



20.
A Midsummer
Sunbeam Site
in New England

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King Philip's Rocks is a 200-acre boulder-strewn area of swamps and hilly glacial till in Sharon, Massachusetts, located on high land between the valleys of the Neponset and Taunton rivers. It lies in the southeastern region of the state known for its ancient occupation and is said to have been a Native American meeting place¹ outside the settlements during the war of 1675, in which Metacom, called King Philip by the Puritans, led an alliance of tribes against the English. Its large glacial clusters and associated stone walls suggest that it was a meeting place of long standing.

Following visits to other locations named with adjectives² such as "Devil's" or "King Philip's," this site in Sharon was selected for archaeoastronomical study. Over many years of avocational study,³ we have made a careful foot survey followed by a map based on measurements with a backpack Global Positioning System unit accurate to 1 meter (m). This report presents three features of the site and concentrates on a cluster with internal passageways that expert visitors agree was modified by human activity. Interpretation based on known aspects of New England prehistory is also provided.

Figure 20.1 Winter solstice sunset, viewed from center of cluster along southwest passageway over 0.6 m rock (notebook page 301, December 27, 1980, 3:51 p.m. Eastern Standard Time).



A General Survey of the Site

The most important feature of the site is the large cluster locally known as King Philip's Cave, the main subject of this report. It lies on low land between two swamps. The eastern skyline near King Philip's Cave is determined by a prominent hill, some 600 feet (183 m) away and 75 feet (23 m) high. To the northeast is the most obvious feature of the site, a second large cluster locally known as King Philip's Rocks. Directly north of King Philip's Cave is a higher hill that, like the East Hill, has a 360-degree view from its top.

The site also contains four horseshoe-shaped stone constructions of 1 to 2 m extent on the high hill to the north. As determined by compass or solar-oriented transit survey, two of these face to the north, one faces the summer solstice sunrise, and the fourth faces the winter solstice sunset. The orientations of 71 other such "prayer seats" in New England have been found to cluster about similar astronomical orientations (Ballard 1999).

The Solstice Sunbeams

King Philip's Cave apparently was formed when the glaciers deposited a huge boulder onto bedrock, and the boulder was cleaved into a jumble of separate rocks under its own weight. In addition to a southerly outlet, the fractured surfaces form two passageways that meet near the center of the cluster, forming a V-shaped cave. These passageways appear to be entirely natural, with matching rock surfaces on either side. However, they are situated such that the winter solstice sunset shines into the center of the cluster through the southwest leg, and the summer solstice sunset shines into the center through the northwest one.

At the outer edge of the southwest passage are several stones of less than 1 m size that do not appear to have come from the smooth fracture surfaces nearby. These may have come from melting glaciers, but as can be seen in Figure 20.1, taken from the center of the cluster,



Figure 20.2 Winter solstice sunset beam shining on stone wall of passage at center of cluster. A wood stick of about 5 cm diameter was placed next to the sunbeam (notebook page 617, December 26, 2000, 4:44 p.m. Eastern Standard Time).



Figure 20.3 Standing stone at entrance to passageway, viewed from north side. The tree is about 15 cm in diameter (notebook page 654, September 22, 2001, No. 23).

they are just in the correct place to form an artificial horizon below the setting midwinter sun. These stones limit the bottom edge of a sunbeam, and the passage walls, converging at the top, limit its sides. The sun shines down the passageway, illuminating only the northerly passage wall until a few minutes before it sets, when it jumps to form a 10 cm spot on the northern rear wall, as shown in Figure 20.2, before disappearing as the sun sets.

At the outer edge of the northwest passage is a stone about 2 m tall, as shown in Figure 20.3. Its top is sharply pointed and is shaped in such a way as to form one side and bottom of a triangular aperture about 20 cm tall and 10 cm wide, as shown in Figure 20.4. The other side of the aperture is formed by the cleavage surface of the passageway. As shown in Figure 20.5, taken from the center of the cluster, the setting midsummer sun shines through this aperture. The sunlight forms a small beam that projects 6 m down the passage and forms a spot about 3 cm x 20 cm on one face of a meter-sized rock at the end of the V-shaped cave, as shown in Figure 20.6. No inscriptions or pictographs have been noted where either beam strikes a stone, and indeed none would be expected because of weathering in the relatively damp climate.

