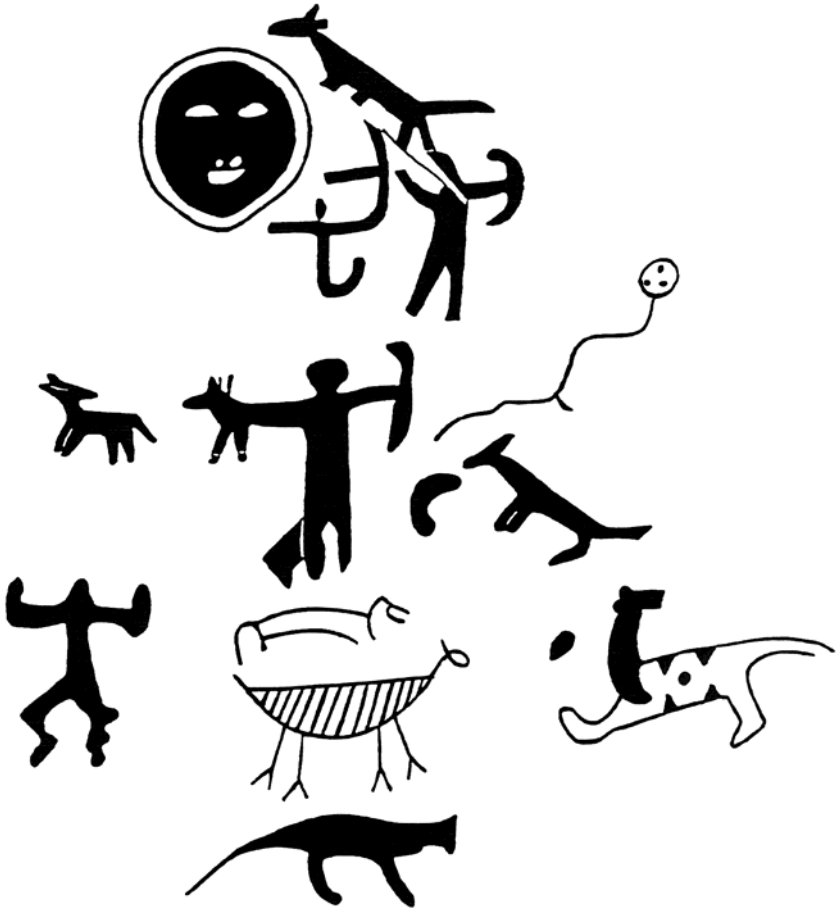
PROJECT ARCHAEOLOGY: PENNSYLVANIA

AN EDUCATIONAL STANDARDS BASED CURRICULUM FOR GRADES FOUR THROUGH EIGHT

STUDENT TEXT

(FOR USE WITH LESSON PLAN BOOK)



AN EDUCATIONAL INITIATIVE OF THE PENNSYLVANIA ARCHAEOLOGICAL COUNCIL EDUCATION COMMITTEE

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October, 2003
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SECTION ONE - BASIC CONCEPTS

CHAPTER 1

What is Anthropology?

1. By this time in your education you have learned a lot about science. Science is a way of studying the earth, stars, plants, animals, and so much more. You may be surprised to learn that there is also a science of people. **Anthropology** is the name we give to the science that studies people. Of course, there are other professions that can help us learn about people. Sociologists study how people work together as part of a society. Historians study written documents and the things that people remember in order to learn about their past. Biologists study the different parts of the human body and how these parts work. Philosophers study how people think about the world they live in. Psychologists study how the human mind works.

2. Anthropology uses a special way of studying people called the **holistic approach**. When anthropologists use the holistic approach they study people everywhere in the world, at all the times people have lived, and everything that people do and are. This means that anthropology does not choose only one kind of person, or one time in the past, or one kind of human behavior. This science studies everything about people**.**

3. Of course, it is impossible to study everything about people all at once. Therefore, the field of **anthropology is often divided into four parts**: cultural anthropology, physical anthropology, linguistics, and archaeology.

cultural anthropology	physical anthropology
linguistics	archaeology

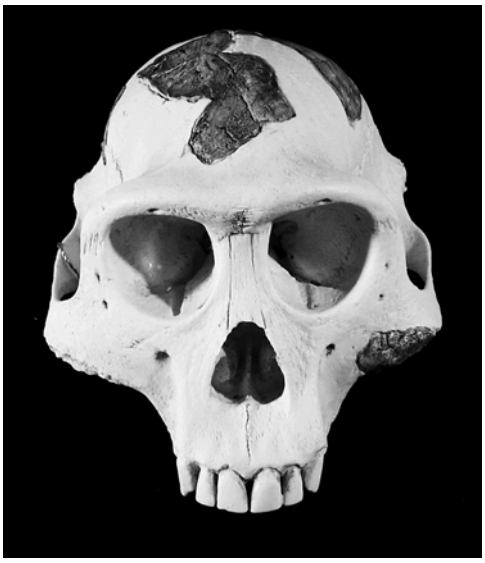
4. **Cultural anthropology** studies the cultures of living and historically known people. **Culture** is a way of life that is learned and shared by a group of people who live and work together and share a common territory. This group of people is called a **society**.

Because we are not born with our culture, we have to learn the rules of our culture while we are growing up. What we choose to eat, the clothes we wear, the tools we use and make, the houses we live in, our beliefs, the work we do, the language we speak, who we can call friend and family, and good manners are all part of the culture that we learn and share.

