

# A World That Never Existed

First in a two-part series

By BRUCE BOWER

Researchers debate the pervasive view  
of modern hunter-gatherers as a window  
to humanity's past

When anthropologist Thomas N. Headland and his wife first encountered the Agta, a group of hunter-gatherers living in the rain forest on the Philippine island of Luzon, it seemed they had stumbled upon a people living in splendid isolation from the intrusions of modern society.

"We thought we were at the end of the world," he recalls. "The Agta wore little G-strings, hunted with bows and arrows and lived a primitive lifestyle."

Two weeks after setting up camp with these "primitives" in 1962, however, Headland heard someone singing in English outside his tent. He peered out and saw an Agta woman, a grass skirt around her waist and a small child in her arms, crooning a religious song he had heard back in the United States. So much for the people at "the end of the world."

Although Headland did not immediately grasp the full significance of his observation, the Agta woman's performance symbolizes a shift in scientific thinking about hunter-gatherer societies over the past decade. Such groups are often envisioned as "living fossils" who exist much as people did 10,000 years ago or more, before the advent of agriculture. But many researchers now say this notion depicts a world of pristine isolation that never existed.

"Most, if not all, tribal peoples have typically been in more or less continuous interaction with neighboring groups, often including state societies, for thousands of years," write Headland of the Summer Institute of Linguistics in Dallas and Lawrence A. Reid of the University of Hawaii in Honolulu in the February CURRENT ANTHROPOLOGY.

In many cases, they contend, hunter-gatherer groups have cultivated foods and raised livestock part-time for thousands of years and were avid traders long before their first contacts with Euro-

peans in the 16th century. Today they are best described as "commercial foragers" who adjust their hunting and gathering strategies to meet the trading requirements of more powerful neighbors.

This view contrasts with an influential statement made in a 1968 book, *Man the Hunter* (Aldine, Chicago), by Harvard University anthropologists Richard B. Lee and Irven DeVore. Lee and DeVore claimed the hunter-gatherer lifestyle — including division of labor between the sexes, food sharing and use of stone tools for hunting — characterized 99 percent of human cultural history over the past 2 million years.

Few anthropologists now believe there are hunter-gatherers who have lived totally isolated from outside influences. But critics of traditional ethnographic studies, such as Headland and Reid, contend these groups provide at best a limited view of prehistoric behavior patterns. Others, such as Lee, say hunter-gatherers often hang on to their basic social organization through long periods of contact with outsiders and can provide important information about the evolution of human culture.

Criticisms of evolutionary theories based on modern hunter-gatherers provoke strong objections from some investigators, who see the basic enterprise of anthropology under attack.

"It's obvious there are no pristine hunter-gatherers," says Lewis R. Binford of the University of New Mexico in Albuquerque. "But to say you cannot generalize in any way to the past because modern behavior is unique is, in essence, an attack on science."

For much of the past 25 years, the !Kung, a group of African Bushmen, have epitomized a life of isolated hunting and gathering thought representative of prehistoric behavior. (The "!" before Kung represents a click sound in the !Kung language.) Harvard University researchers went to the northwest Kalahari Desert in southern Africa in the early 1960s to begin a long-term study of daily life among the !Kung.

At a pivotal 1966 conference, the Harvard anthropologists described !Kung society as relatively isolated, peaceful and sharing; for a few hours each day, men hunted and women gathered edible plants, after which they returned to their camps and pooled their resources. Data on the day-to-day existence of other foraging groups, often differing from descriptions of the !Kung, were also presented at the meeting. Nevertheless, the !Kung became symbols of hunter-gatherers in general as timeless remnants of humankind's past.

The usefulness of the !Kung as evolutionary models is now under attack by a member of the original Harvard team. At the annual meeting of the Society for American Archaeology last year, Nancy Howell, now of the University of Toronto,

said the researchers neglected and avoided evidence that the !Kung are not Stone Age survivors.

"The !Kung were explicitly selected as a topic of study to illuminate and illustrate the nature of hunting-gathering society in prehistory," Howell maintains. "It is not surprising that a minimum of effort went into exploring their history of experiences with agriculture, herding, trading, warring and banditry."

The social turbulence of the 1960s also affected study of the !Kung, Howell contends. Investigators wanted to bring back "a message of liberation, peace and social justice" during the heyday of the Vietnam war.

Howell's stinging reassessment was partly inspired by a 1984 book titled *Past and Present in Hunter-Gatherer Societies* (Academic Press, Inc., Orlando, Fla.), in which 10 scholars considered archaeological and historical evidence concerning African Bushmen, the Agta of the Philippines and other groups. The book's goal, as described by its editor, archaeologist Carmel Schrire of Rutgers University in New Brunswick, N.J., is to present hunter-gatherers "not as relics of the past or exemplars of humanity stripped of the details of pastoral and urban life, but rather as part of the wider world to which they have always belonged."

