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The Pueblo Ladder

Seventeen-seventy-six was an eventful year in the life of Fray Francisco Atanasio Domínguez. This Franciscan priest is best known today as leader of a small party, also including Fray Silvestre Vélez de Escalante, that set out in the summer of that year from Santa Fe, in Spain's Nuevo México Province, to pioneer a route to Monterey, in its Alta California colony. The Domínguez-Escalante Expedition failed to reach California, returning to Santa Fe in the early days of 1777, but it did provide future explorers with valuable information on travel routes across the Colorado Plateau (Fowler 2011:17–22; Sheridan et al. 2020:Map 4). Fray Domínguez is less well known today for his second accomplishment of 1776, the completion of an extensive report to his superiors of the Franciscan Order in Mexico on conditions in Spain's New Mexico colony. That report included Domínguez's observations on the colony's Spanish settlements, along with its Pueblo Indian villages and their associated mission establishments. The New Mexico colony was already 178 years old at the time, having been established in 1598, and it had been just over 235 years since Francisco Vásquez de Coronado had led the first Spanish military expedition across this future territory of New Spain.

More than two centuries may have passed since Coronado's visit to New Mexico but, as Domínguez (1956:4) observed in his report of 1776, "The pueblos of Christian Indians continue to live according to the same kind of political unity and civilization as when they were heathens and the Spaniards found them when they first came—with their two- and three-story houses joined together, forming plazas, and all the houses with portable [two-pole, per Cushing (1974:356)] ladders which they pull up in time of invasion." Domínguez elaborated on the architecture of one such village, Picuris, describing its three room-blocks as "tenements…shaped like a sugar loaf, and the houses… heaped there one upon another as if they had tried to build the Tower of Babel. The ascent to them is by ladders which begin at the communal lower floor, with a landing on the flat roof of the lower dwelling. On this flat roof there is another small ladder that rests upon another flat roof, and so another and another up to the top, the flat roof of one house being the terrace of another and serving as a landing between one ladder and the next" (Domínguez 1956:97). This layout, incorporating room-blocks two or more stories high, was still the norm a century later, as documented in the hundreds of black-on-white photographs taken of the Pueblo villages by anthropologists, natural scientists, professional photographers, and other travelers over the four decades from 1870 to 1910 CE. One of the prominent visual elements of this architectural landscape, as described by Domínguez and documented in the photographic record, consists of the many wooden ladders that can be seen in the photographs, either leaning against the sides of room-blocks or with their upper ends emerging from roof-top entries (Figure 1.1).

The wooden ladder, whether incorporating one pole or two, was already an ancient component of the Pueblo built environment when Domínguez was preparing his report on the New Mexico province. For more than 1500 years, the architectural traditions of Pueblo peoples have included buildings that require their users to move between occupation surfaces at different levels, with wooden ladders having served as the favored means of making this possible. This was the case not only in the villages that Domínguez observed in the eighteenth century and that featured prominently in the later photographic record, but in architecturally similar pueblos dating back to the eleventh century and, earlier still, in pithouse settlements dating to the seventh century or before.

Who were the people that built these different kinds of houses? The ancestors of the Pueblo people had occupied the northern reaches of the American Southwest for more than 10,000 years, living as hunter-gatherers until around 1000 BCE, when some of them adopted farming for the first time. Their crops included maize and squash, the maize having been brought to the region from the south and, ultimately, central Mexico. By 100–200 BCE, a significant portion of the regional population had come to depend on maize for its subsistence. Additional cultural elements appeared over time, resulting in what, for archaeologists, defines a distinctive Ancestral Pueblo archaeological culture (Figure 1.2). This process included the development, during the early centuries of the Common Era, of substantial earth-lodge habitations, typically consisting of pithouses with their floors sunk to varying depths below ground level. Like maize farming, pottery-making arrived from the south—initially in the sixth century in the form of the brown-ware ceramics characteristic of the neighboring Mogollon archaeological culture, but transformed over the following century into the gray-ware ceramic tradition that typified Pueblo pottery for the next 600 years. The seventh century also saw the adoption of beans as an important component of the Pueblo diet. Surface masonry buildings, perfected over the eighth to tenth centuries, mostly replaced pithouses as primary habitations during the later century, with pit structures now serving predominantly as combined ceremonial–communal–residential structures, of a type known to archaeologists as kivas. Spatial variation in ceramic practices and styles, apparent in the earliest gray-ware pottery, as well as comparable variation in architectural and other material traits, underpin archaeologists' recognition of regional subvariants of the Pueblo archaeological

