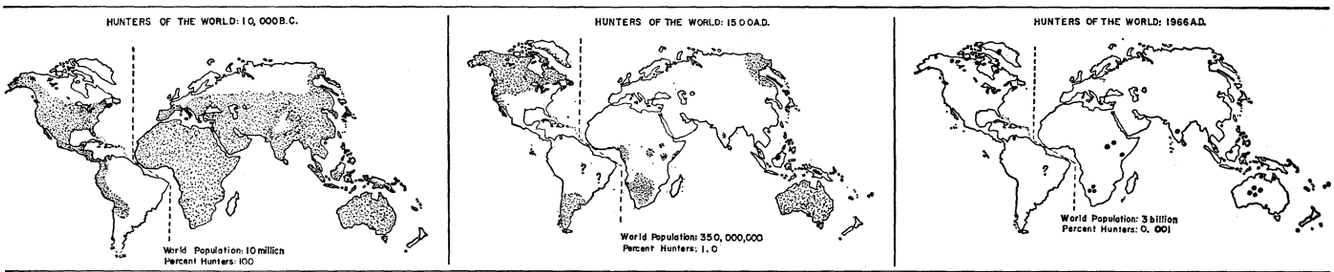

NUMBERS OF HUNTERS DWINDLE—These maps, presented at the "Man the Hunter" conference, show how the numbers of people living by hunting wild game dwindled throughout the ages, from 10,000 B.C. to the present.

ANTHROPOLOGY

Study of Hunters Urged

The few men who still live by hunting animals and gathering wild fruit for food do so under markedly changed conditions

➤ SCIENTISTS should swiftly take stock of the rare handful of people who still survive on earth by hunting wild animals and gathering uncultivated fruits and berries.

These people offer a dwindling resource of first-hand material for anthropologists to study the modes of life that prevailed throughout most of human history, said Dr. George P. Murdock of the University of Pittsburgh.

About 10,000 years ago the entire population of the earth subsisted by hunting and gathering, he told members of an international conference on "Man the Hunter," held at the Center for Continuing Education, part of the University of Chicago. Co-sponsors of the conference were the Wenner-Gren Foundation for Anthropological Research in New York City, and the University of Chicago.

As man evolved, he gradually learned how to scrape the soil, plant seeds and cultivate crops. Instead of roaming the land in search of wild animals, he began to corral and domesticate some of the tamable species —goats and cattle.

By the time of Christ, tillers and herders had replaced the original hunters over at least half the earth, Dr. Murdock said.

At the time the New World was discovered, only perhaps 15% of the earth's surface was still occupied by people living as hunters and gatherers.

Today most of these people have disappeared entirely and been replaced by stronger people using more progressive methods for livelihood. Some have been reduced to dependency and are living on reservations or as servants or outcaste groups. Others have made a transition to some form or other of agriculture, animal husbandry or industrial employment.

The few people still living an independent life of hunting do so under markedly altered conditions, he pointed out.

Some of those studied by modern ethnographers, Dr. Murdock said, include about 5,000 Bushmen. The other surviving 50,000 Bushmen have become serfs to other Africans or servants and laborers to Europeans. Only a small minority of the 170,000 existing Pygmies still hunt and gather food in the Ituri Forest region. In East Africa, the Dorobo, Hadza and Teuso tribes retain their hunting mode of life; and hunters still exist in Mauritania, Siberia, India, Ceylon, the Philippines, Australia and South America.

The largest concentration of hunters is found in North America—the Eskimos of Alaska, the Algonkians and Athapaskans of Canada, and the Plateau, Plains and Gulf Indians of the United States. Also in the United States, are the hunting tribes of the California Indians, the Apache and the Seri.

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MARINE SCIENCE

Oxygen in Sea Animals Shows Climate Cycles

➤ BY ANALYZING the oxygen isotopes in ancient ocean clams and oysters and tiny shelled protozoa, scientists have found that the earth was enveloped by three great successive temperature cycles each lasting 30 million years and fluctuating 86 degrees F.

These long cycles were followed by shorter ones with about the same temperature range, said Dr. Cesare Emiliani of the Institute of Marine Science, University of Miami, Florida.

During the past 425,000 years, a total of eight complete temperature cycles occurred, with an average cycle duration of 53,000 years, he reported at the opening session of the 47th annual meeting of the American Geophysical Union, Washington, D.C.

Changes in the world's climate throughout the ages brought about changes in the oxygen isotopes in sea creatures such as mollusks and foraminifers of the Cenozoic era, stretching from 63 million years ago to the present, and the more ancient Belemnites of the Mesozoic era.

The variations of climate determined by analysis of sea creatures correlate very closely with results obtained with the carbon 14, thorium 239 and uranium 238 methods of dating materials on the continents, Dr. Emiliani told the four-day conference.

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ENTOMOLOGY

Bacterium Effective When Dusted on Plants

➤ THE SUCCESSFUL AGENT for destroying pesty insects, the microscopic bacterium, *Bacillus thuringiensis*, is most effective when it is dusted onto tobacco or other plants, not sprayed, agricultural researchers have recently discovered.

If the bacterium is sprayed on in a clear water solution, it is killed by sunlight, said entomologist G. E. Cantwell and technician B. A. Franklin of the Agricultural Research Service, part of the U.S. Department of Agriculture.

The dust particles shield the bacteria spores from sunlight, the scientists think, and thus keep them alive longer. The discovery was made when searching for reasons why the helpful bacteria did not have such good results when sprayed in the fields.

The bacteria have been used successfully against crop destroyers, such as the cabbage looper, the tomato hornworm and the gypsy moth. The bacteria are now recommended for use against tobacco budworms and hornworms. From known results, the researchers say, they look promising as biological control agents.

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