller.

The Maya healer had never been outside his area so he did not learn it in China. Then one day, I started thinking about another intriguing possibility when I read the book *1421: The Year China Discovered America*. From the years 1421 to 1423, one of the Chinese emperors sent huge sailing vessels around the world. The fleet of boats was sent out to explore the world and bring back everything that was good and could be used in the Chinese economy. When these boats ran aground, which they sometimes did, everyone would go onto shore and wait to be rescued. But by 1423, the empire was bankrupt, so there were no resources to mount a rescue operation. The author of this book, Gavin Menzies, suggested that an element of the Chinese fleet landed on the Mayan shores in the 1400s, bringing some of their systems, including healing, with them.

An interesting parallel exists with pulse diagnosis. The Mayan people have a system of pulse diagnosis that is similar to Chinese and Ayurvedic pulse diagnosis. Yet according to conventional thinking, they were last in known contact 12,000 years ago, except perhaps for this Chinese expedition. So the question becomes, did they invent it independently in all three locations and deduced a similar diagnostic system? Or was there contact? Or is there some other explanation? I don't know the answer.

EXPLORE: Let me ask this. Do indigenous people treat headaches the same way in each culture, or does each culture have a different way of curing them?

BALICK: I haven't observed headaches, but what they do complain about is skin fungus, spider bites, and scorpion bites, and, yes, some of the treatments are very similar. I had one student compare the overlap between the traditional uses of plants from Africa and Haiti. She then compared that information with another area that was not in contact with either Africa or Haiti and she found no significant overlap in the similarity of plants used for specific purposes. Clearly, that overlap showed evidence of migration.

In ethnobotany, the thinking is that if you can observe a plant being used in three or four different places that have not been in contact, then that is some evidence for greater efficacy then if you have only a single observation.

So yes, people use some of the same plants for the same conditions, and they use different plants for those same conditions. As I suggested, indigenous people are consummate experimentalists, and they are always trading—trading information, trading recipes, trading plants. For example, when the Belize Association of Traditional Healers was founded in the 1980s and had their first meetings—in which at least five distinct cultural and ethnic groups were represented—they all brought plants to trade. And everyone took home some new knowledge and practice from that meeting.

Here at The New York Botanical Garden, we carry out a great deal of collaborative study with the Dominican community that is just a few blocks away. The Dominican population in New York City is around 800,000 people. Many seek primary health care from *botanicas*, which are basically shops selling fresh and dried herbs, medicinal mixtures and tinctures, and ritual and religious items. They are very traditional and employ *curanderos* and *espiritistas* and other types of healers. About 14,000 people, including both Dominicans and tourists, fly back and forth each day from the Dominican Republic to New York and with that travel comes a source of plants and knowledge. We see that Chinese and Pacific island plants are now being used in the Dominican Republic and that Dominican healing has also changed somewhat since its arrival on the island of Manhattan. So *noni* (*Morinda citrifolia*), which is a Pacific island species, is now being used in the Dominican Republic, just as ginseng from China is now being used. There is a great deal of change and exchange. This is a rather fascinating phenomenon because, as an ethnobotanist, one of my research goals is to try and recreate an understanding of the original Mayan healing system in the same way that an archaeologist would recreate what a clay vessel looked like before it was broken and scattered all over the earth. And yet the dynamism of traditional healing and practice probably makes that goal nearly impossible.

“Indigenous people are consummate experimentalists and they are always trading—trading information, trading recipes, trading plants.”

EXPLORE: That is an interesting goal. What has been reconstructed so far?

BALICK: Dr. Rosita Arvigo and I recorded the plant therapies that the late Maya H'men (healer priest) Don Eligio Panti taught her as part of her apprenticeship with him. Some of this knowledge has helped shed a little bit of light on what precontact healing was like in Central America and Mexico.

The Maya people had great schools of knowledge and wisdom. Their understanding of astronomy, mathematics, and linguistics was much richer, deeper, and more sophisticated than the Spanish who conquered them. I was recently in Belize and was standing in this 1,000-year-old ruin site of a city, a great center of learning that had schools where children were taught traditional healing, mathematics, astronomy, language, and the Mayan calendar. And all of it was destroyed. As the towns began to be abandoned, and the great cities fell apart, the Mayan culture declined. Some people think it was because that particular region had three prolonged droughts. But the Spanish *Conquistadores* came in and banned the practice of all of these Mayan traditions. They burned the books and libraries and forced the teachers to stop teaching. When you read the journals of the conquerors and the priests, they felt they were doing God's work—that by burning souls they were saving souls, and by burning books they were preserving people's place in the afterlife.