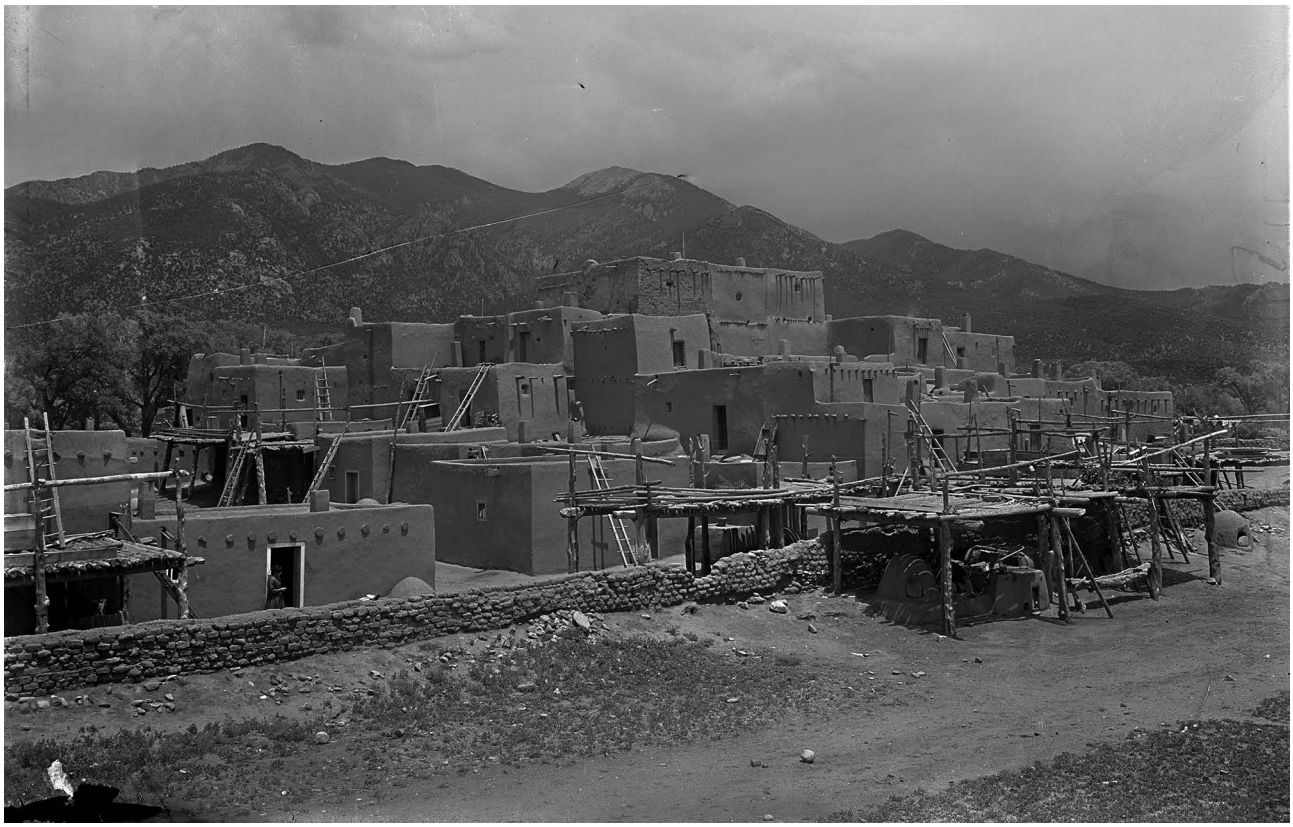

Figure 1.1. Taos Pueblo, showing its many ladders; photograph taken ca. 1900 by T. Harmon Parkhurst. (Courtesy Palace of the Governors Photo Archives [NMHM/DCA], Negative No. 12455.)

