2. Population Trends at Moundville

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AT MOUNDVILLE, MOST MIDDEN DEPOSITS date to the Moundville I phase, but the vast majority of burials date to the Moundville II and III phases. Relative abundances of sherds suggest that Moundville's resident population peaked between AD 1050 and 1300 and then precipitously declined. Between AD 1300 and 1550, the site was inhabited principally by elites and became a center of mortuary ritual for the region as a whole. Most of the dead buried in Moundville's cemeteries during the Moundville II and III phases were apparently brought in from outlying settlements.

Moundville is not only one of the largest Mississippian centers in the Southeast but also one of the most intensively studied. Yet despite many decades of sustained research, one basic question has received surprisingly little attention: How did the size of Moundville's resident population change through time?

The few previous attempts to model population change at Moundville proceeded from the assumption that the people buried at the site also lived there (e.g., Steponaitis 1983a). Thus, the relative number of burials in each phase was taken as a rough index of population. This reasoning suggested that population was small during the West Jefferson (AD 900–1050) and Moundville I (AD 1050–1250) phases, increased during Moundville II (AD 1250–1400) and Moundville III

(AD 1400–1550) phases, then declined precipitously by the start of the Moundville IV (AD 1550–1650) phase. The most frequently cited estimate of the site's maximum population was 3,000 residents (Peebles 1983:190, 1986:29, 1987a:27, 1987b:9–10).

Although this scenario was reasonable given the information available at the time, recent reexamination of midden evidence has called it into question (Steponaitis 1992). Specifically, the problem is this: The great majority of sherds deposited at the site appear to date to the Moundville I phase, significantly earlier than most of the burials. If one assumes that these sherds represent habitation debris, then Moundville's resident population must have peaked early in the site's history, and its later burial population must have consisted largely of individuals who lived elsewhere.

My goal here is to review what is known about midden deposits at Moundville and to discuss more fully the implications of this evidence. I begin by presenting the available data on the chronological distribution of middens. Next, I consider the chronological distribution of burials. Finally, I draw these lines of evidence together in formulating a new interpretation of Moundville's population history.

CHRONOLOGICAL DISTRIBUTION OF MIDDEN DEPOSITS

In view of Moundville's long history of investigation, surprisingly little information exists on the chronology of its middens. This lack is attributable to two factors: First, many of the early excavators sought only burials and large artifacts and did not care much for sherds. Second, even though many of the later excavators did recover sherds, these collections have never been fully analyzed and reported. Hence, I can rely only on the older excavations for which sherd counts have been published and the more recent ones from which I have personally examined at least a sample of the ceramics. Among these are the Roadway and Riverbank excavations conducted by the Alabama Museum of Natural History (AMNH) and the suite of test excavations conducted by the University of Michigan Museum of Anthropology (UMMA).

I focus here on middens that seem to be associated with off-mound residential areas, rather than middens associated directly with mounds (such as those found on summits or flanks). I exclude the latter from consideration because many mounds were nonresidential and also because the summits of residential mounds did not comprise a large

proportion of the site's inhabited area when the population was at its peak (cf. chap. 3).

Let us now discuss each of the relevant excavations, presented in the order in which they were originally carried out.

AMNH Roadway Excavation (1939)

One of the last, and by far the most ambitious, of the Depression-era projects at Moundville was the Roadway excavation, so named because it followed the projected path of the paved road that is now used by visitors to the site (Peebles 1979). The excavations took place within a sinuous transect 15 meters wide and 2.4 kilometers long, which cut across the central plaza as well as areas to the east, south, and west of the mounds (fig. 2.1). In all more than 10,000 square meters were opened; the work yielded dozens of structures, hundreds of burials, and more than 100,000 artifacts from refuse deposits that were encountered along the way.

The collections from this excavation have never been fully studied (cf. Welch 1989). Fortunately, there does exist a published tabulation of all the sherds that were found, classified according to types (Wimberly 1956). Although this tabulation takes no account of vertical or horizontal provenience within the excavations, it can still be used to gauge the overall abundance of sherds dating to different phases and hence the relative intensity of occupation at different times. Whatever these data lack in spatial resolution is more than offset (for present purposes) by the size and spatial extent of the collection; no other excavation, before or since, has ever sampled so much of the site and systematically recovered so many sherds.

