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1. a. James Walton
- b. J. McKim Malville
2. Snowdon Hodges
5. William K. Hartman, *Astronomy: The Cosmic Journey*, Wadsworth Publishing Co., Belmont, California, 1978.
6. John Lubs, Griffith Observatory
10. After C. Daryll Forde, "Hopi Agriculture and Land Ownership," *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 61, pp. 357405, 1931.
11. After E.C. Krupp, *In Search of Ancient Astronomies*, ed. E.C. Krupp, McGraw-Hill, New York, 1978.

Chapter 4:

1. After Stephen H. Lekson, Thomas C. Windes, John R. Stein, and W. James Judge, "The Chaco Canyon Community," *Scientific American*, July 1988, pp. 100109.
2. a. Jean Kindig
 - b. After Anna P. Sofaer and Rolf M. Sinclair, "Astronomical Markings at Three Sites on FajadaButte," in *Astronomy and Ceremony in the Prehistoric Southwest*, ed. John B. Carlson and W. James Judge, Maxwell Museum of Anthropology, Albuquerque, 1987.
3. Stephen H. Lekson, *Great Pueblo Architecture of Chaco Canyon, New Mexico*, University of New Mexico Press, Albuquerque, 1987.
4. After Ray W. Williamson, "Casa Rinconada, A Twelfth Century Anasazi Kiva," in *Archaeoastronomy in the New World*, ed. A.F. Aveni, Cambridge University Press, Cambridge, 1982, pp. 205219.
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Cedar Tree Tower some two kilometers to the north. The tower is built of double-coursed walls in which the stones have been carefully pecked to fit the curvature of the walls. It is similar in the quality of its construction to the Sun Temple, and contains a third pecked basin in its bedrock floor which may mark a second sun-watching station.

The northeastern horizon contains the prominent and sharp peaks of the La Platas, which would have provided excellent calendrical marks for summer solstice sunrise and lunar standstill. Announcement of the dates of ceremonies determined from observations of the sun on the horizon may have been visually communicated by fires from the Cedar Tree Tower southward to the Sun Temple and northward to the Far View community, perhaps to Far View Tower.

Astronomical ceremonies associated with both sun and moon may have occurred at the Sun Temple, Cliff Palace, and Cedar Tree Tower. The orientation of the Sun Temple to the Cedar Tree Tower may have had an important ritual significance if celebrants standing in the Sun Temple could have seen signal fires originating at the Cedar Tree Tower announcing the times of important events. Participants in a winter solstice festival in Cliff Palace could have watched the sun at winter solstice setting over the Sun Temple. They may have been impressed by such a demonstration of the order of the heavens and of the power of individuals to identify and predict that order.

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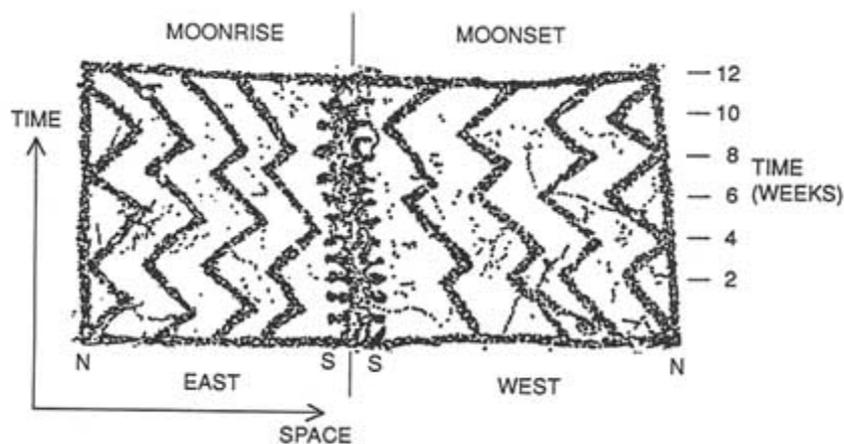


Figure 6. Possible representation of the varying positions of the moon on the horizon.

"Annex," on its northwest side consisting of an additional circular room and a smaller circular structure which may have been a tower. As seen from the pecked basin the sun sets over the center of the tower on approximately December 23, providing thereby a twenty-day warning before winter solstice.

