UNLOCKING THE PAST!

Archaeology of the Cattle Economy
in Colonial Charleston, South Carolina

HOW THIS RESEARCH TEAM UNCOVERED THE ROLE OF CATTLE IN COLONIAL CHARLESTON, SOUTH CAROLINA...
Welcome to the Colonial Charleston Cattle Economy Research Project - where archaeologists and historians use science to unlock the past! We're going to show you how the cattle (cows!) that were raised in and around Charleston in the 17th, 18th, and 19th centuries (AD 1600s through 1800s) can help us answer questions about trade, diet, and local environments from that time.

This kind of research takes a whole team of people. Here are just some of the researchers who make the Charleston project possible...

Martha
Curator of Historical Archaeology at the Charleston Museum.
Specialty: Historical Archaeology

They've been studying Colonial Charleston for decades!

Betsy
Professor Emerita at the University of Georgia.
Specialty: Zooarchaeology.

Barnet
Historical Archaeologist.
Specialty: Zooarchaeology.

Hayden
Historian.
Specialty: South Carolina Environmental History.

Grant
Environmental Archaeologist.
Specialty: Fire Ecology.

Angelina
Environmental Archaeologist.
Specialty: Palynology and Fungal Studies.

Jana
Graduate Student and Chemist.
Specialty: Biological and Analytical Chemistry.

Cam
Graduate Student and Historical Archaeologist.
Specialty: Zooarchaeology.
OUR STORY BEGINS NEARLY 40 YEARS AGO, AT AN ARCHAEOLOGICAL EXCAVATION IN ST. AUGUSTINE, FLORIDA IN 1979...

ST. AUGUSTINE

WHERE MARTHA ZIERDEN AND BETSY REITZ MET, AND BEGAN A DECADES-LONG RESEARCH PARTNERSHIP AND FRIENDSHIP.

A FEW YEARS LATER, MARTHA AND BETSY’S PATHS CROSSED AGAIN IN CHARLESTON, SOUTH CAROLINA...

...AT AN ARCHAEOLOGICAL SITE CALLED MCCRADY’S TAVERN...

WHEN WE STARTED FINDING ANIMAL’S BONES IN OUR EXCAVATIONS, I CALLED BETSY A ZOOARCHAEOLOGIST.

ZOOARCHAEOLOGY IS THE STUDY OF ANIMAL REMAINS LIKE BONES, TEETH, AND SHELLS FOUND ON ARCHAEOLOGICAL SITES.

ANIMAL REMAINS CAN TELL US A LOT ABOUT PEOPLE... WHAT THEY ATE, WHERE THEIR FOOD CAME FROM, AND THEIR PLACE IN SOCIETY.

PICTURED HERE: OYSTER SHELL, CATTLE BONES AND TEETH, AND GLASS BEADS FROM THE MCCRADY’S EXCAVATIONS.
As the years passed, Martha and Betsy continued working on small archaeological sites in historic Charleston that were occupied from the year 1670, when the city was first founded as a European colony through the 1800s.

At first, we were interested in studying the differences between urban and rural life in Charleston...

*Colony: A place controlled by another country. Early cities in North America, like Charleston, were founded by countries like England, Spain, and France.*

Through written histories, artifacts, and animal remains at archaeological sites in and around the city...

.*For thousands of years before Europeans established the Carolina colony, the land was settled and occupied by native nations like the Etowah, Yamasee, and Muskogee (Creek). These native nations were removed from their lands by force through the process of colonization.*

...but we noticed these archaeological sites were full of cattle bones, so then we started to focus on the Charleston cattle.

**Urban: Related to cities and city life.**

**Rural: Related to the countryside and country living.**

Carolina cattle were one of the main exported goods during the colonial period, with cattle regularly shipped to many Caribbean colonies.

Our work at one site in particular – the Charleston beef market – made us ask different questions about the cattle industry in Charleston...