As a result, only two of the Maya codices exist to day. One is in Guatemala, and the other is in the Vatican. But there were hundreds or thousands of these books that



Children at the Bush Medicine Camp in Belize proudly show a visitor the tree they have planted. As the Chinese proverb says, “one generation plants the tree; another gets the shade.” Photo by Michael Balick.

had information about the plants they used for healing. Some were about plastic surgery because the Mayan people performed plastic surgery to cure different problems. Beginning in the 1490s, all of that knowledge shifted from a written tradition that was recorded by the *H'men* and their scribes to an oral one. So mother would take daughter out beyond earshot of the Spanish soldiers and teach her what she needed on her path to womanhood, or father would take son into a cave and explain the plants that the son would need to raise his family.

Five hundred years after the conquest, globalization has shifted the knowledge base again because nearly everyone has given up interest in it. The power of modernization is reflected in the following experience. Ten years ago, I was in a taxi in Belize, and the young driver asked me what I was doing. I told him that I had come to continue my studies in bush medicine, which is what they call their traditional medicine. He said,

“My grandfather was a great healer. He knew everything about the bush and how to survive in it and how to use the plants. He taught my father some of what he knew, but, as a child, I was scared of going into the forest—I wanted to have a car, drink sodas, watch television, and listen to

music on eight-track tapes instead. So I never learned anything, and now I am sorry. I have my taxi, and I have achieved my dream, but I wonder what my life would have been like if I had learned the teachings of my elders.”

So this man was supportive of the fact that someone was in his country on a mission to codify information. But this is happening all around the world in tens of thousands of villages. Elders are not passing information to the younger generations.

If you look at it from the perspective of a young indigenous person living on an island who goes on-line and sees the world, they naturally want to be part of it. So the dream of many is to get off the island. What I observe is that part of that means giving up your roots because they are “primitive or old-fashioned.” Humans are always in a rush to embrace that which is novel. But when these young people leave their cultures and go into the world to embrace these new things and a new lifestyle, they enter at the lowest level of society and have a hard time moving up because of social and economic pressures. So they have given up their roots to embrace something that does not provide the dream they thought it would, and then they start having all kinds of problems.

These are metaphors for ways in which we as Westerners could live. Community is a very powerful positive force, and yet we give up community to enter the modern world. But without community we are at a terrible disadvantage, and without community these people who immigrate to cities don't have a chance. It is very sad to watch the results of globalization.

Rosita Arvigo's motto is “Stand Up for Your Roots”—stand up for the roots of who you are and where you came from. Someone once made the wise observation that if you don't know where you came from, you don't know where you are going.

EXPLORE: Is there a solution?

BALICK: There is no “one” solution. When I was discussing this dilemma with Ashok Ripoche, head of the Tibetan library at Dharamsala and close disciple of the Dalai Lama, he said, as he understood it, that you can never save all knowledge. Life is changing too fast. It's all very transitional and ephemeral. So the idea is to learn the *lessons* of the knowledge and then decide whether you let the knowledge itself go or whether you keep it. But, above all, to learn the lessons of the knowledge before it is too late.

So one of the important goals of ethnobotany is to suggest that cultures have choices, and one of these is to develop a clearer understanding of the value of traditional knowledge in contemporary times, and to integrate the lessons from it into daily life, and in that way to teach the knowledge to their children. To keep traditional knowledge and practice alive and well, along with recording it in a database or publication.

EXPLORE: I love that idea—not only learning the knowledge but learning the lessons of the knowledge.

BALICK: When I first went to Belize in 1987, I found that anybody could get land. Citizens of Belize are entitled to 50 acres and a machete. The idea was to chop the forest down and plant things. If people saw a snake in the bush, they would kill it. If they saw a plant that they wanted to harvest, they would cut the whole tree down just to take a few fruits. Now, 20 years, I am working with the bushmen, the healers, and the teachers as they implement a conservation ethic in that nation. There are annual conservation camps organized by Rosita

Arvigo, Dr. Patti Gildea Long, and Melanie Santiago where young children live with the healers in the bush and learn about plants. Every year two-dozen children have this experience. So, in their schools, on the television and radio, and in their summer camps, children are no longer being taught that cutting down everything in a forest plot is appropriate, rather, just to cut what is needed to plant their crops. And to preserve the rest. These young people are being taught how to think in terms of the future—to plant trees for the enjoyment and use of their grandchildren—a complete reversal of the previous mindset of only a decade ago.

