Early in 1692, a handful of girls put a small village in Massachusetts under a spell that would last well into the next year and would engulf a good portion of eastern Massachusetts Bay Colony. As people in other towns joined in, judges in the colony heard accusations against at least 168 people: young and old, men and women, ministers and merchants, leaders and derelicts. By October of 1692, nineteen had been found guilty of witchcraft and hanged, one was pressed to death with stones, and five died in prison. No one who confessed to witchcraft was put to death. Later that month, Governor William Phips shut down the witchcraft court, and from January through May 1693, the Supreme Court began to clear jails of the accused. There were no more convictions. The spell was over.

Few episodes in American history have gripped the imagination as powerfully as the Salem witch trials, from the impassioned pamphlet against witchcraft by Reverend Cotton Mather to equally strong protests against the trials by Thomas Brattle and Robert Calef; from Tompkins Matteson’s dramatic painting of *The Trial of George Jacobs, Sr.*, in 1855 (see figure 1) to Arthur Miller’s drama, *The Crucible*, in 1953.
So horrifying were the events and so unaccountable did the trials seem to later generations that writers and scholars from 1692 to the present have looked for ways to explain them, scouring court documents and other sources to find clues to the causes of the tragedy, studying, interpreting, and reinterpreting the evidence. When I set about to teach a seminar on the witch trials, I wanted to put the original documents in students’ hands so that they, like professional historians, could experience the excitement of discovering history in contemporaries’ own words. I thought, too, that students would understand the events in Salem better if they studied the original court records alongside other scholars’ accounts.

Because all collections of the primary sources were either out of print or otherwise unavailable, my plan required creating a digital library. A small teaching grant enabled me to digitize transcriptions of the court documents, as well as several pamphlets and books that appeared immediately after the trials. These documents were the first items in the Salem Witch Trials Archive, which now contains approximately 850 legal documents and other primary source materials. I then decided to expand the electronic archive with funding from the
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National Endowment for the Humanities and other sources, so that students and other researchers could use it to explore the witch trials.

One of the organizations from which I obtained support, the Electronic Cultural Atlas Initiative, required that all material in the archive be referenced geographically and chronologically. Using a geographic information system, we developed a database structure linking historical maps and other visual documents to demographic, genealogical, and legal material. Pulling together so many historical documents and types of information created a complex set of categories and relationships. What makes the archive coherent and useful is its simultaneously geographical and historical organization—the linking of every document, every image, and every piece of demographic and genealogical information to every person involved, with their location in place and in time.

I had no prior experience with relational databases or with GIS. As often happens, learning to use new tools pushed me to rethink assumptions about how to organize and use material in teaching and research. Since the technology I was using can manage vast amounts of material, it encouraged me to take an encyclopedic approach. If, for example, the names of all the accusers and the accused can be located on a map, that possibility invites the linking of other information to each name, such as dates of birth and death, family history, and economic information. Using the map, we could then show the pattern of the accusations as they happened over time and the links between accusers and accused. This raised questions about the events that have not been fully studied before, as most research has concentrated on Salem Village. Map-making led me to wonder how much geographic territory should be covered in a study of the Salem witch trials. I also began thinking about what kinds of questions students would be able to pursue if they had access to geographical information about the witch trials, such as where those involved in the trials lived, how far they were from courts and jails, to which churches they belonged, and what proximity or distance might suggest about the relationships between accusers and accused.

I was by no means the first to recognize the importance of geography for understanding events in Salem. Maps have been used by scholars of the witch trials since Charles Upham, a local Salem historian, published a landmark two-volume history in 1867 titled *Salem Witchcraft.*

Upham
drew a detailed map of Salem Village as it stood in 1692 (see figure 2), marking the location of all households in the village, as well as some locations in the town of Salem and neighboring towns of Topsfield, Boxford, Wenham, Rowley, and Beverly. Upham used the map to support his argument that accusations of witchcraft were rooted in property disputes that had taken place years before; hence his view that the trials needed to be understood at the local village level. Like his literary predecessor, Salem-born Nathaniel Hawthorne, Upham regarded the witch trials as personal conflicts that went out of control.

