

Gauging the Winds of War

Anthropologists seek the roots of human conflict

By BRUCE BOWER

In a 1971 Motown hit single, Edwin Starr posed the musical question, "War — what is it good for?" His gruff response: "Absolutely nothin'."

Despite the grimly predictable tragedies of armed conflict, almost all ancient and modern societies studied by anthropologists have engaged in at least periodic bouts of warfare. The ubiquity of organized fighting between human groups — currently brought home by the war in the Middle East — has fired up the scientific study of warfare over the last 30 years and has sparked some bruising academic skirmishes.

A handful of warfare researchers described their findings and theories at last November's meeting of the American Anthropological Association in New Orleans. These investigators do not praise fighting, but they assume that anything so common in human experience serves some purpose. They search for the "absolutely somethin'" that lights the fuse of violence in bands of foragers, tribes of hunter-gatherers, rudimentary political states and modern nations alike.

In the 1960s, as U.S. involvement in Vietnam deepened, anthropological theories of war's causes and consequences flourished, numbering at least 16 by 1973, observes Keith F. Otterbein of the State University of New York at Buffalo. However, he says, only about half of those theories still receive strong scientific support, and no persuasive new theories have emerged.

Current notions about the roots of war stem mainly from studies of nonindustrial societies lacking centralized political power and extensive military organizations. In Otterbein's view, all of these

theoretical approaches focus on three themes:

- "ultimate" causes of war that influence the goals people fight for, such as competition within a society for scarce resources or mates, and intense divisions between groups of related men.

- "proximate" causes of war, such as a society's military preparedness and the goals of its leaders, often centering on the desire for land, natural resources or control of trade routes.

- consequences of war that influence further conflict, including population decline, improved access to resources, and increased prestige and power accorded to victorious warriors.

Although some anthropologists and sociobiologists contend that a genetic tendency toward physical violence greases the human war machine, theories of innate aggression attract few advocates today, Otterbein maintains. Nevertheless, disputes over the alleged biological roots of combat continue to erupt, ignited in many cases by the work of Napoleon A. Chagnon of the University of California, Santa Barbara, whose studies of warfare have become the most widely publicized research in this field.

Since 1964, Chagnon has conducted fieldwork among the 15,000 Yanomamo Indians who inhabit some 200 villages in the Amazonian jungle of Brazil and Venezuela. He has long stressed the ferocity and frequency of combat between Yanomamo villages. Some other anthropologists who have studied the jungle tribe argue that Chagnon emphasizes a misleading slice of Yanomamo life.

Chagnon's latest report, in the Feb. 26, 1988 *SCIENCE*, concludes that revenge fuels protracted, bloody battles between groups of men from different Yanomamo villages. Competition for food, water, territory or women creates the initial friction, he says. Minor bow-and-arrow confrontations ensue, escalating rapidly when a death results and the victim's male relatives exact revenge through raids on the offending village.

Blood vengeance apparently raises the social status and reproductive success of Yanomamo warriors, who represent nearly half of the men in the tribe, Chagnon maintains. On average, killers have more than twice as many wives and three times as many children as their peaceable counterparts.

Chagnon refrains from arguing that warfare generally proves biologically advantageous among the Yanomamo or in any other culture. He does contend, however, that reproductive success and fighting prowess probably go hand-in-hand in many human groups, and that this may help explain the great prestige attached to military conquest in both modern and ancient states.

Even if Chagnon's Yanomamo data hold up, responds anthropologist John H. Moore, successful warriors in similar tribal societies sometimes contribute few genes to subsequent generations. Moore, of the University of Oklahoma in Norman, cites the 19th-century Cheyenne Indians of the North American plains as a case in point. The Cheyenne, with a population of about 3,000 divided into bands of 150 to 400 individuals, engaged in fierce warfare with other Indian tribes as well as with U.S. military forces, achieving historical notoriety with their defeat of Custer at the battle of Little Big Horn. In addition to seven warrior bands led by numerous war chiefs, Cheyenne society included 44 peace chiefs, sometimes more than one to a band, who led polygynous extended families.