Bushman groups such as the !Kung have interacted and traded with food-producing groups — herders and agriculturalists — for more than 2,000 years, reported James R. Denbow in Schrire's volume. Denbow, of the National Museum and Art Gallery in Gaborone, Botswana, based his conclusion on archaeological findings from 400 sites and 16 detailed excavations in the Kalahari.

In support of Denbow, Robert J. Gordon of the University of Vermont in Burlington cites archival records of 19th-century travelers and traders describing Bushmen as far from traditional hunter-gatherers. Gordon notes that the term "Bushman," derived from the Dutch "Bossiesman," means "bandit."

More than 100 years ago, according to Gordon, Bushmen were "hotshot traders" in the world market for ivory and skins. European traders purchased ivory, feathers, horns and skins of animals slain by Bushmen — including the !Kung — for tobacco, beads and other goods, while leaving the meat to the Bushmen. With the introduction of guns, Bushmen became enthusiastic participants in the depletion of wild game.

Records from the 19th century also cite Bushman groups as fierce defenders of the copper mines they worked for trade and profit, Gordon says.

In Schrire's view, the evidence shows that no pure hunter-gatherers live anywhere in southern Africa. Bushmen have sporadically raised livestock for hundreds of years, she contends.

Richard B. Lee, codirector of the original !Kung project and now at the University of Toronto, says Howell's



Images of the Agta: A typical rain-forest dwelling (top) and a dugout canoe.

version of the research is "extremely distorted" and the evidence in Schrire's book is largely unpersuasive.

Lee says he and coauthor DeVore "were never under any illusions about the pristine nature of [!Kung] life." After follow-up visits to the !Kung in the late 1960s, Lee wrote that they were "no strangers to agriculture and pastoralism." When the Harvard project began, he notes, !Kung often lived in camps with black herders. One group of !Kung living with no outsiders often visited nearby herders to obtain milk.

Yet the !Kung encountered by anthropologists in the early 1960s had a low fertility rate and long periods between births, characteristics marking them as "rather different from other non-contracepting populations," Lee says. In addition, basic forms of social organiza-

tion — such as ritual healing, a primary reliance on hunting and gathering, and the lack of a political hierarchy — showed remarkable immunity to outside influences. In Lee's view, !Kung society was fundamentally unaltered by centuries of contact with herders.

Most of Gordon's historical sources, he adds, refer to Bushmen living hundreds of miles away from the !Kung studied by the Harvard researchers.

Given the long history of !Kung contact with outsiders as documented by Denbow, Lee says the persistence of "the irreducible core of their culture" confirms historical descriptions of the !Kung as a fiercely independent people. For instance, an account published in 1868 by British traveler Thomas Chapman refers to the !Kung as "a noble, independent race . . . beholden to no one."

"The !Kung, like many other foraging peoples, took what they needed from other cultures and continued their way of life," Lee contends.

His assertion is supported by evidence of considerable resistance to change among some hunter-gatherers. For example, subarctic Canadian Indians have withstood developers' attempts to infringe on their homelands, and have managed to remain primarily hunters. Their tenacity "helps us to overcome the sense that hunter-gatherers are successful only in isolation and are doomed to destruction by contact with other ways of life," writes Fred R. Myers of New York University in the 1988 *Annual Review of Anthropology* (Annual Reviews Inc., Palo Alto, Calif.).

The Philippine Negritos, made up of 25 hunter-gatherer groups including the Agta, are perhaps less controversial than the !Kung, but their apparent isolation is also questioned. The Agta's foraging strategies are quite flexible and have long involved trade with other groups, suggests P. Bion Griffin of the University of Hawaii in Honolulu in Schrire's book. Although the Agta are primarily hunter-gatherers, archaeological remains show they also relied to varying degrees on fishing and the cultivation of wild plants over the past several thousand years, Bion says. In his view, trading with nearby farmers may have begun several hundred years ago.

Detailed study of the languages spoken by Negrito groups, notes Headland, indicates important linguistic changes were set in motion around 3,000 years ago,

when Austronesian-speaking farmers entered the Philippines. The Negritos apparently adopted Austronesian languages as their own and later developed separate dialects and daughter languages, he asserts. Linguistic shifts of this magnitude suggest "periods of intimate interaction" between foragers and farmers, according to Headland.

**D**ietary needs helped propel the intimacy of the interaction, Headland says. Tropical rain forests are rich in game and poor in plant food. The lack of cultivated starch foods pushed the Negritos — as well as other rain-forest groups such as the central African pygmies — toward periodic exchanges with farmers and overseas traders, Headland argues.

Human populations certainly are not immune to outside influences, says Napoleon A. Chagnon of the University of California, Santa Barbara, "but questions about the past can be partially addressed by studying factors such as population distribution and marriage patterns in horticultural groups." For more than 20 years Chagnon has studied the Yanomamo, South American horticulturalists who plant herbs and bananas and hunt for meat.

Headland and Reid say Chagnon overextended his theorizing when he referred

to the Yanomamo in a 1983 book, *Yanomamo: The Fierce People* (Holt, Rhinehart & Winston, New York), as "our contemporary ancestors."

