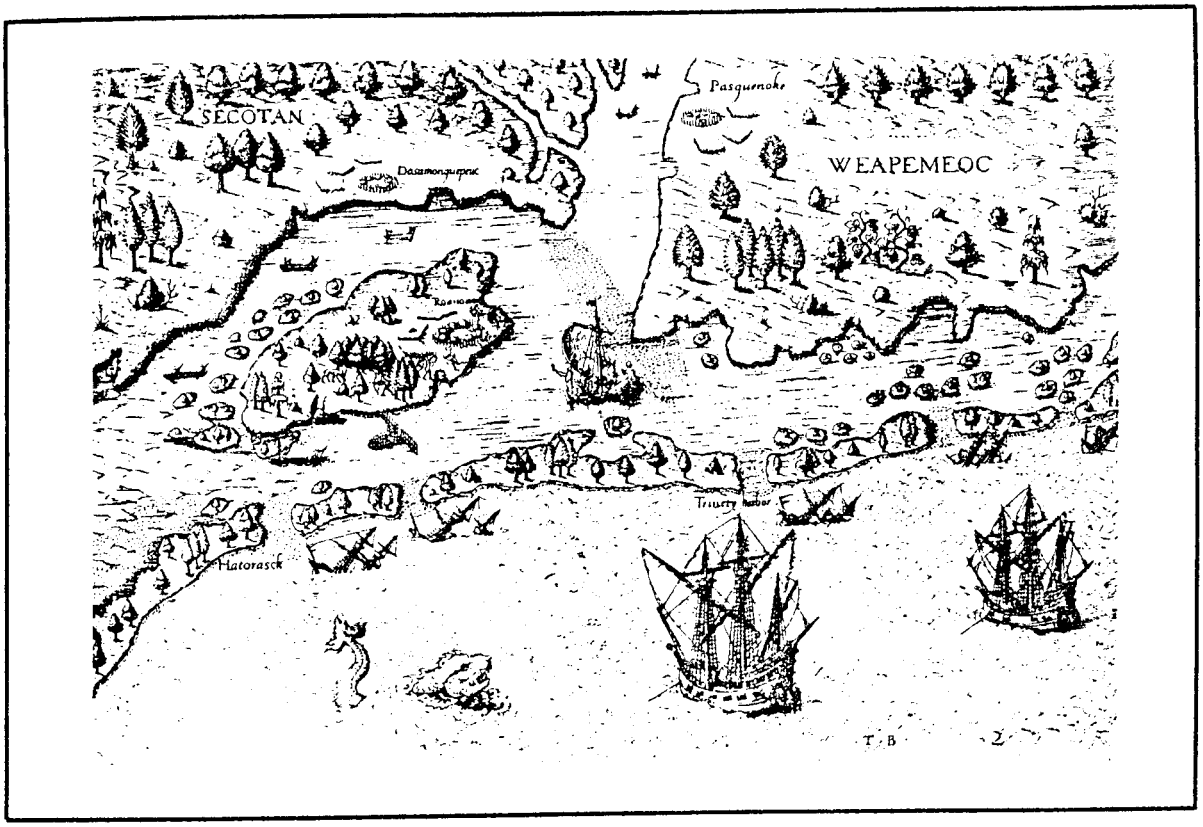

Sir Walter Raleigh's Roanoke Colony: A Remote Sensing Reconnaissance Survey

ECU RESEARCH REPORTS NO. 5

by
Program in Maritime History and Underwater Research
East Carolina University
Greenville, North Carolina

1987

TABLE OF CONTENTS

ILLUSTRATIONS

ABSTRACT

In August 1590, John White returned to Roanoke Island to find the second of Sir Walter Raleigh's colonial settlements abandoned and in ruins. Only the word "CROATOAN" carved on a tree, remained to offer a clue to the colonists' disappearance. For almost 400 years the existence and disappearance of the "Lost Colony" has remained the subject of considerable interest. A reexamination of early colonial settlement patterns in North American and evidence of environmental change on Roanoke Island strongly indicate that the settlement site lies below the waters of Roanoke Sound. In conjunction with plans to celebrate the 400th anniversary of Raleigh's Roanoke Island settlements, the Department of History of East Carolina University conducted a systematic survey of high-probabilty underwater areas in Roanoke Sound identified by historical, archaeological, geological, and environmental research. The survey utilized sophisticated remote sensing technology to identify cultural material that might prove to be associated with the settlement site. During the summer of 1986, the students and staff of the East Carolina University Field School in Maritime History and Underwater Archaeology carried out an on-site assessment of selected side scan sonar and proton precession magnetometer targets. Although this assessment generated no concrete evidence of the Raleigh colony site, the investigation identified a bottom surface feature that could be a relic stream bed north of Shallowbag Bay. If the feature is indeed a relic streambed it could prove to be the stream which was historically depicted as being in association with the settlement site. Additional research is planned to confirm the identity of this feature and test other anomalies located during the remote sensing survey.