**DID YOU KNOW?**

Cattle are colonists too! They were first brought over on ships to the Americas with colonists from Spain and England in the 1400s, 1500s, and 1600s.
The Charleston Beef Market was a public market space near the waterfront, where cattle were bought, sold, and processed through much of the 1700s.

Pictured: Historical recreation of the 18th century Charleston Beef Market

Before we started working at the Beef Market, most archaeological excavations in Charleston focused on private residences (where people lived) rather than public places like markets.

The Beef Market excavations helped us investigate how cattle products made their way into the city.

Historic Charleston Square

We also noticed that in some places within urban Charleston, cattle were raised and butchered on-site rather than purchased directly from a market. This was common for large households.

Nathaniel Russell House and Yard
BEFORE WE INTRODUCE THE REST OF THE TEAM AND OUR ONGOING RESEARCH, HERE ARE JUST A FEW OF THE THINGS WE LEARNED FROM OUR DECADES OF WORK IN CHARLESTON:

1. WHEN WE STUDY ANIMAL REMAINS, WE CAN TELL A MUCH MORE DETAILED STORY OF LIFE IN A CITY.
2. SPECIALIZED STUDIES LIKE ZOOARCHAEOLOGY SHOULD BE PART OF ANY ARCHAEOLOGICAL PROJECT.
3. THERE ARE PLENTY OF WAYS FOR ANIMAL PRODUCTS TO ENTER INTO AND MOVE AROUND A CITY. IN CHARLESTON, CATTLE WERE BOTH BROUGHT TO MARKETS AND RAISED AT PRIVATE HOUSEHOLDS.

... AND NOW WE GET TO WORK WITH OUR COLLEAGUES TO ASK EVEN MORE QUESTIONS!

WHERE DID THE CATTLE SOLD IN CHARLESTON COME FROM, AND HOW WERE THEY RAISED?

HOW WERE CATTLE MANAGED AND RAISED IN AND AROUND CHARLESTON?

WHAT WAS THE IMPACT OF CATTLE ON LOCAL ENVIRONMENTS?

A PROJECT LIKE THIS TAKES A BIG INTERDISCIPLINARY TEAM OF SPECIALISTS TO ANSWER THESE QUESTIONS.

IN 2019, A TEAM OF ARCHAEOLOGISTS AND HISTORIANS BEGAN WORKING TOGETHER ON WHAT IS NOW CALLED THE CHARLESTON CATTLE ECONOMY PROJECT, SUPPORTED BY THE NATIONAL SCIENCE FOUNDATION.
In order to tell the story of the Charleston cattle industry as accurately as possible, we’ll break it down into four major areas of study:

**Historical Research:** How historians analyzed historical documents related to Charleston’s cattle industry, including evidence for where cattle were raised and sold, and who was doing the raising and selling.

**Zoocultural Research:** How cattle bones and teeth from urban and rural sites in and around Charleston can tell us where and how cows were raised.

**Isotopic Research:** How chemical studies of cattle teeth can tell us where they were raised and what kinds of plants they were eating.

**Environmental Research:** How the soils from rural areas around Charleston can tell us how people changed their environment to support cattle raising and the impact of European-introduced cattle on local environments.
**Research Question 1:**

**How were cattle managed and raised in and around Charleston?**

One of the first steps to understanding how the Charleston cattle industry and environments changed over time was studying the primary and secondary source documents from the colonial period.

**Primary sources** can include maps, journals, letters, newspapers, or city records.

These primary sources give us a big-picture look at how people living in and around Charleston were raising cattle, and how these practices changed over time.

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**Primary sources are first-hand accounts of a particular point in time.**

**Secondary sources are usually summaries or interpretations of primary sources.**

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**1670-1730**

During this period of time, cattle that were sold in Charleston were free range, which means they moved freely outdoors in grasslands and pastures outside of the city instead of being confined in a pen all day. Enslaved African and indigenous men, the first "cow hunters" or "cowboys," were responsible for raising and caring for these cattle on ranches called cowpens.

African men in particular used their knowledge of water management and rice cultivation to adapt these practices to Carolina wetlands and marshes.