Rosita and I also wrote *Rainforest Remedies: One Hundred Healing Herbs of Belize* because the healers had asked us to write a primary healthcare manual as one of the exchange requirements for doing our ethnobotanical work with them over a two-decade period. This book has since become a very important reference for their ecotourism industry. We have circulated these books widely in the country for people to use and, along with a checklist of the flora compiled with colleagues at The New York Botanical Garden, Dr. Michael Nee and Daniel Atha, local guides use these to interpret culture and nature for the foreign visitors.

Here is an example of the power of an ethnobotanical manual. One day a woman came up to Rosita and said “God bless you.” Rosita asked why? And the woman said, “My baby was sick with a hundred and three degree fever. Grandma is long gone, and the clinic was closed, and we didn’t know what to do. We had no money. But we have your *Rainforest Remedies* book and saw this flower in it that grows outside our house. So we made a bath of the flower and bathed the baby’s head all night, and the fever was gone in the morning. It’s as if grandmother is back with us because this is grandmother’s knowledge.”

So the solution is not the same for everything and everyone. But by working with the children, by working with the elders and reintroducing elders to their grandchildren, and by showing ways that people can benefit economically, showing them that the forest is worth more standing than cut down, and

by incorporating all this into the curriculum of the local institutions, there is a chance that things can be different. Our work is definitely at the household or village level, from the bottom up, a few people at a time, and in that way differs from most.

The usual scientific paradigm is to go in, collect information, analyze it, and disappear. Our projects in Belize and Micronesia and elsewhere have a different formulation and shape. We recognize that the local people are partners in the effort, and the idea is to leave the knowledge that we all gathered together to be used in that country to benefit that country and to benefit the people and help protect them from outside exploitation.

Rosita and I took second mortgages out on our respective houses to publish *Rainforest Remedies* because we had made a commitment to the healers, and there wasn’t a foundation grant to pay for its publication. So we published it ourselves through Lotus Press and dedicated the royalties back to the healers. Since its publication, the book was able to provide over \$26,000 to the 11 healers we had worked with, each of who used their portion of the money to pursue their own dream. Obviously, it wasn’t a well without limits, but they then began their own family-level economic development efforts. Some built their own medical plants trails and others started teaching their grandchildren about the uses of plants.

But these studies are much more about self-respect, pride, and acknowledgment than they are about money, at least to the genuine healer. Let me tell you another story. When I first met Don Eligio Panti back in 1986, I explained that I had a grant from the National Cancer Institute to survey plants of his region, in South America, and in the Caribbean to look at their potential efficacy for AIDS and cancer. I explained that, if he was willing to share his medicinal plants and samples and his knowledge with us, that we would send samples to Washington to be analyzed by the NCI. He said something very profound in return. And he said, “We elders don’t get respect anymore. The teachers and religious leaders in charge of education in this country say that we are crazy and that people should go to clinics rather than come to us. But I have been practicing for 60 years, and I know it works.”

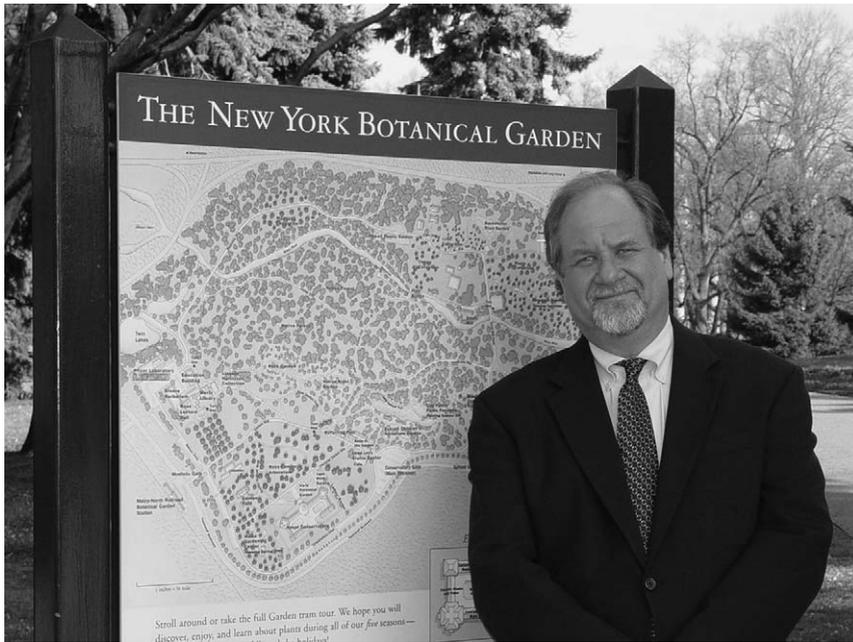
He went on to say that. “My wife died a number of years ago, and I want to join her. I am an old man, and I am lonely. But you have come here saying that your culture cannot deal with these conditions, this things you call AIDS, and you have come to we Maya, the spirits and the present, in a search of answers. So even though I want to be with my wife, I will work with you as long as it takes to give you my knowledge. First, so that Rosita can practice it for the rest of her life and train people to carry it on and, second, so that you can test all these plants. Then, when I am done, I can die and be with my wife and be happy again. And if you find anything of value in these plants, it will be as if these plants were guaranteed by the scientists and doctors as being effective, and, once again, they will respect us and listen to us. And that will be worth my time.”