INTRODUCTION

In 1585 English colonists were dispatched by Sir Walter Raleigh to establish a permanent settlement on Roanoke Island. The colony was abandoned in June 1586. Approximately one year later a second expedition arrived to reestablish the settlement. Within a month, John White, governor of the colony, sailed back to England to secure much-needed supplies. When White returned to Roanoke Island in August 1590, he found the colony abandoned and in ruins. The only remaining clue was the word "CROATOAN," carved into a tree.

For almost 400 years the disappearance of the Roanoke Island colonists and the location of their settlement site have remained mysteries. Our knowledge of the first English settlement in the New World is equally obscure. Surviving historical records preserve little concerning the colony and archaeological research has provided little additional insight. Investigations to date have traditionally ignored or discounted the possibility that evidence of the colonial settlement is preserved within the sediments of Roanoke Sound adjacent to Roanoke Island.

Studies of environmental processes confirm that substantial change has taken place along the northeast coastline of Roanoke Island during the past 400 years. Much of the island's 1585 coastline is now underwater. If Raleigh's colonists had settled in the immediate vicinity of the water, as was characteristic of almost all early European settlements, the physical remains associated with the settlement would have been submerged as environmetal change reduced the Roanoke Island land mass. Preliminary examinations of the archaeological record associated with other early settlement sites at Jamestown and Wolstenholme Towne in Virginia, Santa Elena in South Carolina, and St. Catherines Island in Georgia support expectations that the artifacts and archaeological features associated with the Raleigh Colony should have survived

the inundation process. Properly investigated, the archaeological record can shed new light on the origins of English settlement in America and provide a valuable insight into the existence of those first English settlers.

Interdisciplinary research has identified areas of high probability for the settlement location. With assistance from America's 400th Anniversary Committee, state-of-the-art remote sensing equipment and well-established archaeological techniques were used to systematically search portions of each high-probability area for evidence of sixteenth century occupation. Analysis of survey data led to the identification of twelve target sites with acoustic and/or magnetic signatures that were worthy of additional investigation. During the summer of 1986, the staff and students of the East Carolina University Field School in Maritime History and Underwater Archaeology examined three of the sites and a fourth associatd with a nineteenth century landing. The evidence produced no new insight into the location of the Raleigh colony site but identified what may prove to be a relic streambed that could have been associated with the settlement.

HISTORICAL BACKGROUND

On March 25, 1584, Sir Walter Raleigh obtained a patent from Queen Elizabeth to establish colonies in North America. That summer, a party under the direction of Philip Amadas and Arthur Barlowe spent more than two months exploring in the vicinity of Roanoke Island (Figure 1). Seven ships under the command of Richard Grenville departed England the following Spring with settlers to establish a colony on the island. In August 1585, 108 men under the command of Ralph Lane landed on the northern end of Roanoke Island. Here they constructed an earthwork fortification and a number of other structures for habitation. When Grenville failed to return from England with supplies in the spring of 1586, Lane took advantage of a visit by Sir Frances Drake and abandoned the settlement in June. Grenville returned within a month and found the settlement abandoned. He left a small party to occupy the fortification and returned to England.

That winter, Raleigh organized a second expedition. On May 8, 1587, a small fleet of three ships departed England carrying 120 settlers, including seventeen women and nine children. They

