

**ARCHAEOLOGICAL RESEARCH**

**MISSISSIPPIAN DUGOUT CANOES  
AND THE MOUNDVILLE PHASE**

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**A CONTEXTUAL STUDY OF MISSISSIPPIAN DUGOUT CANOES:  
A RESEARCH DESIGN FOR THE MOUNDVILLE PHASE**

**A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Arts**

**by**


**Richard P. Kandare, B. A.  
State University of New York at Buffalo, 1976**

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**University of Arkansas**

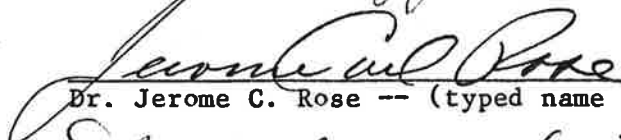
This thesis is approved for  
recommendation to the  
Graduate Council

Major Professor:

  
\_\_\_\_\_  
Professor Hester A. Davis -- (typed name and signature)

Thesis Committee:

  
\_\_\_\_\_  
Dr. Michael P. Hoffman -- (typed name and signature)

  
\_\_\_\_\_  
Dr. Jerome C. Rose -- (typed name and signature)

  
\_\_\_\_\_  
Dr. Neal L. Trubowitz -- (typed name and signature)

## ABSTRACT

Mississippian populations living in the southeastern part of North America during the Late Prehistoric and Early Historic Periods (circa A.D. 1000-1700) inhabited a riverine environment which consisted of a complex patchwork of oxbow lakes, rivers, sloughs, seasonally flooded low areas, and natural levee ridges. The dugout canoe was an important socio-economic device which greatly facilitated human adaptation to such an environment.

Based upon ethnohistoric and archeological information a contextual study of dugout canoe transportation was conducted. Early historic accounts relate that the Southeastern Indians used dugout canoes in their daily rounds to fish, hunt, trade, wage war, and to transport people and goods to a safe refuge in times of stress.

The results of this contextual study provide the basis for the formulation of a regional research design for discerning archeological traces of dugout canoe use at Moundville and Moundville phase sites located along the Black Warrior River in West-Central Alabama. Archeological expectations of dugout canoe use include: lost, discarded or shipwrecked dugout canoes and/or cargo occurring in a manner related to the hydrography of the Black Warrior River and in relation to past landings, water routes, and hazards to navigation. Some Moundville phase sites located adjacent to

navigable waterways may have incorporated canoe landings into their settlement pattern which would have allowed for safe and convenient launching and storage of dugout canoes.

There may also be bioarcheological evidence of canoe use among the skeletal populations of the Moundville phase. In addition, the archeological record of the Moundville phase may contain dugout canoe construction sites.

A contextual study of the Mississippian dugout canoe also provided the basis for the formulation of a processual model for this type of transportation in the Southeast.

Archeological evidence indicates dugout canoes have been used in the Southeast as early as the Archaic Period and possibly the Paleo-Indian Period. Dugout canoe use extends through the Woodland Period and is at its highest development during the Mississippi Period. Decline and abandonment of this type of watercraft occurs among Native American groups during the Historic Period. The Moundville phase of the Mississippian Development may thus represent aboriginal dugout canoe transportation at its highest development.

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## TABLE OF CONTENTS

ABSTRACT	iv
ACKNOWLEDGEMENTS	vi
TABLE OF CONTENTS	ix
LIST OF TABLES	xii
LIST OF FIGURES	xiii
CHAPTER 1. Background	
Introduction	1
Dugout canoes	1
Historic popularity	1
Review of the archeological literature	3
Purpose of the study	7
The Moundville Phase	8
Method and theory	12
An ecological approach	12
Technology and environment	12
Patterned human behavior	13
Effect on culture	14
CHAPTER 2. A Contextual Study of the Mississippian Dugout Canoe	
Introduction	15
The Ethnohistoric literature	15
The Ethnographic present: A.D. 1539-1543	16
The De Soto Accounts	17
The Ethnological value of the De Soto accounts	18
Dugout canoe construction, form and accessories	21
Construction methods	21
Dugout canoe sizes and shapes	22
Type I	22
Type II	22
Type III	23
Type IV	23
Dugout canoe decoration	31
Mythology	32
Dugout canoe accessories	33
Paddles	33
Poles	34
Anchors	35
Bailers	35
Seats	36
Awnings	36
Standards	37

Dugout canoe function and use	38
Canoe travel	38
Use in trade and transportation	41
Dugout canoes used in harvesting fish	44
Dugouts used in gathering	45
Dugouts used in hunting	45
Dugouts used in warfare	46
Dugouts used in emergencies	49

### CHAPTER 3. A Research Design for the Moundville Phase

Introduction	53
Problem domain: archeological traces of dugout canoe use at Moundville phase sites	53
Proposition	53
Data requirements	53
Expected evidence	53
Dugout canoes and cargoes	54
Ethnohistoric data	54
Archeological evidence	59
Landings	63
The importance of landings to travelers	63
Human behavioral patterning at landings	64
Review of archeological literature on canoe landings in the Southeast	66
Historic and modern landings located at Moundville phase sites	67
Topographic features at landings	68
Hypothetical dugout canoe landings at Moundville	70
Logistics of canoe travel between Moundville phase sites	74
Skeletal evidence of canoe use	79
Paddlers	79
Bioarcheology and canoe travel	80
Non-metric traits and biological distance	80
Muscle attachments	80
Skeletal evidence of prolonged kneeling	81
Arthritis	81
Dugout canoe construction sites	82
Ethnohistoric accounts of dugout canoe manufacture	82
Behavioral chain analysis	86
Locus 1: tree felling and trimming activity area	88
Locus 2: log hollowing and finishing activity area	88

Archeological literature	89
Processual Model for dugout canoes in the Southeast	90
The experimental stage	92
The early extension stage	92
The rapid extension stage	93
The maturity stage	94
The decadence stage	96
CHAPTER IV. SUMMARY AND CONCLUSION	99
REFERENCES CITED	104
APPENDIX A A proposed computerized dugout canoe inventory form for Southeast specimens	120

## LIST OF TABLES

Table	Page
1. Prehistoric dugout canoes found in the Southeast	27
2. Density of potential cargo	58
3. Relationship of historic and modern navigational features and Moundville phase sites along the Black Warrior River	69
4. Logistics of canoe travel from Moundville based upon Lafferty's formula	77
5. Behavioral chain analysis of dugout canoe construction	87
6. Historic dugout canoes found in the Southeast	98

## LIST OF FIGURES

Figure	Page
1. Dugout canoe distribution in North and Central America	2
2. The Moundville phase sites of the Black Warrior River	9
3. Reconstruction of Spiro shell engravings which depict Mississippian people using canoes	25
4. Length of some prehistoric canoes	29
5. Flow diagram showing the evolution of a canoe accident	61
6. Dugout canoes found in the Tombigbee-Black Warrior River System.	62
7. Moore's (1905) map of Moundville note mounds A, B, C, D and R have ramps oriented towards hypothesized landing areas (see Figure 8)	70
8. A model of hypothesized dugout canoe landings at Moundville and their relationship to the densest concentrations of artifacts reported at the site	71
9. Partially constructed dugout canoe found in South Carolina	91

...(A)rcheologists...need to add to their repertoire a deliberate, imaginative search for signs of navigation on any stream large enough for a canoe (Trout 1981:10).

## CHAPTER I

### BACKGROUND

#### INTRODUCTION

This paper researches the use of the dugout canoe among Mississippian societies in order to determine the archeological traces that such a transportation device would leave behind. This entails a review of available ethnohistoric and archeological literature on dugout canoe use among the Late Prehistoric and Early Historic societies living along the major river valleys in the Southeast. Based on this information a regional research design was developed for Moundville and its associated sites.

#### DUGOUT CANOES

##### Historic popularity

The most popular type of watercraft used by aboriginal groups to travel the waterways of the Southeast was the dugout canoe. Although skin boats, bark canoes, and cane rafts were at times used by some people, these craft were not universally employed in contrast to the dugout canoe whose distribution extended almost throughout the Southeast (Swanton 1946:589; Stowe 1974:194; Manning 1980:13).

The distribution of dugout canoes in historic times extended from the Great Lakes throughout much of what is now known as the southeastern United States and in and around the Gulf of Mexico. It was also distributed along the Northwest coast and in portions of California and Alaska (Figure 1).

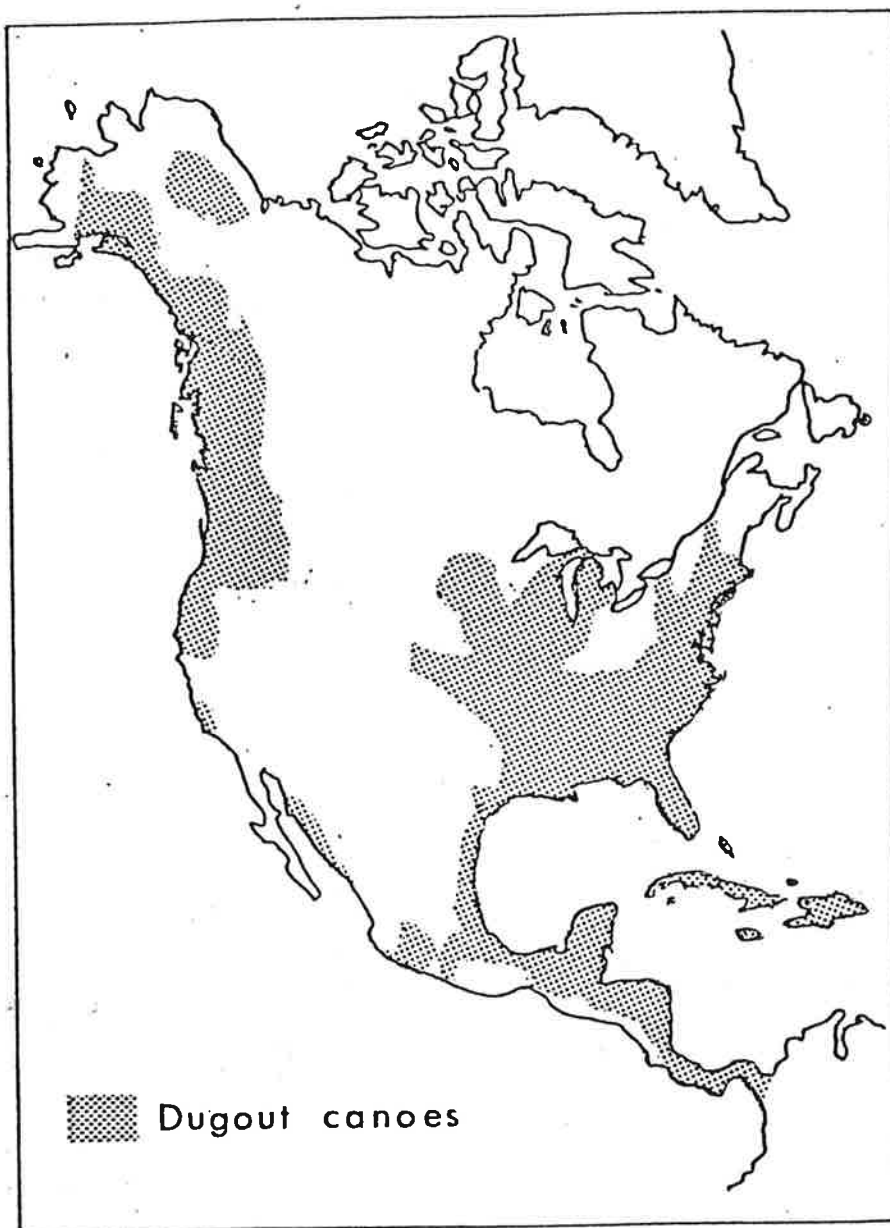


FIGURE 1. Dugout Canoe distribution in North and Central America (adapted from Driver and Massey 1957:291).



Dugout canoe transportation was highly developed in the Southeast and Gulf areas when Europeans began to explore the Western Hemisphere. Early Spanish accounts relate that dugout canoes were in use among the Mayan, Aztec, Arawak and Carib groups who inhabited the islands and coastal areas of the Gulf of Mexico outside the continental United States (cf. Thompson 1951; McKusick 1970; von Hagen 1960; Farriss and Miller 1977; and Nicholson 1976). Nicholson (1976) contends this navigational skill was developing in the Gulf of Mexico as early as 7,000 years ago:

#### Review of the archeological literature

Indirect evidence indicates that human use of watercraft may have been as early as 40,000 years ago. Recent Archeological evidence suggests that humans reached the continent of Australia that long ago. A minimum sea crossing of 95-180 kilometers had to be accomplished. This distance is well beyond swimming range of even the best long distance swimmers. Although humans undoubtedly used watercraft to reach Australia during the Paleolithic period, as yet archeologists cannot say exactly what types of craft these were (Johnstone 1980:5).

As for the earliest appearance of the dugout canoe, a specimen was recovered in Pesse, Netherlands, which was radiocarbon dated to circa 6315 B.C. (Gro-486). Other European dugout canoe finds have been radiocarbon dated showing a range from circa 3060 B.C. (K-1473) to historic medieval times (St-27, T-1429, Pi-84, R-894, D-71, Q-1245).

Beyond Europe the evidence for the use of dugout canoes in the temperate zone is almost worldwide (Johnstone 1980:46-47).

In the American Southeast the oldest dugout canoe found to date was recovered in Florida; it has been radiocarbon dated to circa 1095 B.C. (Isotopes, Inc. Sample 1-1661; Bullen and Brooks 1968:105). Unfortunately, only a few dugout canoe finds recovered in the Southeast have been dated. A recent find in Ohio yielded a date of ca. 1600 B.C. (Dic-612; Brose and Greber 1982:247).

The technology for constructing dugout canoes may have existed in the area from as early as 10,500 to 9,900 B.P. (8500-7900 B.C.) when the Dalton adze was in use (cf. Goodyear 1982). The Dalton adze is recognized as one of the earliest true adzes in the world (Morse 1973:26; Morse and Goodyear 1973:320). Adzes appear around the world later in time as a circumpolar trait (Webb 1975:7; Beirne 1971). The Dalton adze is considered as the prototype for the grooved ax, the gouge, and the celt of later periods (Griffin 1978:227). Adzes are heavy woodworking tools used for, among other things, the hollowing out of dugout canoes (Semenov 1976:13). The large numbers of adzes found at Dalton sites may indicate the construction of dugout canoes (Morse 1975:116).

Chipped and polished stone adzes are major cultural traits of the Poverty Point culture.

The widespread trade and commerce of Poverty Point times, river-oriented, probably was conducted in dugout canoes and they remained in use until historic times. (Webb 1975:7)

Until recently few archeological specimens of dugout canoes had been found in the Southeast (Rau 1884:188-9; Lewis 1952; McCary 1964). In the past few years at least 93 dugout canoes have been found and reported in the area (Bullen and Brooks 1968; Heite and Fortune 1969; Pittman 1970; von Burger 1972; Saltus 1973; Carr 1974; McGahey 1974; Stowe 1974; Fuller 1976; Lewis 1976; Spears 1978; Dreves 1979; Bense 1980, 1981) and others are known (Pittman and Lipe 1972:42; Hamilton 1975; E. Thomas Hemmings, personal communication; M. Katherine Jones, personal communication; Ralph L. Wilbanks, personal communication; Robert L. Stephenson, personal communication; and Barbara A. Purdy 1980).

The growing number of archeological discoveries of prehistoric and historic dugout canoes suggests that more of these specimens may still be found in the water and lands adjacent to prehistoric and historically used waterways. The Arkansas State Archeologist has advised both amateur and professional archeologists working within the area to be on alert for such archeological resources (Davis 1974).

Despite a growing data base, for archeological investigators the diagnostic value of an occasional dugout canoe find and the socio-economic implications of this kind of technology has actually been quite limited. The discovery of such an artifact presents investigators with a number of problems relating to its excavation, analysis, preservation, and curation. These are immediate research concerns as all such finds have been unexpected. Most of the recovered

dugouts that have been reported have been measured, cataloged, preserved, and put on display. Few have been radiocarbon dated. Few have had their wood analyzed and none have been studied in terms of dendrochronology.

Besides the dugouts themselves, little is known of associated sites, features, and artifacts related to their use (cf. Hothem 1979). Contextual information is often ignored. Although long distance trade was conducted in prehistory for thousands of years little or no attention has been given to the possibility of spilled cargos, much less the canoes themselves. Archeological investigations of stretches of white-water in Minnesota and Canada have recovered spilled cargoes of literally tons of historic fur trade artifacts (Wheeler et al 1975). In addition no dugout canoe construction site has ever been identified in the Southeast; only one such site (found in Massachusetts) has been identified in the entire eastern United States (Petzold 1961).

The relationship between Mississippian village sites and canoe landings in the Southeast has never been clarified even though the association of large Mississippian sites with navigable water appears to be very strong. At virtually every major river junction in the Southeast archeologists have found large Mississippian sites (Lafferty 1977:7). In a recent study of Mississippian ceremonial centers (Nassaney 1982) all 26 sites in the sample were noted to be located adjacent to streams, lakes, and bayous large enough to canoe. Although many authors mention that rivers of the Southeast served as

transportation avenues, no specific discussion is given to the use of dugout canoes within archeological summaries of the area (cf. Willey 1966; Griffin 1967; Stoltman 1973; and Muller 1978).

It appears from a brief review of the archeological literature that the methods and techniques of maritime archeology, nautical archeology, underwater archeology (Goggin 1962:86-87), oceanography (Waters 1981), and fresh water archeology are seldom, if ever, considered by prehistoric archeologists in the Southeast. In general in the Southeast dugout canoes have been treated as an archeological curio, an artifact that for one reason or another is not expected to be found and, when found, presents not so much a gain in research knowledge but an immediate problem of measurement, preservation, and storage to the investigator.

#### PURPOSE OF THE STUDY

This study will formulate a regional research design to investigate Mississippian dugout canoe transportation and the expected material and structural by-products of this system of transportation. The study will attempt to consider the ways in which characteristics of various aboriginal dugout canoe transportation activities can be identified and their archeological traces discerned through the use of ethnographical, archeological, ethnohistorical, and environmental data. Its goal is to formulate testable hypotheses concerning the ways in which human populations or

cultural systems incorporate the introduction and development of a dugout canoe technology.

#### THE MOUNDVILLE PHASE

The problem concerns the identification of dugout canoe use among the Mississippian populations inhabiting the Moundville phase sites located in the Black Warrior River Valley in west-central Alabama (Figure 2). These sites begin just south of the Fall Line, near Tuscaloosa and continue downstream for about 75 miles (120 km) to a point where the river enters the Black Belt (Peebles 1978:373, 375). The Black Belt, an important subdivision of the Coastal Plain, is a low valley some twenty miles in width which stretches across central Alabama. It has highly productive soils and is often referred to as the "canebrake" or "prairie" region. The dark, heavy soil was derived from weathering of the underlying bedrock formation known as the "Selma chalk" (Thomas 1973).

As initially described by DeJarnette and Wimberly (1941) and later redefined by McKenzie (1966) and intensively studied by Peebles (1971; 1974 and 1978) the Moundville phase represents an extensive and complex Mississippian society. The time span of this phase approximately brackets the years A.D. 1200 to 1500. The time span of occupation begins at the height of the Mississippian development and its demise begins before European discovery of the North American continent and continues for several years after De Soto's expedition through the Southeast. The demise of this phase is centered on A.D.