Their expertise and labor made rice one of the most valuable exports of the Carolina Colony during this period.
**1730-1780**

By the mid-to-late 1700s, the urban population within Charleston was growing quickly to keep up with rising demand. Cattle ranchers moved into rural lands farther away from Charleston to have the space to raise cattle.

**Cattle Butchering is officially moved away from the urban areas.**

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**1780-1820**

During this time period, the urban Charleston population continued to grow. After the Revolutionary War (1775-1783), South Carolina sold common cattle grazing lands to pay war debts. Cattle ranchers had to limit the number of cattle they raised, or move farther in the rural Carolina interior to find open lands for raising cattle.

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By 1783, butchering cattle within the city limits was prohibited (not allowed), and animals should be slaughtered outside of the city and brought in pieces to markets.

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Now we know how cattle raising practices changed over time around Charleston!
RESEARCH QUESTION 2:
WHERE DID THE CATTLE SOLD IN URBAN CHARLESTON COME FROM, AND HOW WERE THEY RAISED?

TO ANSWER THIS QUESTION, WE NEEDED TO LOOK AT SOME OF THE ARCHAEOLOGICAL SITES... BOTH URBAN AND RURAL, WHERE CATTLE REMAINS WERE FOUND.

OUR ZOOARCHAEOLOGY RESEARCH INCLUDED BOTH TOOTH WEAR ANALYSIS AND SKELETAL COMPLETENESS STUDIES.

WHEN A TOOTH ERUPTS (BREAKS THROUGH THE GUMS), IT IS COMPLETELY COVERED IN ENAMEL (JUST LIKE YOUR TEETH).

AS THE TOOTH GETS USED FOR CHEWING OVER TIME, THE ENAMEL WEARS DOWN, AND THE TOOTH LOOKS WORN, REVEALING THE SOFTER (SOMETIMES DARKER-LOOKING) DENTINE LAYER UNDERNEATH.

WHEN WE STUDY CATTLE TEETH, WE CAN TELL HOW OLD COWS WERE AT THE TIME THEY DIED.

THIS INFORMATION TELLS US A LOT ABOUT HOW PEOPLE WERE RAISING AND USING COWS.

THE MORE TOUGH PLANTS FOOD, LIKE GRASSES, CATTLE EAT DURING THEIR LIFETIME, THE MORE THEIR TEETH WEAR DOWN, SHOWING THE DENTINE.

FROM THE TEETH WE LOOKED AT IN THIS STUDY*, WE LEARNED THAT:

1. THERE WAS LESS TOOTH WEAR ON TEETH FROM URBAN CHARLESTON. THIS MEANS YOUNGER COWS WERE MORE DESIRABLE TO PEOPLE LIVING IN THE CITY, PROBABLY FOR FOOD AND HIDES.

2. IN RURAL LOCATIONS WHERE COWS WERE LIVING FREE RANGE OR ON RANCHES, TOOTH WEAR WAS MUCH MORE ADVANCED. THIS MEANS COWS WERE A LOT OLDER WHEN THEY DIED, PROBABLY BECAUSE THEY WERE KEPT UNTIL THEY WERE NO LONGER USEFUL.
When we look at animal bones on an archaeological site, we usually only find fragments of bones instead of a whole skeleton. A skeletal completeness study looks at how many bones we have for each individual animal we find. We ask questions like, "Are we missing any leg bones? What other pieces of this skeleton are missing?"

We learned that:

1. There was a high degree of skeletal completeness at archaeological sites in the city. That means cows were probably kept alive in or near the city and butchered when needed.

2. The beef market wasn’t the only place people acquired their beef products. Some households kept cows in their yards. Those households have a high degree of skeletal completeness among their cattle bones.

Now we’ll look at a specific example of how zooarchaeological research helped us understand the importance of cattle in a changing colonial market: Mary Musgrove’s Cowpens site...
Cam and I are going to tell you more about Mary Musgrove. Her role in the Charleston cattle industry and the animal bones from the Cowpens site where she lived and worked.