A geologist who visited the site pointed out that the standing stone does not appear to come from the surrounding fracture faces and has a scalloped edge produced by battering.⁴ The scalloped edge faces toward the camera in Figure 20.5 and has indentations about 30 cm long and 3 cm

deep, as shown in Figure 20.7. The working of the scalloped edge was confirmed by Allan Leveillee, a conservative archaeologist with wide experience in New England,⁵ and by an archaeologist and stonemason with wide experience in New England and Scotland.⁶ In addition, it was the opinion of one expert that the sharp tip at the top of the standing stone visible in Figure 20.3 is not glacial and that the back (southwest) side of the stone is broken off at the top to form the slot shown in Figure 20.4 through which the sunbeam shines into the cluster. A second expert felt that the back side could not have been split off in place,⁸ from which one might infer that the stone, which does not come from the walls, had been shaped before it was moved into place.

At the current state of investigation, we cannot state definitely that the winter solstice sunbeam is a work of man. The only evidence is that the small stones are located in such a way that they limit the bottom edge of the sunbeam. Also, the alignment of the two passageways with the solstices is definitely a result of how the glaciers deposited the boulder and is not a work of man. Sunbeams in both passageways are therefore coincidental. However, the northwest passageway has a stone that does not come from its walls and that stands in such a way as to form a narrow sunbeam. This stone has a scalloped edge produced by battering and is, therefore, definitely a work of man. Its top may have been formed to shape the triangular aperture that precisely defines a summer solstice sunbeam. We conclude that the sun shining down both passageways was noticed by occupants and that the summer solstice sunbeam formed by this stone was associated with occupation of the site. Currently, we have no further evidence, such as might be found by more detailed examination of the surfaces of the aperture of Figure 20.4 or by location of a nearby quarry site that matches the standing stone.



Figure 20.4 Slot viewed from the exterior. The standing stone is at left, and a portion of the passageway walls is at right (notebook page 529, June 23, 1996, No. 11A).



Figure 20.5 Summer solstice sunset, viewed from center of cluster along northwest passageway (notebook page 529, June 23, 1996, 7:37 p.m. Eastern Daylight Saving Time).



Figure 20.6 Summer solstice sunset beam shining on side of rock at center of cluster. Beam is about 20 cm wide (notebook page 529, June 23, 1996, 7:38 p.m. Eastern Daylight Saving Time).

Likewise, at the current state of investigation, it cannot be stated in what age the stone in the northwest passage first formed a sunbeam or when it was battered to form its scalloped edge. The standing stone is single, large, and split, reminiscent of early European megalithic practices, and unlike the prayer-seat constructions of many, much smaller, laid-up stones. Its scalloped edge could have been part of an original design or it could have been added later to enlarge the passageway as an exit.⁹ These questions can only be addressed by others expert in the comparative study of such types of stonework.

Some Archaeological Context

Other sites in New England have been found with solstice orientations. The Calendar I site in Vermont has solstice and equinox directions marked by standing stones on the horizon. Excavation determined that at least one stone was marked with deposits of red ochre and had been purposely erected (Mavor and Dix 1989:14-30, 322).¹⁰ The Mystery Hill site in New Hampshire, with a date of 3475 BP \pm 210 [ca. 1500 BCE] for charcoal removed from the wall of one of its drystone structures (Whittall 1977),¹¹ has tall, pointed, outlying standing stones that its owners claim mark the solstices (Lambert 1998:87), although all parties agree that the original foresight or foresights have been removed. A firepit dated to 650 CE has been found against and above the foundation of the northern stone of this array (Lambert 1998:55). Other solstice-oriented sites (Paul 2001; Harris et al. 2005:19, 20; Leonard 2003)¹² have been located recently.¹³

Throughout New England, archaeologists have accumulated hundreds of dates with a histogram (Hoffman 1990:212) that begins at 10,000 BCE and maximizes in the Late Archaic period around 2000 BCE at a peak it does not reach again until the Woodland period near 500 CE. Without excavation, it cannot be determined whether King Philip's Cave was modified in either of these times. However, the site contains some evidence that suggests occupancy in both periods.