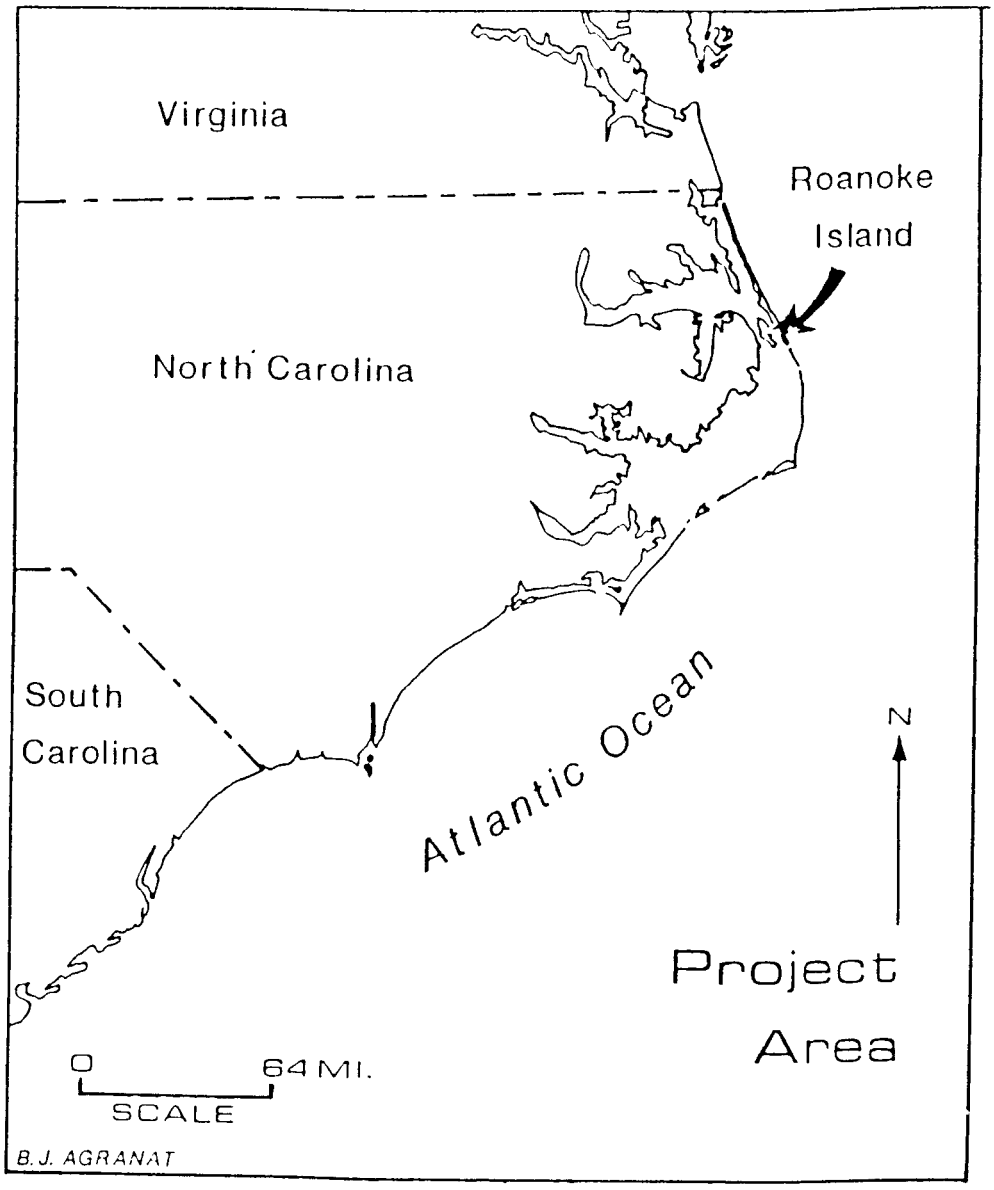

Figure 1. Site location map.

arrived in July and found the earthwork fortification destroyed, the buildings abandoned, and no evidence of the detachment assigned to occupy the fort. Construction of new quarters and rebuilding of the fortification began. John White, governor of the colony, sailed for England in order to secure additional supplies in late August. White's return was delayed for three years by political turmoil and the intervention of the Spanish Armada. Finally in August 1590, he returned to find the settlement abandoned, with only the word "CROATOAN" carved into the trunk of a nearby tree. Foul weather and a shortage of provisions prevented a search for the colonists. White returned to England and plans to establish an English colony in North America were temporarily abandoned.

LOCATION OF THE SETTLEMENT

Time and the elements have obscured the site of Raleigh's Roanoke Colony. Historical data gives only a general indication of the settlement's location. Although National Park Service archaeologists working under the direction of J. C. Harrington located and investigated the remains of a small earthwork thought to be Fort Raleigh, the investigation produced little archaeological evidence of the settlement site. New interpretations of Harrington's data have suggested that additional archaeological evidence might be present in the vicinity of the reconstructed fort, but investigation has revealed little additional material.

