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ARCHAEOLOGY OF THE FLAGSTAFF AREA

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Archaeologists working in the southwest recognize that in the period between 600 A.D. and 1300 A.D., four different Indian tribes, with different cultural traits and history, lived in northern Arizona.

The Sinagua, the tribe that lived in the Flagstaff area about the San Francisco Peaks, received their name because Spanish explorers of the 16th Century called the San Francisco Mountains, "Sierra Sin Agua" — mountains without water. The name is appropriate because so many of their habitations are far from present day sources of permanent water supply.

The history of this tribe is well known from about 600 to 1400 A.D. In this period Sinagua people living near the base of the San Francisco Peaks experienced a volcanic eruption, the last in the area. A volcano, now called Sunset Crater, rising about 1,000 feet was formed very much like Paricutin in 1943, in Mexico. The Arizona cinder cone emitted two lava flows, and spewed black volcanic sand over an area of over 800 square miles. A few miles from the source, the depth of the ash was about one foot and it tapered out to a few inches twenty miles from the crater. The date of this eruption has been determined from tree ring studies (Smiley, 1958, to have taken place in 1064 A.D. The lives of the Sinagua were much influenced by the eruption.

There is an old biological axiom, "An animal is part of its environment," which applies not only to the lower animals but to man himself. To understand man's actions we must also understand the region in which he lives.

A large portion of the plateau of northern Arizona is drained by the Little Colorado River, a muddy intermittent stream, receiving its flood waters from desert tributaries but starting life in the clear brooks of the White Mountains in east-central Arizona. Twice a year floods pour down its sandy bed, in the spring at the time of the melting snows, and in July and August during the summer rains.

The valley of the Little Colorado River cuts northwesterly across the plateau to join the Colorado River in the Grand Canyon. South and west of the river, the land surface rises in a sloping plain to the mountain base.

The general impression of the topography of the area between the Little Colorado River and the San Francisco Peaks is that of a slightly tilted limestone plain, dotted with dozens of cinder cones, covered with lava flows and beds of volcanic ash, so that on an aerial photograph the country looks like the surface of the moon.

At the time of the eruption of Sunset Crater, the Sinagua people living about the San Francisco Peaks cultivated the alluvial soil close to the mountains. The hard clays eroded from the Kaibab limestone surface, and volcanic clays found an old lava flows farther away from the mountains, were too hard to work with the principal agricultural tool of the Indians, the wooden digging stick.

Before the eruption of Sunset Crater it appears, from a study of archaeological surveys and excavated sites, that about 175 families lived in earth lodges about the San Francisco Peaks, all on the north, east, and south sides (Fig. 1). A century after the eruption, we find the estimated population had increased, by immigration, to around 2,100 families living in masonry pueblos. Agriculture flourished over most of the cinder-covered area.

Then for several reasons the population began to decline. In 1250 A.D. about 1,500 persons were dwelling in the area, occupying three large pueblos, mostly close to the mountains like their ancestors, and by 1400 A.D. no sedentary Indians lived in the area.

What are the explanations of the increases and decreases in population?

The great increase in population after 1070 A.D. did not occur outside the area covered by the volcanic ash, which has been found to have valuable properties. This ash layer is very porous so all the rain or snow water that falls is quickly absorbed, and there is no runoff from heavy showers or melting snows. Besides, the layer forms a mulch shading the old soil layer, thus slowing evaporation. When one digs through the ash layer he finds the underlying soil quite damp. It is quite obvious that the eruption of Sunset Crater made a large area, some 600 square miles, available for agriculture, and allowed a much larger population to occupy the area than before.

The great decline in population that began about 1160 A.D. may have been due to several causes, because the decrease was common to most areas in the northern part of the southwest not affected by the volcanic eruption.

For this general decline in population, climatologists have suggested decrease in rainfall. Agricultural chemists (Arrhenius) proposed that the exhaustion of chemicals on agricultural land where fertilizer was not added reduced the food supply. Many archaeologists believe nomadic enemies attacked the pueblos. I have proposed (Colton, 1936) that bad sanitation killed the children with infantile dysentery when the people, without any sanitary traditions, started to live in large multi-family apartment houses (pueblos) after living for generations in single, detached family houses (earth lodges). All of these factors apply to the whole pueblo area.