When one examines the relative frequencies of shell-tempered types from this excavation, one finds that they closely match the pattern typical of Moundville I phase assemblages. This is not to say that Moundville I is the only phase represented; later components are certainly present also. But it is clear that Moundville I is by far the dominant phase represented. There is no other plausible explanation for the high frequency of Moundville Incised among decorated types and the correspondingly low frequencies of Bell Plain and Moundville Engraved. A recent look at a sample of these sherds strongly supports this conclusion (Welch 1989).

For the purposes of reconstructing trends in population, it would obviously be helpful to know how much of this collection dates to each

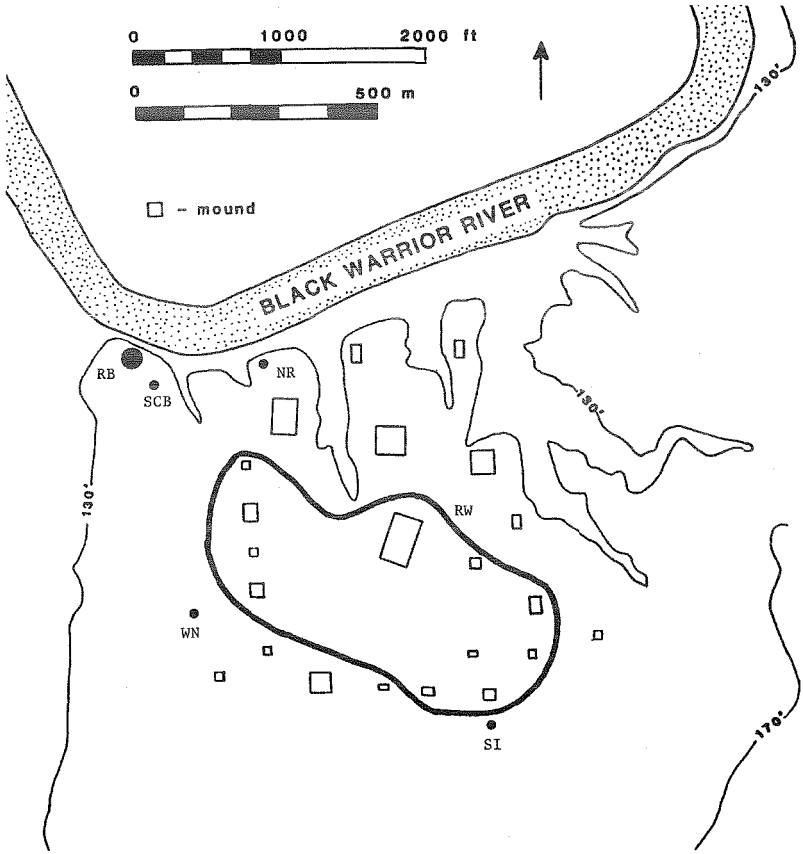

Fig. 2.1. Excavations at Moundville with chronological information on middens. *RW*, Roadway. *NR*, north of Mound R. *SCB*, south of Conference Building. *SI*, south of Mound I. *WN*, west of Mound N. *RB*, Riverbank.

phase in the sequence. One can obtain such estimates using an elegant statistical technique devised by Kohler and Blinman (1987). This technique relies on least-squares regression to partition chronologically mixed collections into their constituent components. The basic idea is simple. One begins by constructing a model assemblage for each phase that might appear in the mixture. The regression equation treats each such phase as an independent variable, the mixed assemblage as the dependent variable, and each pottery type as an individual "case" or "observation." The least-squares criterion is then used to find the linear combination of phase assemblages that best fits the mixed assem-

blage in question. If the type frequencies in the model assemblages are expressed as proportions and the frequencies in the mixed assemblage are expressed as counts, then the regression coefficient (or slope) associated with each phase (or independent variable) represents an estimate of the number of sherds from that phase in the mixed collection.

The model phase assemblages used in the present case are shown in table 2.1, and the results of the regression analyses are presented in table 2.2. Of the 95,742 shell-tempered and grog-tempered sherds in the Roadway collection, Kohler and Blinman's method estimates that 1.1 percent date to the West Jefferson phase, 73.4 percent date to the Moundville I phase, and only 25.5 percent date to the Moundville II and III phases combined.

Before interpreting these figures, one must control for the differing spans of the phases in question. This is best accomplished by dividing the number of sherds from each phase by the duration of that phase in years. The resulting ratios are estimated deposition rates, expressed as the average number of sherds deposited per year (table 2.2). To the extent that refuse accumulation correlates with numbers of people, these estimates suggest that Moundville's population increased by a factor of 50 between the West Jefferson and Moundville I phases, then decreased by a factor of 4 in the Moundville II–III phases.