In light of these findings, serious consideration must be given to the possiblity that Harrington's fortification represents an outpost, and the major earthwork fortification and settlement are located elsewhere. Early settlement patterns in North America confirm that both habitation and fortification sites were closely associated with navigable water. This proximity facilitated essential contact with support vessels, and ensured that shipboard ordnance could be effectively employed in defense. Water access

was also important for transportation, exploration, fishing, and hunting. These factors must have been considered in selecting a site for the Roanoke Island settlement.

The southern end of the island was composed almost entirely of lowland marsh. Navigation there, and along the west coast, was restricted by marsh islands and sand bars. It is most probable that the settlement was located on the east or northeast shore. Deep water channels through the inlets between the barrier islands would have provided accessibility, while fortifications could have been constructed to control their use. The north and east coasts of Roanoke Island also offered two harbors suitable for small boat anchorages.

Location along the north or east coast adjacent to the water would have placed the settlement on the high energy shore of the island, where winds and currents combine to accelerate erosion. Inundation is another factor. A well-documented rise in sea level, along with other geologic processes, has caused the northern end of Roanoke Island to sink while the southern shore rises. Extrapolation of reliable data by geologists indicates that as much as 1,500 feet of the northeast coast has undergone inundation since 1585.

Considering the nature and extent of this activity, it is reasonable to assume that archaeological evidence of the Raleigh colony could be preserved in the sediments of Roanoke Sound. The archaeological record associated with other early colonial settlements, and inundation studies of other North Carolina colonial sites, indicate that both artifacts and archaeological features should have survived the islands sublimation. Underwater archaeological investigations have yielded considerable evidence that cultural material in an underwater environment frequently survives better than similar material in terrestrial sites. The process of inundation does not in itself cause the destruction of cultural material or culturally-associated features. It is possible, therefore, that environmental change and inundation will have contributed to a high degree of preservation at the site.

DESCRIPTION OF THE WORK

1985 Field Research

Based on evidence identified through historical and geological research an on-site reconnaissance was carried out in 1983. The reconnaissance was designed to determine the most appropriate remote sensing equipment to be used to identify submerged cultural material in the Roanoke Island vicinity and establish priority areas for future survey activities. With assistance from the America's 400th Anniversary Committee the East Carolina University Program in Maritime History and Underwater Research resumed the investigation in November and December 1985. Using high-resolution side scan sonar and a proton precession magnetometer, portions of eight survey areas between Shallowbag Bay and the southwest side of Northwest Point were investigated (Figure 2). The magnetometer identified the magnetic signatures generated by iron artifacts and concentrations of brick or other material containing a thermoremnant magnetic potential. The side scan sonar identified targets by echoing sound waves off objects on the bottom surface. Lanes in each survey area were plotted using a Loran C positioning system and on-board track plotter (Figure 3). This permitted quick and accurate recording of each magnetometer and sonar target location.

In spite of disruptions caused by bad weather, a portion of each of the eight survey areas was investigated (Figure 2). While plans called for a thorough examination of areas C, E, and F, weather made working there impossible at times during the survey. During these periods survey activity was shifted west to areas A and B, or southeast to areas G and H so that instrument time would not be completely lost. A small portion of area D was also surveyed using only the magnetometer.

The survey yielded over 500 feet of sonagram records and 40 feet of magnetic records. Preliminary on-site examination of these records confirmed a variety of targets and target clusters. While the majority appeared to be concentrated in areas "C" and "F", targets were found in each of the eight survey areas. In addition a random