culture. These include, most importantly, the Far Western, Kayenta, Mesa Verde, Chacoan, Tusayan, and Northern Rio Grande cultures. It is worth noting that modern-day Pueblo people speak a half dozen languages, whose correspondence to these and other groupings is a matter of on-going debate among archaeologists and linguists. The spatial extent of Pueblo settlement contracted during the twelfth and thirteenth centuries, with substantial portions of the Ancestral Pueblo world abandoned for permanent occupation, and with settlement in the other areas trending toward smaller numbers of larger villages. Finally, there were two events, dating to the post-1400 CE period, that had a profound impact on the trajectory of Pueblo history. The first was the entry into the region of Navajos (*Diné*) and Apaches (*Indé*), who arrived from the north in the fifteenth to seventeenth centuries, if not earlier (Throgmorton 2024). The second was the arrival of Spanish conquerors and colonists, who came to the region from the south at the opening of the seventeenth century.

Despite their enduring role in Pueblo architecture, ladders have received scant attention from students of Pueblo material culture. The one substantial exception to this pattern of neglect appears in Victor Mindeleff's 1891 monograph on the architecture of the Hopi and Zuni Indians of northeastern Arizona and northwestern New Mexico (Mindeleff 1891:156–162). These artifacts deserve an updated treatment today, and not simply because of the more than a century and a quarter that has passed since the 1880s, when Mindeleff conducted his ladder research. Their study can provide a "deep historical perspective" (Adams 2010:209) on persistence and change in Pueblo material culture over a 1500-year interval. During that time, new ladder styles were introduced and old ones modified or set aside, but only after having remained in service for hundreds of years. The story of these ladders involves not just the artifacts themselves, but the woodworking tools used in their production—particularly axes, with tool heads made of stone and later iron and steel. The two implements came into common use at about the same time, in and around the seventh century CE, and also fell out of favor at about the same time, in the seventeenth to early eighteenth centuries. This coincidence in their histories was not by chance, but a function of broader patterns in Pueblo history.

The ladders and axes that were made and used by the Southwest's Pueblo peoples left an archaeological record that is uneven in both quantity and quality and that varies over time and space in the kinds of information that it affords. Temporally discrete peaks, or clustering, in that evidence support the reconstruction of important episodes in the history of these two implements, while contributing to our understanding of three critical episodes in Pueblo history, the first involving an interval of accelerated population growth and expansion that got underway in the Central Pueblo area by the sixth to seventh centuries CE, the second consisting of the previously mentioned abandonment by Pueblo people of broad sections of the northern Southwest, which both accelerated and came to