U.S. Census data collected in 1880 and 1892 reveal that men in the Cheyenne peace bands had a striking reproductive advantage over warriors, reports Moore in the June 1990 *CURRENT ANTHROPOLOGY*. The war chiefs stressed celibacy and ritual suicide, while the peace chiefs had numerous wives and children, he notes.

Moore asserts that many societies



without centralized political systems, including the Cheyenne, undergo periodic cultural reorganizations, and he says researchers have no evidence suggesting that recent Yanomamo behavior reflects all or most of human prehistory, or even the Yanomamo of several generations ago.

Another critic of Chagnon's research, Marvin Harris of the University of Florida in Gainesville, theorizes that war occurs among hunter-gatherers and other "band-and-village" peoples when population growth creates increasingly intense competition for food, especially protein-rich game. He maintains that warfare, for all its brutality, effectively prunes these populations, preventing malnutrition and hunger among survivors — whether the combatants hail from Yanomamo villages or from horticultural groups in Papua New Guinea.

"Band-and-village societies must pay a heavy price for keeping population and food supply in balance, and warfare is part of that price," Harris writes in *Our Kind* (1989, Harper & Row, New York). Conflicts sometimes veer out of control, wiping out more lives than malnutrition would have claimed, but "no system is fail-safe," he notes.

Harris' theory may help explain widespread fighting among North America's Anasazi Indians around 700 years ago, says Jonathan Haas of the Field Museum of Natural History in Chicago. Although Anasazi culture extended back at least to 500 A.D., Haas points out that burnt houses, decapitated skeletons and other archaeological evidence of warfare date only to the second half of the 13th century A.D. At that time, the ingredients for war coalesced, he says: A burgeoning population fostered the emergence of distinct cultural groups with an "us versus them" mentality, and periodic droughts reduced crop yields and drained food reserves.

When the Anasazi abandoned their population centers at the end of the 13th century and the droughts also eased, warfare again diminished, Haas observes.

"Tribal peoples cycle in and out of warfare because of environmental stress," he says. "Warfare has increased with the evolution of states because environmental stresses are more unrelenting now."

The nearly unrelenting warfare of most early states, which spread throughout the world from 3200 B.C. until around 1800 A.D., often reflects the "predatory accumulation" practiced by rulers sitting atop centralized political hierarchies, asserts Stephen P. Reyna of the University of New Hampshire in Durham. However, early or "archaic" states possessed nowhere near the political complexity or destructive means of modern "nation-states," he notes.

A violent conflict in the Chad Basin of north central Africa around 200 years ago illustrates the dynamics of warfare between archaic states, Reyna says. A leader of one state accused a neighboring leader of a crime against Islam — incest with his daughter — and the charge sparked a war. But the real problem stemmed from the rapid growth of both states due to a brutal type of arms race, Reyna holds. These leaders had engaged in constant warfare with weaker neighbors to accumulate wealth and larger armies. In a vicious cycle, each victory enabled them to accumulate even more means of destruction to wage more successful wars, he says. Eventually their "fields of empire" overlapped, and war between the two soon followed.

Reyna notes that the incest charge, though probably unfounded, served a strategic purpose: It led to the defection of several generals aligned with the accused ruler, undermining his army and helping to seal his eventual defeat.

Such hostilities grew out of a long history of warfare among human groups, says Robert L. Carneiro of the American Museum of Natural History in New York City. In his view, war played a critical role in the evolution of large political and social systems.

The origins of war probably stretch back through a couple of million years to Stone Age times, Carneiro contends. Stone Age battles — fought to avenge murders, wife-stealing or other trespasses often observed among modern hunter-gatherers — served to push small bands of humans apart and keep them separate.

But around 10,000 years ago, the nature of warfare changed, he maintains. The spread of agriculture increased permanent settlements and human populations. Adjacent villages then began to fight over access to farmland. Instead of pushing the communities apart in traditional Stone Age fashion, these wars forged the emergence of the chiefdom, a forced coalition of several formerly independent villages under the control of a paramount chief. With chiefdoms came district chiefs, village chiefs, advisers and other early representatives of social and political complexity.