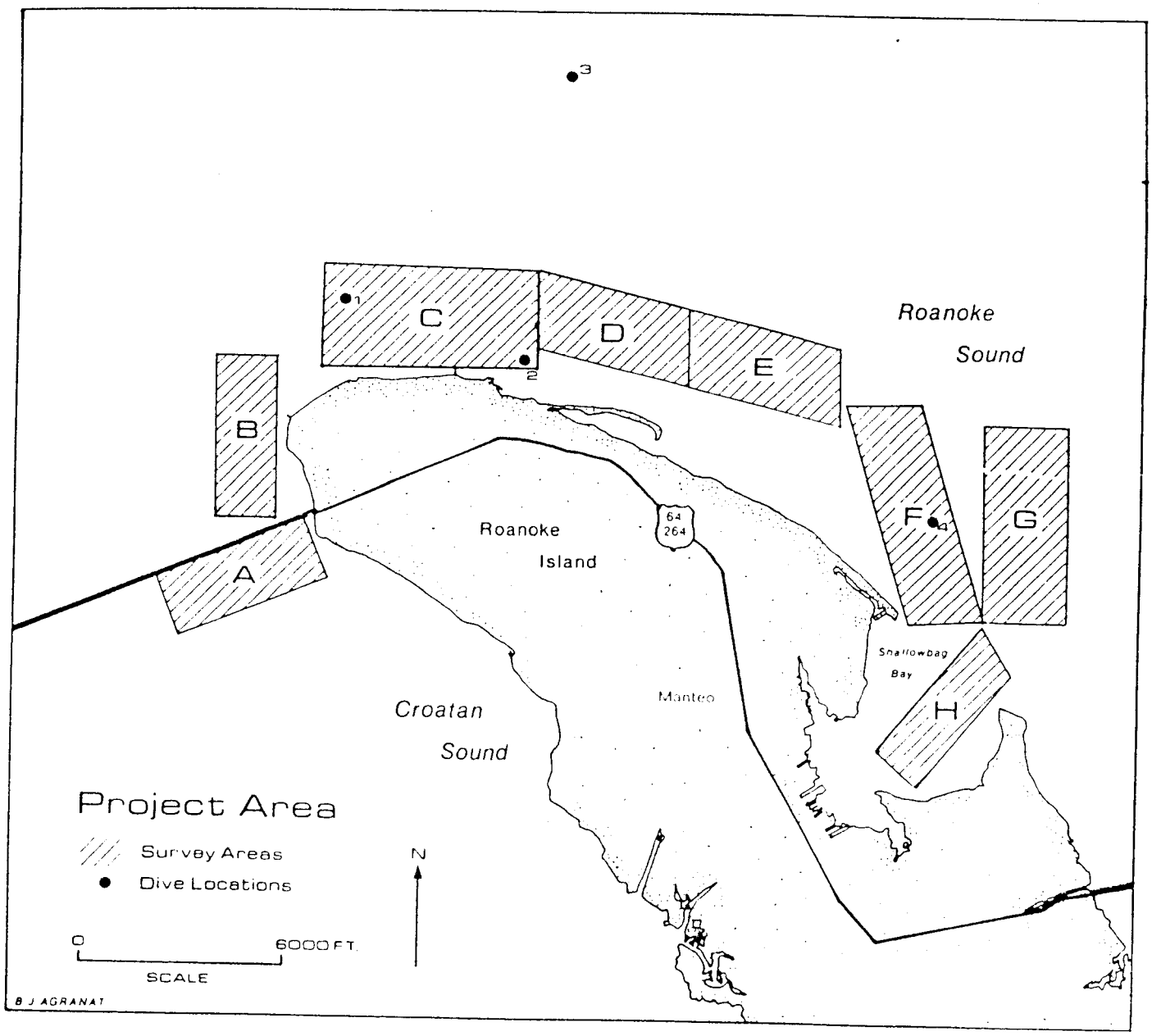

Figure 2. Survey areas and dive locations.

Figure 3. Survey equipment on board research vessel.

(Photo credit: Kathryn Bequette)

survey of the historic channel north of Roanoke Island identified additional "deep water" targets. During the final two days of field operations, SCUBA-equipped archaeologists investigated four targets. These were selected on the basis of geographical location to provide an indication of bottom surface conditions at the various sites. First hand knowledge of the bottom surface conditions will be helpful in evaluating the remote sensing records.

The first site, identified by sonar, and confirmed by the magnetometer, is in the immediate vicinity of the Roanoke Island shoreline as it was in the late sixteenth century. Examination of the bottom environment confirmed that the signatures were generated by an early twentieth century vessel. A limited number of artifacts associated with the vessel's structure were recovered to confirm identification (Figure 4). These are now in storage at East Carolina University. The bottom was found to be highly washed sand. The second site is in "deep water" (eleven feet), in an area that could have served as an anchorage for vessels until direct inlet access to Roanoke Sound ended in the middle of the nineteenth century. Investigations of the magnetic target failed to identify any cultural material above the bottom surface. The bottom was found to be unconsolidated sand over sand and mud subbottom sediments. The other two sites are in areas that would have been part of the island land mass 400 years ago. Material generating both magnetic and acoustic signatures was identified as modern (i.e. anchors, pipe, and pound net remains). No cultural material was recovered from either of these sites. The bottom surface was found to be composed of unconsolidated sand.