The experience at Cliff Palace of watching the moon set between double towers at the Sun Temple is reminiscent of the similar situation at Chimney Rock described in Chapter Five. Could it be that the inhabitants of Cliff Palace were intentionally duplicating the experience of the moon rising between the double pinnacles of Chimney Rock?

Around the time of major standstill, the moon would have appeared in a dark sky in the gap between the towers only during the spring in the six-month period between winter solstice and summer solstice. The moon would have first appeared in the gap after winter solstice as a slender crescent. Month by month, with impressive regularity, the moon in the gap would have grown in size, until the full moon would have set at sunrise near the day of summer solstice.

The rotation of the east-west axis of the Sun Temple by some 10° away from cardinality may also have an astronomical explanation. The architectural precision of the Sun Temple suggests that a departure from true east-west may not have been accidental or arbitrary. A clue to this puzzle may be provided by a second, large pecked basin five meters north of the Sun Temple. The basin lies on the perpendicular drawn from the southern wall and may indicate an important direction to the north. Standing above the alcove in the southern wall, looking across the center of the Sun Temple and across the basin beyond, one faces the direction of

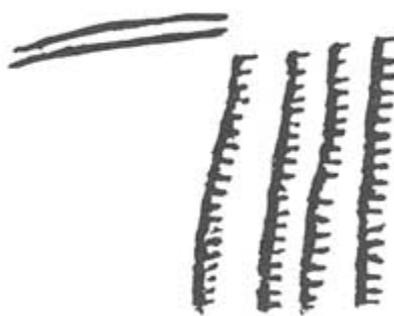


Figure 4. Four sets of tick marks in the four-story tower of Cliff Palace.

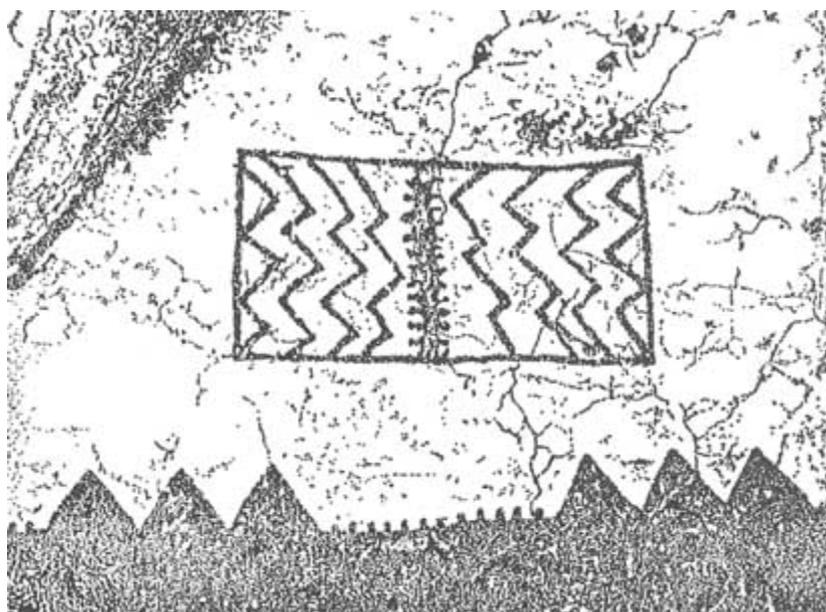


Figure 5. Pictographs in the four-story tower of Cliff Palace.

serve as a solstice marker for an observer standing at the pecked basin. The site may have gradually evolved into a carefully constructed astronomical sighting device, a solar-lunar shrine, and an important ceremonial structure for the Cliff-Fewkes Canyon community.

Ethnography of historic Pueblos indicates that the ability to predict and anticipate the date of winter or summer solstice is as important as the confirmation of the event. ³ The nearly perfect symmetry of the Sun Temple is broken by an addition, which Fewkes described as the

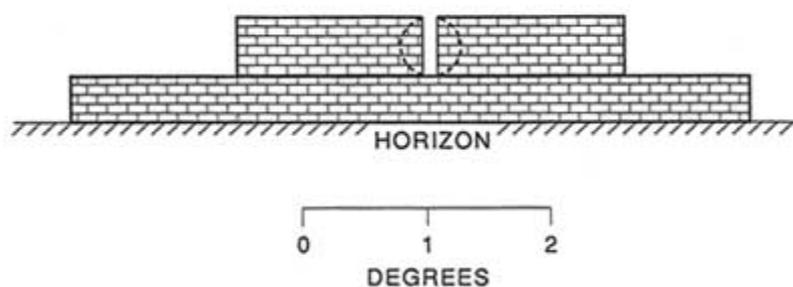


Figure 3. Possible appearance of the twin towers of Sun Temple as viewed from Cliff Palace. The size of the moon as it might have appeared in the gap is shown.

exact dates of initial habitation and final abandonment are unknown, but four major standstill cycles could have been observed at 18.6-year intervals from Cliff Palace starting with the standstill of A.D. 1187 and continuing through the standstill of A.D. 1280.