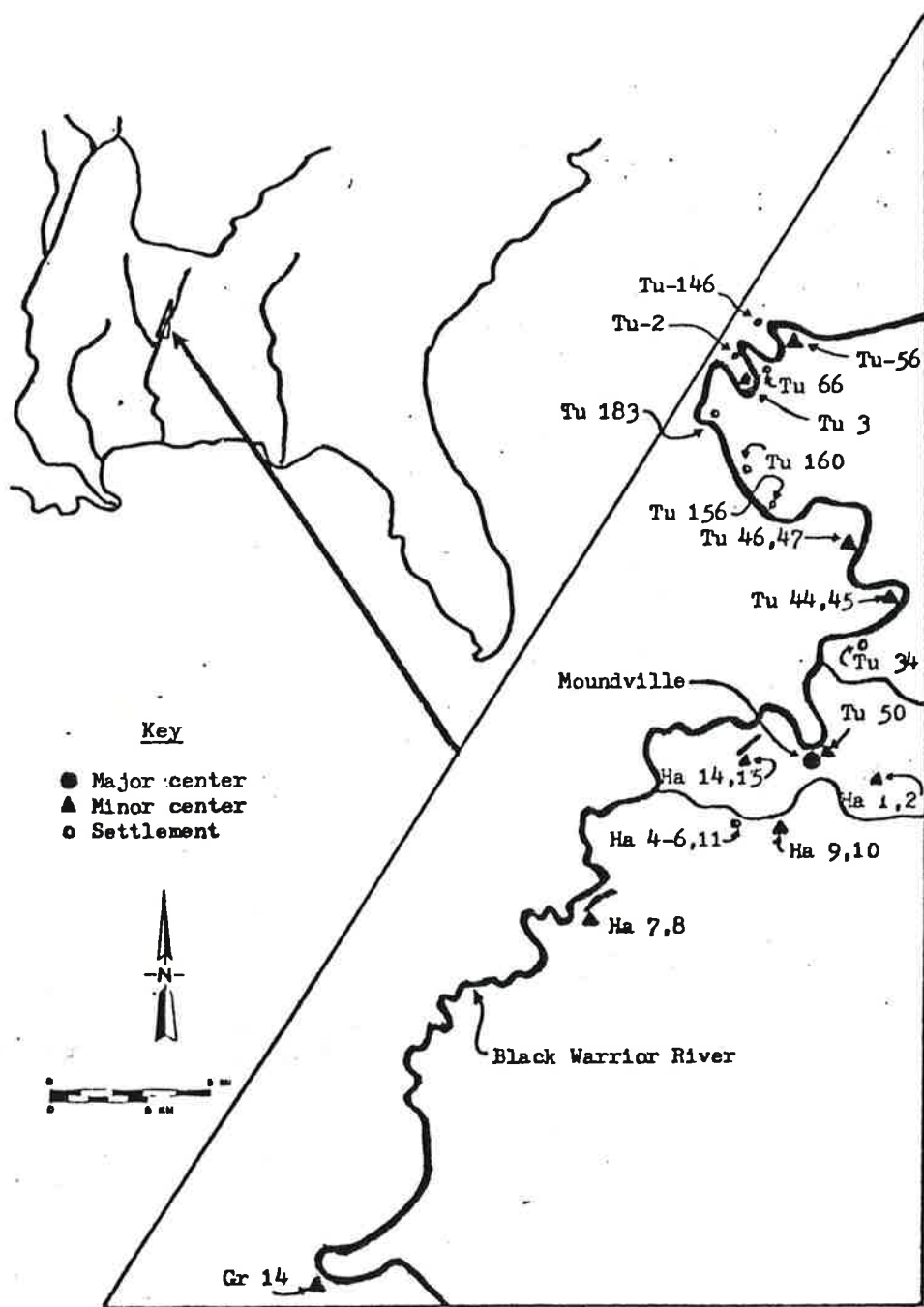


FIGURE 2. The Moundville phase sites of the Black Warrior River (redrawn from Peebles 1978:Figure 13.10).

1500, beginning about 1450 and ending around 1550 (Peebles 1978:370).

According to Peebles (1978:373) the Moundville phase probably had its beginning in one or another early Mississippi phases in Alabama. Peebles is of the opinion that the West Jefferson phase (A.D. 900-1050) as identified by Jenkins (1976) is a prime candidate for consideration. The basic subsistence mode of this phase appears to have been hunting-gathering although a small amount of corn was evidently grown. The beginnings of truncated mound construction appeared in this period. About A.D. 1000 a small ceremonial center was constructed on the banks of a tributary of the Black Warrior River. This site has two truncated mounds and one small burial mound (DeJarnette and Wimberly 1941). A similar small burial mound has been noted in the southwest part of the Moundville site by Peebles. Based on this evidence Peebles argues that indigenous development of the Moundville phase occurred in the Black Warrior River Valley.

The Moundville phase illustrates the Mississippi stage of development to a high degree. This stage is marked by the appearance of shell-tempered pottery, platform mound construction, floodplain horticulture, long distance trade, increased territoriality and warfare, and the emergence of chiefdom level societies (Walthall 1980:185). Formal similarities in ceramics link the Moundville phase sites with artifacts distinctive of the so-called Southern Cult (cf. Williams 1968). These items include copper axes, ceremonial



celts, stone palletes, oblong copper gorgets, and effigy pipes (Peebles 1978:371).

The Moundville phase seems to have operated in a period of organizational stability and cultural complexity for about 200 years. Following the Moundville phase the social, political, and religious hierarchy along with the symbols associated with these statuses and offices are abandoned. The Moundville phase appears to have been superceded by the "Burial Urn Cultures" of which the best known phase is the Alabama River Phase (cf. Cottier 1968; 1970). The "Burial Urn Cultures" inhabit the region from about A.D. 1550 to around 1770. According to Peebles (1978:373-375) there is a marked change in the ceramic assemblage between the two phases but there are broad continuities which can be traced in several of the ceramic categories. In addition, there seems to no major shift in crops grown or animals hunted between these phases. Population levels stay about the same while the settlement system changes. The settlement hierarchy of the Moundville phase is abandoned and replaced by many more smaller settlements during the Alabama phase. A difference in mortuary ceremonialism also occurs between the Moundville and Alabama River phases, the latter showing a dramatic decrease in distinct statuses. The Alabama populations also stopped having their social and political rituals at mound group sites. These segmented communities, loosely connected by common ritual and consanginity were later to develop into the Creek Confederacy (Peebles 1978:374).

## METHOD AND THEORY

### An ecological approach

As a primary objective of archeology is to understand human culture and human ecological adaptations, it is necessary to understand changes that occurred in the modes of transportation used by the population under study. To study the development of a transportation device and its effect on culture, a cultural ecological approach is helpful. As outlined by Julian Steward (1955:40-1), the three fundamental procedures of cultural ecology are:

First, the interrelationship of exploitive or productive technology and environment must be analyzed. . . Second, the behavior patterns involved in the exploitation of a particular area by means of a particular technology must be analyzed. . . The third procedure is to ascertain the extent to which the behavior pattern entailed in exploiting the environment affect other aspects of culture.

#### Technology and environment

The distribution of large Late Prehistoric sites in the eastern woodlands which exhibit Mississippian traits (e.g., shell-tempered pottery, chiefdom level social organization, platform mounds, etc.), for the most part, is within the northern limit of Taxodium distichum (Bald Cypress) (Lafferty 1977:5). Historically, this tree was the favorite wood used in the construction of dugout canoes. The center of the Mississippian development was in Mississippi Valley (Smith 1978). It is a physiographic region that has a great deal of surface water year round; is practically devoid of any major topographic relief; and is characterized by large meandering

streams, oxbow lakes, natural levees, and backwater swamps. Phillips, Ford, and Griffin (1951:9) said that the wet environment of the region ". . . might have fostered aboriginally an amphibious type of culture." The frequent flooding that was a predominate feature of life in the region in the past has been arrested, to a great extent, by the construction and maintenance of a modern system of levees. Before the present levee system was built one could cross the entire width and length of the Lower Valley in shallow draft watercraft (Shelford 1963:94). Mississippian sites in other alluvial river valleys of the Southeast including the Black Warrior River seem to indicate that Mississippian settlements were located along navigable waterways.

#### Patterned Human Behavior

The second procedure, behavioral archeology of aboriginal dugout canoe transportation, will be the main focus of this study as it is least understood. Behavioral archeologists define archeology as "the study of human behavior and material culture regardless of time and space" (Schiffer 1976:ix). The human behavior investigated is dugout canoe transportation behavior, while the material culture is the dugout canoe and its associated artifacts, features, and sites. In the past, archeologists working in the Southeast were only vaguely aware of aboriginal dugout canoe transportation strategies, capabilities, and behavioral systems. A contextual study (cf. Arima 1975) of the form, function, and use of the artifact will help clarify dugout canoe behavioral patterns.

### Effect on Culture

As to the third procedure outlined by Julian Steward for a cultural ecological approach to the subject, that is, to ascertain the extent that dugout canoe transportation affected other aspects of culture, Joel Klein (1973:68) pointed out that:

The introduction of transport by water would certainly affect any hypothesis about trade or culture with which a prehistorian is dealing.

To a non-industrialized society an improved means of transportation may mean a better food supply and would promote trade and the exchange of ideas and accomplishments. As the dugout canoe greatly facilitated human movement in riverine, lacustrine, and coastal environments, the socio-economic impact in such areas is expected to be significant.

## CHAPTER II

### A CONTEXTUAL STUDY OF THE MISSISSIPPIAN DUGOUT CANOE

#### INTRODUCTION

Dugout canoe transportation is patterned human behavior. In order to understand aboriginal dugout canoe transportation strategies, capabilities, and behavioral systems a contextual study (cf. Arima 1975) of the form, function, and use of the dugout canoe is necessary.

#### ETHNOHISTORIC LITERATURE

The ethnohistoric literature accounts of early explorers, missionaries, and settlers contains a wealth of information on aboriginal lifeways of the Southeastern Indians (cf. Swanton 1946). Unfortunately for our purposes, the early ethnohistorical accounts were not written by trained anthropologists interested in dugout canoe transportation. We have no solid information on dugout canoe material culture and the ethnology of discard associated with this type of transportation, or observations on how nonmaterial factors such as values, symbols, or social organization affect patterns of discard (cf. Gould 1978). Thus, the ethnohistoric accounts contain incomplete information. Although frustrating to work with, this does not preclude their use in this research. In fact, gathering of information in this format should be regarded as only an initial step to understanding the relationships between dugout canoe material culture and the human behavior that produced it.

The primary ethnographic contexts are taken from the historic Indian groups inhabiting the Southeast in the early Historic Period as identified by Swanton (1946). The reference class consulted consists primarily of the De Soto accounts along with supplementary information provided by other Spanish and later French, English, and American accounts which provide insight into aboriginal dugout canoe transportation. The ethnohistorical works of Swanton (1911; 1932; 1939; and 1946) are among the major sources consulted on the matter. Other researchers who provide important information on the subject include Pittman (1970), Lafferty (1977), and Manning (1980).

#### THE ETHNOGRAPHIC PRESENT: A.D. 1539-1543

The ethnographic present for this study is the A.D. 1539-1543 dateline. This dateline is established as an arbitrary point of reference in order to observe change occurring in dugout canoe transportation from an evolutionary perspective. Viewing change from an evolutionary perspective we can develop of general laws of culture change (Hickerson 1970:7). The De Soto accounts contain important information on Mississippian dugout canoe transportation at A.D. 1539-1543. The De Soto expedition covered a great deal of territory and encountered a number of Mississippian groups, so the accounts are of great interest to this study, especially when looked at in conjunction with archeological observations.

### The De Soto Accounts

Although there were several explorers who are reported to have visited the Southeast before the De Soto expedition (cf. Swanton 1946:33-38) they left us with little information on the aboriginal use of dugout canoes. Narvaez and his men destroyed more than thirty dugout canoes in 1528 at a coastal village in Florida (Cabeza de Vaca, in Bandelier 1905:42-33; Swanton 1946:589). In this account there is little discussion or detail regarding the canoes and the landing site where they were destroyed. Some of the survivors of this expedition extensively used dugout canoes for their travels in the Southeast. However, other than mentioning that they used them they left us little information that would be helpful for our study.

The chroniclers of the De Soto expedition provide the most complete and detailed information on the aboriginal use of dugout canoes before European contact affected Native American transportation. Between the De Soto expedition and the French exploration and settlement of the area 130 years elapsed. During this interim period aboriginal populations in the area are thought to have undergone drastic social and demographic change including apparent alteration in socio-political organization accompanied by a more dispersed settlement pattern (Milner 1980). The Mississippian lifestyle did not last very long after French settlement of the region. A combination of disease, military campaigns, and other causes

destroyed the last vestiges of the once great Mississippian culture.

A recent review (Manning 1980:20) of watercraft use among the Indians of the Southeast raised the question of diachronic change in dugout canoes from the area.

Does the highly developed expertise at riverine warfare revealed through the De Soto narratives bespeak an emphasis upon water travel which was reduced in the Southeast in later years? If these accounts are not greatly exaggerated, questions are raised not only as to the factors leading to this decline but also with regard to the role of pre-contact water travel in other aspects of life besides warfare.

#### The ethnological value of the De Soto accounts

Four accounts of the De Soto expedition are in existence, all written years after the journey. Three were written by members of the expedition (Elvas in Bourne 1922, I; Ranjel in Bourne 1922, II:40-149; and Biedma in Bourne 1922, II:1-39), while another account is a compilation of oral accounts provided by several different members of the expedition (Garcilaso in Varner and Varner 1951). In 1932 John Swanton published a review of the ethnological value of the De Soto accounts. Based on his research (1932:589) he concluded that the information provided by these accounts

. . . is of great value for an understanding of the cultures of the mound-building tribes in the Gulf region and an intelligent approach to the archeology of the section.

These "mound-builder tribes" are presently referred to in the archeological literature as Mississippian groups. It is generally agreed by scholars that the "mound-building tribes"



encountered by the De Soto expedition were descendents of prehistoric Mississippian populations.

Swanton considered Ranjel, De Soto's private secretary, the most reliable witness, while the accounts of Biedma and Elvas to be almost as reliable. As to the Garcilaso account, Swanton (1932:589) thought it to be inaccurate in many cases and at times is given to "wild exaggeration" but it

. . . was compiled with honest historical intent and preserves a knowledge of certain cultural features of the region not recorded elsewhere.

Despite its obvious shortcomings Swanton viewed the Garcilaso account as being of "considerable importance" to the anthropology of the Indians of the Southeast.

Swanton's conclusion on the ethnological value of the narratives of the De Soto expedition is that the accounts provide cultural anthropologists and archeologists with significant data on native life, including the fact that the Southeastern Indians made "... use of dugout canoes, with awnings at the stern for the leading men" (1932:575).

Years later Phillips, Ford, and Griffin (1951:348-391) reviewed the De Soto accounts specifically for locating archeological sites associated with the De Soto expedition's march through the Lower Mississippi Valley. Phillips, Ford, and Griffin ranked the narratives in the following order of reliability according to their value for providing information leading to the relocation of sites visited by the army of De Soto: Ranjel, Biedma, Elvas, and Garcilaso. Their view of the research value of the Garcilaso de la Vega account is much

more critical than Swanton's because they were interested in specific locational information. According to them the account written by Garcilaso

. . . is commonly regarded as completely unreliable and resorted to only in cases of desperate necessity when one wants very much to prove a point. On the other hand, though not always to be trusted in matters of time, distance, population, and battle statistics, the Inca is far more generous with descriptive detail than the other three chroniclers. Such material, carefully screened for exaggeration and sheer invention, can be very useful in determining what kind of people the Spaniards encountered and how they lived. (Phillips, Ford and Griffin 1951:349).

These same accounts have recently been reviewed and evaluated by Brain, Toth, and Rodriguez-Buckingham (1974) and they reached a slightly different conclusion. Brain et al (1974:243) point out that ethnohistoric data derived from the texts falls into two categories, being:

- 1). Descriptive type information, such as ethnography, geography and specific events
- 2). Statistical type information such as dates, distances and directions

According to the criteria here defined, the accounts given by the chroniclers in question are related to these categories. Garcilaso's account is said to belong to the descriptive level of information and exemplifies that category at its best. Ranzel's account is defined as belonging to the statistical type of information and also exemplifies that category at its best. Elvas' and Biedma's accounts are utilized at both levels, particularly when there is discrepancy among the sources and judgement renders this utilization necessary. On these bases, the De Soto entrada . . . is evaluated and related to the archeological and ethnographic evidence.

Therefore, the accounts of the De Soto expedition are viewed by researchers as containing information helpful to this study.

## DUGOUT CANOE CONSTRUCTION, FORM AND ACCESSORIES

### Construction Methods

There are a number of descriptions of the manufacture of dugout canoes in the historical record of the Southeast. Swanton (1946:589-594) provides a compilation of the original accounts along with important discussion regarding the construction techniques. Manning reviewed these reports and summarized that, with the exception of a few local variations, the construction methods used to make dugout canoes in the area were quite similar (cf. Swanton 1946: Plate 74). According to Manning (1980:14-15)

The log was first stripped of its bark (Beverley 1947:203; Lorant 1946:249), after which a fire was started along the top of the log. Through the use of gum or rosin to fuel the fire, and mud to impede the flames, a controlled burning was achieved (Burrage 1906:234; Lorant 1946:249; Swanton 1911:66, 347). At intervals the flames were quenched, and the charcoal was removed by using stone axes or bivalve shells as scrapers. The removal of the charcoal increased the ease of the task of rekindling the fire so that the process could be continued until the log was judge sufficiently hollow (Lorant 1946:249; Swanton 1911:66; 1922:335; Catesby 1743:XI; Harriot 1903). The exterior of the log was shaped by the same procedure (Jones 1873:53; Beverley 1947:203; Swanton 1911:67).

The construction of dugout canoes among the Indians of the Southeast was one of the men's primary tasks (Swanton 1946:710, 715). It was a major undertaking which required a great deal of time, energy, and skill to produce. It is not known if or to what degree specialization developed.

As late as 1884 canoe making was still one of the industrial arts of the Seminoles (MacCauley 1887:517-518).

Canoe making is still practiced in some parts of the Southeast (Neill 1953; Stowe 1974:194; Quirke 1952:45; and Pittman and Lipe 1972), although on a scale less than in previous times. Once metal tools became available in the early Historic period, they replaced lithics and shell for woodworking.

#### Dugout Canoe Sizes and Shapes

There was formal variation in terms of the sizes and shapes of dugout canoes employed by Southeastern Indians. These differences were probably functional in design (Cushing 1896:364-65; also quoted in Swanton 1946:590).

Cushing's (1896:364-365; also quoted in Swanton 1946:590) discovery of several toy dugout canoes at Key Marco indicates four basic types of dugout canoes in use in Florida. These toys were well carved and finished and measured from a few inches to several feet long.

##### Type I

The first type was ". . . obviously designed . . . for the navigation of shallow streams, inlets, bayous, and the canals." These toy dugout canoes incorporated into their design a comparatively flat-bottom with squared-off ends. It was described as looking like a narrow rowboat but with squared-off ends with the stern being wider than the prow.

##### Type II

The second type was similar to the first type except that it had lower gunwales and was much narrower and had sharper and higher ends. This type ". . . would have been admirably

adapted to swift tidal currents, or to the running of low breakers".

#### Type III

The third type was a comparatively wide vessel with a wide bow and stern. This type may have been used as a transport vessel as it looked as if it was designed to carry heavy loads over shallow water. All except one of the toy canoes of this type found by Cushing were decorated at one end or both with a "semilunar or disc-like device."

#### Type IV

The fourth type was a catamaran-like vessel. Several of these vessels were found and as described by Cushing (1896:364-365; also quoted in Swanton 1946:590) these toy canoes were two feet long by less than three inches wide

. . . gracefully and slenderly formed, tapered cleanly toward the forward ends, which were high and very narrow, yet square at the sterns, which were also very high. We found them almost in juxtaposition . . . Little sticks and slight shreds of twisted bark were lying across them and indicated to me that they had once been lashed together, and as a more finished and broken spar-like shaft lay near by, I was inclined to believe that they represented the sea-going craft of the ancient people here; that the vessels in which these people had navigated the high seas had been made double -- of canoes lashed together, catamaran fashion -- and propelled not only with paddles, but also, perhaps, by means of sails, made probably from the two-ply kind of bark matting. . . which there were abundant traces . . . associated with cordage and with a beautifully regular, much worn and polished spar.