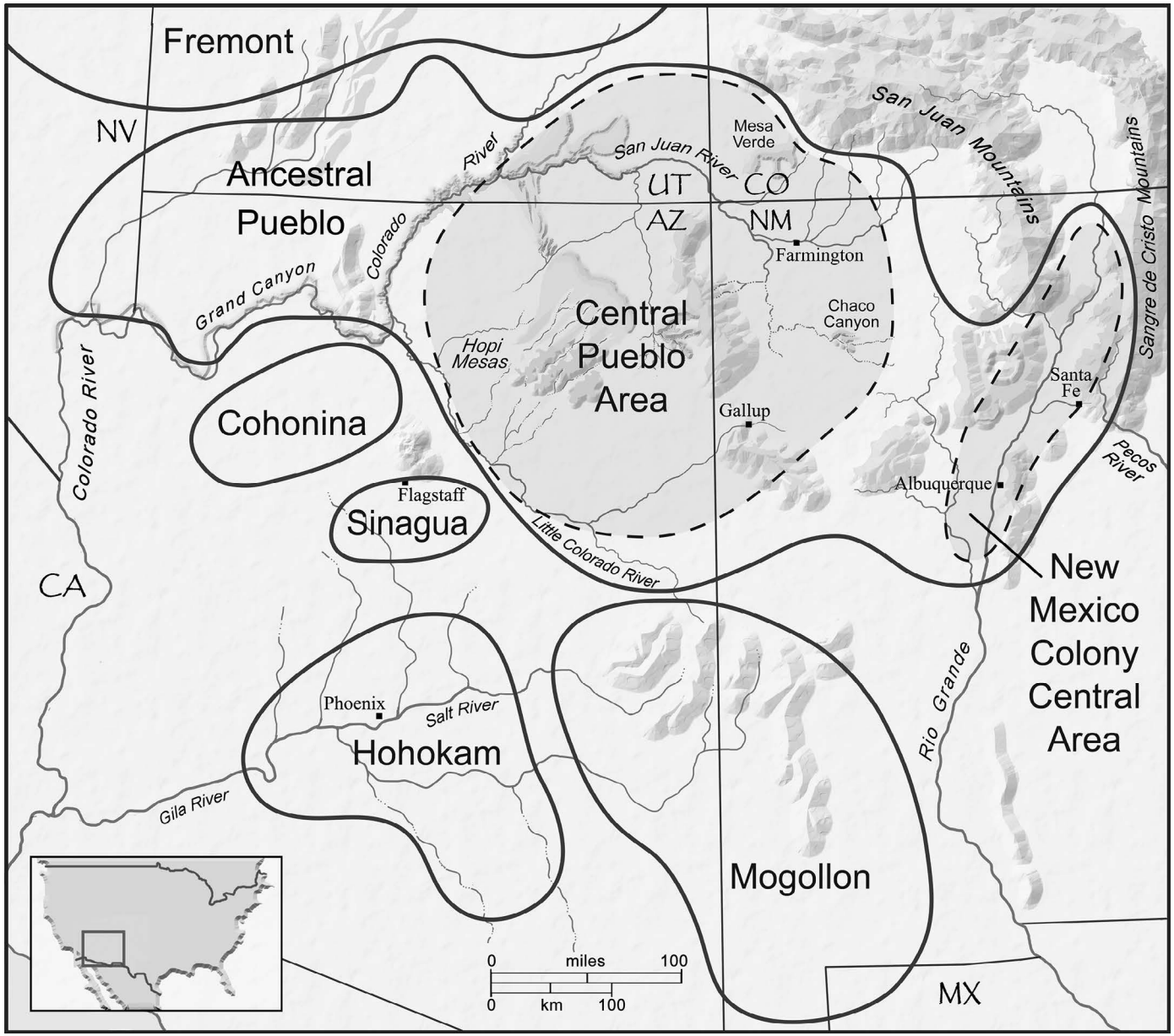

Figure 1.2. Map of the American Southwest, showing the Ancestral Pueblo and Central Pueblo areas, other major archaeological culture areas, and the central area of Spain's New Mexico colony during the early Spanish Colonial period.

completion in the second half of the thirteenth century, and the third resulting from the conquest, colonization, and "missionization" of Pueblo communities by representatives of the Spanish Empire during the seventeenth to early eighteenth centuries.

Pueblo ladders and woodworking tools are also worth examining anew for the opportunity to present and interpret archaeological and related evidence that has become available since Victor Mindeleff's time. That evidence includes (1) a small but significant assemblage of Ancestral Pueblo ladders and ladder components that are documented in archaeological reports and, in many instances, held in museum collections today. A most significant contribution of those objects involves the documentation of the ingeniously designed "classic" Pueblo two-pole and lashed-rung ladder. Mindeleff was apparently not aware of the existence of this ladder type—which, like the early history of the hafted stone axe, is less well known among present-day students of southwestern prehistory than it deserves to be. Additional data sets relevant to the histories of ladders and axes that have appeared since Mindeleff's time include (2) a record of small pits and equivalent features, recorded in the floors of excavated buildings and interpreted as rests for the butt ends of ladder poles, (3) numerous stone axe heads, some with their hafts intact, recovered from various archaeological settings, (4) tree-ring dates that can be applied to many of those preserved ladders, recorded ladder rests, and recovered axes, (5) additional tree-ring evidence that documents and dates the cutting of wood beams with either stone or metal axes, without relying on recovery of the tools themselves, and (6) an expanded sample of the previously mentioned historical photographs of Pueblo villages—which have typically been used to *illustrate* rather than to *document* the history of Pueblo architecture (Ahlstrom 1992; but see Cameron 1999). A related reason for revisiting the story of the Pueblo ladder is to explore a category of past material culture that has yielded its record slowly and, for the most part, just one or a few objects at a time. This pattern of gradual data recovery is probably a major reason why southwestern archaeologists have disregarded the Pueblo ladder's potential as a subject for synthetic analysis.

