Diego, and the Veterans Administration (VA). But epidemiologist Jane Seward, who heads a CDC division that does surveillance of chickenpox and shingles, stressed that they have yet to see any increase in cases of shingles and questioned some key parameters of Edmunds's model. "It's very early yet," added Seward. "The data from next year will be more important to look at." She added that adults might receive immunological boosts from their own varicella periodically reactivating but not causing disease.

Many researchers suspect that the chickenpox vaccine, if given to adults, might help thwart shingles. The VA has a study under way, headed by Oxman, to evaluate this possibility. The placebo-controlled study will involve 38,000 people, and Oxman said they expect to have the first data in 2004.

Edmunds did emphasize a silver lining. Children who receive the vaccine are less likely to develop shingles, he predicts, because the strain of varicella used in the vaccine is much weaker than the natural virus. Widespread use of the chickenpox vaccine thus should ultimately lead to a decrease in shingles. "It will come down quite dramatically," he said, "after 50 to 60 years."

–JON COHEN

PROFILE DENNY MOORE

Learning to Speak the Amazon's Languages

Denny Moore is bringing new linguistic approaches to old, dying languages; the work might elucidate the history of native Amazon Basin peoples

THE AMAZON RIVER BASIN—When Claude Levi-Strauss contacted the Mondé tribe in the Amazon in 1938, he found exactly the kinds of subjects he had been seeking for his research: an isolated tribe not then found in ethnographic literature. But the legendary French anthropologist was so weakened by his journey through the Brazilian outback that he had to give up on properly studying the group he called "my savages." Levi-Strauss did, however, take note of their language, describing it as pleasant. He noted that many words ended with accented syllables: zip, zep, pep, zet, tap, kat. The Mondé, he recounted, peppered their speech with sounds that evoked the clash of cymbals.

More than 60 years later, linguist Denny Moore sits in a ramshackle house in a poor section of Porto Velho. A two-time Amazonian boomtown (first rubber, then mining), the city of 350,000 on the Madeira River has devolved into a sleepy state capital and reputed way station for cocaine. Across a small table, Maria Salomãy sits patiently. Moore, the director of the Amazonian linguistics center at the Goeldi Museum, a leading Brazilian research institute in Belém, tapes Salomãy's halting efforts to recall and articulate words in Mondé. Salomãy forgets most verbs but manages to come up with something for sun, moon, forest, sundry animals, body parts, and household and hunting implements.

One of the last three known semi-speakers of Mondé, Salomãy is older than 60 and hasn't exercised her native tongue in decades. Following a familiar script, the Mondé were plagued with disease, death, and diaspora after coming into contact with Western civilization. Neither of Salomãy's two adult sons speaks a word of the language. "The only existing Mondé tape in the world," announces Moore, pointing to his tape recorder.

The sessions with Salomãy could do more than preserve vestiges of a dying language. By comparing Mondé vocabulary and grammar with that of the languages of other tribes, Moore and his team of researchers hope to reconstruct "Proto-Tupi," the extinct language from which modern Tupian languages like Mondé evolved. Called the Goeldi Comparative Tupi Project, this ambitious endeavor aims to unlock some of the mysteries surrounding the origins of the little-studied native Amazon languages. Because language reveals information about human activities, Moore and his team also hope to dig up clues about the prehistory of a region weak in archaeological evidence.

CREDIT: DENNY MOORE

Speaker for the dead. One of the last 10 speakers of Ayuru lifts his arms, sending the spirits of the dead (in a macaw feather) to run errands.

Moore's research might ultimately define the current epoch in linguistic history, predicts anthropologist Michael Silverstein of the University of Chicago. Moore, who grew up in Michigan and earned a Ph.D. at the City University of New York, helps indigenous people preserve their own heritages, unlike many scholars who dash in, gather data, and leave without providing any aid to their informants. In this way, Moore's work "is different not just in terms of consciousness of the languages but also in terms of the self-consciousness of the people who speak them," Silverstein says.

A boxer in college, Moore takes a no-holds-barred approach to protecting the languages and cultures of Amazonian Indians. For 3 decades he's sparred with all comers. He's survived everything from tropical sprue, a rare malady of the small intestine that interferes with the absorption of food, to a murder attempt by a couple of men from a tribe at odds with one he was studying.

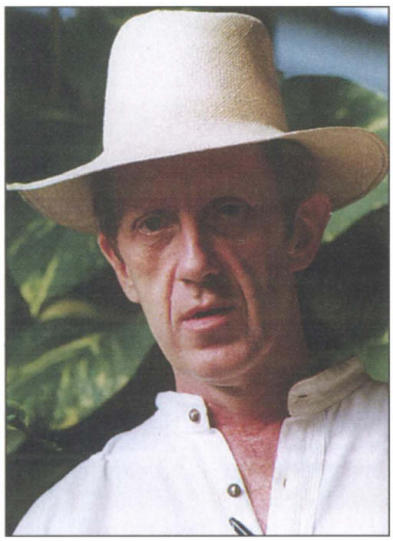
For his efforts, Moore won a $365,000 "genius grant" from the MacArthur Foundation in 1999. Although suddenly flush with cash, Moore sticks to a regimen worthy of a graduate student. The 57-year-old scholar recently spent 2 weeks crisscrossing the Amazonian state of Rondônia by bus to seek out informants like Salomãy. One 17-hour leg was marked by the partial collapse of a bridge underneath the bus; later the vehicle ran aground in a gully and nearly capsized. "If I keep my costs down, other researchers at the museum have to watch themselves, too," Moore explains. "They'll be embarrassed if they outspend me."