Besides Cushing's finds of toy dugout canoes and his interpretations of the kind of water the four types could navigate gracefully, very little is known about southeastern

canoe styles (Stowe 1974:197). Apparently the blunt bow style was common, as it is depicted in the drawings and engravings of Le Moyne and White (cf. Lorant 1946; Swanton 1946) and in a painting by Lassus (cf. Fundaburk 1958:Figure 90). The dugout canoes depicted in two shell engravings from the Spiro Mound Site (Figure 3) was described as serpentine but gives little detail as to bow design (Phillips and Brown 1975).

The first type of dugout canoe described by Cushing probably was the most common type of dugout canoe used in the Southeast. Hudson (1976:315) using accounts provided by Swanton (1946:589-94), summarized a typical southeastern dugout canoe as having a flat bottom, straight sides and was frequently as long as 30-40 feet. Manning (1980:15) adds that the dugouts generally had a trough shape with overhanging blunt ends according to the accounts she researched (Ribault 1927:80; Lorant 1946:79, 119, 189, 233; Arber 1894:69; and Harriot 1903). An exception to this rule were the Cherokee dugouts used on the Tennessee River which employed a pointed bow and stern (probably due in no small part to the white water rapids of the upper Tennessee). Dugout canoes with pointed bows and sterns were common in coastal environmental settings not only in the Southeast but along the Northwest Coast as well (Alvord and Bidgood 1912:213; Waterman and Coffin 1920:20; Swanton 1946:594; and Manning 1980).

McGahey (1974;personal communication) furthermore notes variation occurring between prehistoric and historic dugout canoes. He said the prehistoric type, based on the few known

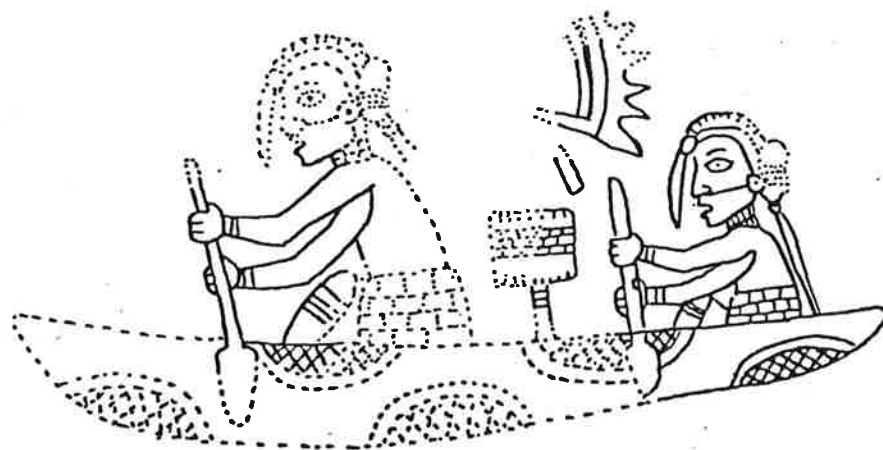


FIGURE 3. Reconstruction of Spriro shell engravings which depict Mississippian people using canoes (redrawn from Phillips and Brown 1975, IV:160, Plate 160).

archeological specimens, was long and narrow with thin walls and abrupt sides. It had a platform at both ends and sometimes has a hole at one of the ends. Pittman (1970) saw the historic type of dugout canoe as smaller in size probably due to differences in the culture as well as function.

Table 1 presents information collected on 15 documented dugout canoes found in the Southeast. All of these canoes are considered by the investigators to be of prehistoric age. Only four out of the fifteen have been dated, using the radiocarbon dated. Obviously some other criterion such as form was used to determine whether or not a dugout canoe specimen was prehistoric or historic.

Nine of the dugout canoes in the sample appear to be representative of the flat-bottomed canoe with squared-off ends labeled as Type I by Cushing. A Type II craft may have been found in Georgia, however, this canoe is quite unique in its form and construction, having a plank seat and looking more like a punt than a canoe. As to the rest of the sample incomplete information in regards to form did not allow such a determination.

The information in Table 1 regarding the construction material used in making prehistoric dugout canoes does not lend support to a hypothesis formulated by Pittman (1970:52-57) that cypress was too hard a material for prehistoric Indians of the Southeast to work. Pittman had suggested that pine, being a soft wood, would have been preferred by the southeastern Indians with their stone age technology.



Table 1. Prehistoric dugout canoes found in the Southeast

State	Length (m)	Width (m)	Height (m)	Hull (m)	Wood	Age B.P.	References
AL	6.13	.38	.24	-	C	605	Stowe 1974:196-8
MS	-	-	-	-	C	485	McGahey 1974:4-5
FL	4.05	.51	.20	.08	P	-	Dreves 1979:114-121
FL	14.02	-	-	-	C	?	<u>Miami Herald 1/24/57</u> <u>Miami Daily News 1/24/57</u>
FL	8.87	.52	.46	-	C	-	<u>FSM Cat #31845</u>
FL	6.74	.76	.34	-	C	-	<u>Hemmings n.d.</u>
FL	5.64	.61	.46	-	C	-	<u>FSM Cat #P-2249</u>
FL	4.88	-	-	-	-	-	FL Times-Union 2/8/57
FL	4.24	.49	.46	-	C	-	FSM Cat # P-2248
FL	3.84	.49	.30	-	C	-	FSM Cat # A-3716
FL	3.72	.46	.27	-	C	-	FSM Cat # A-4085
FL	3.35	.37	.21	-	C	-	FSM Cat # 93387
FL	5.79	.70	.27	-	-	3040	Bullen & Brooks 1968
NC	2.74*	.66*	-	.08*	P	945	Pittman & Lipe 1972
GA	3.35	.76	.25	-	C	?	Rau 1884:188-9

\*Large fragment of a dugout canoe

c= Bald Cypress (*Taxodium distichum*)

p= pine

FSM= Florida State Museum

According to this theory cypress dugouts were a recent development in the Southeast associated with acquisition of metal tools in trade with the Europeans. In historic times the favorite wood for dugout canoes was bald cypress (*Taxodium distichum*), although other species were also used including pine, tulip (poplar), cottonwood, and black walnut (Harper 1958:59; Neill 1953:78; Lefler 1967:103; Le Page du Pratz 1758, II:188-189; Catesby 1743:xi; Burrage 1906:233; Swanton 1911:66-67; 1946:245, 594; Manning 1980:15-16). Of the fifteen prehistoric dugout canoes in Table 1 ten are made of cypress, two from pine, and the rest have not had their wood identified. Even with this small sample it is obvious that prehistoric Indians in the Southeast had the technology to manipulate cypress and did so.

The length of the documented prehistoric dugout canoes varied from a little over 14 meters, to 3.35 meters long (excluding the dugout from North Carolina which was a large fragment. The average length of the twelve remaining canoes for which there are data is about 5.10 meters with the median point being 5.26 meters. The distribution of prehistoric dugouts according to their length is presented in Figure 4.

The canoe from Florida that measured 14.02 meters (46 feet) lends credence to early ethnohistoric accounts which relate the fact that some aboriginal dugout canoes were indeed quite large and capable of transporting many people. Large dugout canoes were reported by the chroniclers of the De Soto expedition. Garcilaso de La Vega mentions that dugout canoes

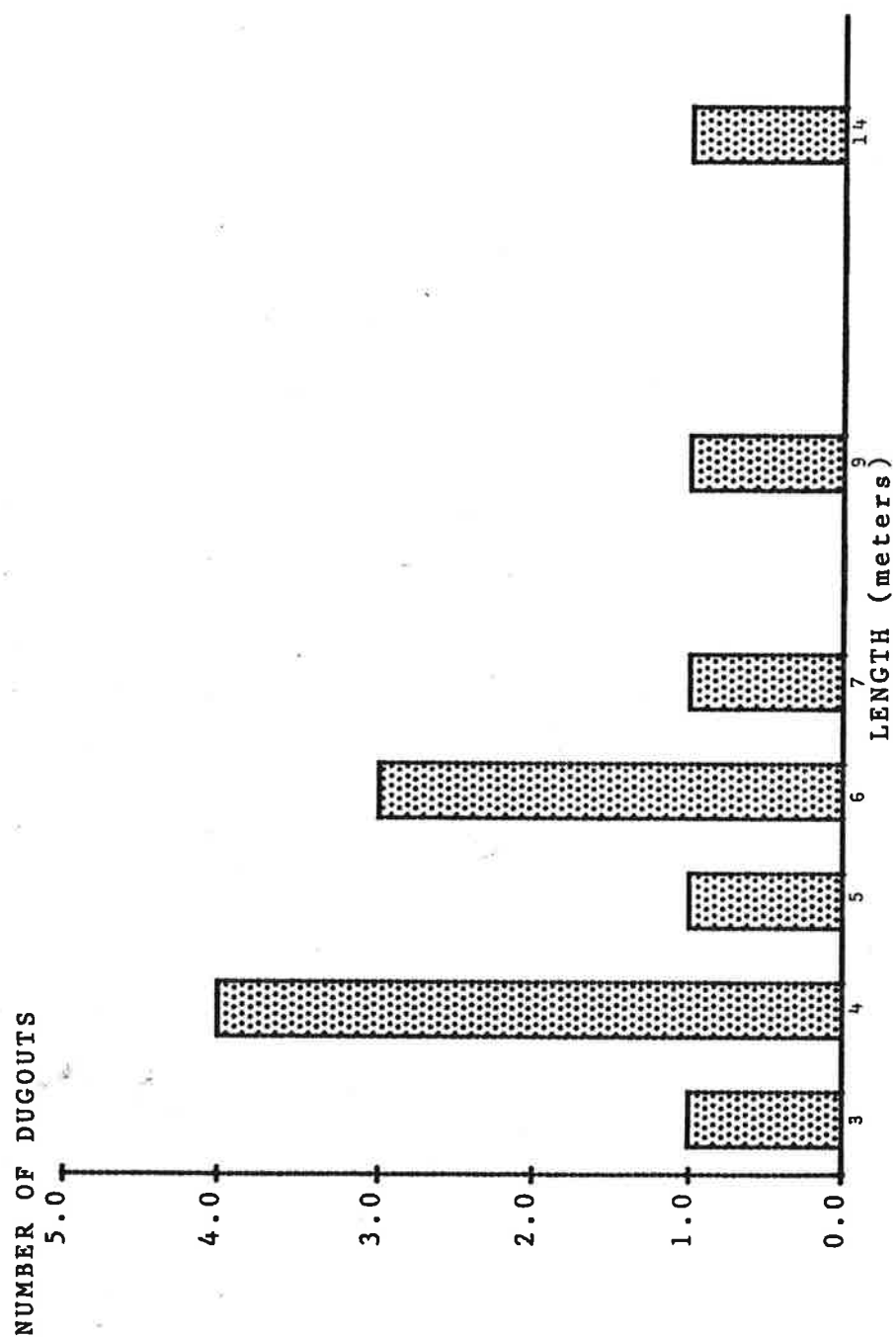


FIGURE 4. Length of some prehistoric dugouts.

used by Indians on the Mississippi River varied in size, the largest holding between 75-80 men while the smallest carried "fourteen oars on each side" (Varner and Varner 1951:575). Biedma (Bourne 1922, II:39) corroborates the above estimate by saying the largest held 80 men. He also said that a dugout built and used by the Spanish held between 60 to 70 men and 5 or 6 horses. Elvas reported that the largest canoes held 60 to 70 men. Lafferty (1977:180-181) in referring to these accounts points out that

If we consider that the De Soto entrada was late in the Mississippian development after most of the larger centers had already fallen into disuse and decay and that the penetration did not come near the largest sites, then it seems highly probable. . . that in A.D. 1250 there were more and bigger canoes, particularly at sites like Cahokia, which De Soto could have seen in Florida.

Swanton (1946:589-594) compiled accounts of thirteen observers of dugout canoes in the Southeast, most of which alluded to the approximate size of the vessels. Pittman (1970:58-59) noted that nine of the accounts discussed size in terms of human carrying capacity. Pittman totaled the number of people that traveled in the canoes, divided the total number of canoes and came up with an average of 30 persons per canoe. Two cited reports that provided information on the length of the observed vessels provided an average length of 43 feet. Dugouts on Chesapeake Bay are known to have been as large as 40 to 50 feet. Cherokee dugout canoes were said to be 30 or 40 feet long (Arber 1884:69; Swanton 1946:592). In Alabama, near Mobile, dugouts were recorded as holding up to 60 people (Feiler 1962:127; Manning 1980:16).

Documentation of aboriginal dugout canoes from later stages of European exploration and settlement indicates a much lower passenger capacity than attested to by the De Soto chroniclers. The French, English, and American accounts relate that the largest dugout canoes used in the Southeast could hold between 20 or 30 people (Ribault 1927:80-81; Burrage 1906a:234; Harriot 1903; Harper 1958:143; Manning 1980:15). In the early days of European exploration the term pirogue was used to describe the largest dugouts (Varner and Varner 1951:571) but today it is only applied to the smallest dugout canoes. Due to this ambiguity, the term has been avoided in this discussion.

#### Dugout Canoe Decoration

Descriptions of dugout canoe decoration are scarce in the literature (Swanton 1946:595; Pittman 1970:58-59; Manning 1980:15-16). Garcilaso relates that the De Soto expedition encountered an Indian flotilla, the canoes of which were painted within and without in various colors including: yellow, blue, white, green, red, and possibly some other colors (Varner and Varner 1951:575). Swanton and Pittman both questioned the accuracy of Garcilaso's description. Manning, on the other hand, discusses the description and then points to another documented historic example of this practice. Catesby (1743:xiii-xiv) reported seeing two large red dugout canoes abandoned by a Cherokee war party. Using this example Manning suggests that the practice of painting canoes and

paddles before a raid persisted in a less dramatic fashion into the 18th century.

We can also get some idea of canoe decoration from two shell engravings from Spiro and from the toy canoes recovered by Cushing from the muck of Key Marco. A series of semilunar patches of diagonal crosshatching appears on the two canoes depicted in the shell engravings (cf. Figure 4). This sort of decoration in the Spiro tradition is the prevailing convention for scales and is confined ". . . almost exclusively to snakes, legs of snake-bird composites, and fishes" (Phillips and Brown 1975, I:112 and IV:160). Coincidentally, the toy dugout canoes excavated at Key Marco were described by Cushing as having been decorated ". . . with semilunar or disc-like devices" (Cushing 1896:364; also quoted in Swanton 1946:590). Some of these toy canoes appear in a volume written by Gilliland (1975:Plate 15) but the decorations cannot be discerned from the photograph.

### Mythology

Such markings on dugout canoes may represent some mythological connection between dugout canoe travel and snakes, fishes, and snake-bird composites for these two groups. Lawson (1860:344-47; also quoted in Swanton 1946:760) was told a story by an Indian doctor in North Carolina about a giant rattlesnake that until recently had regularly eaten whole canoes full of Indians. The flotilla of Indians that attacked the De Soto expedition on the Mississippi River sang songs which were translated to the Spanish as how the Indians

were going to feed the fish and marine animals of the river the flesh of the Spaniards (Varner and Varner 1951:575-576). This fleet from the province of Quigaltam or Quigualtanqui are considered by most authorities to be the ancestors of the historic Natchez (Swanton 1946:159; Phillips, Ford and Griffin 1951:390-391). The Great War Chief of the Natchez incidentally was called by his followers "the Tatttoed-serpent" (Swanton 1946:728). Still another connection between serpents and dugout canoes may not be so mythical, but rather involves basic understanding of the terrain where canoes are often landed. Historically, the use of some landing sites in the eastern woodlands were avoided during certain seasons of the year because they were infested with various kinds of poisonous serpents (Loudon 1971:140).

#### Dugout canoe accessories

Mississippian dugout canoe accessories included paddles, poles, anchors, bailers, seats, awnings, and standards. The large ornate dugout canoes managed by the principal people of a particular Mississippian society may have included most if not all these accessories on board but for the common dugouts in use during Mississippian times it is likely that only a portion of the above accessories were taken on board.

#### Paddles

The shell engravings from Spiro (Figure 4) show four individuals in two canoes propelling their respective craft with the aid of what appear to be wooden paddles. Wicke (1965:418) compared the type of paddle illustrated in one of

the Spiro shell engravings with one that appeared in the Dresden Codex (Thompson 1951:77) from Mesoamerica and noted similarities in design. Some of the wooden objects that Cushing recovered from Key Marco were thought by him to have been parts of paddles, although no complete specimen was ever recovered (Cushing 1896). An early French explorer in the Southeast said he saw Indians using paddles that were approximately six feet long (Le Page du Pratz 1758, II:189; Swanton 1911:67; 1946:595). Besides wooden paddles, cane paddles were also reported to have been used by some Indians in the Southeast (Lawson 1860:67; Swanton 1946:595).

#### Poles

In shallow or shoal waters poles were used effectively to propel dugout canoes (Burrage 1906:233; Lawson 1860:168; Swanton 1911:382; 1946:595). Poles were also used in some cases to anchor the canoe. Some historic canoes in Central and South America were observed as being anchored by means of a pole (McBryde 1947). In Guatemala McBryde noted that a mooring hole was drilled through the overhanging platform at the stern. The canoe was moored with the bow on the beach and a pole was then inserted vertically through the hole and thrust into the soft mud bottom. The same technique with a slight variation is known to have been used by South American Indians in north-eastern Bolivia (Thompson 1951:71). Instead of having a hole at the stern they would moor the canoe to the pole by means of ropes attached to a small overhanging



platform at both ends of the canoe. Two prehistoric dugout canoes, both dating from the Mississippi Period had holes drilled through platforms at their sterns measuring six and ten centimeters in diameter respectively which might have had accommodated a pole-type anchoring device (Stowe 1974:199; McGahey 1974:4).

#### Anchors

Anchors were probably used by Mississippian canoeists, although there is no historical evidence of this. At Key Marco Cushing found a number of objects he identified as anchors. The first anchor that was recovered he described (1896:365-366; also quoted in Swanton 1946:591) as "ingenious".

. . . It consisted of a bunch of large triton-shells roughly pierced and lashed together with tightly twisted cords of bark and fibre so that the long, spike-like ends stood out radiatingly, like the points of a star. They had all been packed full of sand and cement, so as to render them, thus bunched, sufficiently heavy to hold a good-sized boat. Near the lower edge of the eastern bench lay another anchor. It was made of flat, heart-shaped stones, similarly perforated and so tied and cemented together with fibre and a kind of vegetable gum and sand, that the points stood out radiatingly in precisely the same manner. Yet another was formed from a single boulder of coralline limestone a foot in diameter. Partly by nature, more by art, it was shaped to resemble the head of a porpoise perforated for attachment at the eye-sockets.

#### Bailers

Bailers were another accessory item that Indian canoeists may have carried along with them on trips. Cushing (1896:365-366; also quoted in Swanton 1946:591) found a number of

objects he identified as bailers.

. . . Bailers made from large conch shells crushed in at one side, or of wood, shovel shaped, or else scoop shaped, with handles turned in, were abundant.

#### Seats

Archeological and historical evidence suggests that some dugout canoes were equipped with wooden stools or seats (Cushing 1896:363; Swanton 1946:555-556; and Purdy 1974:107). Some dugout canoes in the Gulf region were similarly equipped. Le Page du Pratz (1758, II:182; Swanton 1946:555) described the stools found generally among the Indians of the Lower Mississippi Valley as being made of one piece of wood and usually standing about six or seven inches high. Wooden seats were also reported in Mexico in the canoes of Montezuma and other Aztec leaders (Diaz del Castillo 1956:452). A cypress-plank seat nine inches wide held in place about three feet from the stern by four wooden pins inserted into the side of the Georgia dugout (Rau 1884:188).