EXPLORE: Is that what happened?

BALICK: Yes. We were working with some cancer screens at the time with a mechanism involving light and pigmentation. We sent the samples of a plant he showed us to our collaborators, and they found new activity. They published a paper on it with Don Eligio Panti as a coauthor. He took that paper and put it on his wall and whenever the patients would come in, he would say, “See, this is my plant. They showed that it works.” In his mind, the greatest gift that came out of the project was when two officials from the National Cancer Institute came for a site visit with a certificate of thanks in a frame for his collaboration in this global survey of anti-AIDS and anticancer activity. Tears of pride welled up in his eyes as he sat there and received the certificate. It made everything worth it.

EXPLORE: I have to ask. Did you make enough money from the book to pay off your second mortgage?

BALICK: We did. And in the meantime the healers achieved many of the goals they wanted to achieve. For example, one midwife, whenever she delivered a child, she had to sleep on the floor of her house because the new mother was in her bed. This midwife was in her late seventies, and sleeping on the floor was becoming harder and harder. So she built a bedroom and a toilet. Another woman bought six sewing machines so the Women’s Cooperative could sew clothing in her village.



Dr. Balick in his outdoor laboratory in New York. "I'm fortunate to work in a place with more than one million plants including 18,000 different taxa," he says. "What more could a botanist want?" Photo by Muriel Weinerman.

In Belize, I worked with a Belgium filmmaker, Françoise Pierrot, and she recorded our two-hour interviews with each of the 11 healers. We cut them down to a 55-minute VHS tape and gave them back to the community. Many of the families of these healers would watch the same interview over and over again. I went back and asked one of the family members, "Why are you watching this for the fifth night in a row?" And he said, "Because we think that Grandma might say something different tonight." But regardless, they are re-connecting to their elders again, and, in many cases, the traditional healers in the film have passed on.

EXPLORE: What is your work in Micronesia?

BALICK: The island of Pohnpei, in the Federated States of Micronesia, has perhaps 30,000 people living on it. It is divided up into five kingdoms, ruled by traditional chiefs, at two levels—a paramount chief and an oratory chief. At the same time, there is a US-installed democratic government with a president and a senate. Because of the rapid process of modernization, traditional knowledge is disappearing very quickly there. These are island people isolated from the world who

were once dependent on voyaging to catch their fish and carry out commerce. They needed knowledge of how to preserve food, such as breadfruit, so that when a typhoon came and knocked down all the food trees and flooded all of the cultivated plots on their island and its surrounding atolls, covering everything with salt water, they could go to their bread food pit and obtain their survival food. Fermented breadfruit can last 80 years or more with no refrigeration. But the fact that few people have breadfruit pits anymore and that almost no one remembers how to make one is a metaphor for the consequences of the wider loss of traditional knowledge in the Micronesian region.

Dr. Roberta Lee and I have been carrying out ethnobotanical studies on Pohnpei since 1997. Previously, she was a US Public Health Service physician in Micronesia for nearly five years, so she knew these islands and their cultures quite well. In the early days of this work, we were teaching a class of college students on Pohnpei, and, when it came time to name the parts of a coconut palm in their native language, few were able to do so. This was astonishing in

view of the fact that the coconut is one of the most important and ubiquitous plants on the island. We were curious to find out whether, on this isolated island, other types of plant-based traditional knowledge were being lost. We carried out a very simple survey that ascertained the student's traditional knowledge, their parent's knowledge, and their grandparent's knowledge. It became very clear that traditional knowledge, and its practice, was being lost on this island. None of the college kids knew how to make a canoe, and, for voyaging people, this has a significant impact on culture. Very few of them knew how to use plants for capturing fish underwater to harvest them. It's a process wherein you swim underwater and put a piece of pounded root in a little grotto, and the fish inside are paralyzed and are easy to capture. And none of them knew how to preserve breadfruit.