In 1974, social historians Paul Boyer and Stephen Nissenbaum revisited Upham's map and used it in their study, *Salem Possessed.* They argued that the witchcraft accusations were motivated by economic and social tensions that had arisen between two factions in Salem village, one that wanted political and religious independence from the town of Salem and another that supported the town's continued governance of village affairs. The first step toward independence had been taken in 1672, when the town allowed the village to establish its own church and appoint its own minister. By 1692, however, three ministers had been appointed and dismissed. It was from within the house of the fourth, the Rev. Samuel Parris, that the first witchcraft accusations came. Boyer and Nissenbaum claimed that accusers came mainly from families who lived in the western part of the village, while the accused witches came predominantly from families living nearer to Salem town. They further identified the geographical divide with social and economic divisions in the village, arguing that families living nearer to Salem town were more closely bound to its mercantile interests and political activities. To illustrate their case, Boyer and Nissenbaum plotted accusers and accused on a map, based on Upham's, and drew a line through the center of the village to show that most accusers lived in the west and most of the accused in the east (see figure 3). It was a powerful use of cartography to buttress theory. The authors also added a map showing the property holdings of two of the most influential families to oppose one another in the trials. Although neither of the maps prove that economic differences and conflicting loyalties to village and town caused the trials, they are strongly suggestive.

To explore the Boyer–Nissenbaum socio-economic theory further in class, I used GIS to examine the data that they used, in addition to other data in the Salem
Charles Upham’s hand-drawn map of Salem village shows the boundaries of land grants and farms. While Upham mapped all households in the village, the scale of his map did not allow room for more detailed mapping of Salem town or a larger view of the entire region affected by the witchcraft trials.
Figure 3. Boyer and Nissenbaum's map of accusers and accused

This map extracts the outline of Salem village from Upham's map and adds to it letter symbols standing for the location of accusers (predominantly in the western end of the village), accused witches (mostly in the eastern village and outside its bounds), and those who defended the accused (mostly in the east). The geographical pattern seems to support the authors' argument that economic and social differences in the village lay behind the witchcraft trials. The map's generalizations and scale, however, leave out important details that support other interpretations.
Archive. Was a geographic divide evident in the distribution of wealth (a relatively poor west and wealthy east)? Mapping village tax rates suggests not; that in fact wealth was distributed fairly homogeneously across the community. The same was true of membership in the new village church and support for Parris (see figure 4). None of these factors show a lopsided east/west split. These patterns suggest the importance of social factors operating in the witchcraft accusations that more recent studies have emphasized. The lack of strong geographical divisions lends support to the view that the witchcraft accusations arose mainly out of personal grudges, feuds within and between families, and the social dynamics at work within the circle of girls who became the chief accusers.

I also used the Salem GIS to remap the accusers, accused witches, and their defenders, incorporating some of the ideas from more recent studies of the trials. I added to the accusers the eight “afflicted” girls whose accusations accounted for the vast majority of court cases. Boyer and Nissenbaum excluded them from their map because they did not regard the girls as “decisive shapers of the witchcraft outbreak as it evolved.” I counted among the accusers eight people who defended accused witches. Boyer and Nissenbaum

**Figure 4. Mapping Salem data with GIS**

Village tax rates (A), available all the village households, show a much more homogeneous spatial distribution of wealth than Boyer and Nissenbaum’s argument would lead one to expect. Similarly, people from across the village joined the new church during the three years prior to the witchcraft outbreak (B), and households from all but the most distant reaches of the village opposed the Rev. Parris (C).
had excluded such people from their map. The girls fell mainly to the west of the demarcation line, while the others’ households were mainly to the east. Georeferencing the basemap and the line also shifted three accusers to the eastern side. Despite these differences, my map shows much the same geographical division as theirs, with more accusers in the west and a disproportionate number of accused persons and defenders in the eastern part of the village. The map of accusations can be made more revealing if we add data about social status and wealth (see figure 5). Far more accusers than accused witches came from the households of village leaders—men who held positions in the militia, constabulary, the church, and village committees during the late 1680s and early 1690s. Accusers were also more likely to come from households belonging to the top tax bracket than were witches. These findings reflect the common demographics of New England witchcraft: most people accused of witchcraft belonged to the middle or lowest social and economic brackets, rarely the top level, and few were social leaders. Economic divisions did play an important part in the witch trials, but they were not clearly expressed in the geography of settlement. These maps suggest that we should consider a wide range of divisive issues that spawned disputes within families and between neighbors—the very conflicts that are abundantly documented in the primary sources.