A second pictograph that may also have a lunar association is found at approximately the same height as the four lines (Figure 5). Contained within a rectangular border, the figure is divided by a vertical line with approximately twelve marks and on either side there are twelve zigzags. Such a pattern is not uncommon in Anasazi art, but the recurrence of twelve marks and twelve zigzags is noteworthy because of the twelve "moons" during the year. In one month, the moon swings from southern extreme to northern extreme and back to southern extreme. That pictograph may be a representation of the changing positions of the rising and setting moons during a one-year period. It is the kind of diagram that an astronomer of today might draw on a blackboard to illustrate the changing positions of the moon or an Anasazi astronomer might have drawn for an apprentice.

Immediately beneath the rectangle is a third pictograph consisting of two sets of three triangles separated by twelve circles (Figure 6). The triangles may represent the La Plata Peaks on the northeastern horizon and the circles may represent an annual series of sunrises or moonrises.

We cannot know for certain what was in the mind of the artist or artists who painted these pictographs. But the correspondences are impressive: they are located at the third floor of the tower where an observer could view the setting moon over the Sun Temple; they contain numbers corresponding to the lunar cycles of 12 months and 18.6 years; and, finally, the observing location in the tower is on the tangent line of the circular rooms of Sun Temple which intersects the setting moon at major southern standstill.

Initially a more modest structure, perhaps nothing more than a pile of rocks, may have been built on the location of the Sun Temple to

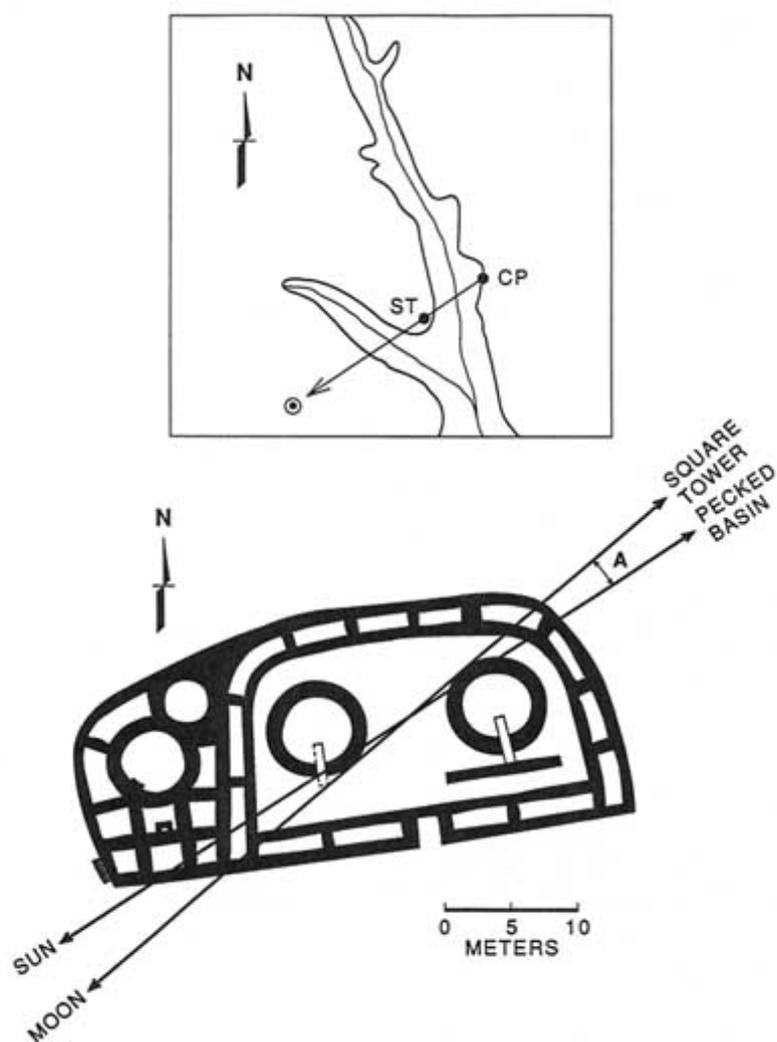


Figure 2. Sun Temple showing the two sight-lines to sunset at winter solstice and to moonset at major southern standstill. ST, Sun Temple; CP, Cliff Palace. $A=8^{\circ}22'$.