#### Awnings

Another accessory item that some aboriginal dugout canoes employed in the Southeast was a covering over the stern of the canoe. The De Soto chroniclers noted in various parts of the Southeast the use of such coverings, often referred to as awnings. Awnings in the stern of the canoes commanded by important personages were reported by the chroniclers when the Spaniards were crossing the river near Cofitachequi (Bourne 1922, I:65; Varner and Varner 1951:297-298). In his account of the incident Garcilaso said that ". . . the canopy was

adorned with decorations". In another incident hundreds of miles to the west Elvas (Bourne 1922,I:113) tells us

. . . The barge in which the Cacique came had an awning at the poop, under which he sate; and the like had the barges of the other chiefs: and there, from under the canopy, where the chief man was, the course was directed and orders issued to the rest.

Similar devices were employed in Mexico by the Aztecs (Diaz del Castillo 1956:244). A shelter in the middle of a large dugout canoe was employed by natives of the Lesser Antilles (Nicholson 1976:Figure 2). The bark matting that Cushing thought represented the remains of sails may instead be the remnants of such an awning. There is still a question as to whether or not sails were used in pre-Columbian times in the Southeast, Mesoamerica, and the Gulf Region (cf. Thompson 1951:71-72; and McKusick 1970:5).

#### Standards

Standards were another accessory item used in the Southeast in dugout canoes. Standards are depicted in the shell engravings from Spiro (Figure 4) and in a painting by Lassus (cf. Fundaburk 1956:Figure 90), although these standards are quite different in form and detail. In addition to these examples of standards, Cushing (1896:362, 382-383) suggests that some wooden tablets he had found at Key Marco may have served as standards although these are even more different in form and detail than those portrayed in the shell engravings from Spiro and later by Lassus at New Orleans.

## DUGOUT CANOE FUNCTION AND USE

Dugout canoes functioned as a transportation device. Dugout canoes were used for many purposes including: trade, fishing, hunting, gathering, warfare, emergencies, and local and distant travel.

### Canoe Travel

Historic accounts relate that Southeastern Indians employing dugout canoes in their adaptations were skilled navigators. According to Charles Wicke (1965:417), this skill was apparently evident in late prehistory

. . . the prowess of the American Indian as a navigator has been greatly underestimated. . . The Mississippi, with its tributaries, constituted an extensive river highway in a country of forests. The towns built beside it show in their cultural similarity that the river road was heavily traveled.

W.E. Myer (1928:735) believes that there was far more travel among the Indians than is usually supposed. According to Myer, trips covering 1,000 to 2,000 miles by Indians have been recorded by a number of European observers. In the Southeast there are several reports of long distance voyages by dugout canoes. Adair (1930:287) mentions a computed round trip of 2,600 miles by a large dugout canoe disguised as a trading vessel for a raid. Long distance raids by Indians in dugout canoes were not an unusual occurrence in the Southeast during early historic times. The Chickasaw often crossed the Mississippi River Valley in dugout canoes to attack Caddoan settlements on the other side (Swanton 1946:736). Travel by dugout canoe ranging far and wide for trading purposes was

also rather common at this time period (cf. Bartram 1792:193-194; Adair 1930:287; Harrington 1924:88; and Milanich and Fairbanks 1981).

Long distance travel by canoe was a complex undertaking. The crew, ranging in size from about 30-80 individuals per vessel, all had to be familiar with the transportation equipment and aware of the travel plans in order to prepare themselves for the hardships and hazards along the way. Some on-river organization to train a crew of 30-80 individuals as a single working unit was obviously necessary as would some off-river organization be necessary to keep the team together. Therefore, when one considers the logistical complexity of De Soto's deploying 4,000 Indians along with some Spaniards 60 miles in three days in dugout canoes (Varner and Varner 1951:491-492) one begins to appreciate the complications involved in making a successful voyage.

Although it is not known whether the Indians employed navigational aids in their journeys, it is well documented that if asked to produce them, the Indians could draw maps with a suprising degree of accuracy of the territories with which they were familiar (Lawson 1860:331-333; Swanton 1946:259; and Wheat 1957:1). By their continual ranging, their travels, and hearing of the travels of others they became familiar with the geography and resources of their part of the world (Smith 1907:103-104; Swanton 1946:258).

Though they had no compass, Southeastern Indians employed the sun and the stars to provide them with information on the

principal directions. In their travels over large bodies of water Lawson (1860:331-333; as quoted in Swanton 1946:311-312) describes an ingenious technique employed to find their way especially when visibility was low.

. . . they get a great many sticks and chunks of wood in their canoe and then set off directly for their port, and now and then throw over a piece of wood, which directs them, by seeing how the stick bears from the canoe stern, which they always observe to keep right aft; and this is the Indian compass, by which they will go over a broad water ten or twenty leagues wide. They will find the head of any river, though it is five, six, or seven hundred miles off, and they never were there in their lives before, but where they shall rendezvous exactly at the prefixed time; and if they meet with any obstruction, they leave certain marks in the way where they that come after, will understand how many have passed by already, and which way they are gone. Besides, in their war-expeditions, they have certain hieroglyphicks, whereby each party informs the other of the success or losses they have withal; all which is so exactly performed by their sylvian marks and characters, that they are never at a loss to understand one another. . .

This passage mentions both the aboriginal use of navigational aids (i.e., the chunks of wood thrown into the water from the canoe to help them find their way), and aids to navigation which should not be confused. A navigational aid is something that is used within the craft to help determine position and assist in the navigation of the craft (United States Navy 1956:146). An aid to navigation, on the other hand, is a device which is external to a craft, designed to aid in determination of position of the craft, a safe course, or to warn of hazards to navigation (United States Navy 1956:4).

### Use in trade and transportation

Dugout canoes played an important role in trade in the Southeast during the colonial period as they probably also did during the Mississippi Period. In the colonial period trade networks developed along the major river systems of the Southeast. These rivers provided an aquatic network of highways reaching from the coast to deep inside the interior of the North American continent.

R. H. Pittman (1970:58-59) has suggested that the large dugout canoes used by Southeastern Indians and witnessed by the early Europeans in the area were utilized for purposes of trade and warfare. Pittman argues that the difference in size of the dugouts later used by Euro-Americans in the area compared with the Indian dugouts was due to their different functions. The non-Indians quickly introduced new and more efficient watercraft to haul people and goods up and down the rivers. The non-Indians made the dugouts smaller for single or several people rather than for groups of people.

Aboriginal dugout canoes had the capability to move large quantities of goods along with a number of people. Bartram (1792:225-194) described aboriginal trade between Indians of Florida and the inhabitants of Cuba.

These Indians have large handsome canoes, which they form out of the trunks of Cypress trees (*Cupressus disticha*), some of them commodious enough to accomodate twenty or thirty warriors. In these large canoes they descend the river on trading and hunting expeditions to the sea coast, neighboring islands and keys, quite to the point of Florida, and sometimes cross the gulph, extending their navigations to the Bahama islands and even to Cuba; a crew of these adventurers had just arrived, having returned from Cuba but a few days before our

arrival, with a cargo of spirituous liquors, Coffee, Sugar, and Tobacco. One of them politely presented me with a choice piece of Tobacco, which he told me he had received from the governor of Cuba.

They deal in the way of barter, carrying with them deerskins, furs, dry fish, bees-wax, honey, bear's oil, and some other articles.

Trade by dugout canoe in Florida not only extended to the Gulf area but also extended inland. Historic waterway routes of trade and travel such as the Caloosahatchee River have been identified by historians and archeologists. Milanich and Fairbanks (1980:81) report that in southwest Florida

The Caloosahatchee River functioned as a canoe highway to tie the Caloosahatchee area to the Lake Okeechobee Basin. It is possible that the impetus for the prehistoric cultural development along the coast came from the basin. When visited by the Spanish, these two areas were linked by trade and political networks.

Elsewhere in the Southeast other investigators working with prehistoric materials have suggested the movement of trade goods by dugout canoes. Harrington's investigation of some sites in Arkansas suggested to him that skilled navigators were specializing in long distance trade by dugout canoe. Harrington (1924:88) based his arguments on exotic prehistoric material found along the Arkansas River Valley.

Like most tribes living along the large rivers flowing into the Mississippi, the Indians of Carden Bottoms used many beads, pendants, and ear-ornaments made from conch-shells originating in the Gulf of Mexico and either traded in from tribe to tribe or brought up in canoes by certain Indians who made a business of this kind of traffic.

Mississippian populations inhabited settlements connected by trade networks. In the Lower Mississippi Valley the De Soto expedition realized quickly that the best means of



transporting supplies in the region was by dugout canoes. The Spanish used dugout canoes to raid for supplies. Elvas (Bourne 1922,I:152) informs us that on one occasion De Soto dispatched a number of men in dugout canoes to obtain supplies. The men returned with their canoes

. . . loaded with maize, beans, dried AMEIXAS, and the pulp of them made into many loaves. The same day an Indian arrived from Guaycohya, and said that the Cacique would come on the morrow. The next day, many canoes were seen ascending the river; and the people in them remained for an hour on the opposite side of the Rio Grande, in consultation, as to whether they should come to us or not; but finally they concluded to come, and crossed the river, among them being the Cacique of Guaychoya with many Indians, bringing much fish, many dogs, skins, and blankets. So soon as they landed, they went to the lodging of the Governor in the town, and . . . presented him with the offerings.

The De Soto narratives relate that most of the Mississippian groups that they encountered could provide the Spanish with dugout canoe transportation almost immediately upon request (Lafferty 1977:175). This was vividly evident when the Spanish army approached Cofitachequi. All four accounts of the De Soto expedition relate that dugout canoes were quickly procured by a high ranking individual to ferry the Spanish army across a large river (Varner and Varner 1951:297-298, 303; Bourne 1922, I:114; II:13; II:98-99).

The Spanish were well acquainted with dugout canoes having used them on a number of occasions to transport personnel and equipment (cf. Elvas in Bourne 1922, I:99, 114-115, 124-125, 147-148, 151-152, 156-158, 191-192, 195-200; Biedma in Bourne 1922, II:13, 22, 25-26, 38-39, 89, 98-99;

Ranjel in Bourne, II;129, 131-132, 137-138, 146; Garcilaso in Varner and Varner 1951: 297-298, 303, 393-397, 428-442, 449-450, 491-92, 558, 582-588). At least one member of the De Soto expedition, Pedro Moron, a native of Cuba "having been born and brought up in canoes, was most dexterous in handling them" (Varner and Varner 1951:586).

#### Dugout canoes used in harvesting fish

The importance of fish and waterfowl to the Mississippian diet has only recently been recognized by archeologists. Recent research has shown that at least 50% of the total protein intake of Mississippian populations living within the meander-belt habitat zone of the Mississippi River was from fish and waterfowl (Smith 1978:485). Manning (1980:18) has recently reviewed and summarized the ethnographic accounts of fish captured from dugout canoes

Dugouts were employed in many ways to catch fish. Night fishing was frequently done from dugouts. A torch was sometimes used to attract fish (Andrew and Andrews 1945:43), but fires were also built in clay basins in the canoes. With the river bottom illuminated and the fish dazzled they were easy targets for men armed with spears and dip nets (Beverly 1947:149; Hudson 1976:284; Lorant 1946). Dugouts were also used to inspect trot lines and to collect fish from weirs and traps (Lorant 1946:251; Beverley 1947:149, 151; Jones 1873:333; Hudson 1976:284). Finally, pearls were collected with the help of dugouts; half the crew could dive for pearls while the others opened the shells (Burrage 1906b:127).

There are several ethnohistoric illustrations of Southeastern Indians fishing from dugout canoes. Probably the best such representation is the White painting of Atlantic

coast Indians fishing from a dugout canoe (Swanton 1946:Plate 52).

#### Dugouts used in gathering

In terms of gathering, dugout canoes were probably used for transport in the exploitation of shellfish (Cumbaa 1976:51).

The gathering of shellfish by southeastern Indians goes back to the Late Archaic Period. Mollusks provided food and/or materials for certain types of tools. The snails were eaten and the shells made into tools or simply discarded. The refuse accumulation at some sites in the Southeast have created deep middens covering several acres. Early archeologists recorded a number of these shell mounds in Florida and other parts of the Southeast (Wyman 1875; Moore 1892; 1893; and 1894).

#### Dugout canoes used in hunting

Dugouts played an important role in hunting in the Southeast. Waterfowl was an important part of the Mississippian diet (Smith 1978:483). Waterfowl could easily be harvested by hunters in small canoes; only with some degree of difficulty and luck can these animals be hunted successfully on land. An engraving by DeBry indicates that Indians shot waterfowl with their bows and arrows from dugout canoes (Lorant 1946:247).

When hunting other animal in the winter whole families sometimes went along in dugout canoes (Feiler 1962:127, 146; Swanton 1946:263; Andrews and Andrews 1945:91-92; Manning

1980:18). In the middle South one historic account (Bossu 1768; also quoted in Swanton 1946:263; and also in Peebles 1978:392) relates:

The savages usually set out at the end of October. The Allibamos go to a distance of 60, 80, and even 100 leagues from their village and they carry along with them in their pirogues their entire family; they return only in March which is the season for sowing their fields. They bring back many skins and much smoked meat. When they have returned to their village, they feast their friends, and make presents to the old people who have been unable to follow them, and who have protected the cabins of the village during the hunting period.

#### Dugout canoes used in warfare

The De Soto accounts provide vivid descriptions of Mississippian naval warfare (Elvas in Bourne 1922, I:113-114, 196-201; Biedma in Bourne 1922, II:26, 39-40; Ranjel in Bourne 1922, II:137-138; Garcilaso in Varner and Varner 1951:428-430, 571-598). These accounts show that Mississippian populations in the Lower Mississippi Valley used substantial numbers of large dugout canoes to conduct tactical and strategic military maneuvers.

In dugout canoes the Spanish were militarily inferior to the southeastern natives but on the land were superior because of their weapons, horses, attack dogs, and armour (Bourne 1922, I:188). The Spanish tended to avoid military confrontation on the water unless they had support from allied Indian groups (Varner and Varner 1951:491-492). When the Spanish did fight in dugout canoes without Indian support they were defeated (Bourne 1922, I:197-198; II:39; Varner and

Varner 1951:577-579). Coincidentally, Cortez in Mexico avoided naval battles with the Aztecs on the lakes of Mexico City until the Spanish were able to build several sloops which were superior militarily to the large dugout canoes employed by the Aztecs (Diaz del Castillo 1956:238-239, 414-415, 418-421, 425, 441, 446, 451-452).

The De Soto expedition had two major encounters with Indian fleets on the Mississippi River. The first encounter happened as the Spanish first attempted to cross the river. The second encounter took place when the remaining members of the expedition descended the Mississippi River to leave the Southeast.

In the first encounter, between 6,000 (Garcilaso in Varner and Varner 1951:428) to 7,000 warriors appeared (Ranjel in Bourne 1922, II:138-139) in 200 (Elvas in Bourne 1922, I:113) to 250 dugout canoes (Biedma in Bourne 1922, II:26). Each canoe was well armed and manned by paddlers and warriors all of whom were painted with ochre. The warriors stood erect in the canoe from bow to stern, some holding bows and arrows, others holding canoe shields (Elvas in Bourne 1922, I:113). These shields were made of closely interwoven cane, so well constructed that an arrow from a crossbow could hardly pierce them (Ranjel in Bourne 1922, II:138-139).

This Indian fleet was commanded by a cacique who issued orders from underneath a distinctive awning on his canoe (Elvas in Bourne 1922, I:113). There were other chiefs in the fleet who also sat underneath distinctive canopies but were

subordinate to the fleet commander. Orders were carried out by shouts and yells which were in themselves intimidating (Ranjel in Bourne, II:138-139; Biedma in Bourne 1922, II:26). The tactics performed by this fleet included enfilade when a canoe was broad-side and near to the shore where the Spanish were trying to build their boats (Biedma in Bourne 1922, II:26; Ranjel in Bourne 1922, II:138-139; Garcilaso in Varner and Varner 1951:429). During one such maneuver De Soto had his crossbowmen hidden by the river shore fire upon an Indian canoe. Several Indians in the canoe were felled by the unexpected fire (Elvas in Bourne 1922, I:114). However, the Indians in the canoe did not panic despite their losses and the survivors retreated in an orderly fashion (Garcilaso in Varner and Varner 1951:429).

The second incident involved anywhere from 40 or 50 dugout canoes (Biedma in Bourne 1922, II:39) to around 100 canoes (Elvas in Bourne 1922, I:196). Garcilaso said each canoe had a crew of about 25 oarsmen and 25-30 warriors (Varner and Varner 1951:575). Elvas said there were about 60-70 men per canoe (Biedman in Bourne 1922, II:39). The canoes in this fleet tried to form a blockade to prevent the Spanish descent of the Mississippi River. To do so the Indian fleet formed two (Elvas in Bourne 1922, I:196-198) or three lines (Garcilaso in Varner and Varner 1951:575-577). The Spanish were aboard several brigantines which they had built. Along with these brigantines the Spanish also had a small number of dugout canoes some of which were being used to transport their

horses. The remaining dugout canoes were available for military action.

The Indian fleet was commanded by men wearing colored plumes and sitting underneath awnings in their dugouts (Elvas in Bourne 1922, I:196-198; Garcilaso in Varner and Varner 1951:575-577). Each group was attired in the colors of their captains or chiefs. In the front line were the canoes of the leader of the fleet. These canoes were controlled by separate shouts from the rest of the fleet although all sang songs to row in rhythm according to the speed and maneuvers they were expected to perform. Top speed of the canoes was as fast as a running horse (Garcilaso in Varner and Varner 1951:575).

The Spanish attacked with some of their canoes. The Indians surrounded these canoes, caught them in a crossfire with their bows and arrows, then closed in on them. Just before ramming the Spanish canoes a number of Indians leaped from their canoes, some to steady their own, others to help capsize the canoes of their enemies. The Spanish crews who were capsized were beaten to death by the Indians wielding paddles and clubs who remained in their canoes (Elvas in Bourne 1922, I:196-198; Garcilaso in Varner and Varner 1951:575-577; Biedma in Bourne 1922,II:39).

From these accounts it is clear that the Indians who attacked the De Soto expedition had a great familiarity with fighting from and with canoes (Lafferty 1977:182-183).

#### Dugouts used in emergencies

The dugout canoe was also indispensable as an emergency

vehicle. Dugout canoes provided relief from both natural and cultural disaster situations. Periodic natural disasters such as floods necessitated the development of some form of watercraft transportation. In addition, dugout canoes also provided a means of escape from enemy attacks.

The wet, swampy area of riverbanks and floodplain lakes favored by Mississippian populations were periodically submerged. Pedestrian access to the region's resources were severely restricted at times as is indicated in the following account by Garcilaso (in Varner and Varner 1951:554-556) in which a flood inundated the village of Aminoya.

. . . one could not pass through the streets of this town except in canoes. . . That which previously had been forests and fields was converted now into a sea, for from each bank the water extended across more than twenty leagues of terrain. All of this distance was navigable in canoes and nothing was visible except the pine needles and branches of the highest trees. . . During this particular flood, it became necessary for the Spaniards to send out a squad of twenty soldiers, who were to travel in four canoes, tied two by two, lest in going singly they be overturned by striking against trees beneath the water. These men were to proceed to the village of Anilco, twenty leagues distant from Aminoya. . . When. . . (they) came to the town. . . (they) found that it had been converted into an island, and that the flood had passed on five or six leagues beyond.

The mention of two dugouts tied together may indicate that catamaran-like vessels (Cushing's fourth type) were used in the Southeast.

The De Soto accounts relate on a number of occasions Mississippian populations escaping the Spanish army in dugout canoes. When the Mississippian town of Guaychoya was stormed by



the Spanish army as described by Garcilaso (in Varner and Varner 1951:487):

. . . the Cacique and his vassals armed themselves in whatever way they could to defend the place. But when they saw the strength, they assembled at the Great River, and in very handsome canoes, which they as hostile people kept in readiness for such occasions, crossed to the other side, taking with them their wives and children and all possessions they could carry. In this way, they abandoned the town.