Back through time

Snuggled up against landlocked Bolivia, Rondônia state is home to half of the 10 branches of the Tupi language trunk, and most scholars suspect it is the original site of the Tupian people. Moore and a team of Brazilian linguists hope to reconstruct Proto-Tupi using an approach known as diachronic research, which identifies phonological, syntactic, and other features peculiar to a specific

time period. Proto-Tupi probably dates back at least 2000 years, estimates Moore.

In reconstructing languages, Moore and his colleagues also hope to piece together Amazonian prehistory, which is complicated by a hot and humid climate that accelerates decay and destroys much archaeological evidence. Using linguistic techniques to reconstruct ancient language forms, scientists can compensate for this problem and identify many ancient human behaviors. "The vocabulary of a language is an inventory of the culture of its speakers," wrote Moore and Luciana Storto in a paper published this year. For instance, they reported that Proto-Tupi has the words "acaí" (a tropical fruit) and "ax," indicating that its speakers used axes and inhabited a region with acaí trees.



A good ear. Despite his tone-deafness, Denny Moore is recording Brazil's dying languages.

The researchers are racing against time. Mondé already appears on many lists of extinct languages. At least two other of the nine target languages in the Goeldi Comparative Tupi Project are similarly endangered. And Tupi is not alone. Of the estimated 1200 languages spoken in the Amazon Basin 500 years ago, at least three-quarters have disappeared. About 160 indigenous languages are still holding on within Brazil's national borders, but one-quarter of them are spoken by 50 or fewer individuals. A decent linguistic description—which would consist of an analysis of phonology, syntax, and morphology (the different forms words take, such as in declensions and conjugations)—exists for only a small fraction of these languages. Even fewer can boast a dictionary and a collection of texts. "It is a parallel to biology" and its accelerating loss of species, says linguist Norvin Richards of the Massachusetts Institute of Technology. "There is a lot to learn, and you have to be quick."

To counteract the perhaps inevitable loss, Moore and his Goeldi team hope to videotape 10 hours of standardized linguistic data on every native language in Brazil. Like everything else collected in the Goeldi project, these tapes will be made available to the Indians as well as to linguists. "The depth of this project will set it apart when seen 25 years from now," says Silverstein.

A language called Gavião will figure prominently in the project. Moore has been working on the language since 1975, when he entered a forest village of the Gavião Indians where he would conduct his dissertation research over the next 3 years. Contrary to the consensus opinion at the time among linguists, who were predominately missionaries, Moore discovered early in his Gavião research that it is a tone language like Chinese. Tone refers to the relative pitch of a syllable or word; a difference in the tone of an otherwise identical word results in a difference in meaning. Moore was terrified by his discovery—he's tone-deaf.

To overcome this handicap, Moore persuaded his Indian informants to help him by whistling the tones, a technique they sometimes use for unobtrusive communication while hunting. Gavião now counts among the seven languages, all previously unwritten, for which the Goeldi Museum has implemented literacy projects.

As Moore was touring Rondônia, his colleague and former student Vilacy Galucio, a native of the Amazon, was holed up in Costa Marques, a backwater town across the Guaporé River from Bolivia. She was trying to collect a word list in Puruborá, but she was having trouble. Her informant, Paulo Aporeti Filho, a Puruborá semispeaker, had recently suffered a stroke, and his memory was failing. To jog it, Aporeti suggested that it might help if they brought in a friend, another semispeaker with whom Moore had worked briefly several years ago. José Evangelista agreed to come. Galucio got him on an airplane.

This group approach is unorthodox among linguists, says Moore. Yet the banter between the two informants seemed to prod them into remembering words and phrases. "We thought that it would be nice to do in human terms, at least," says Moore. "And now it seems to have contributed to linguistic methodology."

One preliminary result of Galucio's research: Puruborá seems to have seven vowels instead of the five or six found in most Tupian languages. This provides some important insights into vowel correspondences in the Tupi language stock, says Moore. Specifically, it provides evidence suggesting that the Puruborá family is closer to a related family, called Ramarama, than previously thought. "Depending on what happens with Vilacy's test case, I think we may try to bring together as many of these old people as possible," says Moore.

Galucio is one of the many Brazilian linguists Moore has trained. A fellowship to his Goeldi institute now pretty much represents a ticket to a good graduate school; no other program in South America has sent so many students to study abroad. As Moore never tires of repeating, Galucio earned her Ph.D. with distinction from the University of Chicago. And anthropologist William Balée of Tulane University in New Orleans notes that Moore "built a whole linguistics program, perhaps now the leading program in Brazil."

After checking in with Galucio in Costa Marques, Moore takes the bus to the town of Cacoal, where he needs to consult with a tribal leader. Coincidentally, this person had accompanied a friend who tried to clobber Moore from behind with a wrench some 25 years ago. (He backed down when Moore whirled around.) The two apparently were making a point about a disagreement their tribe had had with the Gavião, with whom Moore was living.

Persistence of memory. Moore protégé Vilacy Galucio (left) interviews one of the last three semispeakers of Puruborá, who hasn't spoken the language for about 50 years.

Both Moore and the Cacoal leader are willing to forget past grievances. They work out an agreement for collecting data and perhaps developing a literacy program for the tribe's language. It's nothing strange given the culture of constantly shifting alliances among tribes, Moore says: "You have to look at it in the Indian way."

—BILL HINCHBERGER

São Paulo–based writer Bill Hinchberger is editor and publisher of BrazilMax (www.BrazilMax.com).

CREDIT: (TOP TO BOTTOM) MACARTHUR FOUNDATION; DENNY MOORE