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25. EVIDENCE OF THE DINETAH PHASE IN THE LA PLATA RIVER VALLEY, SAN JUAN COUNTY, NEW MEXICO

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Recent work in the La Plata Valley in northwestern New Mexico by archaeologists of the Division of Conservation Archaeology has unearthed evidence that supports the concept of a Dinetah phase as proposed by Dittert (1958a:19). This information also suggests that the Navajo occupied areas of northwestern New Mexico at a much earlier date than previously believed, possibly as early as the mid-late A.D. 1400s and at least by A.D. 1500.

Dates obtained at seven archaeological sites near La Plata, New Mexico, on the La Plata Mine have produced considerable supportive data for this Dinetah phase. The La Plata sites are within two miles of the southern Colorado border (Figure 25.1) and between the La Plata River and Cinder Gulch. The information generated from these sites has provided new insights into the protohistoric culture history of the region (Hancock et al. 1988; Reed et al. 1988).

These sites have a "low profile" because surface indications were few. This is due to the temporary nature of the structures (or to the lack of structures) and to the limited number of artifacts. No forked-stick hogans were discovered. The surface indications were a light scatter of lithic and ceramic artifacts and, on closer inspection, a charcoal lens might be present. The ceramics are gray and brown and easily blend into the soil colors. Their friable nature makes for very small sherds. It is also possible that these sites have been classified as Basketmaker III because their sherds could be mistaken for Basketmaker III graywares and brownwares, especially in the Navajo Reservoir District.

The topographic settings of all the sites are similar, except for DCA-84-407. They were located in pinon-juniper woodlands adjacent to large upland grassland meadows. Site DCA-84-407 was located on a pinon-juniper covered mesa, which could suggest a defensive position; however, there is no concrete evidence for this assumption.

PRIOR WORKS

The Navajo originated in northwest Canada. Controversy exists as to when they entered the Southwest. Some believe they were in the Southwest circa A.D. 1500 (Bailey and Bailey 1978:6; Hester 1962). Others believe they arrived around the time the Spanish entered New Mexico (Wilcox 1981; Schaafsma 1981).

Extensive work in the Navajo Reservoir in northwestern New Mexico uncovered no concrete evidence of Navajo occupation prior to A.D. 1700 (Eddy 1966:505-508). A hypothetical "Dinetah Phase" was suggested for the period A.D. 1550 to 1700, based on ceramic types.

> Navajo ceramics were found in three associational groups: sites with Dinetah Utility (Dinetah Gray) only, sites with Dinetah Utility (Dinetah Gray) + Gobernador Indented (Gobernador Variety), and sites with the first two groups + polychrome pottery. The first two pottery sets are combined in Ceramic Group A. Sub-Group Aa refers to those sites with only Dinetah Utility and no imported foreign pottery types. It is the former Dinetah Phase representing the pre-A.D. 1700 Navajo occupants of the Reservoir District who lived there prior to Pueblo Indian acculturative contact. Dating of this ceramic group was based on early Spanish historical documents. These sources, as analyzed by Hester [1962, fig. 25] and Schroeder [1963, fig. 1], placed the pre-A.D.1700 Navajo in the upper San Juan River country. The earliest documentary source which referred to the Navajo was in 1598; the mention of