interior walls, some of the finest pictographs in the park, may be associated with the moon. On the interior wall of the third story of the tower there are four vertical lines each containing 1720 tick marks, appearing more like tally marks of events than decorative designs (Figure 4). The total number of such marks is 7475, corresponding to an average of 18.518.75; these marks may be records of four lunar standstill cycles observed from Cliff Palace. Tree ring dates in the Cliff-Fewkes Canyon area span the time period between A.D. 11801279. The

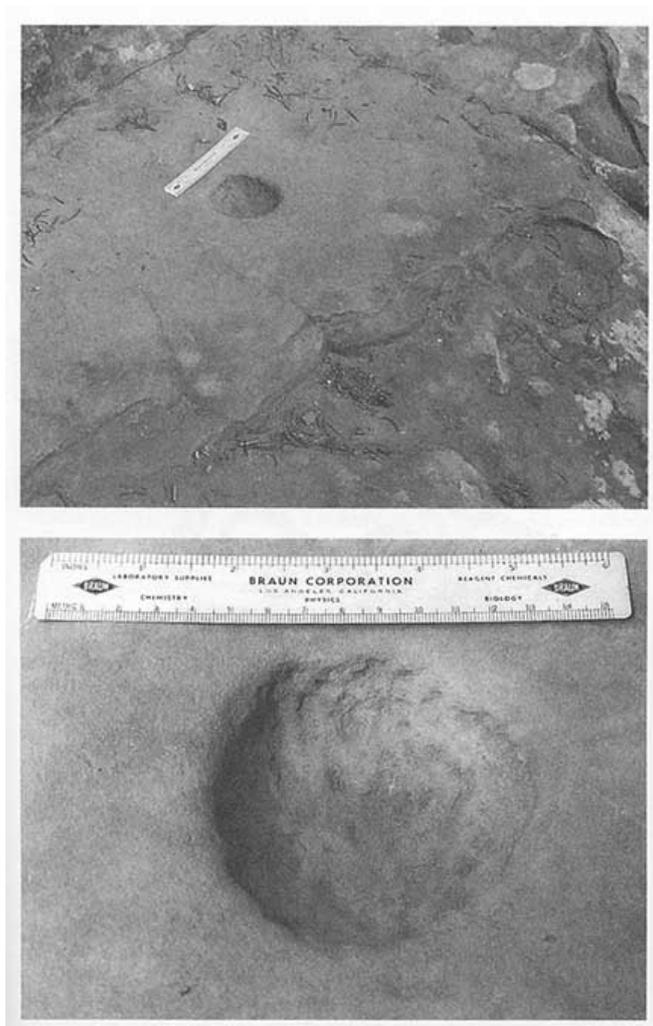


Figure 1. Pecked basin in Cliff Palace

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Cliff Palace faces a southwestern horizon where the sun sets on December 21, the evening of winter solstice. But, today, the horizon is a nearly flat expanse devoid of major natural markers. The one object that breaks the horizon is the Sun Temple on the opposite mesa at a distance of 288 meters across Cliff Canyon. Where would an Anasazi watcher have stood to observe winter solstice sunset over the Sun Temple? At the extreme southern end of Cliff Palace we discovered a small level platform containing a circular basin pecked in the bedrock with a diameter of 8 cm. and a depth of 3 cm. (Figure 1). When one stands over the pecked basin, the perimeter wall of the Sun Temple has an altitude of nearly 5° . The center of the Sun Temple (half-way between its two circular rooms) has an azimuth of $235^\circ 24'$ (Figure 2). Taking into account the effect of atmospheric refraction, we estimate the lower limb of the winter solstice sun would have touched the top edge of the perimeter wall of the Sun Temple at an azimuth of approximately $235^\circ 18'$. Thus it appears that the Sun Temple may have been built, at least partially, to serve as an artificial horizon marker for winter solstice.