Cooapaponak/resa (or, as many know her, Mary Musgrove) was born to a Creek mother and an English father in a Coweta town near the Ocmulgee River in Georgia. She was multilingual in native Muskogean languages as well as English.

Mary Musgrove ran a cowpen and trading post near present-day Savannah from the years 1734 to 1746.

Because she was multilingual and of mixed Creek and English ancestry, she facilitated and participated in both the Native deerskin trade and the colonial cattle industry.
THE ZOOARCHAEOLOGY AT THE COWPENS SITE CAN TELL US A LOT ABOUT HOW MARY MUSGROVE (AND OTHER RURAL LANDOWNERS) SHIFTED FOCUS FROM DEERSKIN TO CATTLE TO SUPPLY THE MARKETS IN CHARLESTON.

IN THE EARLY YEARS OF THE CHARLESTON COLONY, DEERSKINS WERE AN IMPORTANT TRADE ITEM. MUSKOOGEE HUNTERS, WHO KNEW HOW TO HUNT WILD GAME BETTER THAN COLONISTS, SUPPLIED DEERSKINS TO THE CHARLESTON COLONY.

OVER TIME, THE EXPANSION OF THE CHARLESTON COLONY BEGAN TO NEGATIVELY IMPACT THE DEERSKIN TRADE.

WE STUDIED THE ANIMAL BONES THAT WERE EXCAVED FROM A CELLAR (BASEMENT) AT MARY MUSGROVE’S PROPERTY.

WE NOTICED THAT THERE WAS A BIG DECREASE IN THE AMOUNT OF DEER BONES OVER TIME AT MARY MUSGROVE’S COWPENS AND AN INCREASE IN THE AMOUNT OF CATTLE BONES.

COMPENS REQUIRED A LOT OF LAND FOR CATTLE GRAZING, AND DESTROYED THE HABITATS OF DEER AND OTHER WILD GAME.

THIS TELLS US THAT:

1. THE EXPANSION OF THE CHARLESTON COLONY AND THE LANDS REQUIRED FOR RAISING CATTLE TO SUPPLY THE CITY HURT THE DEERSKIN TRADE OVER TIME.

2. MARY MUSGROVE SHIFTED HER TRADING FOCUS FROM DEERSKINS TO RAISING CATTLE.
   - SHE AND HER HUSBAND WERE SUCCESSFUL CATTLE RANCHERS PRIOR TO RUNNING THE COWPENS. RAISING MORE CATTLE MAY HAVE BEEN MORE PROFITABLE FOR HER THAN DEERSKINS.
   - SHE CONTINUED TO BE A MAJOR SUPPLIER OF CATTLE FOR URBAN CHARLESTON UNTIL SHE MOVED FROM THE COWPENS SITE IN 1746.
WHERE DID THE CATTLE SOLD IN URBAN CHARLESTON COME FROM...?

ANOTHER WAY WE CAN ANSWER THIS QUESTION IS THROUGH BIOGEOCHEMISTRY (BIO-GEOL-CHMISTRY).

IN ORDER FOR US TO FIND OUT WHERE THESE COWS WERE RAISED, WE NEED TO LEARN MORE ABOUT CARBON, NITROGEN, AND STRONTIUM ISOTOPES FOUND IN NATURE AND IN THE BONES AND TEETH WE STUDY.

ISOTOPES ARE DIFFERENT FORMS OF AN ELEMENT. SOME ARE RADIOACTIVE AND DECAY OVER TIME INTO OTHER ISOTOPES OR ELEMENTS, BUT OTHERS ARE STABLE, WHICH MEANS THEY DON'T BREAK DOWN OVER TIME.

WE CAN STUDY STABLE ISOTOPES OF ELEMENTS LIKE CARBON, NITROGEN, AND STRONTIUM IN ANIMAL REMAINS LIKE CATTLE TEETH. TOGETHER THEY CAN TELL US WHERE THESE COWS WERE RAISED AND WHAT TYPES OF PLANTS THEY WERE EATING.