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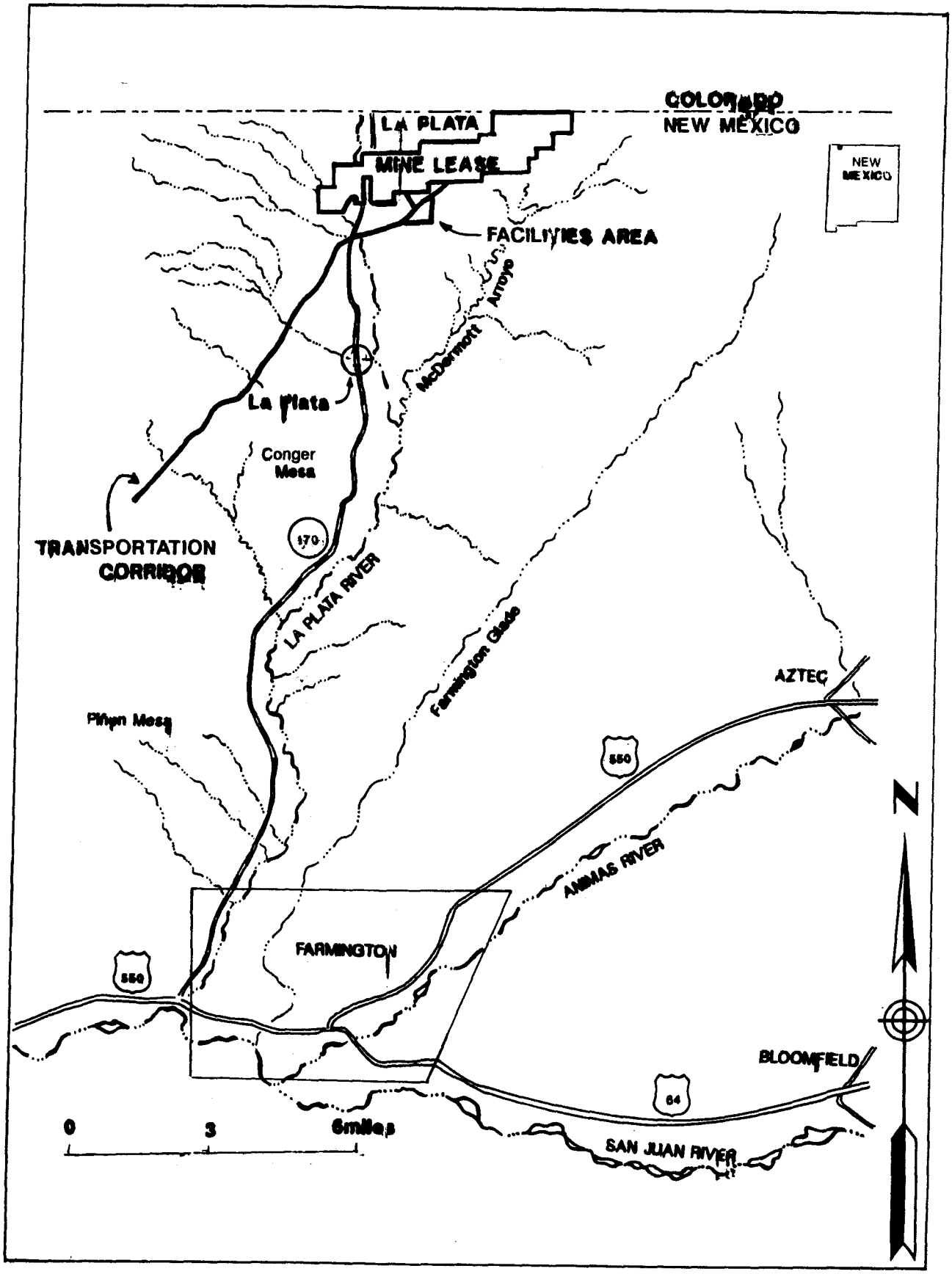

Figure 25.1: Archaeological sites near La Plata, New Mexico.

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the Navajo by their present name was somewhat later, in 1626 [Schroeder 1963:5-6]. From this information, it has been surmised that the early Navajo makers of Dinetah Utility Ceramic Group Aa pottery must have been established in their ancestral homeland, the Dinetah Region, by about 1550. Additional evidence is needed to define this phase (Eddy 1966:458).

The Spanish entry in the Southwest created havoc with the indigenous populations. Four events had great impact on the early historical period: the initial contact (A.D. 1540 to 1542), the conquest (A.D. 1598 to 1599), the Pueblo Revolt (A.D. 1680), and the Reconquest (A.D. 1692 to 1700) (Brugge 1982:282). During the Pueblo Revolt in A.D. 1680, portions of the Rio Grande Pueblo population fled north and were given refuge by the Navajo population in the Dinetah region. At this time the Navajo are believed to have emulated Puebloan animal husbandry, pottery manufacturing, weaving and masonry house construction (Bailey and Bailey 1978:10). This period of cultural exchange is referred to as the Gobernador phase (ca. A.D. 1680 to 1780).

