George Weiblen's Story From His Work in Papua New Guinea

The tropical forests of New Guinea once seemed very far from Minnesota but not today. Pen pals in our public schools exchange text messages with the children of my forest-dwelling collaborators. When I first visited Papua New Guinea as a young botanist thirty years ago, I could not have imagined how the pace of globalization would transform the places and the people that are part of my work. How we developed a 20,000-acre conservation area, an international research facility, and a public school on tribal land requires a bit of explanation.

New Guinea is a kind of last frontier for botanical discovery with at least twenty times more plant species than Minnesota. Nobody knows exactly how many because much of the forest remains unexplored. Countless species await scientific names if only we can locate them in time. The extent of the forest is somewhat larger than Texas but is shrinking from industrial logging and a growing agricultural population. The forest also provides valuable materials, potential new medicines, genetic variations, and plays a vital role in regulating global climate. I first visited New Guinea to catalogue tropical trees but, year after year, I return there for an ongoing exchange of knowledge with indigenous landowners whose future depends on the fate of the forest.

Papua New Guinea (PNG) doesn't have national parks protecting its biological riches. Instead, 98% of the country is owned according to tribal tradition such that environmental protection is in the hands of the people. This unique situation is a challenge for conservationists confronted by a rising tide of extinction in tropical forests worldwide. Customary land ownership also means that you can't set foot in the rain forest without intruding on somebody's backyard. Community engagement, respect, and reciprocity are essential first steps.

An anecdote from my graduate student days illustrates what it means to practice citizen science in PNG. When community leaders invited me to survey the forest around Ohu Village, I met a rural subsistence farmer with a second grade education who had never before met an academic. Brus accompanied me while I surveyed the trees of Ohu and we chatted in pidgin. I told him how very small insects pollinate figs, how each fig species is pollinated by a unique wasp, and how they depend on each other for survival. As we counted the species, Brus described their local uses and named them in Amele, a traditional language with a few thousand speakers. The leaves of some make excellent stewed greens. Another is a source of bark cloth while yet another provides colorful dyes for grass skirts. Some fruits make a savory snack when salted and yet others are sweet.

Remarkably, each scientific name was matched by a different Amele name. One day Brus noticed some wasps inside a fig that did not agree with what we knew. He drew a picture showing how the antennae were curled instead of straight, a discovery in 1996 that won the distinction of a new genus and species, *Ficobracon brusi*. Discoveries like this are a source of pride in the community that just this year celebrated the launch of WIAD Conservation: A handbook of traditional knowledge and biodiversity. It took twenty years of engagement with the Ohu community to

produce the first written record of Amele lore combined with names of hundreds of species in three languages.

The story of Ohu illustrates the mission of the New Guinea Binatang Research Center, the organization through which my colleagues and I developed 'science in the village' as model for community engagement. Research and education grants support village-based 'bush laboratories' where we train talented young Papua New Guineans in biological fieldwork and the formally educated mingle with a sometimes illiterate but exceedingly knowledgeable grassroots.

In recent years we have witnessed a wave of economic development engulf once-isolated communities across PNG. The threat of commercial logging around our Wanang 'bush lab' in 2008 motivated us to address bigger challenges. We partnered with ten clans of landowners, PNG government agencies, the private sector, and a global research network to create the 20,000-acre Wanang Conservation Area. We built Swire Station in the heart of Wanang, several hours walk from the nearest road, where my research grants support long-term study of a quarter-million trees representing at least 500 species. Field assistants from the Wanang community and experts worldwide are united in an effort to document organisms new to science. Our partnership with the Forest Global Earth Observatories (Forest GEO) draws visitors from around the world to Wanang and sends Papuans abroad to gain expertise. Together we launched the Wanang Conservation School where there was no opportunity for formal education. We opened the first permanent classrooms in 2013 and the PNG government now support 250 students six grades. Last year, it was gratifying to see Wanang honored in Paris with the Equator Prize from the UNDP.

The response in Minnesota and across the developed world to these efforts has been overwhelming. Media coverage has included, for example, The New Yorker, BBC, The Guardian, LA Times, Radio Australia, Science, Nature, New Scientist, Minnesota Public Radio, WCCO, and the Star-Tribune. The Bell Museum provides opportunities to express what it means to be engaged in more than scholarship. In recent years, I've focused here at home on communicating how much we share as scientists and global citizens by developing the Minnesota Biodiversity Atlas, the Mapping Change citizen science project, and designing the visitor experience of the new Bell Museum in St. Paul.

It is a sad fact that knowledge accumulated by countless generations of oral tradition is disappearing more rapidly than the forest itself. We embrace digital technology while the names of plants along the forest paths are easily forgotten. I feel a special obligation to record this knowledge and our natural connections. It is important not only for preserving cultural heritage but also given the potential for new medicines, new materials, and new technologies that could sustain a healthy future and this is why I practice a community-engaged scholarship on the forest frontier.

Dr. George Weiblen, 2023 Professor Weiblen, PhD is the Science Director of the Bell Museum at the University of Minnesota, holds tenure in the Department of Plant and Microbial Biology and teaches in the College of Biological Sciences.