At Pahaca or Capaha, as it was called by Garcilaso (1951:437), a similar incident took place when the Spanish approached that town.

The Cacique Capaha was within the town when his enemies, the Casquins, hove in sight; but feeling that his own forces were too few and unprepared to resist their adversaries, he gave way, and before they came into the place, entered one of the canoes which he kept in the moat and went out through the canal to the Great River to take refuge on a well-fortified island which he held there. Those of his people in the town who were able to obtain canoes followed their lord, and those who could not fled to the nearby forest.

Still another account shows a whole Mississippian town (Anilco) quickly loading their families and possessions in dugout canoes and abandoning their town to seek refuge elsewhere. The Cacique and fifteen hundred warriors are said to have resisted De Soto's army while others tried to convey women, children, and household good to safety.

Some conveyed them in boats and canoes to the opposite shore of the river, and others carried them to the woods and underbrush lining the bank of the same stream. Then the Castellians arranged themselves in squadrons and advanced. But the Indians dared not await them, and without firing an arrow retreated to the town. From thence they went to the river where almost all crossed over to the opposite shore, some in canoes and boats and others by swimming. For they had not intended to fight

the Spaniards but desired only to delay them and prevent their entering so quickly, in order to have an opportunity to convey what was there to a place of safety. On seeing the Indians in flight, our men charged and took some of them prisoner as they were embarking. (Garcilaso in Varner and Varner 1951:486).

Apparently such incidents were common at Indian towns in the path of the De Soto army (Ranjel in Bourne 1922, II:111).

## CHAPTER III

### A RESEARCH DESIGN FOR THE MOUNDVILLE PHASE

#### INTRODUCTION

While previous studies have provided a baseline on the nature of the prehistoric cultures of the Southeast, with few exceptions they have treated the relationships between those cultures and their use of a river, or river systems as transportation/communication networks, in only an implicit and cursory manner. This study attempts to remedy this situation with the development of a regional research design for the Moundville phase.

#### PROBLEM DOMAIN: ARCHEOLOGICAL TRACES OF DUGOUT CANOE USE AT MOUNDVILLE PHASE SITES

Proposition: Cultures which use dugout canoes will leave evidence of this behavioral patterning in the archeological record. Documentary data indicates that historic Mississippian societies used dugout canoes. Therefore evidence of dugout canoe behavioral patterning will be expected to occur in the archeological record in some, if not most, Moundville settlements.

Data requirements: A sufficient sample of contemporaneous and culturally related sites located along a waterway and spatially distributed so that inter-site and intra-site organization can be studied; data recovery with accurate spatial and temporal controls; environmental reconstruction of the region's hydrography; bioarcheological and mortuary analysis of skeletal populations; and tools used in the construction of dugout canoes.

Expected evidence: If the proposition is correct then we would expect to find:

- 1) lost, discarded, or wrecked dugout canoes and/or cargo occurring in a manner related to the hydrography of the waterway and in relation to past landings, water routes, and hazards to navigation;

- 2) landings along navigable waterways adjacent to Moundville phase settlements;
- 3) skeletal evidence of canoe use;
- 4) dugout canoe construction sites.

#### DUGOUT CANOES AND CARGOES

If the proposition is correct then we would expect to find lost, discarded, or wrecked dugout canoes and/or cargo occurring in a manner related to the hydrography of the waterway and in relation to past landings, water routes, and hazards to navigation.

#### Ethnohistoric data

Documentary data for the Southeast indicates that some members of Mississippian societies used dugout canoes. As Moundville and its associated sites were occupied at the height of the Mississippian Period it is expected that lost, discarded, or shipwrecked dugout canoes and/or cargo will occur in a manner related to the hydrography of the Black Warrior River and in relation to past landings, water routes, and hazards to navigation.

The use life of a dugout canoe is dependent upon the type of wood and the care and maintenance afforded by its owner(s). Without care and maintenance the craft would undergo rapid transformation when exposed for lengthy periods of time to sun or water. Unfortunately we have found little information on how southeastern Indians tried to hinder deterioration. John House reports that in South America at the end of its use life a dugout canoe was salvaged for other uses such as placement across small streams to make a bridge, placement along a path

in swampy areas to create a better walkway, and to catch water (House n.d.).

Historically dugout canoe spills and wrecks were common occurrences (Tonty 1898; Gravier in Kenton 1927:344). Canoeing accidents occur even among experienced paddlers and often result in the loss of cargo, sometimes in the wreckage of a canoe, and at times the loss of human lives. No one is born with an innate ability to canoe. According to Riviere (1969:118) it is a skill

. . . that must be learned by doing and necessarily involves progressively more difficult expertise in an increasingly dangerous environment.

Southeastern Indians had a technique to recover from canoeing accidents. This technique was recorded by Spanish explorers in the Southeast and on the Gulf of Mexico. Garcilaso de la Vega (Varner and Varner 1951:598) related that when a dugout canoe was overturned in the Mississippi River they

. . . being good swimmers, twelve or thirteen Indians, depending more or less upon the size of the canoe, take their vessel between them and turn it so as to have its mouth straight downward. Then as it comes up full of water, all simultaneously give it a shake, and when the water in falling is collected on one side, they immediately give a shake in the opposite direction. After two such shakes, not a drop of water remains in the canoe, and the Indians re-enter it. And all of this they accomplish with such haste and facility that the vessel has hardly been upset before they have it turned over and put in position again. Our men were greatly amazed at this trick because they themselves were never skillful at doing it in spite of the many times that they tried.

In the Bahamas Christopher Columbus saw the same method of righting an upset canoe by the Indians of that region. According to the history of the voyage written by his son, Fernando Columbus (1824:57; also quoted by McKusick 1970:8), the Indian dugout canoes

. . . if overset they soon turn them right again by swimming; and they empty out the water by throwing them from side to side like a weaver's shuttle, and when half emptied they lade out the rest with dried calabashes cut in two, which they carry for that purpose

The ethnographic record suggests that most actual dugout canoe wreck sites will contain nothing more than a spilled cargo. Spilled cargo from historic canoe accidents have been recovered by archeologists working underwater in Canada and Minnesota (Wheeler et al. 1975; Lockery 1978).

Brose and Greber's (1982) analysis of an Archaic period dugout canoe recently found in Ohio provides important insight into dugout canoe stability calculations and prehistoric cargo characteristics. By finding out the density of a number of potentially relevant cargoes in Late Archaic times it was possible to estimate how each may have affected the stability of the dugout canoe.

They discovered that two classes of cargo existed based upon their specific gravity. Dense materials (i.e., items with a specific gravity above 1.2) contributed to positive stability when loaded into the available space. While on the other hand, the other class of cargo consisted of less dense material (i.e., items with a specific gravity below 1.2) that could not be loaded into available space without being placed

so high that they create negative stability. The "stable" cargoes appear to correlate with many archeologically identified long distance trade items while the "unstable" cargoes appear to represent subsistence resources. The "unstable" cargoes can be made into "stable" cargoes if they are in containers like baskets (cf. Swanton 1946:Plate 56), pottery, conch shells, and gourds. Mixed loads of different materials could contribute to load stability. Brose and Greber (1982:253-255) state:

(R)emarkably little of any material as dense as copper would be required to provide sufficient mass with minimal height to meet or exceed the requirements of neutral stability. . . Clearly, in any inferred trade or transmission involving subsistence resources, a little heavy metal would go a long way toward insuring stability (hydrodynamic and social). Certainly the rank order of materials presented. . . [in Table 2] deserves comparison with rank orderings of similar materials proposed as indices of social status in later prehistoric periods.

Mississippian cargoes contained both local and exotic material. These goods were either finished craft products or raw materials. According to Walthall (1980:190) there were essentially two types of trade:

- 1) long-distance trade of rare products made of materials from particular points of origin such as copper, galena, marine shell, and certain types of stones; and
- 2) localized redistribution of foodstuffs and craft goods.

Rank and status was associated with some of the rare items such as copper, as indicated in its use as mortuary offerings for elite members of the society.

TABLE 2

DENSITY OF POTENTIAL CARGO  
(after Brose and Greber 1982:274)

MATERIAL	SPECIFIC GRAVITY	
Copper	8.8-8.9	P
Galena	7.4-7.6	O
Hematite	4.9-5.3	S
Mica	2.7-3.3	I
Soapstone, Sepentine, Steatite	2.5-3.3	T
Obsidian	2.5-2.7	I
Flint, Chert, Chalcedony	2.3-2.6	V
Salt	2.2	E
<hr/>		
Grit-tempered Pottery	1.6-2.7	S
Conch shell, fresh	1.6-1.9	T
Conch shell, weathered	1.3-1.6	A
Meat	1.1-1.3	B
Furs, Skins (tanned without chromium)	1.0-1.3	I
Nuts, fresh	0.6-0.8	L
Nutmeats, dried	0.3-0.6	I
Seeds, sunflower	0.2-0.8	T
		Y



All of the historic accounts of trade reported in Swanton's The Indians of the Southeastern United States (1946:737-738, 741) and Hudson's The Southeastern Indians (1976:316) relate that the traders transported their goods by means of dugout canoes (see Swanton 1946: Plate 56). The trade items reported by Swanton and Hudson moving along the historic trade routes of the Southeast included: salt, dried fish, sea shells, the leaves of *Ilex vomitoria*, red ocher, red root, hard cane, feather cloaks, pottery, animal skins, copper, mica, and bow wood. In addition, maize, beans, squash, fish, dogs, blankets, beads, furs, bees-wax, honey, and bear's oil are known to have been transported in dugout canoes during Indian trading expeditions (Bourne 1922,I:152; Smith 1907:56 as quoted in Swanton 1946:643; Bartram 1791 also quoted in Swanton 1946:594). Dugout canoes themselves were also items of trade.

#### Archeological evidence

Researchers in the Southeast have rarely been given the opportunity to study dugout canoes and cargoes in situ as the great majority of dugout finds have been recovered with little or no regard for contextual information including provenience data or the processes which led to its deposition. Typically provenience information on dugout canoes has been fair to poor and in most cases nonexistent. Some investigators, notably Dreves (1979) and Hemmings (n.d.), were concerned with provenience information including discerning the environmental and cultural context of the dugout canoe find.

When future finds are recovered some basic principles underlying shipwreck formation and analysis outlined by Muckelroy should be examined. According to Muckelroy (1978:157)

The shipwreck is the event by which a highly organized and dynamic assemblage of artefacts are transformed into a static and disorganized state with long-term stability. While the archaeologist must observe this final solution, his interest . . . is centered on the former, whose various aspects are only indicated indirectly and partially by the surviving material. If the various processes which have intervened between the two states can be identified and described, the researcher can begin to disentangle the evidence he has uncovered.

Although Muckelroy was discussing more complex types of watercraft his ideas can be applied to dugout canoes (cf. Figure 5).

At least one prehistoric dugout canoe, the Grimes-Mason canoe, has been found in the Black Warrior-Tombigbee River System (Figure 6). It is a cypress canoe found lodged in some brush on the east bank of the Tombigbee River near the U.S. Corps of Engineers Mile 103 approximately one-quarter mile southeast of Peavy's Landing in Alabama. The 6.13 m long canoe has been radiocarbon dated to  $605 \pm 60$  B.P. (c. 1345 A.D.) (UGA-695). This date indicated that the dugout canoe was probably constructed during Mississippian times (Stowe 1974:196-199). The canoe was found near a mound site recorded by Moore (1905).

Besides the Grimes-Mason dugout canoe, an early historic dugout canoe was recently discovered in an oxbow lake of the Tombigbee River near Amory, Mississippi. This dugout canoe

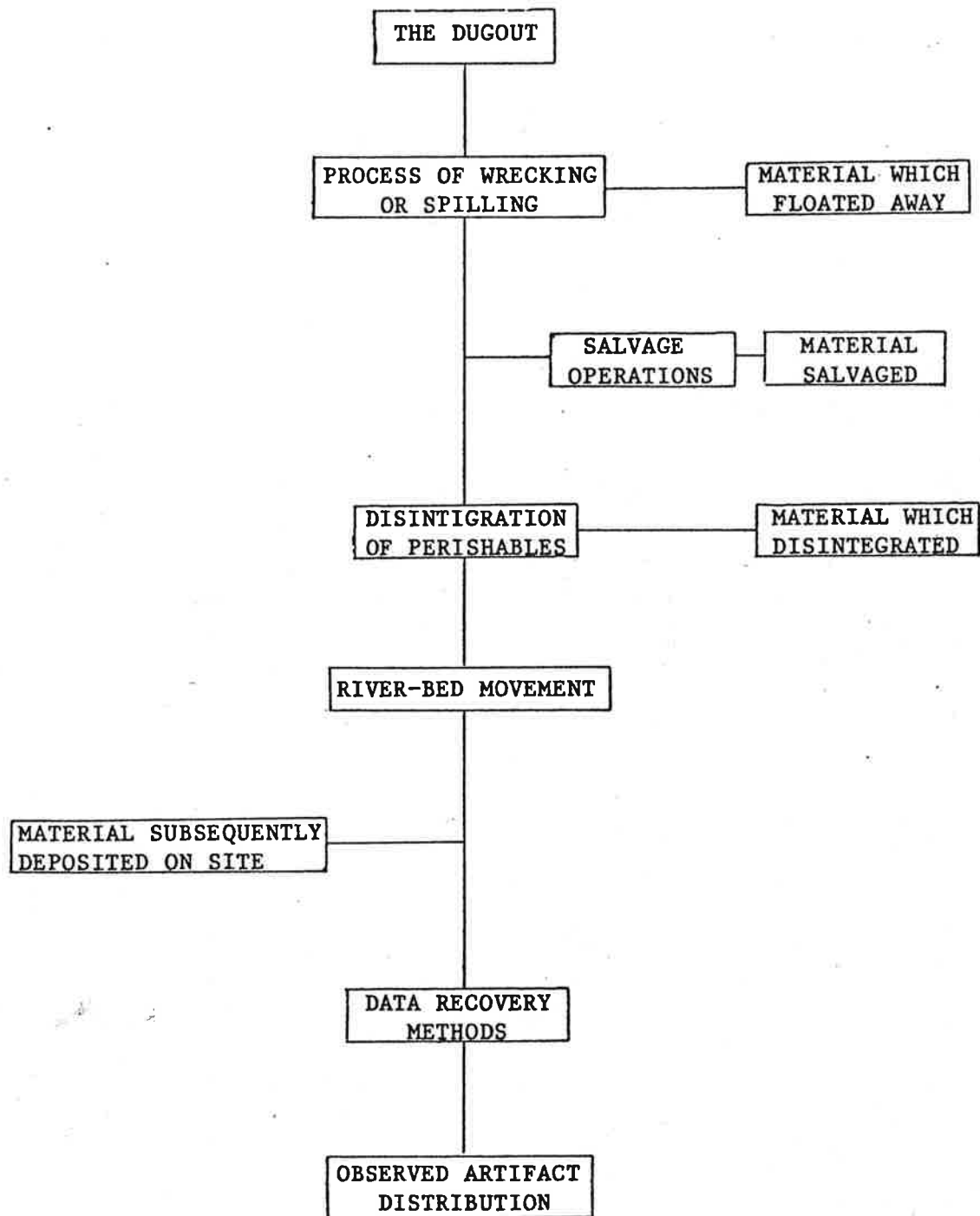


FIGURE 5. Flow diagram showing the evolution of a canoe accident (adapted from Muckelroy 1978:158).

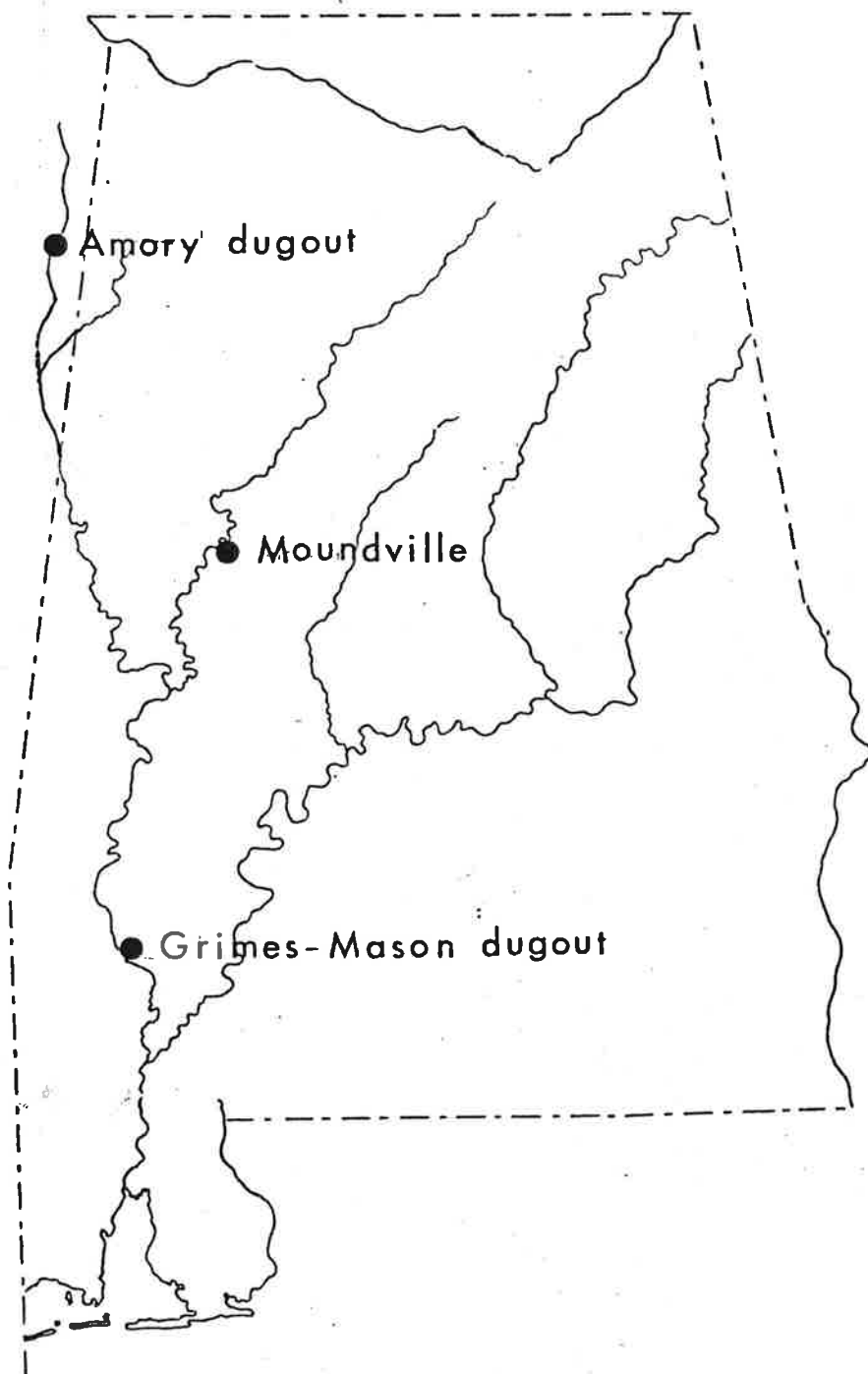


FIGURE 6. Dugout canoes found in the Tombigbee-Black Warrior River System.

was radiocarbon dated to  $280 \pm 50$  B.P. (c. 1670) (Bense 1981:11).

Therefore, the implications are that the Tombigbee-Black Warrior River System may contain more whole or fragments of dugout canoes along with lost or discarded cargoes associated with the Moundville phase sites from its mouth on the Gulf Coast to its headwaters stretching almost to the Tennessee River.

#### LANDINGS

If the proposition presented on page 54 is correct then we would expect to find landings along navigable waterways adjacent to Moundville phase settlements.