The present study of ladders and woodworking tools has benefited from previous research touching on a variety of disciplines and topics of archaeological and historical inquiry relating to the Pueblo Southwest. One of these involves the history of Pueblo architecture, a topic pursued by archaeologists and historians from various angles, though with little reference to ladders and axes. Another concerns the place of these objects within the broader research topic of Pueblo wood-use behavior, which is studied most often within the context of southwestern dendroarchaeology. Stone axes and, in particular, stone axe heads appear in archaeological analyses of ground-stone tools from Ancestral Pueblo sites, while their counterparts of iron and steel are typically included in analyses of metal artifacts from historical period sites. The field of ethnohistory generally takes the lead in examining the historical documentary record as it relates to Indians of the American Southwest—though archaeologists often consult this record as well. Information relevant to the bindings used to lash the rungs on two-pole ladders and to attach stone axe heads to their wooden handles comes from studies of Pueblo basketry and, more broadly, of technologies involving the use plant fibers and other perishable organic materials. Dendrochronology and historical-documents analysis provide the primary supports for the chronological analysis of ladders and woodworking tools included in this study, but other archaeological dating techniques contribute as well. Ethnographic and archaeological studies of the visual arts can provide clues to the possible significance of ladders in Pueblo religion. Each of these fields of inquiry has something to contribute to our story.

A major goal of this study of Pueblo ladders and woodworking tools is to document the "what, where, and when" of these implements' histories—hence the compilation of ladder evidence presented in Appendix A—but broader processes in the history of technology are relevant as well. Among these are innovation, cultural transmission, diffusion, and adoption. Technological *innovation* involves the creation of new tools and other implements, facilities, and practices for manipulating and exploiting elements of the physical world. Cultural *transmission* includes the passing of technological elements from one generation to the next, but also their movement or spread across space. Our primary concern here is with technological *diffusion*, or the transmission of the aforementioned tools, facilities, and practices over space, but also across social boundaries. Though important in its own right, the simple relocation of a technological component across a physical or geographic distance does not qualify as diffusion: there must also be movement across a social distance for that term to apply. The transfer could involve the movement of knowledge concerning the technology involved or, in the case of tools, of the objects themselves. Migrants could carry the knowledge involved to the new location or, perhaps to lesser effect, traders or other itinerant travelers could provide the means of transmission. The information could also arrive there in written form—though this mode of transfer is likely to have little relevance to the history of Pueblo ladders and woodworking tools. Finally, there are questions relating to both the *adoption* and *rejection* of innovations by those to whom they are newly introduced (Barnett 1953:49; Cameron 2016:138). Their rejection may, in fact, represent a purposeful "act of resistance to [a] dominant culture." (Cameron 2019:26). There is much to be learned concerning all of these aspects of technological change, with Catherine Cameron noting, in particular, that "prehistoric archaeology currently lacks a well-developed body of theory for understanding the mechanisms by which diffusion occurs" (Cameron 2019:16; for helpful discussions of these and other relevant aspects of technological change see Adams 2010; Barnett 1953; Cameron 2016, 2019; McGuire and Schiffer 1983; Roux 2010).

1.1 Pueblo Ladder Types

Victor Mindeleff based his *Study of Pueblo Architecture: Tusayan and Cibola* on data that he and others collected between 1881 and 1888 at inhabited and abandoned Hopi villages in the Spanish province of Tusayan in northeastern Arizona and at Zuni Pueblo, its associated farming villages, and abandoned Zuni villages in the province of Cibola in northwestern New Mexico. His study includes descriptions of the kinds of wooden ladders present in the inhabited villages, organized in terms of their inferred historical development. It is worth noting, when assessing this developmental framework, that Mindeleff appears to have shared the evolutionary mindset that was typical of many pioneering anthropologists at the close of the nineteenth and beginning of the twentieth centuries. This paradigm included the assumption, or expectation, that more complex forms of implements, including ladders, would typically have been developed from simpler ones.