1986 FIELD RESEARCH

During the spring of 1986, magnetic and acoustic signatures from the remote sensing survey were analyzed to identify targets of high probability. Four major target concentrations were identified. Three of these were located off the north end of Roanoke Island while the fourth cluster of targets was found on the west side of the island near Burnside Landing. In conjunction with the East Carolina University Field School in Maritime History and Underwater Research a reconnaissance level survey of these target sites was carried out in July, 1986. Although equipment problems and a lack of adequate vessels limited research time, portions of three target areas were investigated. To minimize the loss of field time during periods when work off the north end of Roanoke Island was impossible, targets in the survey area on Croatan Sound on the west side of the island from Burnside Headquarters to the U. S. 64 bridge, were examined.

Target relocation was accomplished using the North Star 800 Loran "C" and
on-board track plotter used to control survey data. Once each area had been defined by buoys, a Littlemore Scientific Type 7702 Small Boat Magnetometer was employed to identify specific target sites.

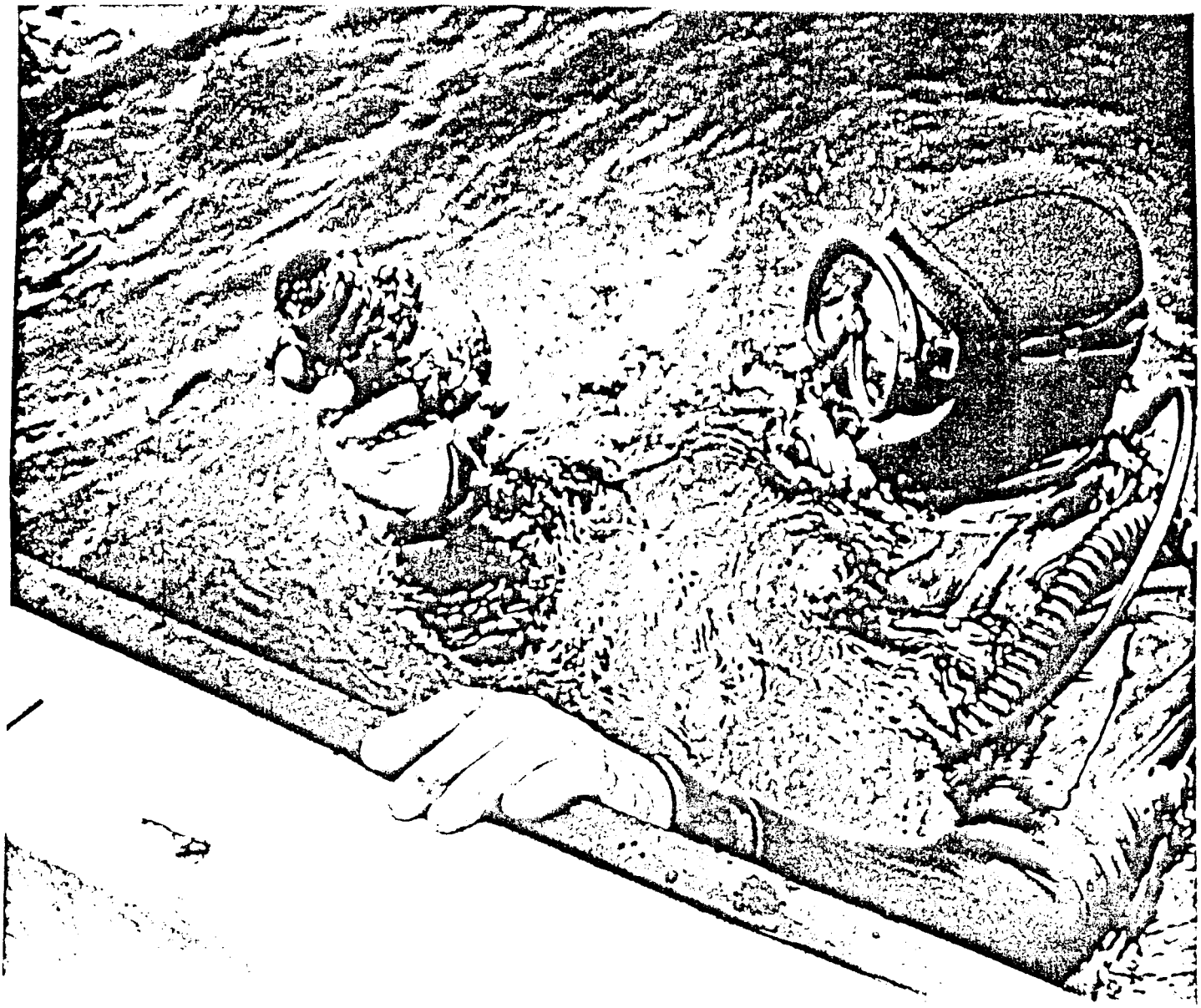

Figure 4. Diver recovering artifacts from remains of modern vessel in Area "C."