#### The importance of landings to canoe travelers

In an early 18th century French account by Poisson (In Keaton 1927:395) of dugout canoe travel during extreme high water on the Mississippi we get an idea of the importance of landings to canoe travelers.

We set out at the time of highest water; the river had risen more than forty feet higher than usual; nearly all the country is lowland, and consequently it was inundated. Thus we were exposed to the danger of finding no cabanage, -- that is to say, no land where we could cook and sleep. . . We are much more to be pitied when we find no camping ground; then we fasten the pirogue to a tree, and if we find an embarras of trees we prepare our meal on it; if we do not find one, we go to bed without supper, -- or rather we have no supper, and we do not go to bed; we remain still in the same position that we kept during the day; exposed through the whole night to the fury of the mosquitoes.

An embarras, according to Poisson, was a mass of floating trees which had eroded into the river and became stuck and

piled on one another. This account indicates that land travel in some river valleys in the Southeast was severely limited during period of extreme high water. Canoe travel during high water periods was not altogether safe nor pleasant especially when no high water level landings were located along the route of travel. Even when a landing was found experienced early 18th century canoeists were aware of the danger of a sudden rise in water levels.

I have never seen here such a terrible storm as we had last night. The wind and the rain almost leveled our tent and the thunder frightened even the most intrepid. We just escaped having our canoes and baggage carried away by the Mississippi which flooded the shore a long way as it rose nearly two feet. (Paul du Ru in Butler 1934:40).

#### Human behavioral patterning at landings

Documentary data indicates that a great deal of human activity took place at landings. Gravier mentions ceremonial gift exchange occurring at a landing during his departure preparations (Gravier 1700 in Kenton 1927:334). Du Ru (1700 in Butler 1934:19) relates participation in a ceremonial entrance

. . . Here is the landing place. Our vessels assemble to enter the port in order. The landing begins. The whole bank is black with Savages. . . We arrive thus in good form. After having embrace our people, it was necessary to respond to the embraces of the Savages, and to go through all the details of their ceremonies.

Henry Woodward provides us with a description of an Indian town he saw along the Savannah River. According to Woodward (as quoted in Swanton 1946:635) the town

. . . stands upon a poynt of ye river. . . Ye inland side of ye towne being double Pallisaded, & yt part which fronts ye river haveing only a single one, under whose steep banks seldomly less than one hundred faire canoes ready uppon all occasions.

Landings are not only the place where arrivals and departures of traders and travelers occur, they also served as the access point for fishermen and hunters using canoes (du Ru 1700 in Butler 1934:34, 37). Important people were brought to landings and probably placed by means of litter in canoes (Elvas in Bourne 1922, I:64-65; Biedma in Bourne 1922, II:13; Ranjel in Bourne 1922, II:98-100; Garcilaso in Varner and Varner 1951:296-303). This practice of using litters to load and unload important personages into dugout canoes was noted in Mexico (Diaz del Castillo 1956:244) and in South America (Mason 1896). Battles were also fought at landings (Elvas in Bourne 1922, I:99; Ranjel in Bourne 1922, II:129, 132-133; and Garcilaso in Varner and Varner 1951:393-397, 440-441).

The patterning of human behavior at recurrently used landing involves a series of repetitious acts which include: boarding, loading, landing, and unloading vessels. These activities must be undertaken in areas that have favorable topographic and hydrographic features that allow safe, efficient, and successful completion of these acts. Human alteration to provide further safety and convenience is expected at the landings of permanently occupied sites including

locating the main approach to the site at the canoe access point, the landing.

Ceremonial centers, both major and minor, are expected to show a greater complexity at landings than villages or hamlets due to greater amount of traffic conducted between these socio-political sites and related communities. The traffic at each site probably varied widely from one time to another corresponding with traditional feasts and other social, political, or religious ceremonial occasions. The normal seasonal pattern would have been altered or destabilized in consequence of unusual economic or war developments.

Review of archeological literature on  
canoe landings in the Southeast

Archeological observations of canoe landings at prehistoric sites are rare in the literature. In describing an earthen mound in Florida Douglass (1885:141) reports that

It was impossible to resist the conviction, that when the mound was constructed, easy access to and from the water and a suitable place to land were also provided.

At the Key Marco site at least nine canals and three lagoons were recorded and a number of artifacts were recovered in them. Cushing (1897:29; Gilliland 1975:18) described long, straight, and narrow canals, terminated in "little court-like landings and short graded ways" which led up to a series of mounds. In addition he reported seeing



. . . several straight, low benches or tongues, of compacted shell and tough clay-marl. . . from twenty-five to thirty feet long and from eight to twelve feet wide, level on top and built to a height gradually increasing from a few inches where they joined the boundary banks, to nearly two feet at their rounded ends, so as to form low, originally submerged, slightly inclining piers, as it were.

Conant (1878:361) visited a large Mississippian site with platform mounds in southeast Missouri and noted similar tongues of land sloping into the water.

All along the shore of the bayou, in front of the enclosed works **small tongues of land have been carried into the water, of varying length and width**, averaging perhaps thirty feet in length by ten to fifteen feet in width, and about the same distance apart, resembling on a small scale, the wharves of a sea-port town. (emphasis added)

In addition, canals, ditches or man-made sloughs are noticed at other sites in the Southeast including Parkin in northeast Arkansas (Morse 1981:19), Etowah in Georgia (Moorehead 1932:3), the Bottle Creek site in Alabama (Bigelow 1953:192), and the McLeoud Bluff site in western Kentucky (Webb and Funkhouser 1933). Prehistoric canals are also known to have been in Mesoamerica at this time (Diaz del Castillo 1956; Thomson 1974).

Historic and modern landings located  
at Moundville phase sites

A historic and modern landing site located at Moundville, Gr-14, and Tu-34 might possibly indicate that natural hydrographic and topographic features influence site selection for optimum safety and convenience for watercraft users. Moundville is known to modern navigators as O. T. Princess

Landing (U.S. COE 1978:68). Slightly downstream from the Moundville site there is a modern paved boat ramp. Between the boat ramp and the Moundville site aids to navigation are posted warning boaters to pilot their craft near the shore of the Moundville site to enjoy the best navigable water. Table 3 presents the Moundville site, Tu-50, Tu-34, Tu-44,45 and Tu-46,47 in their relationships to modern navigation of the Black Warrior River. Tu-34 is located at a modern landing and an aid to navigation. Tu-46,47 is located at the head of Eagle Shoals at the place called by C.B. Moore as "Hill's Gin Landing". Downstream from this site is Tu-44,45 located at the end of Little Log Shoals. If these two shoals are taken together it appears that Tu-46,47 and Tu-44,45 are located at the beginning and end of approximately four miles of shoal waters.

#### Topographic features at landings

Landings are composed of topographic features that can be discerned and explicitly examined. Basically these can be broken down into three categories: the shore, the waterline, and the slope.

The shore is that part of the land in immediate contact with a body of water, including the area between the high and low water lines. The shore may be divided into the backshore and the foreshore. The backshore is defined as the land bordering a body of water which is usually dry, being reached only by the highest water level. Foreshore, on the other

TABLE 3

RELATIONSHIP OF HISTORIC AND MODERN NAVIGATIONAL FEATURES  
AND MOUNDVILLE PHASE SITES ALONG THE BLACK WARRIOR RIVER  
(INFORMATION FROM MOORE 1905; PEEBLES 1978, AND US COE 1978)

SITE NUMBER	MODERN NAVIGATIONAL FEATURE(S)	RIVER TRAVEL SIGNIFICANCE	MILE
Tu-183	Robinson Bend	Possible hazard to	325.2
	North Star Wreck	Navigation as indicated by historic shipwreck	324.8
Tu-46, 47	Beginning of Eagle Shoals Hill's Gin Landing	Possible hazard to navigation	315.1
Tu-44, 45	Ending of Little Log Shoals	Possible hazard to navigation	312.4
Tu-34	Hull's Landing	Canoe access	309.3
Mound- ville	O.T. Princess Landing	Canoe access	303.5
	Paved Public Ramp		303.3
Gr-14	Warrior Lock Warrior Dam Public Ramp	Canoe access	261.2

hand, is considered as that part of the land which lies between high and low water levels.

The waterline is defined as the line marking the junction of water and land. From a terrestrial perspective this line marking the junction of land and water is said to be the shoreline (U.S. Navy 1956:195, 232). A range of water level occurs with any body of water through time and space. Generally speaking any land surface with a gradient of less than 50 degrees can serve to beach a canoe.

Contour maps and bathymetry maps are expected to provide clues to navigable channels, canals, lagoons, tongues of land, and gradients that may have been amenable to receiving, storing, and launching large dugout canoes. Although no bathymetry maps were available for this research a contour map was (Peebles 1969).

#### Hypothetical Dugout Canoe Landings at Moundville

Using Moore's (1905) map (Figure 7) and Peebles maps (1969; 1978) as guides, hypothetical dugout canoe landings were formulated and appear in Figure 8. A number of landing places have been hypothesized for Moundville based on the extended shoreline created by the three small channels that flow from the site and into the river. Such channels, waterbasins, and amenable gradients allow for a maximum amount of space to be utilized to facilitate the launching, landing, and storage of dugout canoes. Moore's map indicates orientation of some mound ramps toward hypothetical landing areas. Deposition of artifacts is expected to occur along the

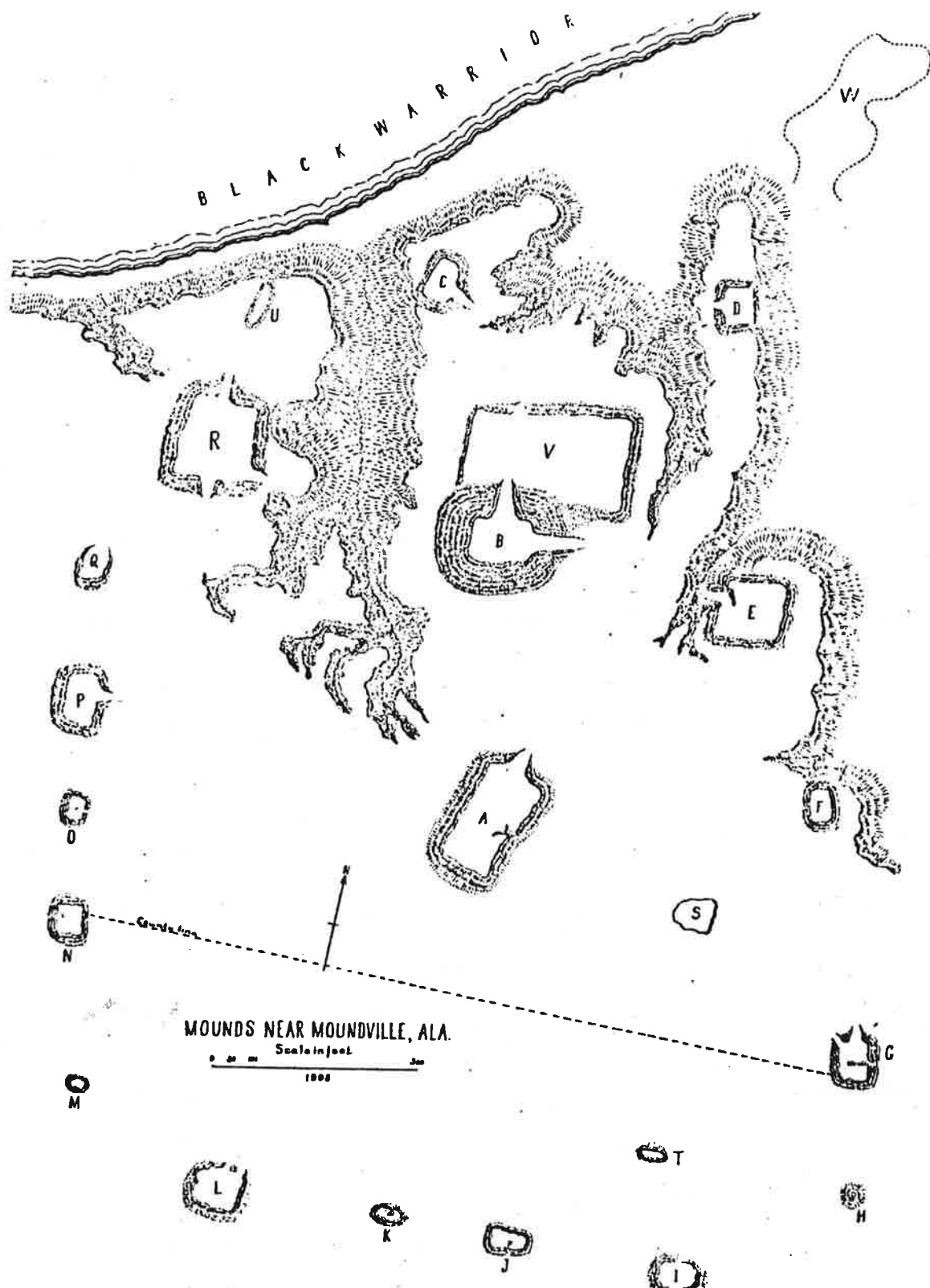


FIGURE 7. C.B. Moore's (1905) map of Moundville note that mounds A, B, C, D, and R have ramps oriented towards hypothesized dugout canoe landings (see Figure 8)



paths leading to the water's edge, at the water's edge itself, and fanning out into the water resulting from the human activity which took place at the landing places in and out of canoes. The limited archeological research on artifact pattern of deposition near and in the water precludes a definitive test of the proposition but instead offers tantalizing hints that this proposition is not without merit.

At Key Marco, Cushing (1897:31; Gilliland 1975:20) recovered many perishable and nonperishable artifacts in the water and at the landing places at the site. A similar "port refuse pattern" is proposed for Moundville. A variety of artifacts used in dugout canoe travel, transportation, and trade are expected to be found in the foreshore region of the landing place both in and out of the water. The backshore region is also expected to have a patterning of artifacts related to pedestrian travel from the main part of the site to and from the landings.

Some archeological testing has provided information on spatial distribution of artifacts at Moundville may indicate such a patterning. According to Peebles (1978:381):

The density and distribution of artifacts recovered from the several excavation units at Moundville show that most of the day-to-day debris was discarded into the river and ravines. . . In general, the densest concentrations of artifacts were along the slope leading to the river at the northeast boundary of the site.

Peebles suggests that the residents of Moundville were deliberately partitioning their refuse and dumping it along the slopes leading to the river. This implies secondary

deposition of refuse rather than primary refuse deposition, that is, the materials found on the slopes are considered by Peebles to have been used and broken elsewhere and then dumped down the slopes and into the river. There is some basis for this assumption as plazas are ethnohistorically known to have been kept clean of debris.

An alternative assumption also based on ethnohistoric data would be to consider some of the deposits to be primary deposits (i.e., used and broken at the activity area). The identification of activity areas near the water's edge would support this idea of a landing refuse depositional pattern of artifacts deposited in the foreshore and backshore areas leading to and from the landings. Much more fieldwork needs to be done to adequately test this hypothesis.

#### Logistics of canoe travel between Moundville Phase sites

That river travel was an important consideration for the location of Moundville phase sites has been pointed out by Sears (1968:150). Eighteen of the nineteen Moundville phase sites as identified by Peebles (1978) are located on navigable water or water that is potentially navigable during certain times of the year. Thirteen sites are located on either side of the Black Warrior River indicating that the river was not a barrier to cultural interaction. Two ceremonial centers are located on oxbow lakes. A village site and a ceremonial center are located on a tributary of the river. All may be considered as having the potential for access to the waterway.



Only Ha-1, a ceremonial center, is located more than a kilometer away from navigable water.

To determine the spatial efficiency of Moundville to its minor centers, Steponaitis calculated the straight line and river distances between Moundville phase sites and Moundville. Using these data he then divided the minor centers up into two groups. The first group consisted of those minor centers that were probably connected to Moundville mainly by water and included Gr-14, Ha-7, Tu-44, Tu-46, Tu-3, and Tu-56. The second group was composed of the minor centers that were probably linked to Moundville by land and these included Tu-50, Ha-1, Ha-9, and Ha-14. As to his spatial efficiency model Steponaitis (1978:441-43) found that

With respect to the river sites. . . Moundville's location has an extremely high spatial efficiency of .996. In relation to the four land connected centers. . . a similarly high value of .89 is obtained. . . [This suggests] that minimization of movement costs between Moundville and other centers was an important factor influencing the spatial configuration of the Black Warrior System.

Sites Tu-50, Ha-9, and Ha-14 may also be linked to Moundville by waterways. Tu-50 is about a half mile upstream from Moundville in a very strategic location in terms of water travel. It is located on a bluff from which about two miles of upstream river travel can be observed. Ha-9 is not located on the Black Warrior River but is on Elliot's Creek which flows into the Black Warrior River. This creek may have been navigable by canoes during periods of high water. As to Ha-14, it is located on an oxbow lake that is connected to the Black

Warrior River by an unnamed slough (cf. Fosters, Ala. Quad. U.S. Geological Survey 1969, Photorevised 1978). Taking these factors into account, the spatial efficiency of minor sites connected to Moundville by water should include Tu-50 and possibly Ha-9 and Ha-14 as canoeists from these sites could travel to Moundville by water.

To determine the logistics of riverine travel between Moundville and some selected minor centers, Lafferty's formula (cf. 1977:168-173) of the speed of a hypothetical dugout canoe was adapted for use with the Moundville settlements. In calculating the transportation logistics of a dugout canoe manned by 20 paddlers, Lafferty concluded that such a canoe would be able to cover 16.6 kilometers per hour. A canoe manned by a crew of only eight paddlers carrying a cargo would average about 5.6 kilometers per hour. If we consider the De Soto accounts to be relatively accurate in terms of paddlers per large canoe then these estimates would appear to be extremely low. Keeping this in mind, Table 4 presents the travel time between Moundville and some of its related sites.

Using Lafferty's formula we see that all of the Moundville phase minor centers that are located on the Black Warrior River are easily within a days journey from Moundville by canoe. Five of the six centers can be reached within three hours in a dugout canoe with twenty paddlers. Three of these sites can be reached with twenty paddlers in under two hours. The farthest site away from Moundville is about four and a half hours away by water while the farthest center north of

TABLE 4

LOGISTICS OF CANOE TRAVEL FROM MOUNDVILLE  
(BASED UPON LAFFERTY 1977:168-173)

SITE	DIRECTION FROM MOUNDVILLE	APPROXIMATE DISTANCE ALONG RIVER IN MILES (KM)	APPROXIMATE TRAVEL TIME WITH 20 PADDLERS	APPROXIMATE TRAVEL TIME WITH 8 PADDLERS
Gr-14	South	44.8 (72.1)	4 h/21 m	12 h/52 m
Ha-7	South	18.7 (30.1)	1 h/49 m	5 h/22 m
Tu-3	North	25.3 (40.7)	2 h/27 m	7 h/16 m
Tu-44	North	8.3 (13.4)	0 h/49 m	2 h/23 m
Tu-46	North	11.2 (18.0)	1 h/05 m	3 h/13 m
Tu-56	North	28.4 (45.7)	2 h/45 m	8 h/10 m
Mouth of Black Warrior- Tombigbee River System (Mobile Bay)	South	303.5 (488.43)	29 h/25 m	87 h/13 m
Head of Navigation (Mulberry Fork)	North	124.5 (200.36)	12 h/04 m	35 h/47 m

Moundville is only two hours and forty-five minutes away. The head of navigation and the mouth of the river are also within a couple of days travelling range from Moundville by a large dugout crew.

Most of the sites of the Moundville phase in the Black Warrior River Valley are located in proximity to navigable water. At about the same time period that Moundville was occupied a similar settlement pattern by another Mississippian group was being established. According to Brain (1978:347-349)

All of the major centers of . . . (Winterville-Anna phases) with the exception of the Lake George site, are located along the Mississippi River. Furthermore, they are strategically situated at what were then the major points of control of the entire riverine system in these regions. . . .Quite clearly, there was a strong orientation toward the Mississippi, and perhaps even a conscious attempt to control movement along it.