It was almost a century later when dendroarchaeologists from the Laboratory of Tree-Ring Research, including this writer (Ahlstrom et al. 1978, 1991), adapted Mindeleff's ladder types for use in their analysis of data collected during a dendrochronological study of Walpi Pueblo. Their revised typology, further modified for use here (Table 1.1), is based on distinctions made at three levels. The first considers whether a ladder incorporates one upright or two and, based on their diameters, whether those uprights are best characterized as "logs" or "poles." A second distinction has to do with the nature of a ladder's footholds. For ladders consisting of a single pole or log, there are three possibilities, based on whether the footholds consist of branch stubs, simple cut notches, or larger and deeper cuts resembling stair steps. In the case of ladders with two poles, only a single kind of foothold is recognized, consisting of rungs that extend between the two ladder poles, to which they are affixed at either end. The third distinction included in the typology applies specifically to these two-pole ladders and addresses the method of rung attachment. There are at least five possibilities, defined with reference to the interaction of three variables: whether the ladder poles are notched or unnotched at the points of rung attachment; whether the rungs are fixed to the poles by means of lashings, mortise-and-tenon joints, or nails or bolts; and, in the case of lashed rungs, whether the attachment involves the use of a special kind of supplemental rod or withe.

The typology also considers the source and treatment of the materials used to make the ladders. The last two kinds of ladders listed in the table consist entirely or in part of manufactured components, including milled lumber and metal nails or bolts, which first became available to Pueblo ladder makers toward the end of the nineteenth century. The others incorporate "traditional" materials procured and fashioned by hand, often with the aid of stone and, later on, metal tools.

Ladders incorporating two poles joined by rungs have a long history in Middle Eastern and European history. They can be seen, for example, in Assyrian relief sculptures dating from the seventh to ninth centuries BCE that depict attacks on enemy cities (Bersani and Dutoit 1985:Figures 9, 11, and 13; Reade 1998:Figure 104) and, much later, in Georgius Agricola's monograph on mining and metallurgy, published at Basil, Switzerland in 1556 CE (Hoover and Hoover 1912:Plates on pp. 123, 194). It is worth emphasizing, in light of their Old World history, that the two-pole ladders found in Pueblo communities represent an independent, New World invention of this technology (Mindeleff 1891:158).

1.2 Matters of Scope, Evidence, Dating, and Organization

Most of the physical, photographic, and documentary evidence of ladders considered here comes from Pueblo sites and villages in the Central Pueblo and Northern Rio Grande areas. The Central Pueblo area, comprising northeastern Arizona, southeastern Utah, southwestern Colorado, and northwestern New Mexico, is particularly important as the

Table 1.1. Typology of Pueblo Ladders.

Poles				
Number	**Type**		**Foothold**	**Rung Attachment**
one	pole/log		branch base	--
"	pole/log		cut notch	--
"	log		cut step	--
two	pole		pole rung	supplemental rod and lashing
"	pole		pole rung	cut notch, supplemental rod, and lashing
"	pole		pole rung	cut notch and lashing
"	pole		pole rung	mortise and tenon
"	pole		milled lumber rung	nail or bolt
"	milled lumber		milled lumber rung	nail or bolt

source for most of the intact ladders and hafted stone axes that have been preserved in archaeological contexts, with most of these artifacts pre-dating 1300 CE (Figure 1.2).

Smaller data sets derive from Pueblo sites in the Far Western (Virgin) Pueblo region lying along the central-to-western section of the Arizona–Utah border, from Sinagua culture sites in north-central Arizona, and from initially distinctive (pre-1000 CE) and subsequently more pueblo-like (post-1000 CE) Mogollon sites in east-central Arizona and west-central and southwestern New Mexico. Evidence from these "peripheral" regions will be called-out as it comes to bear.

The study area encompasses much of the region characterized by archaeological remains assigned to the Anasazi or, as it is generally known today, Ancestral Pueblo cultural tradition. Use of the term "Anasazi" has been criticized by the descendents of the people who produced the cultural remains in question (Ahlstrom et al. 1993:61–62), so that older label will be avoided here. I will refer instead to the Pueblo people and Pueblo artifacts and other phenomena. It is also helpful to think in terms of a Pueblo "cultural tradition," because of the everyday association between the term "pueblo" and a specific style of above-ground architecture. We are concerned here not only with the residents of those specific buildings, but with their ancestors who resided in semi-subterranean pithouses. The concept of a "Pueblo tradition" bridges the transition between these architectural forms.