As already mentioned, the site lies in the headwaters of the Neponset and Taunton river basins. It has been found that the distribution of stone points from the Early Archaic period (7000-6000 BCE) follows the river valleys closely. The river systems are argued to have “formed an inland water route from Boston Harbor to Narragansett Bay” in Rhode Island. Development of the highlands appears to have occurred as the climate improved and the population expanded. The presumably egalitarian hunter-gatherers of the lowlands turned into a developed and stratified Late Archaic culture based on a food surplus, including amaranth and chenopodium horticulturally gathered from the river flood plains. Use of the food resources of the swamplands in this period has been emphasized (George and Jones 1997), and clearing of the riverside forests has been discussed. Transitional Archaic traits include the widespread appearance around 2000 BCE of cremation burials of previously dried bone, sometimes only female, or of presumed high-status individuals inside the most important central houses, together with red ochre, which had not previously been widely used, and burnt and broken stone tools, including especially the diagnostic “Broadspear” large broad stone knives (Dincauze 1972:55) and ground stone woodworking tools, the latter implicated in the making of boats. The oldest pottery in the Northeast (Vinette I style, dated 3715 +/- 180 BP [ca. 1700 BCE]) is thought to have begun in the Taunton river basin, in association with the Broadspear culture. The trade route for soapstone bowls, an alternative to the Vinette pottery, went from the quarries in central Massachusetts southward to the ocean and back northward up the Taunton river to the Boston basin (Hoffman 1990).¹⁴ Many of the activities customarily assigned to the Late Archaic are also found during the Middle Archaic in the area 30 miles southeast of King Philip (Doucette 2005).

To What Period Do King Philip’s Rocks Belong?

Some factors suggest that the site may date from the Archaic period. Seasonal dispersal and gatherings of New England inhabitants are widely inferred (Dincauze 1972; George and Jones 1997; Hoffman 1990:172), but little is known of the nature of such meetings. There may have been a tendency to gather at traditionally set meeting places, especially ones characterized by prominent natural features and a location at the head of several river valleys. Likewise, there is a need for a prearranged time,¹⁵ possibly set by an event such as the full moon nearest the winter or summer solstice. The existence of Archaic habitation only in the river valleys and of a known Archaic trade route on the Neponset river support the idea that the imposing clusters of King Philip’s Rocks at the junction of two river basins could have been selected as a Late Archaic meeting place.¹⁶

Some factors suggest that the site should be interpreted as continuing through the Woodland Period. Although the frequency of radiocarbon dates fell at around 1700 BCE, the population may have grown continuously and become concentrated in fewer sites along the rivers and coastline during the early Woodland period. Both the Early and Late Woodland inhabitants of the coastline are regarded as indigeneous cultures that appropriated ideas from the Adena and Hopewell cults in the Midwest (Hoffman 1990:190, 219). The indigenous residents spoke various Eastern Algonquian languages, which diverged or were separated from the Western Algonquian languages by the northward intrusion of the Iroquois around 1500-1800 BCE (Snow 1980:27). The initiation and rejuvenation of shamans among Algonquian groups involved extended fasting and a



Figure 20.7 Edge of standing stone, taken with camera facing downward from its top. The 8-inch (20.32 cm) notebook is held to show the most prominent scallop (February 21, 2001, page 636, No. 11).

vision quest (Mavor and Dix 1989:220-223; Chartkoff 1983), in part at mountaintop stone seats¹⁷ with views in northern or solstice directions (Ballard 1999:Table 1). One such structure has been dated to 12th century CE in the Late Woodland Period (Ballard 1999:49). Whether or not their orientation is taken to be significant, the four small, U-shaped stone structures located on high lands at King Philip's Rocks may indicate continued use of a traditional site in the Woodland period.

Conclusion

Apparently, people with stone-age technology were interested in the two solstice sunsets and chose to improve the natural structure of the glacial cluster called King Philip's Cave, which already had passageways pointing in these two directions. The improvement may include boulders placed in the southwest passage, and definitely comprises a shaped stone standing in the northwest passageway. On the basis of archaeological context, it is suggested that King Philip's Rocks in general contains stonework associated with its use as a meeting place in the Late Archaic era, as well as continued traditional use in the Woodland era. Competent archaeological investigation of the full site is recommended.