ABBREVIATIONS SCIENTISTS USE FOR ELEMENTS:
- CARBON = C
- NITROGEN = N
- STRONTIUM = Sr

CARBON AND NITROGEN EXIST IN OUR ATMOSPHERE AS CARBON DIOXIDE (CO₂) AND NITROGEN (N₂) GASES.

PLANTS ABSORB CO₂ DURING PHOTOSYNTHESIS...

...WHILE BACTERIA IN THE GROUND TURN N₂ INTO NUTRIENTS FOR PLANTS.

PLANTS ABSORB THE CO₂ AND NITROGEN INTO THEIR TISSUES...

...AND ANIMALS (LIKE COWS) THAT EAT THESE PLANTS ABSORB CARBON AND NITROGEN INTO THEIR BODIES.

ANIMALS EXHALE CO₂...

...AND RELEASE NITROGEN BACK INTO THE SOIL WHEN THEY DIE AND DECOMPOSE.

STRONTIUM ISOTOPES ARE FOUND IN ROCKS. WHEN ROCKS BREAK DOWN INTO SOILS, PLANTS ABSORB SOME OF THIS STRONTIUM.

WHEN ANIMALS EAT PLANTS, THAT STRONTIUM IS TRANSPERRED INTO ANIMAL TISSUES.
We analyzed stable isotopes of teeth from 34 archaeological sites, both urban and rural.

These stable isotopes are important for understanding where cattle were raised, what they were eating, and how grazing lands were managed.

- Carbon isotopes tell us what kinds of plants cows were eating.
- Nitrogen isotopes tell us about landscape management practices like fire-clearing forests or fertilizing fields.
- Strontium isotopes tell us where cows were raised.

I cleaned each tooth to remove the modern dirt and debris from the surface, then, I sliced into each tooth to separate the enamel and dentine parts of the tooth.

Remember: For a look back on enamel and dentine, see page 8.

Enamel was tested for strontium isotopes, while dentine was tested for carbon and nitrogen isotopes.

Here's what we learned from our biogeochemical studies:

- The carbon isotopes indicated that cows from both urban and rural sites had access to similar food for grazing.
- The nitrogen isotopes revealed that some cows, especially in rural areas, grazed in fields that had been burned.
- The strontium isotopes indicated that cows within urban Charleston came from many different geographic areas, from different rural farms and plantations.

Now that we know these cattle were raised in different places within and around Charleston, what did those landscapes actually look like?
**Research Question 3:**

What was the impact of cattle raising on local environments?

Angelina and I are going to tell you how we studied the soils around Charleston to reconstruct what the landscape and environment looked like more than 300 years ago.

A sediment core is a way for us to look at how soils build up over time. We drill a pipe several feet into the ground vertically and close it on both ends, preserving the layers of dirt inside the pipe.

When we pull it out of the ground, it looks something like this.

The oldest layers are on the bottom of the core (the soils buried the deepest underground), while the youngest layers are closest to the surface.

See the dark layer of dirt at the top of the core? That's charcoal - burnt wood and plant material.

We know that colonial landowners in rural areas around Charleston would set fire to some forested lands to make more room for cattle to graze.

This made the practice of raising cattle very destructive to the South Carolina landscape and native species.

We noticed a lot of charcoal in soil layers near the top of the core. These layers are the same age as Colonial Charleston (1600s-1800s).

This dense layer of charcoal lets us know that there were a lot of fires on this landscape during that time period.
I’m interested in what the pollen and other microscopic materials from the sediment core can tell us about environmental changes through time.

When pollen is released by plants, it often falls to the ground and is buried.

When we look at the pollen record in the dirt from the sediment core...

...we know what the environment looked like at different times in the past.

Pollen is a powdery substance produced by plants to fertilize other plants of the same species. Pollen grains of different species have distinct shapes that can be identified microscopically.

The soils from rural areas around Charleston contain a lot of pine tree (genus Pinus) pollen and some grass pollen, especially in soils dating to the colonial period.