Although the Gobernador phase has been well documented, there has been a general lack of Dinetah phase sites. Material is now available to both document the Dinetah phase and question the original proposed dates of ca. A.D. 1550 to 1680. Many sites containing just Dinetah Gray (or Eddy's [1966] ceramic Group A, Sub-group Aa) may indeed be Dinetah phase and the beginning date of the Dinetah phase may be earlier than A.D. 1550.

A volume of information was gathered at the seven proposed Dinetah phase sites in the La Plata River Valley, but for the proposes of this paper I concentrate on the absolute dates that were recovered at these sites and the description of ceramics that I call Dinetah Gray. The dating and ceramic information used in this paper have been synthesized from Hancock (1988) and Powers (1988).

THE DATES

Dates for the protohistoric sites on the La Plata Mine Project are derived from three sources: radiocarbon (C-14) from wood, obsidian hydration (OH) and thermoluminescence (TL) analysis of sherds and one piece of sandstone. The dates are presented in Table 25.1 according to site number, cluster and site type. There are six site types and 79 dates.

Radiocarbon

Radiocarbon samples from each site were processed when suitable materials could be obtained. Radiocarbon dating is subject to several areas of interpretative error. First, radiocarbon dates are normally reported with a standard deviation that reflects the counting error, a commonly used analytic statistic. It indicates only the likelihood of error in deriving the mean date, not the range of time over which the cultural event may have taken place. Second, standard radiocarbon dates are not adjusted for fluctuations in the manner of radioactive carbon in the atmosphere. Dates that are calibrated to account for atmospheric carbon ratios may run earlier or later than the original date and may have multiple "intercepts," that is, points where the radiocarbon reading intersects the curve of levels of C-14 through time. Thus, the range of the date may be increased. Table 25.2 shows the relationship of calibrated dates to the original reported dates. Fluctuations in atmospheric radiocarbon are particularly critical after A.D. 1650 when industrialization resulted in an increase in nonradioactive carbon from fossil fuels. Samples from sites of this period may date earlier than they should (Powers 1988:352-353).

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TABLE 25.1: Dates of La Plata Mine Project Protohistoric Sites by Site Type

Site Number	Cluster	Site Type	Dating/ Method	Date (A.D.)
DCA-82-208	2	1	C-14	1150±50
			TL	1480±30
			C-14	1490±60
			OH	1536±56
			C-14	1670±50
			TL	1700±30
DCA-86-79	1	1	OH	1307±23
			OH	1389±25
			C-14	1460±60
			TL	1510±40
			TL	1510±88
			C-14	1560±60
			TL*	1590±40
			C-14	1600±60
DCA-86-81	12	1	OH	1436±21
			TL	1600±70
			OH	1601±45
			OH	1609±19
DCA	10	2	OH	1361±19
			C-14	1380±60
			OH	1421±35
			TL	1480±60
			TL	1530±50
			C-14	1730±50
DCA-86-81	1	2	TL	1340±122
			OH	1555±28
			OH	1558±21
			C-14	1560±70
			TL	1610±40
DCA-86-81	16	2	TL	1510±88
			C-14	1550±60
DCA-86-81	3	3	OH	1584±26
DCA-82-207		4	TL	1460±98
Feature 2			TL	1470±96
			OH	1490±26

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TABLE 25.1: Dates of La Plata Mine Project Protohistoric Sites by Site Type (continued)

Site Number	Cluster	Site Type	Dating/ Method	Date (A.D.)
			TL	1510±80
			C-14	1510±50
			OH	1531±25
			TL	1570±76
			TL	1600±70
			TL	1620±70
			C-14	1630±80
DCA-84-407 Testing Phase		4	OH	1309±25
			OH	1343±62
			OH	1375±53
			C-14	1530±60
			C-14	1530±60
			TL	1650±60
			TL	1680±20
			C-14	1460±60*
			C-14	1520±60*
			C-14	1580±60*
			C-14	1580±60*
DCA-86-79	2	4	C-14	1580±50
DCA-86-80	12	4	OH	1358±37
			OH	1403±44
			OH	1561±53
			OH	1572±42
			OH	1617±23
DCA-86-81	4	4	OH	1538±26
			TL	1700±50
			C-14	1740±50
DCA-86-81	5	4	C-14	1400±60
			C-14	1430±50
			C-14	1500±50
			OH	1511±30
			TL	1540±40
			TL	1550±80
DCA-86-81	8	4	OH	1494±36
			OH	1587±25
			TL	1670±56
DCA-86-81	13	4	C-14	1400±50
	15	4	OH	1494±50