Despite the uncertainties that beset these estimates, one conclusion seems beyond doubt: The vast majority of habitation refuse encountered during the Roadway excavation was deposited during the Moundville I phase, prior to AD 1250.

UMMA Test Excavations (1978–1979)

In the late 1970s, the University of Michigan Museum of Anthropology tested four different localities at Moundville: north of Mound R, south of the Conference Building, south of Mound I, and west of Mound N (fig. 2.1). These excavations were carried out by Margaret Scarry (1981a, 1986), under the general direction of Christopher Peebles. Although the principal goal was to recover plant-food remains, valuable chronological data (in the form of diagnostic sherds and dates) were obtained as well. Let us now consider the chronology of each locality in turn.

NORTH OF MOUND R. This excavation consisted of two adjacent 2 × 2-meter units, which were taken down to sterile subsoil. The cultural deposits here were 2 meters thick and rich in artifacts. Broadly

Table 2.1.
Model Phase Assemblages and Actual Sherd Counts from the Roadway Excavation at Moundville

	Model Phase Assemblages			
Type[a]	West Jefferson[b]	Moundville I[c]	Moundville II–III[d]	Roadway Excavation[e]
Bell Plain	0	59	1,487	8,918
Mississippi Plain	94	1,075	3,500	79,442
Carthage Incised	0	14	82	1,752
Moundville Engraved	0	0	167	397
Moundville Incised	1	157	74	4,116
Baytown Plain	8,266	0	0	1,078
Benson Punctated	5	0	0	16
Alligator Incised	4	0	0	16
Mulberry Creek Cord Marked	5	0	0	7
Total	8,375	1,305	5,310	95,742

a. Type names from early publications were translated to their approximate modern equivalents as follows: Moundville Black Filmed is counted as Bell Plain, Warrior Plain as Mississippi Plain, Moundville Filmed Incised as Carthage Incised, Moundville Filmed Engraved and Moundville Engraved Indented as Moundville Engraved, McKelvey Plain and West Jefferson Plain as Baytown Plain. Nonlocal types and those predating the West Jefferson phase were excluded from consideration. Also excluded were several rare types that do not appear to have been consistently sorted in all assemblages.

b. Based on the combined assemblages from sites 1Je31, 1Je32, and 1Je33 (Jenkins and Nielsen 1974).

c. Based on the total shell-tempered sherd counts from Bessemer (DeJarnette and Wimberly 1941:81). This site was chosen over other known Moundville I components largely because its pottery was originally sorted according to the same typology later used in classifying the Roadway material. The Bessemer collection also contains some 1,200 grog-tempered sherds; although some of them may well date to the early Moundville I phase, most can be attributed to the preceding West Jefferson component and thus were ignored for present purposes.

d. Based on assemblages from the Moundville II and Moundville III levels in the midden north of Mound R at Moundville (Steponaitis 1983a). The two phases are here combined because they contain virtually identical type frequencies (i.e., they differ only at the level of varieties). Keeping these phases separate in regression analysis would inevitably lead to problems of collinearity (see Kohler and Blinman 1987).

e. After Wimberly 1956.

Table 2.2.
Estimated Rates of Sherd Deposition in the Roadway Assemblage at Moundville

Phase	Phase Duration (years)	Estimated Sherds in Assemblage[a] (*N*)	(%)	Estimated Rate of Deposition (sherds/year)
Moundville I	200	74,621	73.4	373.10
Moundville II–III	300	25,958	25.5	86.53
West Jefferson	150	1,101	1.1	7.34

a. Estimates derived by means of the least squares method of Kohler and Blinman (1986), using the data in table 2.1. The regression equation is $y = 1{,}101.4\,x_1 + 74{,}621.4\,x_2 + 25{,}957.6\,x_3$, where y is the Roadway assemblage, x_1 is the model West Jefferson assemblage, x_2 is the model Moundville I assemblage, and x_3 is the model Moundville II–III assemblage ($R^2 = 0.995$; $p < .001$). The dependent variable (y) consists of sherd counts, while the independent variables (x_1, x_2, x_3) are expressed as proportions.

speaking, three stratigraphic zones were encountered. The uppermost 40 centimeters consisted of midden with scattered pits and hearthlike features, but no definite floors or distinct living surfaces. The next 30 centimeters consisted of similar refuse deposits, except that these were interspersed with occasional traces of sand floors. Finally, the lowest 130 centimeters comprised a series of closely superimposed sand floors, separated by lenses of refuse.

