

# *Drought May Have Doomed the Lost Colony*

By William K. Stevens

April 24, 1998

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On Aug. 18, 1587, on a coastal island called Roanoke in what is now North Carolina, a couple named Ananias and Eleanor Dare produced a daughter and named her Virginia, in honor of both the colony where they lived and of Elizabeth I, known as England's virgin queen. The baby, as schoolbooks have long noted, was the first English child born in America.

Four days later, the colony's leader sailed for home to obtain supplies. But England was preparing to meet the Spanish Armada and no ships could be spared for the New World. Three years passed before a relief expedition returned to Roanoke Island. It found no one. Virginia Dare and all the other colonists had vanished.

Ever since, the fate of the Lost Colony of Roanoke has presented one of the most baffling and enduring mysteries in American history.

Now at least part of an answer, and possibly the key to the mystery, has emerged from centuries-old cypress trees in southeastern Virginia and northeastern North Carolina, not far from Roanoke Island. Analysis of the annual growth rings of the trees has shown that in a colossal piece of misfortune, the Roanoke colonists -- and the Jamestown settlers who followed them a few years later -- arrived in the worst droughts of the last 800 years in that part of the country.

"If it weren't for bad luck, these English wouldn't have had any luck at all," said Dennis Blanton, an archeologist at the College of William and Mary in Williamsburg, Va., and a co-author of a report on the new findings, which are being published today in the journal *Science*.

As a result of the findings, experts are now nominating food shortages brought about by the mega-droughts as a possible root cause of both the Lost Colony's failure and Jamestown's well-known miseries and near failure. Jamestown survived to plant the first seed of the British Empire and its political values in North America, but just barely. The ill and starving settlers had abandoned the colony and were sailing down the James River for home when they met a relief convoy sailing up.

As for the Lost Colony, it "might well have survived if not for the drought," said Dr. Warren Billings, a historian at the University of New Orleans and an authority on the early settlements, who did not participate in the new study but is familiar with it.

The role of climatic and environmental change in shaping human events over the last several hundred years has largely been ignored by historians. "They tend to assume, and I think wrongly, that conditions haven't changed a lot," Mr. Blanton said.

Evidence has mounted in recent years that climatic change played a major role in the rise and fall of ancient civilizations, especially in the Middle East and South America. But scarce attention has been paid to its possible role in more recent centuries.

The latest findings add a dimension to the study of early American history, although the authors of the study do not claim that drought was wholly responsible for the misfortunes of Roanoke and Jamestown. "We don't want to come across as environmental determinists," Mr. Blanton said. "The stories are complex."

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But the revelation about the super-droughts of the late 16th and early 17th centuries casts a new light on what transpired. It also offers something of a cautionary tale about what type of climatic disasters might strike in the future, either from natural causes or as a result of human alteration of the atmosphere.

In fact, said Dr. David W. Stahle of the University of Arkansas, the chief author of the study on Roanoke and Jamestown, the findings grew out of an effort to reconstruct the past climate of the southeastern United States as an aid in producing a baseline against which

any climatic changes caused by the emission of waste industrial gases might be gauged.

Dr. Stahle is a dendrochronologist, one of a breed of scientists who have made a speciality of analyzing tree rings. The rings are regarded as highly accurate gauges of climatic conditions in a given year or even in part of a year, since their thickness and consistency vary with soil moisture, and the year can be pinned precisely by using the most recent year's ring as a benchmark.

In this case, the scientists analyzed the rings of bald cypresses growing along the Blackwater and Nottoway Rivers in Southeastern Virginia, part of the climatic region that includes Jamestown and Roanoke Island. These trees, which commonly live 600 to 800 years and sometimes reach 1,700 years, are the longest-lived trees in eastern North America.

The ring samplings were taken a decade ago, and Mr. Blanton, as part of a reassessment of the Jamestown site sponsored by the National Park Service, suggested using the samples to investigate the climate of the early colonial period.

The scientists were astounded by the results. Dr. Stahle, said Mr. Blanton, "called me back and he was just on top of the table, saying, 'Good God! This is incredible.' " The analysis showed that the most extreme three-year growing-season drought in 800 years coincided exactly with the period in which the Roanoke colony was established and then vanished. The worst single season occurred in 1587, the year of Virginia Dare's birth.

It also showed that the worst seven-year drought in 700 years coincided precisely with the foundation and early years of Jamestown.

Both sets of colonists would have been highly vulnerable to drought, the experts say, because they were living off the land and, rather than farming, depended for food on trade with the Indians and on gifts of corn from them. An extreme drought would have cut food supplies sharply, wiping out any surplus the Indians had. The Indians themselves may well have been afflicted by famine and reduced to eating roots and berries, as happened in an earlier drought, from 1562 to 1571, documented in the historical account of a Spanish priest.

Several clashes broke out between the Jamestown colonists and the Indians, and Dr. Billings believes that a conflict over food, brought on by the drought of 1606 to 1612, helps explain the hostility. And the new study suggests that almost certainly, the Jamestown drought contributed directly to the colony's high mortality.

Malnutrition was a leading cause of death at Jamestown, and the number of deaths rose during dry years while dropping off in others. In all, 4,800 of 6,000 settlers sent to Jamestown from 1607 to 1625 died.

Drought might also have contributed to the colonists' ill health, since water quality is poorest then. The brackish James River would have become saltier, and a lowered water table would have made it difficult to dig wells. Mr. Blanton says some colonists might have suffered from salt poisoning.

Jamestown's plight became most critical in the winter of 1609, known as the "starving time." The previous summer's drought probably prevented the colonists from saving any food for winter, Mr. Blanton said, and the winter itself was harsh, aggravating the situation. It was after this winter that the Jamestown settlers packed up and headed for home, only to return when succor arrived.

The end game on Roanoke Island could have played out in any of several ways, the experts say. The colonists could have been wiped out by the local Indians, the Croatans, in a clash over food. They could have left, sailing north to Chesapeake Bay, their original but never-achieved destination, and perished there or on the way. They could have joined forces with the generally friendly Croatans and moved out of the drought-stricken area, farther south, where today some Indians claim that the blood of Roanoke's settlers flows in their veins.

All that is known is that when ships returned to Roanoke in 1590, they found a single word carved on a tree: "Croatoan."

The drought may have ultimately doomed the Lost Colony. But exactly what happened to its members, Dr. Billings said, "will always be one of the great mysteries."

**Correction: April 25, 1998**

*A drawing yesterday showing the Roanoke colony in 1590, with an article about the colony's disappearance, carried a misspelled credit. The source was Corbis-Bettmann, not Bettman.*

A version of this article appears in print on , Section A, Page 1 of the National edition with the headline: Drought May Have Doomed the Lost Colony