Archaeological signs of war, such as the number of weapons found in graves and heavily fortified occupation sites, increase with the growth of chiefdoms, Carneiro observes. The push from chiefdoms to even larger state-societies did not occur swiftly or irreversibly throughout the world, he says, but early hotbeds of state growth appeared where limited areas of prime farmland prevented vanquished villagers from fleeing to greener pastures. Prime examples include Mesopotamia, the Nile valley and the Peruvian coast.

"War was the one instrument capable of surmounting autonomous villages and

deserves careful study as a cause of social evolution," Carneiro says.

Perhaps the most wide-ranging warfare study to date was conducted during the 1980s by Carol R. Ember and Melvin Ember of Human Relations Area Files, a privately funded research organization in New Haven, Conn. The team analyzed anthropological descriptions of 186 nonindustrial societies, virtually all of which operated on a much smaller scale than modern nation-states. Descriptions ranged from 18th-century writings on Native American tribes to recent accounts of African hunter-gatherers.

Two independent coders read the voluminous literature and rated the presence and frequency of warfare, aggressive acts, natural disasters and other social and psychological factors, focusing on a 25-year period in each society.

The Embers say their unpublished findings offer a tentative theory of war, at least among "simple" societies: The societies that engage in the most warfare express considerably more fear of food shortages caused by expected but unpredictable natural disasters, such as drought, flood or infestation. The fear of others — indicated by child-rearing practices stressing mistrust of neighbors — further fuels the tendency to fight, the researchers say.

Their data provide no backing for other explanations of warfare. For example, the Embers found that societies already experiencing chronic food and protein shortages did not engage in excessive fighting. The study also failed to support the idea that a shortage of women stimulates warfare and regulates population.

Some researchers have suggested a penchant for warfare among sexually restrictive societies and among societies with high levels of interpersonal aggression, as reflected in elevated rates of murder and theft. The Embers' study showed no such links.

Parents in warlike societies do tend to encourage toughness and aggression among boys, but warfare apparently *causes* this practice rather than vice versa, the Embers argue. When these societies lose wars and come under the control of outside forces, harsh child-rearing methods diminish sharply, they found.

Three-quarters of the sample's "simple" societies fought wars every two years, Carol Ember notes, although "this doesn't mean war is inevitable."

The Embers hope to expand their analyses to modern nation-states. In the meantime, they suspect that the link between the risk of war and the fear of unpredictable disasters extends to a wide variety of situations.

Continued on p.91

orological records for that country.

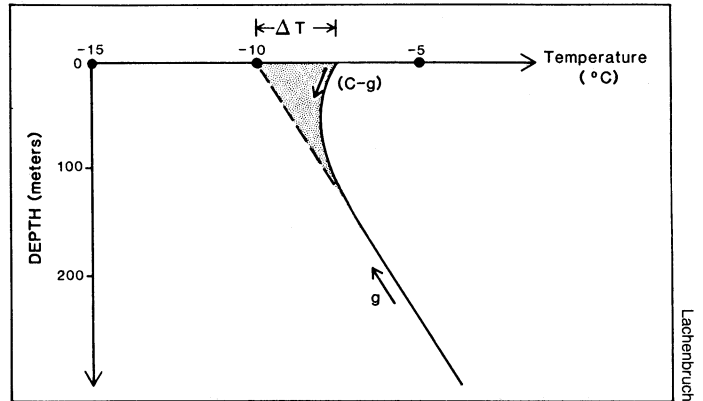
Borehole researchers say their data can provide important climate information that complements findings from other sources. Until now, scientists searching for signs of a global warming have focused mostly on records of air and sea-surface temperatures. But those records don't cover the globe evenly, because remote regions often lack reliable historical archives of temperature. Moreover, most of the usable records reach back no more than a century, and many cover only the last 50 years.

Boreholes, in contrast, portray the last several centuries. Many were drilled in remote areas by companies searching for minerals. According to Pollack, temperature records exist for more than 10,000 boreholes around the world.

He and his colleagues are working to compile those data, trying to piece together a picture of how different parts of the world have warmed or cooled during the last century. That information can serve as a test for evaluating the reliability of computer models used to forecast future climate changes, Lachenbruch says.