An extended discussion of the pottery from this excavation has appeared in print (Steponaitis 1983a) and need not be reiterated here. Suffice it to say that the lowest zone dated to the Moundville I phase (principally late Moundville I), the next zone dated to the Moundville II phase, and the uppermost zone dated to Moundville III. Thus, even though refuse from all three phases was present, nearly two-thirds of this deposit accumulated during Moundville I times.

SOUTH OF CONFERENCE BUILDING. This test also consisted of two adjacent units, each 2 × 2 meters in size. Though not nearly as deep, the cultural deposits were similar in character to those north of Mound R. On top was a plowzone 20 centimeters thick (Zone I); below that was dark, rich midden about 25–35 centimeters thick (Zone II); and at base was a layer of superimposed sand floors (Zone III), containing three puddled-clay hearths (Scarry 1986:161–168).

The shell-tempered pottery from this excavation comprises an almost pure Moundville I assemblage (table 2.3). The only later diagnostic is a single sherd of Moundville Engraved, var. *Hemphill*, suggesting a slight Moundville II or III phase admixture. Jar attributes exhibit a classic stratigraphic sequence (table 2.4): from bottom to top, the percentages of standard jars and unmodified rims increase, while the percentages of neckless jars, folded-flattened rims, and folded rims decrease. Based on the predominance of standard jars, the nearly equal and high frequencies (overall) of both folded and folded-flattened rims, and the healthy representation of Moundville Engraved, the deposit would seem to date principally to the middle-to-late portion of the Moundville I phase.

Table 2.3.
Ceramic Assemblage, South of Conference Building

Type, Variety	Zone I[a]	Zone II[b]	Zone III[c]
Shell-tempered			
Bell Plain, *Hale*	72	115	18
Mississippi Plain, *Hull Lake*	3		
Mississippi Plain, *Warrior*	387	466	63
Carthage Incised, *Summerville*		1	
Carthage Incised, *unspecified*	3	1	
Moundville Engraved, *Hemphill*		1	
Moundville Engraved, *unspecified*	11	4	1
Moundville Incised, *Carrollton*	3	1	
Moundville Incised, *Moundville*	5	23	4
Moundville Incised, *unspecified*		5	
Grog-tempered			
Baytown Plain, *Roper*	8	13	4
Alligator Incised, *unspecified*	3	1	2
Benson Punctated, *unspecified*	1		
Sand-tempered			
Baldwin Plain, *unspecified*	2		1
Nonlocal			
Harrison Bayou Inc., *Harrison Bayou*		1[d]	
Total	498	632	93

a. Includes TUA level 1 and TUD level 1.

b. Includes TUA levels 2–4 and TUD levels 2–3.

c. Includes TUA levels 5–9 and TUD levels 4–5, as well as features 1, 5, and 8.

d. Partial vessel.

Table 2.4.
Attributes of Shell-Tempered Jar Rims, South of Conference Building

	Zone I		Zone II		Zone III		Total	
	(*N*)	(%)	(*N*)	(%)	(*N*)	(%)	(*N*)	(%)
Basic shape								
Standard jar	10	83.3	20	74.1	1	50.0	31	75.6
Neckless jar	2	16.7	7	25.9	1	50.0	10	24.4
Secondary shape feature								
Unmodified rim	7	58.3	8	29.6	0	0.0	15	36.6
Folded rim	2	16.7	11	40.7	1	50.0	14	34.1
Folded-flattened rim	3	25.0	8	29.6	1	50.0	12	29.3

Note: All but one of the descriptive terms used here are defined by Steponaitis (1983a:47–78); the exception is "unmodified rim," which refers to unthickened jar rims, that is, ones that are neither folded nor folded-flattened. For the correlation between stratigraphic zones and excavated levels, see notes to table 2.3.

The four dates obtained from this excavation are generally consistent with the pottery (Scarry 1986: table 5.11). One radiocarbon assay from the base of Zone II yielded an uncorrected age of 875 ± 80, or AD 1075, a bit on the early side but not unreasonably so, given the standard error. Three archaeomagnetic dates from hearths in Zone III fell within a range from AD 1120 TO 1230.