Garcilaso also suggested a similar function for a Mississippian site that was, for a while, occupied by the Spanish army. According to Garcilaso "a lofty mound. . . had been built on a cliff overlooking the river, and . . . served as a lookout" (Varner and Varner 1951:432). The U.S. Navy Hydrographic Office defines a lookout station as "a structure or place on shore at which personnel keep watch of events at sea or along the shore" (1956:128). Walker (1936:32) says that the #7 mound of the Troyville group was

. . . built at such a commanding point on the bluff where it overlooked the mouths of three rivers, it can hardly be doubted that it served as a lookout station to warn of the approach of hostile canoes from any of these directions.

Up north in the Chesapeake Bay region it was noted by Europeans that the Powhatan Indians were also concerned with having their settlements within view of the waterways. According to Strachey (1849:72; as quoted in Swanton 1946:629)

Theire habitations or towns are for the most part by the rivers, or not far distant from fresh springs, commonly upon a rise of a hill, that they may overlooke the river, and take every small thing into view which sturrs upon the same.

#### SKELETAL EVIDENCE OF CANOE USE

If the proposition on page 54 is correct then we would expect to find skeletal evidence of canoe use.

#### Paddlers

Pervading all of the accounts of the De Soto expedition is the fact that a limited number of high status individuals could organize a number of strong healthy males to propel their vessels. In the Lower Mississippi Valley, Le Petit (in Kenton 1927:429) describes how the French obtained the services of rowers from the Natchez, a Mississippian group:

. . . The French, who are often in need of hunters or of rowers for their long voyages, never apply to any one but the great Chief. He furnishes all the men they wish, and receives payments without giving any part to those unfortunate individuals, who are not permitted even to complain.

As far north as Virginia, early Europeans noticed a level of social organization among Indians using dugout canoes on Chesapeake Bay. Powhatan reportedly showed John Smith (1907; as quoted in Swanton 1946:643) his dugout canoes and

. . . described unto me how hee sent them over the Baye, for tribute Beades: and also what Countries paid him Beads, Copper, or Skins.

### Bioarcheology and canoe travel

It is proposed that bioarcheologists using multivariate statistics might be able to identify individuals who canoed a great deal in their lifetime. Several different osteological observations can be employed to discern preference for water travel. Taken together these bioarcheological analyses may provide investigators with biological indicators reflective of dugout canoe travel preference.

### Non-metric traits and biological distance

Probably the most widely known study supporting the concept of biological affinity associated with prehistoric river travel in the eastern woodlands were Buikstra's pioneering works (1975; 1976). Buikstra (1976) determined that biological distance among individuals can be measured by subregional comparisons of non-metric or "discrete" traits. In her study of Middle Woodland populations in the lower Illinois and adjacent Mississippi River Valleys the results suggested that genetic interaction could be interpreted as related to river travel (Buikstra 1975; James 1977).

### Muscle attachments

In addition to analysis of non-metric or "discrete" traits bioarcheologists should consider studying the muscle attachments of arm and leg bones. Several burials from a site in Massachusetts were thought to have displayed skeletal evidence suggesting to the investigators a preference for canoe travel (Russell 1980:47). These burials had prominent

muscle attachments on the arm bones with only moderate leg bone attachments.

#### Skeletal evidence of prolonged kneeling

Canoe paddling is most efficient done from a kneeling position. To provide greater interpretive accuracy of a past preference for canoe travel it is suggested that alterations in foot bones can provide skeletal evidence for prolonged kneeling. Ubelaker (1979) has identified skeletal evidence for kneeling in Pre-Columbian populations. Ubelaker (1979:679) noted bone alterations on the superior distal surface of the metatarsals and the superior proximal surface of the first proximal foot phalanx in a prehistoric skeletal sample from Coastal Ecuador and concluded that the location and morphology of the changes, as well as their relationship with femoral "squatting facets"

. . . strongly suggests they were produced by prolonged hyperdorsiflexion of the toes, probably resulting from habitual kneeling posture.

Alternative tasks could produce similar stress patterns on skeletons as indicated by Ubelaker, therefore, this variable should be carefully examined in conjunction with non-metric traits and muscle attachments.

#### Arthritis

If, in fact, some individuals were specialized paddlers then one also might expect evidence of patterned arthritis from prolonged kneeling and paddling activities to appear in the skeleton of these people.

## DUGOUT CANOE CONSTRUCTION SITES

If the proposition on page 54 is correct then we would expect to find dugout canoe construction sites.

### Ethnohistoric accounts of dugout canoe manufacture

In the historic record of the Southeastern United States are a number of descriptions of the manufacture of dugout canoes. Swanton's (1946:589-594) compilation of this ethnohistoric material provides archeologists with theoretical expectations of what information could be recovered from the archeological record that might indicate activities associated with the manufacture of dugout canoes.

According to Swanton (1946:591) one of the earliest and best descriptions of dugout canoe construction is by Hariot (1893). Hariot's description of aboriginal dugout canoe construction methods is very difficult to read because it is written in the old English style of the Seventeenth Century and contains a number of misspelled words. Hariot basically says that Indians living in Virginia constructed well-made dugout canoes without iron tools. They first would choose a tall thick tree according to the size of the dugout canoe they wished to construct. They would then make a fire at its base with kindling, dry moss, and wood chips. They would control the burning so that the flames would not damage too much of the tree trunk. Through burning and then chipping away the carbonized wood the tree would eventually be felled. Then the branches and ends of the tree would be similarly burned until only a log would be left of the right length for their dugout



canoe. They would then pick up the log and place it on poles laid down crosswise. Then the bark would be removed with shell scrapers. On one side they would build a fire according to the length of the body of the log but would not let the fire touch the two ends of the log. When they thought the fire had sufficiently burned enough of the log they would quench the fire and scrape away the carbonized wood with shell scrapers and then make another fire to burn it again. The process of controlled burning followed by scraping away the carbonized wood would be continued until the dugout canoe had sufficient gunwales and depth midships to make it a seaworthy craft.

In a description by Barlowe, we are informed that some dugouts were made from pine and that gum and rosin from coniferous trees were also used in the controlled burning of the canoes.

They burne downe some great tree, or take such as are wind fallen, and putting gumme and rosin upon one side thereof, they set fire to it, and when it hath burnt it hollow, they cut out the coale with their shels, and ever where they would burne it deeper or wider they lay on gummes, which burne away the timber, and by this meanes they fashion very fine boates, and such as will transport twentie men (Burrage 1906:234).

Strachey noted that the native living along the Chesapeake Bay made their canoes from singular trees

. . . by burning and scraping awaye the coales with stones and shells, tyll they have made them in forme of a trough. Some of them are an ell deepe, and forty or fifty foote in length, and some will transport forty men; but the most ordinary are smaller, and will ferry ten or twenty, with some luggage, over their broadest rivers. Instead of oars they use paddles and sticks, which they will

rowe faster then we in our barges (Strachey 1849:75).

Another important descriptive source of aboriginal manufacture of dugout canoes is Beverly. The following account relates the similarity of the process with the previous descriptions in addition to providing more information on the stone tools used in cutting, scraping, and chopping.

They bring down a great Tree, by making a small Fire round the Root, and keeping the Flame from running upward, until they burn away so much of the basis, that the least puff of Wind throws it down. When it is prostrate, they burn it off to what length they would have it, and their Stone TOMAHAWKS breake off all the Barke, which when the Sap runs, will easily strip, and at other times also, if it be well warm'd with Fire. When it is brought to a due length, they raise it upon a Bed to a convenient height for their working, and then begin by gentle Fires to hollow it, and with scrapers rake the Trunk, and turn away the Fire from one place to another, till they have deepen'd the Belly of it to their desire: Thus also they shape the ends. . . (Beverly 1705, bk. 3:61).

Catesby, in his description of dugout canoe manufacturing process, says that the material used in making such vessels was from pine or tulip trees. He also mentions that prior to the diffusion of european woodworking implements the Indians constructed their dugouts by controlled burning and scraping and hiping of the carbonized surface with "oyster-shells and stone-hatchets". Timberlake, says that the dugouts of the Cherokees were hollowed with European tools although the Indians formerly did so by controlled burning and scraping (Catesby 1731-43, vol. 2:XI).

Du Pratz mentions that the manufacture of these vessels required single trees of enormous size to be cut down. This process is said to have demanded great skill and patience and was accomplished by the following procedure, as recorded by Du Pratz

The native axes. . . could not cut wood neatly, but only bruise it. For this reason they always cut a tree close to the ground so that the fire that they built at the foot of the tree would more easily consume the filaments and fibers of the wood which the axe had mashed. Finally, with much trouble and patience, they managed to bring the tree down. (Le Page du Pratz 1758, vol. 2:188-9; Swanton 1911:66-7; 1946:593).

After felling the tree and cutting the ends to the desired length the next step was to hollow it out, Du Pratz says that

In order to set fire to this tree destined for making a pirogue, a pad of clay. . . has to be made for the two sides and each end. These pads prevent the fire from passing beyond and burning the sides of the boat. A great fire is made above, and when the wood is consumed it is scraped so that the insides may catch fire better and may be hollowed out more easily. . . (Ibid.).

Additional insight into the construction of dugouts during the French period in the southeast is provided by Penicaut

To make these they kept a fire burning at the foot of a tall cypress until the fire burned through the trunk and the tree fell; next they put fire on the top of the fallen tree at the length they wanted for the depth of the boat; they put out the fire with thick mud; then they scraped the tree with big cockle shells as thick as a man's finger; afterward, they washed it with water. Thus they cleared it out as smooth as we could have made it with our tools. These boats may be twenty-five feet long. The savages make them of various lengths, some smaller than others. With these they go hunting and fishing with their families and go

to war or wherever they want to go (Stowe 1974:194-195).

#### Behavioral chain analysis

Table 5 represents a behavioral chain analysis of dugout canoe construction. By describing these past activities in terms of behavioral chain components, the cultural pathways to the archeological record can be followed and activity documentation can be made more secure (cf. Schiffer 1975:112).

Examining Table 5 it is concluded that the activities of felling, trimming, hollowing, and finishing are the behavioral tasks which have outputs to the archeological record. The archeological traces which are produced from these activities include artifacts and features related to woodworking. Two loci are identified for the woodworking activities leading to the production of a dugout canoe.

The first locus is where the tree species grew which were used in making the dugouts. If they couldn't find a tree felled by a storm Southeastern Indians would either fell trees by girdling them with rings cut into the bark or by burning and chipping the base (Hudson 1976:295, 315). The tree species used in the manufacture of dugouts in the Southeast were bald cypress, pine, poplar (tulip), black walnut, and cottonwood. Wherever tree stands of these species occur there is a likelihood that activities such as tree felling and trimming took place in the past. It is noted that the dugout canoe found in the Lower Tombigbee (Stowe 1974) was made of cypress and this tree species is native to the region and that

TABLE 5. BEHAVIORAL CHAIN ANALYSIS OF DUGOUT CANOE CONSTRUCTION

ACTIVITY	Energy sources social units	non-human	Conjoined Elements	Time and Frequency	Location	Output	Intersections additions deletions
TREE SELECTION	Canoe builder w/family (8) or canoe builder w/o family (1,7,9). All builders are male (7)		Hatchet, basket of corn, and stones to make fire (9)	Several days a year (10)	Procurement area for desired tree species (10)		
TREE FELLING	Same as above	Fire (1,2,4)	Axe and hatchet (9)	10-12 days (9) lets it dry for 1-2 months (10)	Same as above	Exhausted tools and carbonized wood	Pitch, rosen (2) moss and wood (1) Roots and part of the base
TREE TRIMMING	Same as above	Fire (1)	Stone hatchets to break up the bark (4) and to remove the branches and roots (10)	1-4 months (10)	Same as above (10)	Exhausted tools and carbonized wood	Branches and ends of trunks
TRANSPORT	Ten or more people (8,10) 35 men (10)		Food for workers (10)	One day (10)	From treefall to working Platform (1,4 9) beside owner's hut (8,10)	Food debris	
HOLLOWING OUT OF THE LOG	Builder/owner and possibly associates (10)	Fire (1, 2,4,5)	Shell scrapers (1,3, 5), adzes (8,9), axe (9), hatchets (5,9), stones (3), wood scrapers (6).	Daily for weeks (8)	Beside hut (8 Exhausted tools Clay pads (6) 9) on working carbonized wood pitch, rosen (2) platform (1,4, (11) postmolds, moss wood (1) 9,10) burned clay, Food debris		Interior of the log
PIELING	Same as above		Same as above includ- ing paint and beeswax (8). May include sand- stone abraders and 'and	Daily for week(s)	Same as above (10)	Exhausted tools, Same as above daub, carbonized wood, postmolds, some food debris	Wood from canoe
1) Harlot 1903	3) Strachey 1849	5) Catesby 1731-1734	7) Swanton 1946	9) Meill 1953	11) Petzold 1960		
2) Barlowe	4) Beverley 1847	6) Du Prat 1758	8) Quirke 1952	10) Tassar 1974			
Burrage 1906				(modern data from Florida)			
				(modern data from Panama)			

one of the closest modern settlements to Moundville is a small village called Cypress, Alabama (Hammond 1972).

The second locus would either be adjacent to Locus 1 or away from it on a platform (see Swanton 1946:Plate 74), under a canopy near the dwelling of the builder (cf. Tesar 1974), or within his settlement. In any case it would most probably be near navigable water.

The expected site content of dugout canoe construction sites is outlined below:

Locus 1: tree felling and trimming activity area

Function of Tools: Chopping, cutting, sawing, chipping, and splitting of wood.

Materials: Stone, shell, wood, pitch, rosin, moss, clay.

Reductive tools made of stone, shell, and wood.

Additive element is clay pads.

Altering elements used are wood, moss, pitch, and rosin.

Tool kit consists of the following:

- Chopping -- axes, celts
- Cutting -- Knives, blades
- Sawing -- Knives, blades
- Chipping -- Axes, celts and adzes
- Splitting -- Wedges, hammerstones, and pieces esquillees

Features: Fire-hearths with charcoal, very little subsistence material associated with clustering of woodworking tool kit composed of items listed above.

Altered Elements: Burned clay, carbonized wood, carbonized moss, carbonized pitch, carbonized rosin, and fire-cracked rock.

Locus 2: log hollowing and finishing activity area

Function of Tools: Chipping, scraping, splitting, gouging, abrading, carving, and polishing of wood.

Materials: Stone, shell, wood, pitch, rosin, moss, and clay.

Reductive tools, additive element, and altering element same as above.

Tool Kit consists of the following

Chipping and splitting same as above

Scraping -- Stone, shell, and wood scrapers. Also some knives and blades.

Gouging -- Gouges, celts, and adzes.

Abrading -- Sandstone abraders and sand in its granulated form.

Carving -- Knives, burins, and gravers.

Polishing -- Paint, dye, or pigment and possibly bees wax.

Features: Fire-hearths with charcoal (some subsistence material) associated with clustering of woodworking tool kit composed of the items listed above. Post molds note working platform illustrated by De Bry after White in Swanton 1946:Plate 74.

Altered elements: Same as in Locus 1.

#### Archeological evidence

No sites in the region have been concluded to represent dugout canoe construction sites or to have had construction loci within multifunction sites, however, the region has never been systematically surveyed for these remains.

The archeological literature on dugout canoe construction sites in the eastern Woodlands consists of two recognized sites: one prehistoric and one historic. The prehistoric site, in Massachusetts, consists of a charcoal lense almost a foot in depth and over 100 feet long, it contained among other debris a chipped hatchet, a modified gouge, a celt, and a grooved ax (Petzold 1961). The historic site consists of a partially finished canoe that was discovered eroding from a

river bank in South Carolina (Figure 9). The roots on the partially completed canoe indicate that the tree used as the raw material was uprooted by a storm sometime prior to its selection. The ax, chisel, and possible adze marks on the inside suggest the use of historic metal tools.

#### PROCESSUAL MODEL FOR DUGOUT CANOES IN THE SOUTHEAST

How long ago Indians made. . . [dugout] canoes, and hence had available water transportation, is of considerable anthropological interest. (Bullen and Brooks 1968:106).

According to Fair and Williams (1950:36-139) all forms of transportation go through a series of stages. Every mode of transportation does not necessarily have to go through each stage but all when analyzed tend to show a general pattern of development and degeneration called "a life cycle." The following diachronic model is base upon the idea of the "life cycle" concept advanced by transportation economists albeit with changes in order to apply the model to a prehistoric mode of transportation in the Southeast.

##### The experimental stage

The experimental stage of dugout canoe development represents the period when floating log craft of limited dependability and safety may have been utilized for only short distances on local waterways by only a few inventive members of society. It is proposed that this period related to the Paleo-Indian Period in the eastern woodlands. It is theorized that, if indeed Paleo-Indians used watercraft it would have



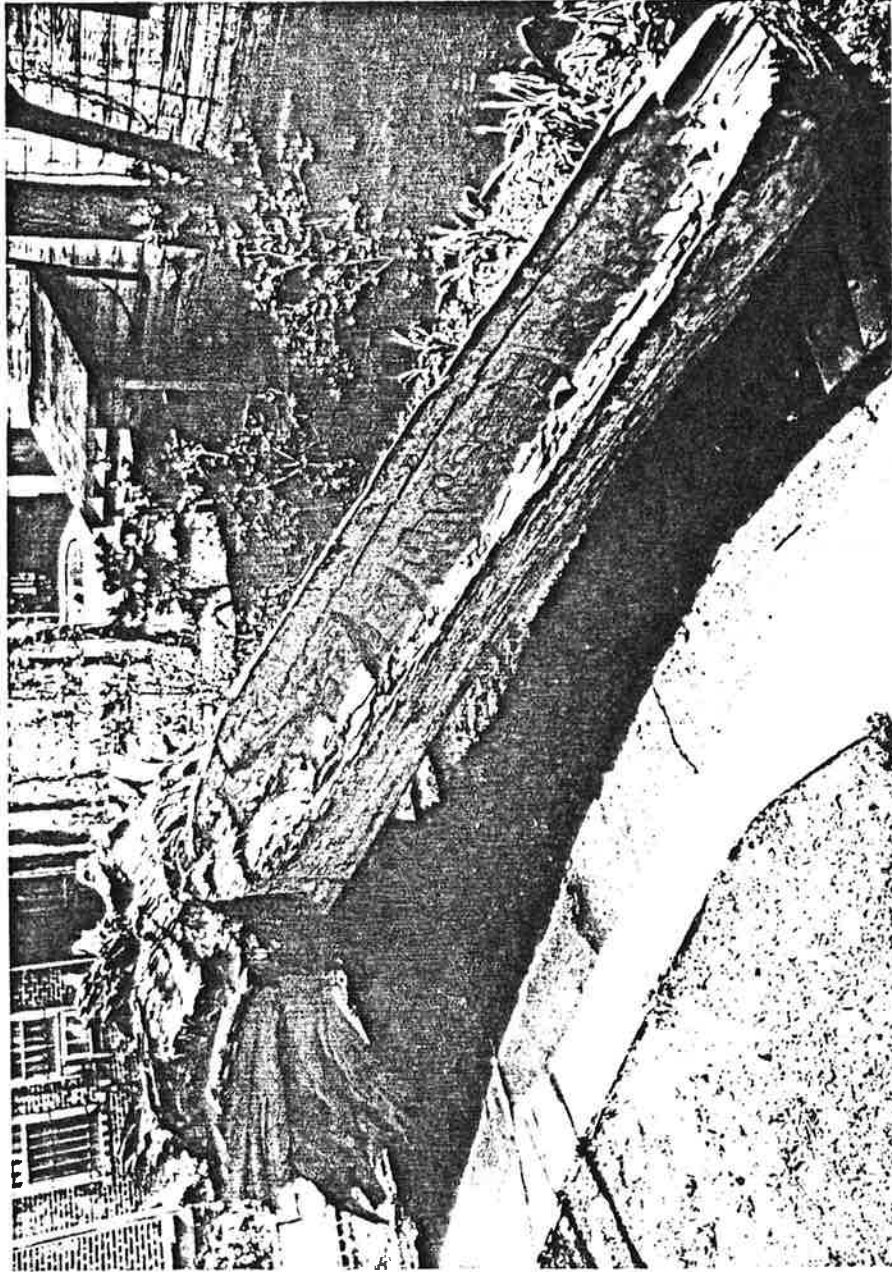


FIGURE 9. Partially completed historic dugout canoe  
found in South Carolina.

been to ford streams or for downstream travel. If used, watercraft were disposed of after usage. The Dalton adze provides indirect technological evidence of the possible construction of dugout canoes at the terminal end of this period (Morse 1975:116). To date, there have been no watercraft related to the Paleo-Indian period in the Southeast. If found, these dugouts are expected to be very poorly preserved, small craft.