Among the historic Pueblos there was a distinction between offertory shrines to the sun and calendrical sun-watching stations. ⁴ The pecked basin may have marked a sun-watching station while the strangely eroded rock at the southwest corner of the Sun Temple may have been an offertory shrine. The offertory shrines were often associated with unusual stones, concretions, or oddly shaped rocks such as the one contained in the stone enclosure. Such shrines were sites, usually some distance from the pueblo, where water, corn meal, prayer sticks, or prayer feathers were placed. The line connecting the pecked basin to this possible offertory shrine for the sun has an azimuth of $235^\circ 50'$, also notably close to that of the setting winter solstice sun (Figure 2).

There is a second potential line-of-sight across the Sun Temple established by the tangent to its two circular rooms. That tangent line falls upon the center of the prominent four-story tower of Cliff Palace and may identify a foresight visible to an observer in the third or fourth story of the tower. If the two circular rooms of the Sun Temple had been towers extending above its perimeter wall, they could have functioned as a "gunsight" for an observer in the four-story tower. The line-of-sight from the center of the T-shaped doorway in the fourth story through the gap formed by the double towers has an azimuth of $227^\circ 2'$. The sun never reaches that far south, but the moon at major southern standstill would have touched the perimeter wall of the Sun Temple at an azimuth of $227^\circ 9'$ and thus would have fitted nicely in the gap between the towers every 18.6 years (Figures 2 & 3).

The intersection of the lunar standstill line-of-sight with the square tower is particularly significant because pictographs painted on its

Eight The Sun Temple of Mesa Verde

Few visitors to Mesa Verde National Park miss the opportunity to explore the Sun Temple, and few leave that extraordinary structure without a mixture of admiration for its builders and puzzlement over its meaning. With its careful design and symmetry, it is clearly not a purposeless or unplanned building.

When he excavated the building in 1915, Jessie Fewkes concluded that it must have been primarily dedicated to ceremonial activities. ¹ The effort expended in pecking and shaping nearly every stone of the wall veneer indicated the importance of the building for the people who lived in its vicinity. Built on a narrow peninsula, the Sun Temple is bordered by Cliff Canyon to the north and Fewkes Canyon to the south. In the Cliff and Fewkes canyon area are some 33 habitation sites, including Cliff Palace, Oak Tree House, Fire Temple, Mummy House, and Sunset House.² With a total of some 530 rooms and 60 kivas, the population in the vicinity of the Sun Temple may have exceeded 600.

During the summer of 1991, we found evidence of a horizon calendar that could have been used by observers in Cliff Palace.³ We had been encouraged in our search by ethnographic analogy with the Pueblo culture, for at least 19 of the 24 historic Pueblo communities had one or more members who practiced sun-watching near the times of solstices for the purpose of establishing an agricultural and festival calendar.⁴ As noted in Chapter Three, the standard technique among the Pueblos was to observe the position of the rising or setting sun relative to irregularities of the horizon from an observing station inside or close to a settlement. The most important solar festival among the historic Pueblos was winter solstice, a time when there was sometimes concern that the sun would be delayed in its return to the north unless appropriate ceremonies were performed.

intensely cold in winter and very dry throughout the year. The want of water alone would forbid the residence of any considerable number of persons at Surouaro if everything else were furnished them. The arroyos, through which streams seem to have once flowed, are now dry, and it was only with great difficulty that sufficient water was obtained for the supply of our train. The remains of metates are abundant in the ruins, and corn was doubtless the staple article of their existence, but none could be raised here and the readiest solution of the problem would to infer a change in climate, by which this region was made uninhabitable. 13

One result of climate change occurring in the thirteenth century could have been a preoccupation with events in the skies. The sun must have been watched closely for good or bad omens to determine whether or not it was to be a good agricultural year. A series of bad years of drought and early, killing frosts would have intensified ritual activity connected with the sun.

Much of what drove the Anasazi astronomer may thus have been stimulated by the unstable climate associated with the Medieval Maximum of sunspot activity. We can speculate on the thoughts of the sun priests, observing the sun through the morning mists with puzzlement and horror. Ominous black spots crawled across its surface, the land was cold and dry, and society was falling apart. The dark side of Father Sun had asserted itself, and beneath the flecked sun the people said, "we must flee."