SOUTH OF MOUND I. A single 2 × 2-meter unit was opened south of Mound I, approximately 30 meters inside the presumed location of Moundville's palisade (Scarry 1981a, 1986:161). The cultural deposits were about a meter deep but not as rich in domestic refuse as those north of Mound R or south of the Conference Building. Among the features encountered were a hearth, a wall trench, and a line of postholes, clearly indicating that houses stood here. The entire deposit was excavated in arbitrary 10-centimeter levels, and no clear stratification was observed.

For present purposes, we can treat the pottery from the various levels as a single assemblage (table 2.5). Leaving aside the few grog-tempered and sand-tempered sherds from earlier components, all the shell-tempered diagnostics point to an occupation during the Moundville I phase, possibly lasting into early Moundville II. Rim modes can be used to refine this estimate even further (table 2.6). The

Table 2.5.
Ceramic Assemblage, South of Mound I

Type, Variety	All Levels[a]
Shell-tempered	
Bell Plain, *Hale*	63
Mississippi Plain, *Hull Lake*	5
Mississippi Plain, *Warrior*	466
Carthage Incised, *unspecified*	2
Moundville Incised, *Moundville*	9
Moundville Incised, *unspecified*	1
Grog-tempered	
Baytown Plain, *Roper*	3
Sand-tempered	
Baldwin Plain, *unspecified*	3
Total	552

a. Includes TUB levels 1–10.

very low percentage of neckless jars and the complete absence of folded-flattened rims suggests that this occupation began in late Moundville I times. All in all, this area seems to have been inhabited sometime between AD 1150 and 1300, with no hint of anything later.

WEST OF MOUND N. A single 1 × 1-meter test unit was excavated about 130 meters west-southwest of Mound N, in an area thought to be near the palisade (Scarry 1980:11–12; also see Scarry 1986: fig. 5.6). The cultural deposits here were about 45 centimeters deep and contained a relatively low density of artifacts.

The recovered sherds, though sparse, again seem to indicate an early occupation (table 2.7). All the diagnostics in this small assemblage are consistent with the Moundville I or early Moundville II phase.

AMNH Riverbank Excavation (1991–1992)

The most recent midden excavations took place in the winter of 1991 and 1992 and were located on the terrace edge near the Conference Building in the northwest portion of the site (chap. 4). The work was done in advance of a riverbank stabilization project, which ultimately destroyed much of this locality. Some 1,825 square meters were manually or mechanically stripped and mapped, and the exposed features were

Table 2.6.
Attributes of Shell-Tempered Jar Rims, South of Mound I

	All Levels	
	(*N*)	(%)
Basic shape		
Standard jar	20	95.2
Neckless jar	1	4.8
Secondary shape feature		
Unmodified rim	12	57.1
Folded rim	9	42.9
Folded-flattened rim	0	0.0

Note: All but one of the descriptive terms used here are defined by Steponaitis (1983a:47–78); the exception is "unmodified rim," which refers to unthickened jar rims, that is, ones that are neither folded nor folded-flattened. These counts include TUB levels 1–10.

Table 2.7.
Ceramic Assemblage, West of Mound N

Type, Variety	All Levels[a]
Shell-tempered	
Bell Plain, *Hale*	3
Mississippi Plain, *Warrior*	42
Moundville Engraved, *Havana*	1
Moundville Engraved, *unspecified*	2
Moundville Incised, *Moundville*	2
Moundville Incised, *unspecified*	1
Unclassified	1
Total	52

a. Includes TUE levels 1–6.

excavated. The area was found to contain some 16 house patterns, a segment of the palisade showing several episodes of rebuilding, a variety of shallow pits, and a few burials. All the structures and virtually all the refuse dated to Moundville I and the very beginning of Moundville II; the only significant later features were a number of intrusive burials from Moundville II or III times. As we shall soon see, this pattern of superposition nicely reflects Moundville's history in microcosm.

Discussion

All told, the various off-mound excavations undertaken over the last 60 years have yielded surprisingly consistent results. In every case, the greatest bulk of the midden encountered dated to Moundville I or (perhaps) early Moundville II times. The only places that yielded significant later deposits were portions of the Roadway and the locality north of Mound R.