So ancient traditional knowledge, and its practice, is disappearing very quickly within this current generation. We work closely with The Nature Conservancy, Micronesia Office, directed by a very visionary man named William Raynor. He understands the link between culture, conservation, and environmental sustainability. I first went to Pohnpei in 1997 with Drs. Diane Ragone, Tim Flynn and David Lorence from the National Tropical Botanical Garden; Roberta Lee, MD, from the Beth Israel Center for Health and Healing; and Jim Wiseman, a filmmaker. We all were there as a research group—a nice example of what you can do as an interdisciplinary team.

With the encouragement of people like Raynor, over the past few years we have been working to catalogue traditional knowledge as well as produce a checklist of the island plants. Imagine that most of these biodiversity-rich Pacific islands do not even have a reliable list of the plants, insects, animals, and other organisms that are found there. Having an inventory of what is present is really the antecedent to conserving it. Otherwise, how do you develop priorities for conservation areas, and how do you evaluate the results of the work? So we have gathered everything that was ever recorded, from brief photocopied reports of observations made by Japanese scientists during the 1930s to the papers of the Germans and Spanish, and created a

rich database of current knowledge. I am privileged, through the support of a Guggenheim Fellowship, to be spending this year combining all of that information with the information our team has gathered on Pohnpei since 1997 into a book on the ethnobotany of the island and its people. Because at the same time that you need to understand what plants are there, you need to have an idea of what it has been used for—to learn the lessons of the wisdom.

EXPLORE: Did the indigenous peoples work with you easily, or was it hard to get their cooperation?

BALICK: What happened in Micronesia is that, after nearly two years of visits to Pohnpei, I sat down with one of the Oratory chiefs, the Iso Nahnken of Nett—a very intelligent, traditional, and thoughtful man—and told him what I wanted to do. He said, “We chiefs are responsible for our people. In the old days, to manage our yam or tuna harvest, the chiefs would find out when the tuna were near our island and then send the boats out for harvest. We would find out when the yams were ready and declare a yam feast. The ancestors, whose spirits are all around us, want us to live in this traditional way, but there are outside forces. Our children want to go to Guam or Hawaii and live a Western life. They no longer speak the respect language of this island, which is how elders and chiefs are to be addressed. They don’t know the names of the plants, and they don’t know our traditions. But if we lose the respect of our people then the ancestors around us will rise from their resting places and be angry and that would be a catastrophe.

“Respect holds this island together,” he said. “I had a dream that an outsider would fly in on the wings of a bird and live among us and be able to help explain to our children that the Western culture that they are so worshipful of does not have all the answers and that we should not lose everything about our traditional lifestyle so quickly. You are that person in my dream, so you are free to live amongst us and carry out this project, and we will help you.” And that was another one of those moments.

We plan to devote the next five years to expanding the project to other islands in Micronesia as people in other places have heard about what Pohnpei is doing and

want us to work there as well. Our team will be developing new initiatives, and Dr. Lee will coordinate the production of a primary healthcare manual based on Micronesian plants, as well as offering a fellowship for physicians interested in learning about ethnomedical practices and medicinal plants.

EXPLORE: Is there an American tradition of plants? Maybe I just don’t know about it, but we seem so impoverished.

BALICK: In public lectures, I always ask if people remember what their grandmother or grandfather prescribed for a stomach-ache. Most people don’t raise their hand, and, if they do, the answers are soda or coke syrup. But if you ask that question overseas, you get a wide range of different answers that are much richer. What’s happening to these island cultures from globalization is exactly what has happened to us in this country.

“People from all around the world are coming to this country and globalizing us in a way that we have never been globalized before.”

Of course, the Native American peoples have a rich culture, but that’s not one of my research topics. Currently, there are numerous individuals from Native American cultures studying the traditional uses of their own plants. Some of these are physicians, while others are formally trained ethnobotanists. What I am involved in really is what is called salvage ethnobotany with cultures and ecosystems that are on the verge of being globalized and destroyed, with the hope of interesting young people in those places to take up studies of the traditional wisdom of their elders before they pass on—whether it be for use by the family in healthcare, as a career in ecotourism and conservation, as

the foundation of an herb business—or perhaps to lead a more fulfilling life.