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TABLE 25.1: Dates of La Plata Mine Project Protohistoric Sites by Site Type (continued)

Site Number	Cluster	Site Type	Dating/ Method	Date (A.D.)
DCA-86-80	6	5	C-14	(220 B.C.±80)**
			OH	1413±31
			TL	1570±76
			TL	1660±40
DCA-86-81	10	5	TL	1500±90
SAR-922-10		6	C-14	1500±60
			TL	1560±68

Site Types:
1 = Dwelling with interior feature(s) and exterior hearth
2 = Dwelling with no interior feature(s) and exterior hearth
3 = Dwelling with interior feature(s) and no exterior hearth
4 = No dwelling but exterior hearth(s)
5 = Lithic and ceramic scatter
6 = Sweatlodge

C-14 = radiocarbon
TL = thermoluminescence
OH = obsidian hydration

* Alan Reed, personal communication 1988
** Archaic component

TABLE 25.2: Calibrated and Uncalibrated Radiocarbon Dates

Beta Analytic Sample	Site Number	Uncalibrated Radiocarbon Mean	Uncalibrated Radiocarbon Standard Deviation	Calibrated Radiocarbon Intercept(s)	Calibrated Radiocarbon One-Sigma Range	Calibrated Radiocarbon Two-Sigma Range
17923	DCA-86-80	1380	60	1398	1300-1418	1280-1440
17931	DCA-86-81	1400	60	1404	1311-1427	1290-1450
17932	DCA-86-81	1430	50	1414	1397-1434	1306-1448
17934	DCA-86-81	1440	50	1418	1400-1437	1311-1453
17916	DCA-86-79	1460	60	1426	1406-1442	1317-1490
15519	DCA-82-208	1490	60	1437	1413-1461	1328-1616
17930	DCA-86-81	1500	50	1440	1422-1461	1400-1510
11876	SAR-922-10	1500	60	1440	1418-1469	1400-1623
11878	DCA-82-207	1510	50	1442	1426-1469	1410-1616
15418	DCA-84-407	1530	60	1448	1431-1487	1410-1640
15419	DCA-84-407	1530	60	1448	1431-1487	1410-1640
17933	DCA-86-81	1550	60	1460	1436-1617	1410-1640
17917	DCA-86-79	1560	60	1455	1437-1623	1420-1650

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TABLE 25.2: Calibrated and Uncalibrated Radiocarbon Dates

Beta Analytic Sample	Site Number	Uncalibrated Radiocarbon Mean	Uncalibrated Radiocarbon Standard Deviation	Calibrated Radiocarbon Intercept(s)	Calibrated Radiocarbon One-Sigma Range	Calibrated Radiocarbon Two-Sigma Range
17926	DCA-86-81	1560	70	1468	1436-1630	1410-1650
17919	DCA-86-79	1580	50	1487	1443-1630	1430-1650
17919	DCA-86-79	1600	60	1494/1502/ 1506/1605	1445-1640	1430-1660
12339	DCA-82-207	1620	80	1519/1587/1623	1453-1651	1430-1955
12340	DCA-82-207	1630	70	1523/1566/1629	1468-1651	1440-1950
12341	DCA-82-208	1670	50	1642	1519-1657	1470-1950
18218	DCA-86-81	1700	0	[ ]	[ ]	[ ]
17929	DCA-86-81	1720	50	1657	1642-1955	1180-1955
17928	DCA-86-80	1730	50	1660	1613-1747	1070-1955

Third, radiocarbon dates from burned wood are an average of the dates from each of the rings represented in the sample. The longer the series of rings, the older the radiocarbon date relative to the date of the outer rings. Furthermore, the outer ring of the sample is probably not the outer ring of the original tree because the outer rings probably were burned away. Therefore, the radiocarbon date is probably earlier than the death date of the tree. Fifth, the death of the tree may not accurately date the feature from which the sample was taken. Wood that was already dead at the time it was used as fuel or for construction may date many years earlier than its use (Powers 1988:353).