Nevertheless, common social patterns among a number of hunter-gatherer societies around the world, including egalitarian decision-making and communal religious practices, may shed light on behavior in earlier times, Lee says, although such analogies probably cannot extend beyond several thousand years.

**L**ee thinks critics such as Howell and Schrire mistakenly portray "all science as myth-making" by assuming that scientists' cultural preconceptions inevitably overwhelm careful empirical efforts to reconstruct prehistoric behavior.

Responds Schrire, "Such assertions are based more on an act of faith than on elegant research."

There is, however, an important implication about past behavior gained from insights into longstanding trade between hunter-gatherers and outside groups, says Charles A. Bishop of the State University of New York at Oswego. Evidence that Cro-Magnon clans in Europe entered into elaborate trade networks between 28,000 and 10,000 years ago suggests the majority of hunter-gatherers did likewise for the past 12,000

years, he asserts. Thus, their societies probably consisted of different social levels and were not as egalitarian as Lee and others claim.

Within the last few centuries, Bishop proposes, overexploitation of local resources and dependency on more powerful, technologically advanced neighbors have shattered traditional hunter-gatherer social systems. He maintains that anthropologists study the fallout of this process — groups with few social or political divisions, masquerading as long-isolated populations.

Whatever the truth may be, Headland says the fallout of the ongoing debate over hunter-gatherers is likely to revitalize ethnographic, archaeological and linguistic investigations. For instance, he acknowledges that his contention that most hunter-gatherers engage in commercial foraging "is a theory in need of testing." Researchers checking out his proposal will likely emphasize the ties between a variety of hunter-gatherer societies and the outside world.

The interdependence of hunter-gatherers with outsiders is not a novel notion, having been described by several prominent anthropologists in the past 70 years. But, says Headland, "Today we see the interdependence theory finally coming of age." □

*Next: The strange case of the Tasaday*

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## Solving a mystery in the sands of Mars

Results from the biology instruments that sampled and analyzed the Martian surface from the two Viking landing craft in 1976 failed to make a case for the presence of life on Mars. On the other hand, neither have scientists heretofore succeeded in completely explaining Viking's data by means of inanimate chemistry alone. Now, however, a group of researchers has proposed an answer that they say fits the data in detail, and without the need for Martian life.

In one Viking experiment, a nutrient solution labeled with carbon-14 moistened a bit of Martian "soil," causing the sample to emit gases containing the radioactive carbon in a manner suggesting metabolism. When the soil was again injected with the solution, the amount of gas in the test chamber dropped by 22 percent, and when the sample was heated to kill off any possible microorganisms, the gas production indeed stopped, suggesting life to some.

But when soil was injected with the carbon-14 nutrient solution in a second instrument, called the gas-exchange experiment, it startled Viking scientists by giving off an unexpected quantity of

oxygen, which declined rapidly a few hours later. When those samples were heated, they still gave off oxygen, but less of it, suggesting the presence of a chemical oxidant that was broken down by heat.

Viking scientists concluded the experiments failed to support the idea of life on Mars, but no one managed to explain fully what chemistry might account for the surprising data.

Physical chemist Robert C. Plumb of Worcester (Mass.) Polytechnic Institute, together with three of his present and former students, set out to match the Viking results as closely as possible. They used test chambers made of the same materials as Viking's, and report in the April 20 *NATURE* that their goal was to reproduce quantitatively the same chemical reaction rates, the same 22 percent reduction in the amount of gases produced during the "labeled release" test, the same responses to heating, and more.

A key step in the analysis, says Plumb, resulted from research reported in 1978 by Soviet researchers who proposed that oxygen could become trapped in microscopic pores in the rocky material of the Martian surface. The pores, according to the group, could readily open if exposed to water vapor, which was provided by the nutrient solution in the gas-exchange experiment. This would trigger the abrupt release of oxygen, one of the more dramatic events in the months-long oper-

ation of the biology package.

Viking scientists had suggested that superoxides trapped on the sample might have released the oxygen, but Plumb says "superoxides are not stable in the carbon dioxide atmosphere of Mars." Instead, his group cites a 1983 Soviet report, unrelated to Viking, that ultraviolet or X-ray radiation can break down metal nitrates into an oxidizing agent called peroxonitrite (the lander instruments could not detect nitrogen). This compound can oxidize the organic compounds in the nutrient and is destroyed by heat (which would shut off the carbon dioxide production) — again reminiscent of Viking's data.

A third Viking biology instrument, designed to see whether labeled carbon dioxide might be metabolized by hypothetical Martian microorganisms, failed to show results that changed consistently with shifts in heat and humidity, Plumb says, noting another U.S. researcher's suggestion that the test was probably disturbed by the heat-driven transport of dust through the device.

Even if there are no micro-Martians, adds Plumb, future Mars-landing missions should be instrumented to detect peroxonitrite and carbonate on the planet's surface, as well as to confirm a slight alkalinity that would account for the 22 percent carbon dioxide reabsorption reported by Viking. — J. Eberhart