These are the same soil layers where Grant found a lot of charcoal.

Pollen isn’t the only microscopic thing I saw in the sediment core!

The top layers of the core also contained evidence of fungal spores that most commonly grow in feces... like cattle droppings.

Delitschia fungus

What do these sediment core studies tell us about the environment around colonial Charleston?

1. The dense charcoal layer near the top of the core means that fires were common during the colonial period up to today. Some of the rural forested lands outside of Charleston were probably burned on purpose.

2. The pollen record from the same soil layers shows that pine trees and grasses were found on this landscape. The environment in this area had a lot of pine trees and grasses. Burning improved the grasses that cattle ate.

3. Fungal spores associated with cattle feces were found in the same soil layers as the charcoal and pollen. Free range cattle were present on this landscape, probably after the forested area was burned and new, tender grass grew.
RESEARCH QUESTION 1: HOW WERE CATTLE MANAGED AND RAISED IN AND AROUND CHARLESTON?

THE HISTORICAL RECORDS TELL US THE CATTLE SOLD IN CHARLESTON CAME FROM MANY PARTS OF THE SOUTH CAROLINA LANDSCAPE.

RESEARCH QUESTION 2: WHERE DID THE CATTLE SOLD IN URBAN CHARLESTON COME FROM, AND HOW WERE THEY RAISED?

THE ZOOARCHAEOLOGICAL RECORD TELLS US THAT CATTLE RAISING CHANNELED THE DEERSKIN TRADE...

...ESPECIALLY IN RURAL AREAS LIKE MARY MUSGROVE’S ESTATE, A MAJOR SUPPLIER OF CATTLE TO CHARLESTON.

WE ALSO KNOW THAT CHARLESTON RESIDENTS PREFERRED YOUNG CATTLE FOR FOOD, SOMETIMES RAISING THEM WITHIN THE CITY ON PRIVATE PROPERTY INSTEAD OF BUYING CATTLE PRODUCTS AT MARKETS.

THESE YOUNG COWS PROBABLY CAME FROM RURAL PLANTATIONS OR COMPENS OUTSIDE OF CHARLESTON.

RESEARCH QUESTION 3: WHAT WAS THE IMPACT OF CATTLE RAISING ON LOCAL ENVIRONMENTS?

THE BIOGEOCHEMICAL STUDY TELLS US THAT CATTLE CAME TO URBAN CHARLESTON FROM MANY RURAL AREAS OUTSIDE OF THE CITY.

ISOTOPE RESEARCH ALSO TELLS US THAT CATTLE WERE PROBABLY GRAZING IN FIELDS THAT HAD BEEN PREPARED FOR THEM THROUGH CONTROLLED BURNING.

THE ENVIRONMENTAL RESEARCH TELLS US THAT RURAL LANDOWNERS PROBABLY BURNED SOME OF THE LOCAL PINE FORESTS TO MAKE ROOM FOR CATTLE TO GRAZE AS THE BEEF INDUSTRY GROW IN CHARLESTON.
THANKS FOR JOINING US ON A RESEARCH JOURNEY MANY YEARS IN THE MAKING!

IT TAKES A BIG TEAM WORKING TOGETHER TO SOLVE COMPLEX PROBLEMS LIKE THE HISTORY OF THE CATTLE INDUSTRY IN CHARLESTON.

RESEARCH LIKE THIS CREATES A FULLER HISTORY OF LIFE IN CHARLESTON AND HELPS US UNLOCK THE PAST.

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ILLUSTRATED BY JAMES BURNS

TRANSLATED BY EDGAR ALARCÓN TINAJERO
NOW THAT YOU HAVE READ ALL ABOUT THE COLONIAL CHARLESTON CATTLE ECONOMY PROJECT, LET'S THINK ABOUT WHAT YOU LEARNED:

**List 3 New Things You Learned:**

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**Write 2 Things You Want to Learn More About:**

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**What is 1 Thing You Liked About This Project?**

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