Several geophysicists are trying to alert other global-warming analysts to the rich potential of borehole records, but a number of key players in climate

Throwing a curve: Because of Earth's internal heat, temperatures recorded along a borehole should increase steadily with depth, following the dotted line shown here. However, in this representation of a typical borehole in the Alaskan Arctic, a bend in the temperature record (solid line) reveals abnormally high temperatures near the surface, indicating that the climate warmed during the last 100 years.



research have yet to hear the news. Climatologist James Hansen, for instance, told SCIENCE NEWS he was under the impression that borehole records could provide useful information only in permafrost areas, and thus had limited applications. Hansen directs NASA's Goddard Institute for Space Studies in New York City, where he models climate change and tracks global air temperatures.

If heat-flow scientists have had difficulty making themselves heard, a rattling of the research coffer might draw some attention. Right now, none of the federal funding earmarked for global-change re-

search goes to borehole studies, but that will probably change, says Ian MacGregor, acting director of the National Science Foundation's earth sciences division in Washington, D.C. Several geophysicists have recently submitted proposals for borehole work related to climate change.

The ground, they insist, has valuable messages to convey.

"If you want to know what the Earth has been doing, ask the Earth, because it remembers," Lachenbruch says. "It's quiet, but it's very knowledgeable. All we've got to do is ask it some questions." □

Continued from p.89

Several researchers say contact with Westerners has whipped up local conflicts in Africa and elsewhere since the early days of European colonialism.

More than a century ago, for example, Tuareg tribes of northern Africa limited their attacks to small-scale raids on caravans passing through their territory, says Candelario Saenz of the State University of New York at Purchase. The Tuareg extorted camels and other goods from the caravans to support their pastoral way of life, Saenz says. But when France took control of Algeria in the late 1800s, it imposed numerous restrictions on trade in the region. Tuareg groups soon entered into a period of nearly constant warfare among themselves as they competed for the rapidly decreasing supply of goods passing along traditional trade routes, Saenz says.

Another instance of Western contact helping to foment violence occurred more recently in the ethnically mixed African nation of Mauritania, says Michael M. Horowitz of the State University of New York at Binghamton, who has conducted fieldwork there for the past four years.

The completion of a large dam on the Senegal River several years ago expanded farmable floodplains and drew

the promise of considerable outside investment by Western agricultural companies, Horowitz says. But the local population, long dependent on farming this fertile river valley, already occupied much of the area.

"The Mauritanian government is now killing and torturing these people to get the land," Horowitz says. "In the process, they've created 100,000 refugees and intensified violence between ethnic groups."

Whether stimulated by Western contact or not, most of the 120 wars documented since the end of World War II similarly pit large states against smaller nations or ethnic groups the states claim to represent, says Jason Clay of Cultural Survival, a public-interest organization in Cambridge, Mass.

In the aftermath of the international conflict sparked by the aggressions of the Axis powers, he notes, dictatorships and one-party states ironically solidified their power in many parts of the world, including Africa, the Soviet Union and Eastern Europe. Diverse nations and groups of people with separate languages and cultural histories were yoked to the goals of unresponsive, unelected leaders of both the political right and left, Clay says.

Moreover, those leaders socked away whatever taxes, internal resources, foreign aid and international loans they

could extract for themselves, leaving the rest of the populace destitute, he maintains.

"The destruction of social and political life at the local level and the stripping away of resources by modern one-party states has led to longer, more widespread wars," Clay argues. "We'll have more violence at the regional level and the settling of old scores as states fall apart in the post-Cold War world."

Although Clay's dire prediction gathers support from the bloody Soviet crackdown on Lithuania's independence movement and the increasing tensions in other Soviet republics, anthropological research provides room for optimism, says R. Brian Ferguson of Rutgers University in Newark, N.J.

"War is not the natural human condition," Ferguson says. "Research shows that war varies over time due to factors such as trade, population growth and outside contacts."

Often, leaders must paint the enemy as inhuman in order to motivate people to kill, he says — and even then, many soldiers come out of combat with severe psychological aftereffects.

"We need to dispense with the idea that people love violence and are doomed to fight," Ferguson concludes. □