(Photo credit: Tony Rumple, ECU News Bureau)

Divers equipped with SCUBA carried out a bottom surface examination to locate material generating the signature. Where the source of the signature was not exposed on the bottom surface probing was employed to pinpoint subbottom cultural resources. Once the location of subbottom material had been established induction dredges were used to systematically remove overburden.

Survey Area D CHECK AREA DESIGNATION ON CHART
The remote sensing investigation of Area "D", north-northeast of Baum Point produced a number of small acoustic and magnetic targets. Examination of three sites identified a series of reefs constructed of automobile tires, a concentration of wire rope, and a modern small boat anchor. A test excavation was also carried out in the vicinity of a small meandering channel that extended across the shallows north of Baum Point. The channel was identified during a aerial examination of the area. The test excavation was carried out in an effort to determine if the channel was associated with a relic stream bed that could have channeled fresh water into Shallow Bag Bay. No evidence of fresh water deposits were identified in the first two feet of bottom sediment.

Survey Area "F" CHECK SURVEY AREA DESIGNATION ON CHART
The remote sensing investigation of Area "F" identified a number of small magnetic anomalies and one acoustic signature with a magnetic component. That signature was examined in 1985 and proved to be the remains of an early twentieth century work boat. Only a portion of the lower hull was found to survive in conjunction with the gasoline engine, transmission, propeller shaft, and propeller. The shaft and propeller were recovered along with the carburator.

A reconnaissance of the bottom in the vicinity of the workboat identified a small concentration of ballast stones. A ten-by-ten foot grid was established at the site and the exposed stones were mapped in-situ. Induction dredges were used to excavate bottom sediment inside the grid. That excavation revealed that the stones were not associated with any structutre and were randomly deposited at the site. No artifacts were found in association with the stones.

Near the shore northeast of a partially submerged rip rap bulkhead east of the Lost Colony theater a small magnetic target was examined. Relocated using the magnetometer, material generating the signature proved to be a small boat anchor and short length of chain. No additional material was found in the area of the anchor.

Survey Area "H" CHECK SURVEY AREA DESIGNATION ON CHART
Remote sensing and diving operations in survey area "H" were carried out during periods when weather prevented operations off the north end of Roanoke Island. In the vicinity of Burnside Landing sonagrams indicated the remains of a dock structure and associated debris. Magnetometer records confirmed concentrations of ferrous material within the submerged structure. Examination of the site confirmed that material generating the signatures was associated with a dock structure. Bottles, ceramic fragments, and iron fastenings suggested that the dock was in use at least as early as the late nineteenth century. Investigation at the site was limited to a brief reconnaissance and no testing was conducted. Artifacts recovered for examination were returned to the site.

CONCLUSIONS

While examination of these target sites failed to produce evidence of the Raleigh Colony it did provide information that will be valuable in continued assessment of the remote sensing records and refining theories about the location of material associated with the settlement site. Knowledge of the specific botton conditions will make it easier to assess additional target signatures. Examination of these sites also confirmed that the nature of the bottom sediments would contribute to the preservation of any cultural material in the area. In the high energy environment off the north shore of Roanoke Island buoy anchors rapidly migrated into the sediment where they were isolated from the highly destructive saltwater environment. If artifacts associated with the settlement site were similarly buried in the sediment, the degree of preservation could be excellent.

The identification of a relic stream bed northeast of Baum Point could be the most significant insight produced by the investigation. If the feature can be confirmed as a relic stream feature, it could have been the source of water associated with the settlement site that is identified in historical record sources. During the summer or fall of 1988, the staff and students of the Program in Maritime History and Underwater Research plan to return to Roanoke Island to test the potential relic streambed off Baum Point, examine additional "high probability" target sites identified by remote sensing, and continue the magnetometer survey of uncompleted portions of the eight survey areas.