The problem of possible coal contamination of the radiocarbon samples was also considered. Murray Tamers of Beta Analytic, advised that coal contamination would be readily evident if it were present because it would make the sample radically older (Powers 1988:353).

Thermoluminescence

One of the questions of recent concern is the origin of Navajo pottery manufacture. Based on studies in the Abiquiu Reservoir District, Schaafsma (1979) argued that Navajo pottery dated only from the time of the Pueblo Revolt. Brugge (1982) has also adopted this position. Because the associated radiocarbon dates from Navajo components in this study could be earlier than the actual occupation, sherds were submitted for thermoluminescence dating. The earlier samples were sent as they were received in the laboratory; later samples were sent with the surrounding soil matrix in sealed containers. The latter procedure allows more precise determination of moisture content and soil elements. Analyzing the soil accounts for background radioactivity and its effect is to decrease the standard error of $\pm$ 20 percent to approximately $\pm$ 10 percent (Powers 1988:353-354).

Thermoluminescence dating measures light emitted by electrons created in crystal lattices by radioactive emissions (Cairns 1976) and released over time. The original thermoluminescence is destroyed by heating (as in firing of the pottery or heating of sandstone hearth elements), and thermoluminescence is reacquired in direct proportion to the radiation released through the time since the firing or heating. The maximum standard error is estimated at 20 percent based upon an experimental variation of $\pm$ 15 percent obtained by dating specimens of known age (Michels 1973). With soil sample controls for background thorium, potassium, and uranium radiation, the error is approximately 10 percent. The principal sources

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of error involve uncertainties about radon gas escape and moisture content, which affects radon escape, during burial (Powers 1988:354).

Thermoluminescence dating has the advantage of dating the object of interest (pottery) directly rather than by associated materials. In this study, the technique was consistent in that sherds from the same vessel, submitted to the laboratory without revealing their association, yielded nearly identical dates. In the first test, two conjoined sherds were dated within 10 years of each other (A.D. 1460 ± 98, A.D. 1470 ± 96) at DCA-82-207. In the second test, two sherds with similar physical characteristics and believed to be from the same vessel were both dated to A.D. 1510 at DCA-86-79 (in one case the error was ± 88 years, in the other ± 44 years; this difference in magnitude is due to the submission of soil with the second sample). In a third sample, burned sandstone and its matrix from the same feature as the sherds that dated A.D. 1510 (above) was dated. The sandstone dated A.D. 1590 ± 40. A radiocarbon date from the same feature yielded a date of A.D. 1600 ± 60. Another radiocarbon date from a post within the nearby structure at DCA-86-79 produced a date of A.D. 1560 ± 60. Although not as clear as dates from sherds of the same vessel, these dates are similar enough to feel confident of the consistency of the technique (Powers 1988:354).

I believe the associated thermoluminescence ceramic dates are the most indicative of site use. They record the date at which the vessel was fired or reheated to a specific temperature. The life span of a ceramic vessel is expected to be much shorter than the life span of lithic artifacts. Lithic artifacts also may have been scavenged from earlier sites.

Obsidian Hydration

After the first round of excavations from the La Plata Mine Project, it was observed that obsidian hydration dates tended to be earlier than other types of dates from the same site. This trend was examined and the results are discussed below (Powers 1988:354).

Obsidian dates are based on the development of a hydration layer that forms a freshly exposed obsidian surface. The thickness of the layer is a function of the obsidian type and the "effective hydration" temperature (Michels 1973:207). The cooler the temperature, the more slowly the hydration layer develops. At a given temperature, the thicker the hydration layer, the older an artifact is (Powers 1988:354).