EXPLORE: But you mentioned that you also work in New York City?

BALICK: About a decade ago, I began working on a project with Dr. Fredi Kronenberg at the Rosenthal Center for Alternative and Complementary Medicine at Columbia College of Physicians and Surgeons. New York is a magnet for immigrants, and, with Fredi’s interest in women’s health, we began to work with the Chinese and Hispanic communities on how they addressed women’s issues. For example, we carried out inventories of plant use in the Chinese clinics and in the Hispanic *botanicas*. This is what laid the groundwork for our current NCCAM grant to look at Dominican health and healing systems and how knowledge changes during its movement from one island to another. This project is being directed by Dr. Ina Vandaebroek, a postdoctoral fellow on the Botanical Garden’s staff. One of the advantages of this project is that we don’t have to get on an airplane, don’t need a passport, and don’t have to take a malaria prophylaxis. I can get on the subway and go downtown and talk to people who are just as knowledgeable as the people I had been traveling thousands of miles to see.

In fact, one of the healers, who worked in a small dark basement maybe about half the size of this office, was one of the most intuitive people I have ever met. And his diagnostic skills, understanding of the use of herbs in healing, and overall manner were equally extraordinary. The realization that Fredi, I, and others on this project had that these knowledgeable people were within walking distance of The New York Botanical Garden was another “ah ha” moment.

EXPLORE: So 20 years into this, and you are a strong proponent of the power of the mind and of people’s beliefs.

BALICK: Yes, another story that brings home the mind-body connection happened when we were traveling in the back woods of Brazil with a group of people on a bus. We passed this woman who was cracking open the nuts of a palm tree and extracting the fruits. Of course, everyone jumped out of the bus and circled around her. So here were all these excited foreigners with their video and still cameras flashing away as she was undertaking her sim-

ple, daily routine—breaking open nuts with her axe. As soon as she was surrounded, she became hysterical, had a difficult time breathing, and went into a state of shock. She was convinced that the people had stolen her spirit with their cameras. She had to be hospitalized immediately.

EXPLORE: The belief itself caused the physical manifestation of the symptoms.

BALICK: Yes, and people from cultures that have these strong beliefs can become seriously ill or even die from such conditions.

If you look at the *DSM-IV-TR (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, the American Psychiatric Association [2000])*, there is now an entire appendix on the nature of culturally specific disease. Physicians are just starting to acknowledge and understand the depth of these conditions. At The New York Botanical Garden, one of our team, Jolene Yukes, has been working with the Dominican community and their healthcare providers to produce a manual of the plants used by Dominican people living in New York City. But the manual is not for use by them. It is for the physicians and healthcare providers who treat patients

from this community and need to know how to identify the botanicals individual patients are using, where these come from, their safety, and what their indications and contraindications are, so they can better serve their patients who are using these plants.

This brings up another interesting phenomenon that I call “reverse globalization.” We seek to bring our society and values to the rest of the world and, in our naivety, see it as a unidirectional process. But because the United States is a magnet for immigration, what’s really happening is that people from all around the world are coming to this country and globalizing us in a way that we have never been globalized before. In New York City, the diversity of fruits and vegetables in the markets has increased 10-fold in the last two decades. The changes in medicinal plants, healing systems, practitioners, and restaurants are probably the most obvious examples of this process. We have become much more like the rest of the world. The result? More and more New Yorkers of all ethnic groups are going to *botanicas* and talking to traditional healers and talking to their doctors about herbs and other modalities these days. I think reverse global-

ization has had a huge impact on the consciousness of people in this city, and I think it is one of the forces that has fueled the growth of integrative medicine, a combination of allopathic and scientifically validated traditional medicine.

Where is this all going? I suspect that the academic study of the ethnomedical practices of traditional cultures around the world will continue to comprise only a relative handful of scientists and their students. And that much data will be lost over the coming decades as human societies move forward. As human ethnic groups become less homogenous, so too will traditional knowledge, becoming an amalgam of practices from the past and present and from different geographic regions. In the same way that there will be biodiversity reserves, such as national parks, there will be areas where traditional practices continue. But for both of these important resources, I fear that they will eventually come to occupy only a fraction of the globe’s surface, unless we begin to think about ourselves, our cultures, and our environmental responsibilities with a different level of respect and understanding. Remember, the fate of the seventh generation depends on it.