Indeed, judging from the excavations just considered, some of the deepest and richest middens formed along the northern edge of the site, closest to the Black Warrior River. This area was clearly a major focus of settlement during the Moundville I phase, and it continued being used, albeit more sporadically, in later phases as well. The Roadway excavations, located farther south and away from the river, also encountered many middens. Moundville I sherds were found throughout these excavations, but Moundville II and III sherds were principally concentrated in two locations: west of Mound P and east of Mound S (Welch 1989:6).

CHRONOLOGICAL DISTRIBUTION OF BURIALS

Having just reviewed the chronology of Moundville's middens, let us now turn to another important source of information on Moundville's population history, the temporal distribution of burials. Moundville's many excavations since the turn of the century have yielded data on more than 2,000 burials, found virtually everywhere across the site (Moore 1905, 1907; Peebles 1971, 1979). Many of these burials contained grave offerings, such as pottery, beads, celts, and other implements.

Since 1978, I have been able to date many of these burials based on the associated pottery (for a description of the method, see Steponaitis 1983a:133–149). As of this writing, 505 burials can be placed within temporal spans consisting of one or two adjacent phases. If we partition the burials that span two phases equally between them, then we arrive at a corrected estimate for each phase (table 2.8). These estimates suggest that only about 7 percent of the burials were interred during Moundville I, 38 percent during Moundville II, 53 percent during Moundville III, and less than 2 percent during Moundville IV. It should be noted, incidentally, that the complete absence of burials during the West Jefferson phase may be more apparent than real, since burials of

Table 2.8.
Chronological Distribution of Dated Burials at Moundville

Phase	Length of Phase (years)	One- or Two-Phase Spans[a] (*N*)	(%)	Estimates for Single Phases[b] (*N*)	(%)	Estimated Rate of Deposition (burials/year)
Moundville IV	100	2	0.4	9.5	1.9	9.5
Moundville III–IV	250	15	3.0			
Moundville III	150	149	29.5	267.5	53.2	1.78
Moundville II–III	300	222	44.0			
Moundville II	150	59	11.7	190.5	37.7	1.27
Moundville I–II	350	41	8.1			
Moundville I	200	17	3.4	37.5	7.4	0.19
West Jefferson	150	0	0.0	0.0	0.0	0.00

a. Includes all burials that can be dated to a one- or two-phase span by direct association with diagnostic pottery; individuals within multiple interments are counted separately. Rows designated by a range spanning two phases include burials that date within that range but cannot be placed more precisely.

b. Single-phase estimates based on the data at left. Burials that span two phases are divided equally between the two.

this period generally do not contain pots as grave accompaniments (Jenkins and Ensor 1981; Ensor 1979; Welch 1990).

There are, of course, other ways of arriving at such phase-specific estimates. One could, for example, rely only on the burials that can be dated to single phases; one could also divide the chronologically ambiguous burials proportionally rather than equally between the phases to which they might date. Yet no matter which method one chooses, all estimates point to the same, inescapable conclusion: The vast majority of burials at Moundville—something on the order of 90 percent—date to the Moundville II and III phases. Even if all the borderline cases were assigned to Moundville I, the total for this phase would not exceed 13 percent.

Correcting for differences in phase duration (table 2.8), we see that the rate at which burials were deposited increased 670 percent between Moundville I and Moundville II and another 40 percent between Moundville II and Moundville III, after which it declined precipitously.

MOUNDVILLE'S POPULATION HISTORY: SYNTHESIS AND SPECULATIONS

It now remains to construct a plausible interpretation of Moundville's population history by reconciling the two, seemingly contradictory patterns we have observed: most of the middens are early, but most of the burials are late (fig. 2.2). The question is, What do these patterns mean?

The simplest and most plausible explanation for the midden pattern is that Moundville's resident population peaked early in the sequence, during the Moundville I phase, and declined substantially thereafter. Recent data suggest that most of the mounds were constructed during the late Moundville I or early Moundville II phase (AD 1200–1300) (Knight 1989, 1992; Welch 1989). The decline in population seems to have occurred just after this period of mound construction, when Moundville established itself as a major regional center (cf. Steponaitis 1992). Prior to this change, Moundville probably contained a cross-section of the region's inhabitants, including many commoners as well as the elite. After AD 1300, however, it is reasonable to suppose that the inhabitants were mostly elite: high-ranking families together with some retainers and assorted functionaries. The Moundville of AD 1300–1500 was not strictly speaking a vacant ceremonial center, but