The study area also falls within the range of a nearly century-old cultural chronology known as the Pecos Classification (Kidder 1927)—which supports the dating of objects and related events, including those involving ladders and woodworking tools, to intervals that average 200 years in length. The version of that now-traditional temporal and cultural framework followed here includes the Basketmaker II (500 BCE–500/550 CE), Basketmaker III (500/550–700), Pueblo I (700–900), Pueblo II (900–1100), Pueblo III (1100–1300), and Pueblo IV (1300–1600) periods (Ahlstrom 1998a). The term Ancestral Pueblo applies, for present purposes, to these six prehistoric periods. They are followed by the early Spanish Colonial period (1600–1750 CE), equivalent to the first half of the region's historical period (1600–1900 CE). Additional subdivisions of this temporal framework—early Basketmaker III, late Pueblo II, and so on—along with area-specific "phase" sequences—divide time into smaller intervals that are 100 or, in some instances, as little as 50 years in length. Dating at these varied levels of temporal resolution relies on several kinds of chronological evidence, typically used in combination, that can include painted pottery designs, tree-ring dates, radiocarbon dates, sometimes archaeomagnetic dates, and stratigraphic relationships. Much of the evidence presented in this volume is best dated with reference to these 50 to 200-year-long units of analysis, but other significant components can be assigned to intervals that are from one to several years in length on the basis of tree-ring dates or documentary sources. Much of the cited tree-ring evidence derives from a database, compiled by the author, that lists 390 tree-ring-dated pit structures built from 200 to 1625 CE (Ahlstrom 1985, 2020, 2022a, 2022b). Many of those features can be confidently dated to intervals that are no more than five years in length, but for ease of comparison are referenced here mostly to 25-year intervals.

Appendix A presents summary data on the sample of ladders and ladder parts identified for inclusion in this study. The appendix numbers the known ladders and ladder parts, making it possible to correlate the objects listed in the appendix with those described or illustrated in the text. Figure 1.3 shows the locations of the sites and localities that produced the described and illustrated ladders, along with much of the cited axe evidence. The ladder data are presented here in detail because this is the only compilation of its kind to have been produced, and I would like to spare future researchers from having to track down that evidence again. The goal in preparing Appendix A was to provide a comprehensive list of known Pueblo ladders, but also a representative accounting of ladders recorded at Navajo sites. The latter, of a particular one-pole type, are indistinguishable from similar ladders found on Pueblo sites, and it is likely that two shared similar histories of development and use. Evidence relating to these ladders, as well as to the woodworking tools that Navajo people could have used to produce them, can therefore contribute to the study of Pueblo technology during the early Spanish Colonial period.

The discussion is organized as follows. Chapter 2 discusses the place of ladders as building accessories and, to the extent possible, in Pueblo religion and ideology. Chapter 3 summarizes the history of Pueblo woodworking tools, focusing on axes, with heads made originally of stone and later of iron. It also discusses Pueblo people's introduction to Spanish metalworking and woodworking practices. Chapter 4 looks at evidence of ladder use that does not involve the objects themselves, including rests for the butt ends of ladders identified in the floors of Pueblo structures. Those features indicate not only that a ladder had been in use in the location indicated, but in most cases whether it incorporated one pole or two (Table 1.1). The other, more detailed criteria for identifying ladder types consider the nature of the footholds that were built into a ladder, which can only be determined from the remains of the ladders themselves. That evidence is presented in detail and by ladder type in Chapter 5, for ladders consisting of a single pole with built-in footrests, and in Chapter 6, for ladders with two poles and attached rungs. Chapter 7 synthesizes the study's findings, with specific reference to three peaks in the record of ladder and axe evidence, dating to the seventh and eighth centuries, the mid-eleventh through thirteenth centuries, and the seventeenth to mid-eighteenth centuries. Chapter 8 concludes the study. Two appendices follow. Appendix A, as previously discussed, details evidence of Pueblo and Navajo ladders and ladder components that have survived from before ca. 1900 CE. Appendix B characterizes the kinds of modern replicas or reproductions of older Pueblo ladders with which many readers are probably most familiar.