However, it may be that in the black sand area another factor is involved. After some years it appears that the strong spring winds blew the sand from the cultivated fields, and concentrated it in deep dunes and in canyons, leaving the old surface bare once more, for the sand in the once cultivated areas was never more than three to eight inches deep. This factor is probably the most important reason for the abandonment of the limestone plains. The two pueblos that survived to nearly 1300, "Turkey Hill" and "Old Caves", are located in the original region where their inhabitants could cultivate the alluvial soil as their ancestors had done before the eruption of Sunset Crater.

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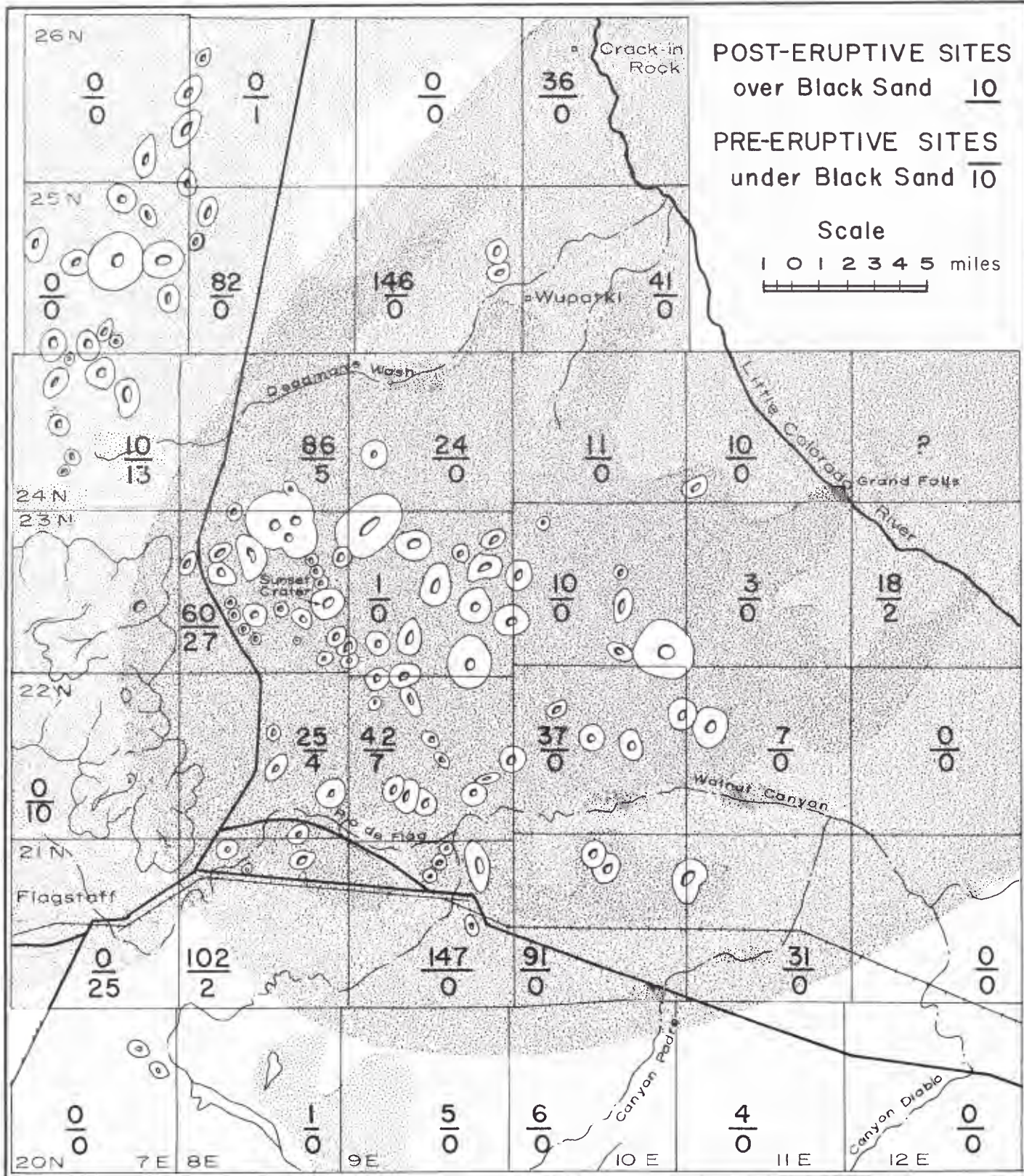


Figure 1. Map of the area east of Flagstaff, Arizona, showing distribution of prehistoric sites before and after the eruption of Sunset Crater in 1064 A.D.
 White areas, Kaibab limestone and Moenkopi sandstone.
 Light stippled areas, volcanic rocks.
 Darker stippled areas, covered by ash from Sunset Crater.