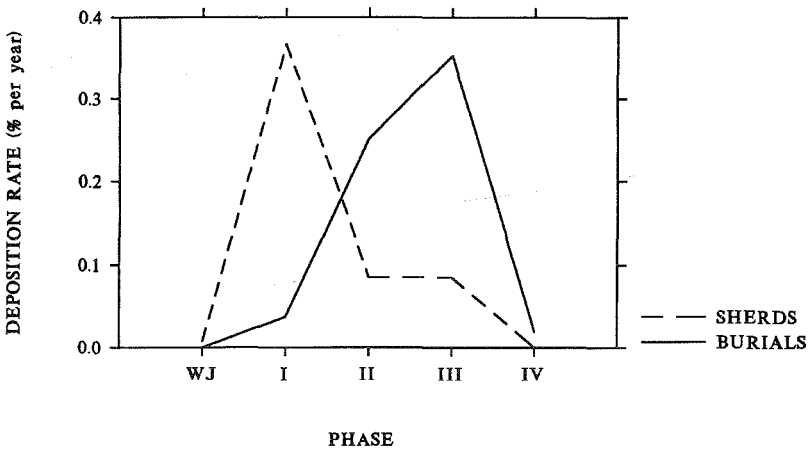

Fig. 2.2. The deposition rates of sherds and burials at Moundville. Data are taken from tables 2.2 and 2.8; to facilitate comparison, deposition rates have been reexpressed in units of percent per year.

neither was it a densely settled town. Rather, it contained a modest resident population that probably fluctuated through time with the vicissitudes of politics and the demographic fortunes of particular kin groups connected with the mounds (chap. 3). Whatever the case, by circa AD 1550 Moundville was virtually abandoned as a settlement. The few Moundville IV sherds that occur suggest an ephemeral occupation, perhaps nothing more than occasional visits to a sacred place that had formerly been a political and religious center of a major chiefdom.

Yet if middens are the best index of Moundville's population, then how do we interpret the great increase in burials that occurred during Moundville II and III, when the number of residents declined? The only good explanation is that most of the people interred at Moundville after AD 1300 did not actually live there. Moundville was, after all, not only a political capital but also a ritual center. In this light, it is not at all difficult to imagine that people from outlying communities may have been brought to Moundville for burial. Indeed, the cemeteries at Moundville are the only ones known in the Black Warrior Valley for the period between AD 1050 and 1450. The two other cemeteries that have thus far been discovered in the valley date to the Moundville III phase, close to the time when Moundville was abandoned (chap. 7; DeJarnette and Peebles 1970; Welch 1991).

There are other possible explanations for the observed pattern, but none is as convincing. For example, one alternative is that the paucity of Moundville II–III midden reflects a change in refuse-disposal practices. Although Moundville I refuse may have accumulated around residential precincts, Moundville II–III refuse may have been collected and dumped into the ravines and river along the northern edge of the site (Peebles 1978:381). The idea is interesting, but there is no compelling reason to believe it is true. For one thing, Moundville II–III middens do exist on the site, even in places far from the riverbank. Indeed, some of the richest and deepest Moundville III middens are those on the flanks of mounds (e.g., Knight 1992; cf. Smith and Williams 1994:30). If any refuse were given special treatment, one would think it would be that associated with these sacred structures. The fact that mound-related trash accumulated where it was dropped argues strongly against any major movement of refuse.

One might also argue that the lack of Moundville I burials is an archaeological illusion, caused by proportionally fewer burials of this phase having datable pots as grave goods. This proposition can be evaluated by examining the abundance of vessels in single-component ceme-

teries at outlying sites. The two known outlying cemeteries in the Black Warrior Valley—Snows Bend (DeJarnette and Peebles 1970) and White (Welch 1991)—both date to Moundville III. These sites yielded a total of 75 burials, 43 percent of which included pottery. Although no outlying Moundville I cemeteries have yet been found in the Black Warrior Valley proper, three Moundville-related cemeteries of this age have been excavated in the Tombigbee Valley nearby (Atkinson et al. 1980; Jenkins and Ensor 1981; O'Hear et al. 1981); here, 56 burials were uncovered, of which 32 percent contained pottery. The early cemeteries do have a slightly lower percentage of burials with pots, but the difference is so small that it cannot account for the dramatic patterns observed at Moundville.