One of the factors that makes the Salem story different from other New England witchcraft episodes is that a large number of prominent people rose up in defense of the accused. Most of the defenders, marked by the letter “D” on figure 5, were the friends and family relations of one accused woman, Rebecca Nurse, who happened to live in the eastern side of the village. From this group came the leaders of the anti-Parris faction that later ousted him. The
witchcraft conflict in the village was intensified by the fact that there were village leaders on both sides of the issue.

Wanting students to explore the full range of relationships between accusers, accused, and defenders, using the documents as their guide, I asked each person in the seminar to choose two of the accused witches and to comb through the records to extract information about them, including their age, gender, family relationships, social, economic, and political position in the Bay Colony, residence, and the date and nature of their participation in the trials. With all this information organized in a relational database linked to a GIS of locations, students could investigate who was doing what to whom and study the unfolding legal process.

I also wanted to offer students a more comprehensive geographical approach. The court records include people from twenty-four different towns. Mapping the location of everyone who was involved in the trials shows that what we usually think of as the peculiar aberration of Salem in fact affected much of the eastern half of Massachusetts Bay Colony (see figure 6). Taking account of everyone who was involved raises questions that Perry Miller, the leading historian of Puritan New England, considered in The New England Mind, published in 1953. Miller believed the trials were caused by institutional failures of church and state in Massachusetts Bay. He particularly blamed the leaders of the colony, from the governor, Sir William Phips, and his close circle of advisors (including Increase and Cotton Mather) to the ministers and judges in Salem who broke judicial precedence by endorsing the use of spectral evidence and by doing nothing to dampen the accusations.

Historians generally agree that the suspension of the old Massachusetts Bay charter in 1690, and the appointment of Phips as governor with a new royal charter in 1692, destabilized colonial institutions. The new charter abolished the longstanding Puritan theocratic state, in which the

Figure 6. Regional extent of the witchcraft trials
Salem village lay at the heart of what might better be called the witchcraft region, which by the autumn of 1692 extended from Wells, in present-day Maine, to Roxbury, and from the fishing port of Gloucester to Chelmsford. Towns in larger, gold-colored type had one or more persons involved in the witchcraft trials; towns in smaller, white type were not involved.
governor, church, legislature, and courts were welded together in a single religious and civil body. The tight control formerly exercised by the colony’s unified authorities came unstrung just as the witchcraft accusations began. With the courts suspended, people accused of witchcraft were charged and held in jail for up to three months pending trial. Even when Phips arrived with the charter, it was unclear how the church, state, and judiciary would now relate to each other. In this period of political uncertainty, town conflicts and personal animosities were allowed to play themselves out unchecked.

Seeing the broad geographical extent of the accusations also drew students’ attention to conflicts within other towns. The class focused on Andover, the town that registered the greatest number of people accused of witchcraft and the subject of a good deal of recent research. Divisions in Andover arose between older and newer settler families and the factions that sided with them. These divisions attracted and reinforced accusations from two of the girls of Salem Village, who were invited to Andover to identify witches in the community. The Salem accusers, with the help of one of the ministers, pointed to people who were already suspect in public opinion or who were in conflict with others in the village. The girls’ accusations then gave license for local people openly to join in. Whole families were systematically accused and brought to trial.

A series of maps generated from the Salem GIS shows the chronology of accusations and their spread across the colony from the first court hearing on February 29, 1692 to the last day of trial on November 30, 1692. By late April, people were being accused of witchcraft in a ring of towns surrounding Salem (see figure 7). A rash of accusations in Andover in midsummer coincided with the Salem girls’ visit. The four maps shown here depict significant phases of the process, showing leaps in the number of accusations and their widening distribution across the region. The online animated maps from which these images were taken show the pattern changing day by day. The sequence of maps shows an explosion of accusations across the landscape the local level—a dramatic representation of the temporary breakdown of the once tightly controlled Puritan social order. It was this widening collapse of church–state order that led to the popular New England characterization of the Salem witchcraft outbreak as a “hysteria” and a mass “delusion.” The animation of this process, taken from information recorded in the court records, can be paused to note developments day by day at any point along the timeline.
The first accusations of witchcraft were in Salem village and neighboring Ipswich. By the end of May, they extended as far north as Amesbury and as far west as Billerica and Woburn. After June, no one was accused in Salem, but more and more people were swept into the trials from outlying communities, particularly Andover, where forty-six people stood accused by the end of September.
Seeing the explosion of accusations in Andover prompted vigorous class discussion. Did the geographical expansion of accusations signify the contagious spread of notions of witchcraft—simply the hysteria of popular belief—or were other factors at work? Because the Andover accusations involved extended families, they seemed especially calculated, not hysterical as much as personally directed. Yet the records also reveal an interesting feature of gender genetics found in other New England episodes. Powers of witchcraft were ascribed to female blood lines, hence the great susceptibility of women and their female siblings and offspring. Several students devoted their work to Andover cases to explore this important theme.