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a consequent greater dependence on farming. Game would have become less plentiful in the vicinity of population centers. As the climate began to falter in the middle of the thirteenth century, the ability of the Anasazi to adapt to change was seriously reduced.

The political system of the settlements may have been inadequate to respond effectively to the climatic challenge. There may have been no leaders able to organize the society in such a period of stress. Though there were sun priests, they may have been discredited as the climate failed. The social structure of the community may have collapsed with the failure of the land and sun to provide. The northern Anasazi migrated eastward to settle among the populations living in the Rio Grande valley.

Recent studies of tree ring data from the Colorado Plateau indicate that there was a change in the frequency of droughts after A.D. 1150. Droughts may have become more frequent and of shorter duration. The strategies that had once been appropriate may not have been sufficient during the periods of frequent years of poor rainfall and poor harvests.

In the Four Corners Region there is clear and direct evidence of a serious climate change. 12 Pollen analysis and tree ring studies indicate that the region was hit by a devastating combination of drought and cold beginning approximately in A.D. 1200. A cooling trend would have narrowed the window of frost-free days, perhaps reducing it below the approximately 80 days needed for cultivation of aboriginal corn. At that time there was apparently a sudden change to cold and dry weather that continued for 600 years.

Between A.D. 800 and 1050, the climate in the Four Corners area was apparently as wet as the present but cooler; between 1050 and 1150 it was as wet and warm as the present. Then following 1250 a major climatic change occurred, and the region entered a dry and cold period which lasted until the beginning of the present century. Visitors in 1859 described the Mancos and Dolores regions as dry and sterile.

Sage is the predominant vegetation, and no water is found yet we passed several ruined buildings, and broken pottery is scattered everywhere. Surouaro is the name of a ruined town which must once have contained a population of several thousands. The name is said to be of Indian (Utah) origin, and to signify desolation, and certainly no better could have been selected. The surrounding country is hopelessly sterile; and, whatever it once may have been, Surouaro is now desolate enough but where a population of many thousands once existed, now as many hundreds could not be sustained, either by agriculture or the chase. The surrounding country contains very little animal life, and almost none of it is now cultivable. It is 7000 feet in altitude,

from half-way around the world. In the Aztec creation mythology, after the fourth destruction of the world, the gods gathered in Teotihuacán to create the world for the fifth and last time. Around a fire burning on the summit of the Pyramid of the Sun, the Aztec gods prepared to create the Fifth Sun by the self-immolation of one of their members. ¹⁰ The god who first threw himself into the fire to become the sun was Nanahuatl, the Pimple One, the Ulcerated One, hideously disfigured by running sores which covered his entire body. It requires no great leap of the imagination to suspect that here again, buried in myth, is an acknowledgement of the trauma and puzzlement associated with the the abundance of naked eye sunspots during the Medieval Maximum.

Another possible tragic consequence of the outburst of sunspots has been recently suggested by John Eddy. We suspect that because of the increased temperature of the sun associated with heightened sunspot activity there would have been an increased amount of ultraviolet radiation reaching the surface of the earth, especially in the equatorial latitudes. There is evidence that malignant melanoma in humans follows the 11-year cycle of sunspot activity. Eddy suggests that a plague of fatal skin cancer may have broken out during the Medieval Maximum, destabilizing some cultures and causing them to abandon their homelands and move elsewhere. It may have been melanoma on human skin and not just spots on the sun which led the Hindus and the Mexica to associate leprosy and ulcers with the sun. The adoption by the Mexica of an angry and wrathful sun god may have been in response to the transformation of a benign sun into one associated with drought and disease.

Abandonment

A poignant mystery has always been associated with the abandonment of the Anasazi homeland.¹¹ It is entirely possible that sunspots may have been related to the exodus of the Anasazi. They had abandoned their homes before as they moved in search of good farm land, game, and water. The duration of occupation of small sites was short. But the final abandonment of a such a large area, leaving it empty of people, is unique. Elsewhere on the planet there had always been migrations of people forced out of their homeland by population pressure and failing climates, but for a people to depart and leave no one behind is rare. In some of the ruins at Mesa Verde, the inhabitants seemingly intended to return, leaving cups, bowls, sandals, and other domestic items carefully arranged. Climate appears to have been the primary villain. As the populations increased, stimulated initially by a period of benign weather, there was a movement into larger communities and

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