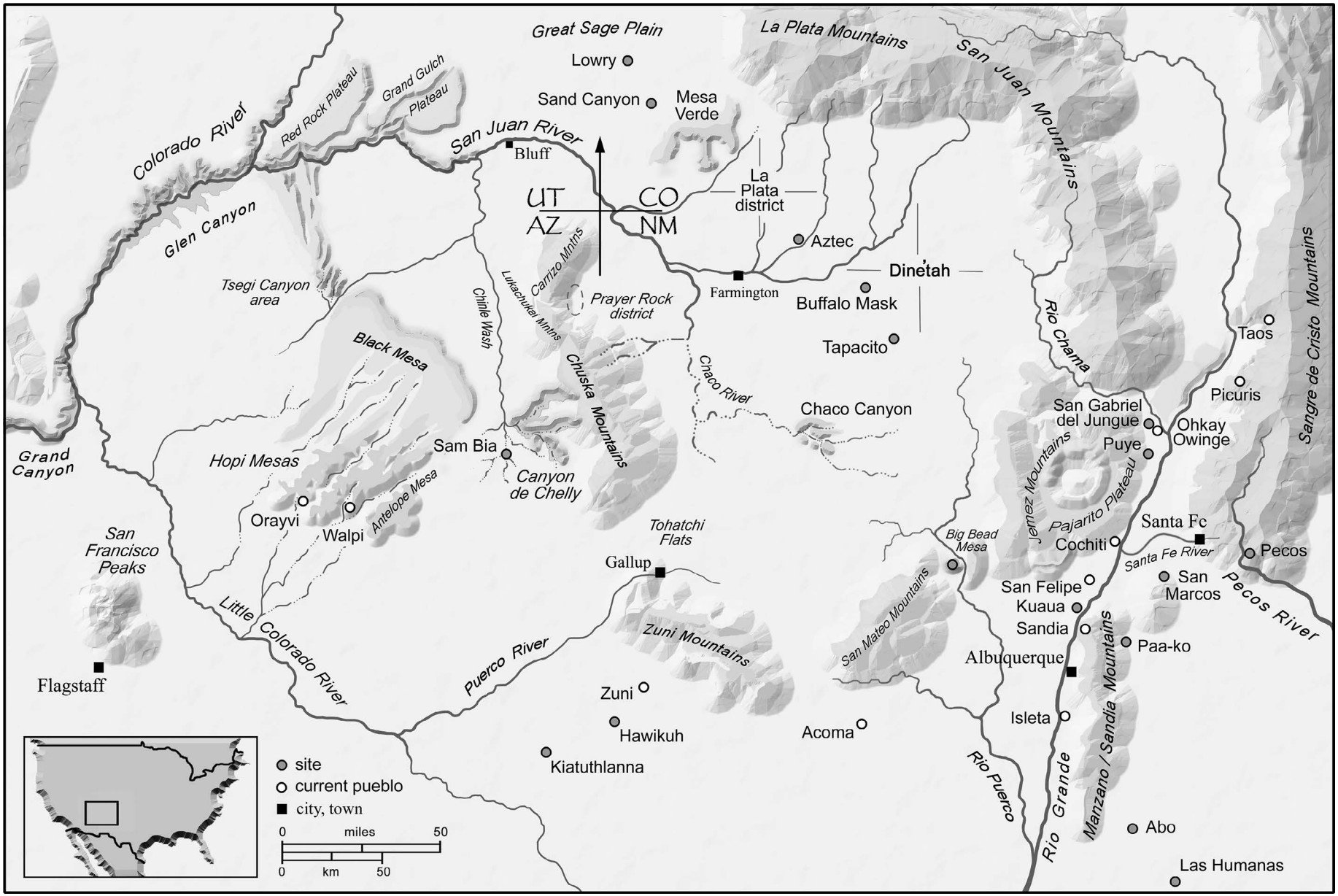

Figure 1.3. Map of the American Southwest's Pueblo region showing the locations of archaeological sites, geographical site settings, and currently inhabited Pueblo villages mentioned in the text.