The range of error in an obsidian date is based on the error obtained when measuring the hydration layer. Potential sources of error in hydration dates result from uncertainties about the temperature and about the reworking of the artifact. It is not clear to what extent differences in the microenvironment affect the development of the hydration layer. Perhaps the subtle differences between a north- or south-facing slope or the presence of long-lasting snow banks under trees affect the hydration layers in significant ways. The reuse of an artifact may produce fresh scars that will yield different hydration layers than the rest of the artifact. Multiple cuts for hydration measurement may be necessary to clarify the dating of the original artifact and its reuse. A major advantage of obsidian dating is that the technique dates the artifact of interest. As with thermoluminescence dates, however, it does not date nearby features except by association (Powers 1988:354-356).

Analyses of Obsidian Hydration Dates

The accuracy of the obsidian hydration dates was questioned. Were they consistently earlier than other forms of dating? A comparison of the mean thermoluminescence, obsidian, and radiocarbon dates (Table 25.3) gives the mean of each class of dates. Pairwise comparisons of the means using the *t*-test for unpaired (unequal sample sizes) samples show that there are no significant differences between the radiocarbon dates and the thermoluminescence dates. There are, however, significant statistical differences (one-tailed test) between the radiocarbon and obsidian dates and between the

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thermoluminescence and obsidian dates. In both cases the obsidian dates are significantly earlier (Powers 1988:356).

TABLE 25.3: Thermoluminescence (TL), Obsidian Hydration (OH) and Radiocarbon (RC) Dates

Dating Method	N	Mean	Standard/Deviation
TL	27	1560.4	84.1
OH	30	1471.2	99.0
RC (uncalibrated)	22	1550.0	100.0
RC (calibrated)	17	1484.7	85.0

To confuse the issue, examination of the calibrated radiocarbon dates shows that they are more similar to the obsidian dates than to either the uncalibrated radiocarbon dates or the thermoluminescence dates. In general, calibration of the radiocarbon dates pushed them back in time and broadened the maximum range of a date at both the one- and two-sigma levels (Powers 1988:356).

Several interpretations of these patterns of dates are possible. First, the obsidian hydration dates simply may be wrong; that is, too early. They may be too early due to insufficient control, or inaccurate estimates, of the effective hydration temperature. Initially the obsidian dates were reported using an effective hydration temperature based on temperatures for Farmington, New Mexico. They were subsequently revised using temperatures for the La Plata Mine. Because the mine is higher in elevation than Farmington, temperatures tend to be lower; therefore, the dates derived using the revised temperatures were slightly earlier (60 to 100 years earlier for the Navajo sites) than the dates derived using the original Farmington temperatures (Powers 1988:356).

A possible behavioral explanation for the apparently early obsidian dates is that they represent an early post-Anasazi intrusion into the La Plata Valley area and that most of the obsidian found on the sites was bought in by these early visitors. Subsequent site occupants simply may have used the discarded obsidian for their own purposes. Nonetheless, some of the obsidian dates correspond well to other kinds of dates recovered from the same features (Powers 1988:356).

Ceramics

Attributes of protohistoric ceramics recovered on this project were compared and contrasted with Brugge's (1963) descriptions of Dinetah Gray in Table 25.4. Seven attributes were monitored: surface treatment, interior treatment, temper, color, wall thickness, rim style and fracture. The attributes were monitored to ascertain whether attributes normally associated with Navajo ceramics pertained to the La Plata Mine collection (Hancock 1988:357)

The La Plata collection contains two ceramic types: 1) Dinetah Gray and 2) Dinetah Gray: Gobernador Variety. Dinetah Gray: Gobernador Variety ceramics have been typed by the presence of shallow indentations on a smooth surface.

In both surface treatment and interior treatment, the ceramics recovered on this project fit Brugge's descriptions. The only noticeable difference is the general lack of corn cob scraped vessels and the fact that vessels with mica glints are rare (Hancock 1988:357).

Tempering material differs somewhat from Brugge's description in that the La Plata ceramics have tempering material of detrital sandstone from an igneous source along with sand, sandstone and quartz temper. Also tempering material was not abundant. More will be said about tempering material below (Hancock 1988:357).

