NEW STUDY BACKS THESIS ON WITCHES

Article Says Ergot Poisoning Caused Behavior That Led to 1692 Trials in Salem

By WALTER SULLIVAN

A new scientific report supports the theory that the 1692 witch trials in Salem, Mass., may have followed the widespread consumption of a poisonous fungus similar to lysergic acid diethylamide, or LSD.

Nineteen women and men were hanged as witches after they, or children in their presence, acted as if "Satan were loosed in Salem," according to descriptions by colonists at the time.

A report in the current issue of American Scientist suggests that the aberrant behavior of the adults and children, which included convulsions and hallucinations, probably was brought on by ergot, a fungus that grows on rye in cool, damp weather.

When eaten, the fungus can cause symptoms, especially in children, that are said to resemble behavior that the early colonists attributed to witchcraft.

The ergot theory was first suggested six years ago in an article in the journal Science. But soon after the Science article was published, a long analysis in the same journal dismissed the explanation as improbable.

"The symptoms of the afflicted girls and of the other witnesses," the skeptical authors wrote, "were not those of convulsive ergotism." Furthermore, they added, the abrupt end of the crisis and the remorse of the accusers can be explained in other ways.

Ergot Theory Is Supported

In the latest report, a historian, Mary K. Matossian, an associate professor at the University of Maryland, concludes that the original proposal was probably correct. Dr. Matossian, who has been studying the effects of mold poisoning on social behavior, based her report on an analysis of court transcripts, climate indicators, diaries and other records of the 1692 witchcraft episodes in Massachusetts and Connecticut.

Dr. Matossian writes that the trials of 1692 were "the worst outbreak of witch persecution in American history." When Governor Phips of Massachusetts ordered a general reprieve the following spring, about 150 accused witches were released.

The idea that ergot was to blame was originally proposed by Linda R. Caporael, a graduate student in psychology at the University of California at Santa Barbara. She argued that symptoms displayed by the children thought to be bewitched — fits and complaints of being pricked or bitten, for example — were typical of ergotism.

Visions reported by the victims, she added, were strikingly like those produced by the hallucinogen LSD, a chemical derivative of ergot.

Responding to Social Cues

The rebuttal, by Nicholas P. Spanos and Jack Gottlieb, psychologists at Carleton University in Ottawa, noted that the children did not report some symptoms typical of ergot poisoning. Among them were nausea and vomiting, followed by ravenous hunger.

The afflicted girls, they said, "were enacting the role of demoniacs as that role was commonly understood in their day." They responded to social cues, such as "convulsing en masse when the accused entered the room."

The skeptics also responded to the argument that the witch hysteria ended abruptly because the exposure to ergot ended. In Germany in the 16th and 17th centuries, they said, "abrupt endings to large-scale panics about witchery were the rule rather than the exception."

In her new analysis, Dr. Matossian writes: "I have concluded, after examining the Salem court transcript, the ecological situation, and recent literature on ergotism," that the objections are not valid.

The witchcraft affair, she adds, "may have been part of a largely unrecognized American health problem." Occasional cold, damp periods in coastal lowlands, she believes, allowed rye to become infected with ergot.

Among the symptoms of severe ergotism is "formication," a feeling that ants are crawling under the skin. The victim may also suffer coldness of the extremities and spasms of limbs, tongue and facial muscles. In severe cases, epileptic seizures, partial paralysis and coma are followed by death.

"Animals suffering from convulsive ergotism may behave wildly, make loud, distressed noises, stop lactating, and die," Dr. Matossian wrote. Several cows and three people died during the 1692 outbreak.

"The suggestion that the afflicted teen-age girls in Salem Village were feigning their symptoms or, as Spanos and Gottlieb suggested, role-playing in the presence of social cues, cannot explain the symptoms of the animal victims," she wrote.

Rye Bread Was Diet Staple

In Salem and other towns of Essex County in Massachusetts, 24 of 30 purported victims of bewitchment in 1692 "suffered from convulsions and the sensations of being pinched, pricked or bitten," she said. They may not have reported other symptoms such as nausea because those were not expected in witchcraft victims.

In the American colonies at that time, according to Dr. Matossian, rye bread was still a dietary staple and the crop was vulnerable to ergot. From widths of tree rings formed during that period, she found, the growing season in eastern New England was abnormally cool in 1690, 1691 and 1692.

Diaries kept in Boston during the intervening winters showed they were "very cold." The households chiefly stricken by the "bewitchment" were those closest to marshy land.

"New Englanders believed in witchcraft both before and after 1692," she wrote, "yet in no other year was there such severe persecution of witches."