Because all the information in the GIS links individuals to their geographical location, students can follow the social, spatial, genealogical, and legal relationships involved in particular cases. The story of Rebecca Nurse in Salem Village exemplifies many of the elements of neighborly conflict identified by Upham and Boyer and Nissenbaum. The accusations against Rebecca (Towne) Nurse, who was generally regarded as a model of Christian piety, were a turning point in the trials (see figure 8). If she could be accused, anyone was vulnerable. Several years prior to the witchcraft accusations, Rebecca’s family, the Townes, won a series of judgments over land disputes with the Putnams, another leading family in Salem Village. Rebecca’s husband’s family, the Nurses, prospered while the Putnams did not fare so well. The Putnams supported the new village church while Rebecca kept her membership in the mother church in Salem. When witchcraft accusations started in the village, the Putnams laid charges against Rebecca Nurse. A neighbor Sarah Holton added damning testimony that, three years before, Rebecca Nurse had vigorously scolded her husband, Benjamin Holton, for letting his pigs damage her vegetable garden. According to the widow Holton, Benjamin’s sudden death after the incident was caused by Rebecca’s witchcraft. Rebecca maintained her innocence and was put to death on the gallows.

In addition to influencing my approach to teaching history, creating the Salem Witch Trials Archive involved me in new collaborative relationships with Salem witchcraft specialists, archivists, database designers, GIS technicians, and graphic designers. These collaborations required me to rethink the content and representation of historical source materials and how they can be used in research and teaching at various levels.

The GIS portion of the project forced me to consider for the first time how maps are made and the purposes they can
Figure 8. Visualizing the tale of Rebecca Nurse
The Salem Witch Trials Archive brings together many kinds of documents related to the trials, including maps on particular themes, artistic renderings of events, and modern images of the landscape. All images are linked by their geographical location. A search on Archive documents related to Rebecca Nurse brings up (A) a map of those involved in accusing her of witchcraft, (B) F. A. Carter’s drawing of her being brought before the court, from John R. Musick’s suggestively titled 1893 book, The Witch of Salem: or, Credulity Run Mad, and (C) a photograph of the Nurse house, still standing in Salem. Photograph by Richard Trask.
serve in teaching and research. Although I could have calculated the relatively small numbers involved and plotted them on a series of hand-drawn maps, I would not have tried to do it without GIS because of the labor and potential inaccuracies involved. Using GIS enabled me to incorporate and analyze a larger body of data, and to explore geographical patterns at a variety of temporal and spatial scales. While GIS has not changed my basic historical methods, I now routinely use spreadsheets and relational databases because they permit far more accurate and richer maps. Because all the data can be so easily shared, this approach enables—and indeed virtually demands—collaboration in both teaching and research. I am in the process of designing a new course on the Salem witch trials in which students themselves create demographic records for the maps. Finally, while GIS maps can be powerful devices for asking new questions of historical subjects, they can also become powerful visual components in developing new interpretive arguments.
Further reading


Notes

1 The Web site URL is jefferson.village.virginia.edu/salem. The Archive and the research supporting it remain in progress.


5 I was unable to identify several households at the center of Boyer and Nissenbaum’s map, marked by the letters “A,” “W,” and “D,” owing to inaccuracies of the hand-drawn map and to the fact that Boyer and Nissenbaum do not identify most of the people (and households) marked by the letters they placed on map.


7 This Flash map is the work of Christ Jesse, the Institute of Advanced Technology in the Humanities, U. Va. jefferson.village.virginia.edu/%7Ebcr/salem/salem.html. See below.

7 This Flash map is the work of Christ Jesse, the Institute of Advanced Technology in the Humanities, U. Va. jefferson.village.virginia.edu/salem/maps. Why does footnote 7 appear twice? Which URL is correct?