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TABLE 25.4: Attributes of Protohistoric Ceramics Recovered in the La Plata River Valley

Dinetah Gray from Project	Dinetah Gray: Gobernador Variety from Project	Brugge's Dinetah Gray
crudely smooth, smooth, wiped corn cob scraped* near rim, scraped mica glints	smooth to lumpy, shallow nail impressions	scraped with corn cob, wiped with shredded juniper bark or corn husks, or smoothed or rarely light polished, usually scattered mica glints
smooth to lumpy, smoothed, wiped, scraped	smoothed, smoothed to lumpy, scraped	wiped with shredded juniper bark or corn husks, sometimes scraped with corn cob, or smoothed, rarely polished, or combination of these techniques
sand and crushed rock, sandstone, quartz	sandstone and crushed rock, sand and crushed rock	abundant quartz sand
light brownish gray to black, includes reddish gray, pale brown and light yellowish brown	dark gray to brown includes weak red and reddish brown	light gray to black, sometimes brown, tan, buff, orange-buff, pink or red
gray to black includes reddish brown	gray to very dark gray, includes weak red, red, pinkish gray	light gray to black, sometimes buff, brown or red
3.3 - 7.8 mm	3.5 - 5.8 mm	2.0 - 8.0 mm
4.8 mm	4.8 mm	3.0 - 5.0 mm
IA3 IIIA3 IIIB2 IIIB6 IIIB7 IIIB10	IIIB6	IA3, IB3, IB4, IIA4, IIB3, IIIA10, IIIB3, IIIB5, VB4, VB5
crumbling to medium, crumbling to brittle, crumbling	crumbling to medium crumbling	crumbling
weak to medium weak to strong	weak to medium weak	usually weak, sometimes medium

* = mica glints ** = rim style based on Colton (1953)

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Exterior and paste colors fall within Brugge's range. The Munsell color designations are described for the sherds in tabular form in the individual site descriptions (Hancock et al. 1988; Reed et al. 1988). The variety of colors recorded for one vessel are believed to be the product of uncontrolled firing techniques (Hancock 1988:357).

The range of wall thickness and the mean wall thickness fall within Brugge's range (Hancock 1988:357).

Rim style varies somewhat from Brugge's description. The La Plata ceramics have rims that tend to curve outward at the lip and Brugge did not observe this tendency (Hancock 1988:357).

The sherd fracture, or the profile of the broken sherd's edge, was crumbling or irregular and ragged. This is consistent with the vessel wall hardness, which was weak to medium weak. A few Dinetah Gray sherds were brittle. Brugge's sherds were crumbling (Hancock 1988:357).

In general it is impossible to distinguish Brugge's Dinetah Gray from ceramics recovered from the La Plata Mine Project sites. The only distinctive attribute differences are rim lip and tempering material (Hancock 1988:357).

Tempering material found in the La Plata collection displays a wide variety of mixed materials of various mineral compositions, size, and degree of sorting and wear. Some of the fragments appear to be derived from quartzite, granite, gneiss, or diorite. Sherds containing sand or sandstone and crushed rock (andesite/diorite) were very common in the collection. Also, no consistent pattern of temper choice can be seen in the collection. Most of the material looks like coarsely sorted lithic fragments picked up on detrital outwash slopes rather that well-sorted riverine sands. A sandstone rock has more uniformity in composition than the temper in most of these sherds. It appears that gravels from various localities were used for tempering material (Hancock 1988:360).

Consequently, the presence of crushed rock in the tempering material was not the product of crushing a volcanic rock, which appears to have been the Anasazi technique, but rather the collection of sands that have igneous rock as part of their composition. The tempering material of the La Plata collection, which was listed in the tables as sand and crushed rock, is now believed to be detrital sand with an igneous source. The source of this material is believed to be the La Plata Mountains to the north; however, petrographic analysis could not pinpoint the source (Hancock 1988:360).

I propose that all ceramics recovered on the La Plata Mine Project are Navajo, have a slight variation in tempering material due to their location and have earlier dates than those generally accepted for Dinetah Gray.

In conclusion, the La Plata Valley sites on the La Plata Mine support the concept of the Dinetah phase, indicate that the Navajo had ceramic vessels before the currently accepted dates and the Dinetah phase could date earlier than the proposed dates of A.D. 1550 to 1700, possibly as early as the A.D. 1400s. Data from other excavations sites are necessary to support or rebuff this conclusion.

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