#### The early extension stage

The early extension stage of dugout canoe development represents the period when rapid technological improvement in dugout canoe technology occurs. It was probably a period marked by the extension of the dugout canoe into new regions and the interchange of ideas and innovations regarding its socio-economic applications and practicability. It is proposed that this stage correlates with the Archaic period in the eastern woodlands.

The development of the Dalton adze and subsequent adzes, celts, gouges, and other heavy duty woodworking tools suggest that rapid technological improvement occurred in dugout canoe construction. The adze becomes a circumpolar artifact during this period (cf. Beirne 1971) and its appearance in the Southeast at this time is also widespread.

The use of the dugout during this period would have facilitated exploitation of new regions. The Archaic period is marked by the stabilization of the Holocene climactic period and human adaptation to wetland environmental niches is

evident along with successful adaptations to other habitats. Evidence of long-distance trade along waterway routes may also suggest the use of dugout canoes during this period.

A dugout canoe excavated in Florida (Bullen and Brooks 1968) dates from this period as does a dugout canoe recovered in Ohio (Brose and Greber 1982). Both canoes are small; this is expected as the social organization for this period is hypothesized as egalitarian, consisting of small groups of individuals.

#### The rapid extension stage

The rapid extension stage of dugout canoe development is the period when system formation occurs with the construction and use of dugout canoes. It is a period characterized by the coordination of a number of dugout canoe users occupying seasonal and sometimes year-round landing areas. It is proposed that stage relates to the Woodland Period in the eastern woodlands. The Woodland Period is marked by the appearance of pottery and the possible development of agriculture. During the Woodland period villages were established, some of which may have been at strategically located recurrently used landings. The Hopewell culture may represent the development of group efforts in the construction and use of dugout canoes for trade, as well as the familiar burial mounds.

The Zellwood canoe from Florida dates to this period. A sample of the wood from this canoe has been radiocarbon dated to A.D. 765  $\pm$  75 years (Sample ML-324). This dugout was poorly

preserved when found being in two pieces split lengthwise and damaged at one end hence little data on its form was given (Bullen and Brooks 1968:97-102).

In addition, several Copena burials dating from this period have been found in Alabama placed in "long wooden troughs or canoe-shaped coffins" in association with celts (Walthall 1974; 1980:118-119).

#### The maturity stage

The maturity stage of dugout canoe development represents the highest level of efficiency in the construction and use of dugout canoes. It is proposed to have been an era marked by the use of large dugout canoes for purposes of trade and warfare. The use of large dugout canoes with a number of paddlers suggests formalized rule and sharply defined lines of authority and responsibility in their operation. There was also a great deal of cooperation and coordination of many number of canoeists and crews operating out of a number of landings along waterway travel routes. It is proposed that this stage correlates with the Mississippian Period.

Three dugout canoes have been recovered that date from the Mississippian period (Pittman and Lipe 1972; Stowe 1974; and McGahey 1974). These include the Grimes-Mason dugout (Stowe 1974), the Haney-Lewis-Ellis dugout (McGahey 1974), and the Pittman dugout (Pittman and Lipe 1972). The Grimes-Mason dugout canoe was recovered from the east bank of the Tombigbee River by Grimes and Mason and loaned to the University of South Alabama for preservation and study. Although

waterlogged it was thought by the men to have been washed up on the river bank where it lodged in some brush. The condition of the dugout was good although there were some "checking" and longitudinal cracking. In addition, the port gunwale is missing and the starboard gunwale split. Stowe says that the canoe was probably made of cypress. Both ends of the canoe show similar tapering from the bottom of the hull to form platforms 1.0 ft long by 1.25 ft wide at the bow and 1.0 ft long by 1.35 ft wide at the stern. In addition, the stern platform has a hole drilled through it. The wood was radiocarbon dated to be  $605 \pm 60$  B.P. (1345 A.D.), UGA-695 (Stowe 1974).

The Haney-Lewis-Ellis dugout canoe was recovered in the Homochitto River in Mississippi by three men from Natchez, Mississippi. The Forest Products Laboratory of the U.S. Forest Service in Madison, Wisconsin identified the wood as bald cypress (Taxodium distichum). The Geochronology Laboratory at the University of Georgia dated the canoe to A.D.  $1465 \pm 60$  (UGA-803). Adze marks along with evidence in the interior of charring suggest that it was constructed by controlled burning with the carbonized wood chipped away with a stone adze. Much of the surface of the canoe was smoothed. The bow was missing but the stern platform was intact and had a hole drilled through it. A fresh break gives this hole a keyhole-like appearance (McGahey 1974).

The Pittman dugout canoe was recovered from the dry bed of Black Lake in North Carolina. This specimen is actually a

large end fragment of a dugout canoe. The preserved end of the dugout canoe has a 1'4" overhanging platform. Charring is noticeable in the interior of the craft although absent on the exterior. Geochron Laboratories, Inc. radiocarbon dated a wood sample from the canoe at A.D. 1005  $\pm$  45 (GX-1574). The Forest Products Laboratory of the U.S. Department of Agriculture in Madison, Wisconsin identified a sample of the wood of the canoe as the genus Pinus of the yellow pine group, but the species could not be determined (Pittman and Lipe 1972).

Bullen and Brooks (1968:106) point out that the traditional, pre-Columbian dugout canoes with blunt overhanging ends were made at least until 1564 as one is illustrated by Le Moyne and post-Columbian specimens tend to exhibit marks made by metal tools.

#### The Decadance Stage

The decadance stage of dugout canoe use represents the era when this mode of transportation is abandoned either for other modes of transportation or more specialized and efficient types of watercraft. It is a period of general decline in number of users and of dugouts themselves. The dugout canoe is no longer an important element of Native American culture. It is proposed that this stage correlates with the Historic Period.

During the Historic Period non-Indian exploration and settlement of the Southeast affected Native American Culture

to a drastic extent. Few people are known to still make dugout canoes (Neill 1953; Stowe 1974:197). Those that still practice this almost lost art utilize construction and design elements unlike those of prehistoric Native American. The modern Southeast dugout canoe builders use metal tools to shape the wood into designs which generally imitate modern canoes built of different materials (cf. The Arkansas Gazette March 20, 1983:24A).

Although a number of dugout canoes have been found in the Southeast only twelve have enough associated data to place them with some degree of certainty in the category of Historic Period dugout canoes (Table 6). With such a small sample both historic and prehistoric dugouts it is premature to statistically compare their size. For such comparisons to be worth while it would be necessary to standardize methods of measurement and dugout canoe data collection and then to compare results. Appendix A presents a proposed computerized dugout canoe inventory form for Southeast specimens which might be used to collect such data.

Although popular up until the turn of the century few dugouts are in use today. This was due in no small part to deforestation that diminished forest resources of suitable raw material to make a dugout and damage of many of the major southern rivers. Among all the various types of watercraft popular today in the Southeast the closest in design to prehistoric Indian dugout canoes is the Jon boat with blunt bows and flat bottom.

TABLE 6

## HISTORIC DUGOUT CANOES FOUND IN THE SOUTHEAST

State	Length (m)	Width (m)	Height (m)	Hull (m)	Wood	Age B.P.	References
MS	5.44	0.55	0.35	--	C	340	McGahey (pers. comm.)
MS	2.64	0.46	--	0.04	C	175	Lewis 1976
MS	--	--	--	--	P	150	McGahey (pers. comm.)
MS	5.94	0.61	0.61	--	-	185	McGahey (pers. comm.)
MS	4.91	0.81	0.24	0.03	-	-	Stowe 1974
TN	9.91	0.64	0.23	--	-	153	Lewis 1952
MO	4.27	--	--	--	-	-	Hamilton 1975
MS	6.93	0.70	0.11	0.02	-	280	Bense 1980; 1981
FL	5.98	0.76	0.43	--	-	-	vonBurger 1972
FL	--	--	--	--	-	-	Carr 1974
VA	8.08	0.64	--	--	-	-	McCary 1964
NC	5.59	0.49	--	--	-	-	Wilde-Ramsine 1978



## CHAPTER IV

### SUMMARY AND CONCLUSION

The historic popularity of the dugout canoe is well documented in the accounts of the earliest explorers traveling through the Southeast. This paper has attempted to rectify the lack of attention in the area's archeological literature to dugout canoes. Despite the fact that there is a growing number of archeological specimens of prehistoric and historic dugout canoes found in the Southeast, the diagnostic value and socio-economic implications of these finds have largely been ignored. The goal of this research has been to formulate testable hypotheses concerning the ways in which human populations or cultural systems incorporate the introduction and development of a dugout canoe technology.

The problem concerns the identification of dugout canoe use among the Mississippian populations inhabiting the Moundville phase sites located in the Black Warrior River Valley in west-central Alabama. The Moundville phase represents an extensive and complex Mississippian society bracketing the years A.D. 1200 to 1500. Formal similarities in ceramics and other artifacts link the Moundville phase sites with the Southern Cult.

In order to understand Moundville phase dugout canoe transportation strategies, capabilities, and behavioral systems a contextual study of the form, function, and use of the Mississippian dugout canoe was necessary. The

ethnohistoric literature contains a wealth of information on aboriginal lifeways of the Southeastern Indians including the use of dugout canoes. The ethnographic present for this study is A. D. 1539-1543 dateline when the De Soto expedition crossed through the Southeast. The chroniclers of this expedition provide the most complete and detailed information on Mississippian use of dugout canoes before European contact affected Native American transportation. The four accounts of this expedition are considered by other researchers to contain ethnologically valuable material for such a study.

The De Soto accounts relate that dugout canoes were widely used in the Southeast and, that among Mississippian groups their use was highly developed in matters of trade, transportation, and warfare. According to these accounts thousands of Indian warriors skillfully operated hundreds of dugout canoes. Some of these dugout canoes were large enough to carry 60 to 80 people and were managed by an important person who sat underneath a canopy at the stern of the vessel, giving orders to the crew. At top speed, these vessels were said to move as fast on the water as a running horse moves on land. The chronicles substantiate the fact that a high degree of social organization was involved in the operation of such large dugout canoes. Besides being an important transportation device utilized in trade and warfare, dugout canoes were also used by Mississippian groups in their daily rounds for fishing, hunting, gathering, and for local and long distance travel. Above all, dugout canoes were indispensable

items for groups inhabiting flood prone area, where most Mississippian settlements were located. In addition, the De Soto accounts mention that dugout canoes were employed by Indians as "get away vehicles" when the Spanish troops attacked Indian towns. Based upon the amount of ethnological detail provided by all four accounts of the De Soto expedition it is concluded that the dugout canoe played an important role in Mississippian culture.

Behavioral analysis of the dugout canoe indicates that archeological traces of its use can potentially be identified and studied. At least one prehistoric dugout canoe dating to the Mississippi Period has been recovered from the Tombigbee-Black Warrior River System and the possibility exists that this river system contains additional dugout canoes and perhaps lost cargoes. Behavioral analysis of the dugout canoe also pointed out that when such objects are used landings must be employed to launch, land, and store dugout canoes. Moundville's location and design is shown to have features that could have facilitated the launching, landing, and storage of a number of large dugout canoes in a number of places (see Figure 8). If other minor ceremonial centers associated with the Moundville site had dugout canoe landings incorporated into their settlement design then the logistics of dugout canoe travel from Moundville presented in Table 4 suggests that all such centers are within a day's travel from Moundville. This aspect of intra-site and inter-site settlement pattern studies provides an interesting avenue for

future research. In addition, behavioral analysis of canoeing activity suggests that repetitive paddling from a kneeling position would project itself as signs of stress on certain parts of an individual skeleton. Such skeletal indices used in conjunction with non-metric trait analyses of biological distance might provide investigators with bioarcheological evidence for canoe travel. Furthermore, behavioral chain analysis of dugout canoe construction activities suggests that such activities may produce outputs to the archeological record in the form of features and artifacts. Such activity areas or sites have been found elsewhere in the archeological record. It is proposed that such sites may exist along the Black Warrior River but have not yet been found or have not yet been identified as such.

In summary, this contextual study and behavioral analysis of the Mississippian dugout canoe synthesized the available literature on the form, function, use, and significance of the dugout canoe among Mississippian populations in order to discern potential archeological traces of its use. This was done in order to develop a regional research design for studying Mississippian societies (specifically the Moundville phase) through a new cultural perspective, the evolution of prehistoric technology.

In conclusion, the Moundville phase of the Mississippi Period was investigated to present the first regional perspective on dugout canoe development in the prehistoric Southeast. Heretofore our knowledge of dugout canoes in the

archeological literature has not been viewed from a holistic point of view. The significance of this study is that it is an initial attempt at a regional analysis of aboriginal dugout canoe transportation which constructed predictive-explanatory diachronic models of site location, intra-site artifactual patterning, function, and artifact types. Hopefully, this study will help to augment future cultural ecological research in the region.

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## APPENDIX A

### A PROPOSED COMPUTERIZED DUGOUT CANOE INVENTORY FORM FOR SOUTHEAST SPECIMENS

1. SITE NUMBER \_\_\_\_\_ ACC # \_\_\_\_\_ CAT # \_\_\_\_\_
2. SITE NAME \_\_\_\_\_
3. LOCATION
  - a. STATE \_\_\_\_\_
  - b. COUNTY \_\_\_\_\_
4. DATE REPORTED \_\_\_\_\_
5. REPORTED BY \_\_\_\_\_  
ADDRESS \_\_\_\_\_
6. OWNER \_\_\_\_\_  
ADDRESS \_\_\_\_\_
7. COMPLETENESS OF SPECIMEN
  - a. complete ( )  
incomplete ( )
  - b. longitudinal cracking ( )  
horizontal checking ( )  
no longitudinal or  
horizontal checking ( )  
other ( )
8. FORM
  - a. Measurements of Complete Specimens
    1. Length \_\_\_\_\_
    2. Width \_\_\_\_\_
    3. Height \_\_\_\_\_
    4. Hull Thickness at gunwales \_\_\_\_\_
  - b. Bottom Contour
    1. Flat Bottom ( )
    2. Arch Bottom ( )
  - c. Bow Contour
    1. Sharp or Pointed ( )
    2. Broad or Blunt ( )
  - d. Stern Contour
    1. Sharp or Pointed ( )
    2. Broad or Blunt ( )
9. TECHNIQUES OF MANUFACTURE
  1. Charring by fire ( )
  2. Stone adze marks ( )
  3. Steel or iron tool marks ( )
  4. Other ( )

10. SIDES

- 1. tumblehome (concave sides) ( )
- 2. Straight sides ( )
- 3. Flared sides ( )
- 4. Other ( )

11. KEEL LINE (BOTTOM LINE OF A CANOE FROM A LATERAL VIEW)

- 1. Straight keel line ( )
- 2. Slight uplift ( )
- 3. Moderate rocker ( )
- 4. Extreme rocker ( )

12. ASYMMETRY

- 1. Present ( )
- 2. Absent ( )

13. AGE \_\_\_\_\_ How determined? \_\_\_\_\_

C14 Ref. \_\_\_\_\_

14. MATERIAL

- 1. cypress ( )
- 2. pine ( )
- 3. poplar ( )
- 4. cedar ( )
- 5. black walnut ( )
- 6. other ( )

How determined \_\_\_\_\_

15. PHYSIOGRAPHIC ASSOCIATION

16. SURFACE SOIL IN SITE AREA (if not underwater discovery)

17. NEAREST SOURCE OF NAVIGABLE WATER

- 1. Marsh-Bog ( )
- 2. Backswamp ( )
- 3. Lake ( )
- 4. Oxbow Lake ( )
- 5. Fourth Order Stream ( )
- 6. Third Order Stream ( )
- 7. Second Order Stream ( )
- 8. First Order Stream ( )
- 9. Estuary ( )
- 10. Ocean ( )
- 11. Other ( )

18. DISTANCE (IN METERS ROUNDED TO NEAREST 10 METERS) TO  
NEAREST SOURCE OF WATER \_\_\_\_\_

19. NAME OF NEAREST BODY OF NAVIGABLE WATER \_\_\_\_\_

20. AVERAGE SLOPE OF LANDSURFACE

- 1. 0.0-2.9% ( )
- 2. 3.0-6.9% ( )
- 3. 7.0-14.9% ( )
- 4. 15.0-25.0% ( )
- 5. above 25% ( )

21. ASSOCIATED ARTIFACTS \_\_\_\_\_

22. ASSOCIATED FEATURES \_\_\_\_\_

23. PRESERVATION METHODS UNDERTAKEN \_\_\_\_\_

Jerry:

The person with the Department of Education in Little Rock who was the most help to me was Cheryl Pagan. She told me that a course in Global Studies will be required under the new standards to be taught in every high school in the State. Some schools in the State have a course by that name, but the Fayetteville campus does not. She suggested a graduate-level course taught in the summer with the name "global" in it. My thought is to have a special topics course with a name like "global cultures" listed in the summer school racing form. The course could meet along with an undergraduate course (2023, maybe) and then the people enrolled for the course could do a paper relevant to high school curriculum development and extra readings. This course would meet the needs of teachers who were already out there teaching.

Pol. Sci. offers a 2000-level course called "Global Politics" which meets certification requirements. We might think about changing "Peoples of the World" to "Global Ethnography" or "Global Cultures" to try to fit into the teacher certification requirements on the undergraduate level.

Mary Jo



lost

# HUMAN INTERACTION RESEARCH INSTITUTE

KIRKEBY CENTER, SUITE 740 • 10889 WILSHIRE BOULEVARD

LOS ANGELES, CALIFORNIA 90024

(213) 879-1373

October 30, 1985

Professor Mary Jo Schneider  
University of Arkansas  
J. Wm. Fulbright College of Arts and Sciences  
417 Hotz Hall  
Fayetteville, Arkansas 72701

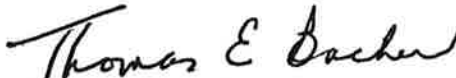
Dear Professor Schneider:

This is to confirm that your chapter, "Rural Rehabilitation," will indeed appear in Volume V of the ANNUAL REVIEW OF REHABILITATION. The book manuscript is being finalized now, and will shortly be sent off to the publisher in New York.

I share your disappointment that your manuscript had to be delayed for publication. Our publisher sometimes has to impose economic limitations on us regarding length of the REVIEW book manuscripts, and hard decisions are the result. Let me assure you that the postponement of publication was in no way a reflection on the quality of your work; when faced with the requirement to cut, we quite literally "flipped a coin" to decide which of the several manuscripts of approximately equal length would have to be delayed to the next volume.

Thank you for your understanding. We look forward to an excellent book, much enhanced by the quality of your contribution to it.

Sincerely,

  
Thomas E. Backer, PhD

TEB:nt

Department of Anthropology



OCT 31 1985

Dear Colleague:

Thank you for completing and returning the questionnaire for Year Three of the five-year study. We appreciate your cooperation and will inform you of the results when the study is completed.

With best wishes,

*Patty Jo Watson*

Patty Jo Watson  
Chair, Committee to Study the Academic  
Employment of Women in Anthropology

PJW:mk