Finally, we must consider the possibility that the observed patterns are simply the result of sampling error. Because Moundville has never been thoroughly investigated with any sort of probabilistic or systematic design, the biases in our existing sample are admittedly hard to gauge. It may be, for example, that past excavators missed major concentrations of Moundville I burials or major deposits of Moundville II–III midden. Yet there are several factors that make this explanation seem unlikely. First, there has been no deliberate bias toward recovery of early middens or late burials; indeed, all but the most recent excavations took place before the current chronology was worked out. Second, the fact that the chronological trends for burials and middens run in opposite directions argues against our simply having missed one or another phase entirely. Third, the magnitude of the differences in those trends is so great that it is hard to imagine how sampling error alone could account for them. All in all, I see no credible alternative to the historical scenario I have proposed.

Up until now, we have considered only the relative size of Moundville's population at different points in time. The question remains, can we also say anything about its absolute size? I can answer this question only by indulging in speculation, loosely constrained by the few bits of evidence that exist.

The first way of approaching this problem is to work backward through time. If my scenario is correct, Moundville was inhabited during its later phases (Moundville II and III) by a contingent of elite families, religious functionaries, and their retainers. All these individuals were presumably linked to particular mounds or sets of mounds, which were maintained by corporate subclans or cult institutions (see chap. 3 and Knight 1986, 1990). Let us assume that on the average 20 individuals were associated with each of the principal mounds; some may have

lived on the mounds, while others may have lived nearby. We know that at least 4 of the mounds at the site (I, J, K, and X) were not used much, if at all, after Moundville I times (Knight 1989; Steponaitis 1992). Let us also exclude from our estimate Mound V, which is probably an extension of Mound B, as well as the low outliers that probably are associated with major mounds of the plaza-periphery group. If we assume that the 15 remaining mounds were all used simultaneously during Moundville's later history (almost certainly an unrealistic assumption), we arrive at an estimated population of 300 individuals for the Moundville II and III phases. Recalling that the estimated sherd-deposition rate in the Roadway excavation was four times greater before AD 1250 than after (table 2.2), we can plausibly assume that the earlier population was also four times greater. This reasoning yields an estimate of 1,200 residents for the Moundville I phase.

Alternatively, one can derive an estimate using data on house densities and total habitable area. At present, the only large exposure at Moundville with houses that can be accurately dated is the Riverbank excavation. There, a total of 16 house patterns were uncovered in an area of 0.1825 hectare. (This count includes structures 1 through 6 in the PA tract and structures 1 through 6 in the ECB tract, described by Scarry in chapter 4. Among the latter, Structure 5 was rebuilt twice and Structure 6 was rebuilt four times, yielding a total of 16 discrete patterns.) Many of these house patterns overlapped, and all dated to the 250-year interval between AD 1050 and 1300 (chap. 4). If we assume that a wooden-post house lasted an average of 10 years (cf. Warrick 1988), then the average density of contemporaneous houses can be calculated as $D = NL/AT$, where D is the average density of houses at any time, N is the number of house patterns observed, A is the area excavated, T is the duration of the interval over which the houses were occupied, and L is the average longevity of a house. Using the Riverbank figures just cited, the formula yields an estimated average density of 3.5 contemporaneous houses per hectare. Assuming 5–8 people per house (chap. 4), this household density translates into an average of 17.5–28 persons per hectare. If one excludes the mounds and the plaza, the total habitable area within and immediately around the palisade is about 60 hectares. Extrapolating from the Riverbank to the entire site thus produces an overall population estimate for the Moundville I phase of 1,050–1,680 residents.

Although the two estimates just derived for Moundville's peak population are consistent with each other and are of the same order of mag-

nitude as the previously cited estimate of 3,000, we have every reason to be suspicious, if not downright skeptical, of all these numbers. We still know very little about the distribution of residential areas at Moundville, the longevity of houses, or, for that matter, the numbers of people associated with houses or mounds. Indeed, the little we do know suggests that areas along the river were among the longest and most heavily occupied portions of the site; if so, then extrapolating from the Riverbank to the site as a whole is bound to yield estimates that are too high. What we can say is this: Moundville may have had a population, early in its history, of 1,000–1,700 people. But the underlying calculations entail some tenuous assumptions, which if wrong would probably tend to inflate the results. Frankly, I would be very surprised if Moundville's permanent residents much exceeded 1,000, even during Moundville I times.

Whatever the case, much more in the way of excavations and collections research needs to be done before Moundville's population history is well understood. My hope is that the evidence and hypotheses presented here will serve as a useful baseline from which this future work can proceed.

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Archaeology of the Moundville Chiefdom

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