Endnotes

- ¹ The importance attached to the large site by Native Americans is shown by the choice of the Wampanoags to use it at the memorial of the 300th anniversary of Metacom's death (Dully 1976) and by the recent decision of the (federally recognized) Narragansett and Wampanoag tribal historic preservation office to declare it eligible for listing on the National Register of Historic Places.
- ² The Puritans associated the Indian deity Hobomock with the Christian Devil and Indian gathering places in the woods with Hobomock.
- ³ Dr. (Fred W.) Martin (Ph.D., physics, Yale, 1964) formerly taught at the graduate level and is currently engaged in research on ion optics. Mrs. (Elizabeth F.) Martin (M.A.T., Yale, 1962) is a retired teacher of social studies. Our correspondence address is 50 Village Avenue, Dedham, MA 20026. The authors have kept a field notebook documenting their study of King Phillip's Rocks. Foot survey and mapping began in December 1979.

- The accurate GPS data were taken in May and July 2000 in conjunction with G. Meister of the Conservation Commission of the Town of Sharon, in furtherance of a conservation purchase of 100 acres surrounding the KPR cluster. The backpack GPS unit and final printed maps were provided by the Town of Sharon Department of Public Works.
- ⁴ This unanticipated discovery was made on December 13, 2000, by John A. Thompson, a professionally certified geologist and civil engineer holding a master's degree in geology with a concentration in glacial geology. He is chairman of the Archaeology Advisory Committee for the town of Medfield, Massachusetts.
 - ⁵ Personal communication on site, February 16, 2001, subject to further study and confirmation.
 - ⁶ "I observed distinct archaeological features consisting of one megalithic stone which had been shaped with lithic percussion techniques. On the floor of this cave we observed the pile of discarded stone flakes from this shaping technique ... I have no doubt in my mind that we observed evidence of indigenous stone shaping and debitage.... My perusal of the surrounding area also convinced me that the entire King Phillips Cave area is archaeologically sensitive and should be treated as such" (Stuart-Smith 2003).
 - ⁷ This opinion, recorded in our field notes of December 13, 2000, was confirmed in writing (Thompson 2003).
 - ⁸ Allan Leveillee, remark while examining the stone, February 16, 2001.
 - ⁹ It has been pointed out that entranceways to passages in King Philip's Rocks and King Philip's Cave have surfaces which have been pounded to smooth them where careless impact on previously jagged surfaces would cause bruises or scrapes (Thompson 2003).
 - ¹⁰ Horizon stones reach bedrock at 1 m depth and are surrounded by a lowest postglacial green soil layer. There is red ochre deposited near one horizon stone, and markings and designs exist on the bedrock under the green soil (Mavor and Dix 1989:16, 313, 314).
 - ¹¹ Whittall (1977:24, 28) "uncovered charcoal from between the slabs of the layer course of walling of structure XIB, at a level approximately 15 cm above bedrock. The date obtained from this test was 3475 years BP +-210." This report contains the original isometric drawing of the test pit, copied by other authors.
 - ¹² From a hill on the north shore of archaeologically rich Assawopmsett pond, the summer solstice sunrise is seen over white cliffs on the northeast shore (Leonard 2003:7), above which there is a stone "prayer seat" (E.C. Ballard, private communication).
 - ¹³ In the Chumash Indian region of California, another large boulder with internal passageways bringing two solstice beams to the same center has also been documented (Hammond 2002).
 - ¹⁴ This paragraph gathers widely dispersed references (Hoffman 1990: early Archaic inland route, 69; chenopodium and amaranth, 118, 165; forest clearings, 166; all-female cremations, 118; burials only in central huts, 173; Vinette I pottery, 165; Transitional Archaic inland route, 168)
 - ¹⁵ Aubrey Burl (2000), discussing the five dissimilar stone circles at the same place that align on the summer solstice sunrise on the island of Arran between England and Scotland, points out that traders arriving after the day of the solstice will find the merchandise has already been dispersed.
 - ¹⁶ There is also some archaeological evidence for Archaic use that is specific to the site. A photograph of a collection from King Philip's Rocks made about 50 years ago shows points of the types Dalton, Neville, Stark (before 4000 BCE), Vosburg (Late Archaic) and Atlantic (after 2000 BCE). Private communication, E.C. Ballard, May 2005.
 - ¹⁷ The Yurok of California go to a "seat or little monument on a mountain top" or a "stone chair on a mountain" (Krober 1976:63, 64). The Yurok, an Algonquian-speaking group, are thought to have migrated into California around 1100 CE, on the basis of linguistic studies (Chartkoff 1983:757).

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