All human cultures are not the same. What may be good manners in one culture may be rude in another culture. For example, in the United States, we write thank you notes or say thank you to someone who has given us a gift. If we don't do this, the person who gave us the gift might think that we are rude. Among the !Kung San of the Kalahari Desert of South Africa, to say thank you for a gift is considered rude. It suggests to the person that gave the gift that somehow she is not generous and that you did not expect her to share. In both cultures, people enjoy receiving gifts, but the correct response to a gift is different.

We share our culture with people who are our ancestors (such as our parents), with the people we live with today, and with our descendants (such as our children). Yet, this is not always the same culture. Culture is always changing. Human needs, opportunities, tools, and attitudes change through time. Everyone has heard someone say: "well, when I was your age…" They are only saying that things were once different. Yet you probably share today's culture with them. In fact, you are sharing a changing culture with them.

Cultural anthropologists can study a culture as it exists in one time, or they can study how a culture changes. Both kinds of study provide us with knowledge about the nature of culture and its importance to people.



5. **Physical anthropology** studies the biology of human groups (populations). Physical anthropologists are interested in describing and explaining our physical and genetic characteristics. Some study living people. They try to learn about human diseases, nutrition, and why there are differences among people. Others study people who lived in the past by studying their skeletons and fossil bones. They try to understand why people have changed through time. Still others work with the police to help solve crimes. Some physical anthropologists study monkeys and apes in order to discover how they interact with their environments. Others study how the environment affects human biology and human characteristics.

6. **Linguistics** is the study of language. Linguistic anthropologists study the sounds, rules, meanings, and relationship to culture of languages all over the world. Anthropologists estimate that there may have been as many as 2,000 languages that have been spoken by people. Many languages disappeared so long ago that we will never be able to study them.

Babies are born with the ability to learn language. But the particular language they speak must be learned, just as culture must be learned. If you had been born in Japan to a Japanese family, Japanese would have been your first language. In some cultures, children learn to speak more than one language. A child born to the Arunta culture of Australia would learn both the Arunta language (the language of the native culture) as well as English (the official language of Australia).

Language is an important tool for learning a culture. Some languages are written and spoken. Others are only spoken. Some

languages, such as American Sign Language, use hand symbols. All are important tools for communication.

There are many kinds of linguistic anthropologists. Some study how a particular language has changed through time or how the meaning of words has changed in a language. Others try to describe a particular language including its sounds and grammar. Most try to understand how a particular language meets the needs of a particular culture.

7. **Archaeology** is the study of past cultures from the things people have left behind. Historical archaeologists study people who have writing. Prehistoric archaeologists study people who lived before writing was invented. Over 99% of the time people have been on the earth occurred before writing. Although these people did not write, they left us clues such as their tools, houses, symbols, ceremonial objects, and trash. The places where these remains are found are called archaeological sites. By discovering these remains and paying careful attention to where they are located (context) archaeologists can learn about the history of a culture, the way of life of a people, their ideas, and how their cultures changed.

An archaeologist is a kind of detective, always looking for clues about cultures of the past. Archaeologists often work with scientists such as chemists, ecologists, zoologists, botanists, and geologists in order to discover how people interacted with their environment.

An archaeologist does not collect archaeological remains as a hobby. The scientists who are archaeologists try to solve research problems or answer questions about people who lived in the past by studying their remains.

Archaeological remains are very fragile and non-renewable. We have all learned about plants and animals that are extinct. They are gone forever. Archaeological sites that are not carefully studied are also gone forever. The people who created the remains are no longer alive. They cannot produce new remains. An archaeological site that is destroyed cannot be replaced. Therefore, archaeologists are very careful when they study sites and the things found at sites. Many archaeologists now work to help protect archaeological sites.

8. There are special anthropologists called **applied anthropologists.** They include anthropologists from all of the four areas of study in anthropology. They help people all over the world solve a variety of problems. For example, physical anthropologists work with medical scientists to help stop the spread of diseases. Linguistic anthropologists work with teachers to help immigrant children learn a second language. Cultural anthropologists work with doctors to help them provide medical services to immigrants from other cultures. Archaeologists work with the Pennsylvania Department of Transportation to discover archaeological sites that may be destroyed by a new road.

Today, anthropology is more than the science of people. It is a science that can help people live a better life today and in the future.

CHAPTER 2

What is Archaeology?

1. Almost everyone has heard of **archaeology**. Newspapers and magazines often write about important archaeological discoveries. Television programs show us archaeologists at work or the places where discoveries have been made. Museums display the things archaeologists have found. Television news tells about old shipwrecks that have been discovered. In many cases the word archaeology is used. In the first lesson, you learned that archaeology is part of the science called anthropology. It is the study of past cultures from the things people have left behind. Archaeology is the systematic study of the past, from the remains of human behavior, given certain specified objectives. Let's explore some words in this definition.

2. What is the **past**? The past is that part of time that has already happened. Archaeologists study three kinds of past: prehistoric past, historic past, and living past.

The **prehistoric past** is that part of human time before the invention of writing. Archaeologists who study the prehistoric past try to learn everything they can about the people who lived before writing in every part of the earth. They study what the people ate, how and where they got their food, how they protected themselves, how they built their houses, how they interacted with their environment, how they made and used tools, what they believed, and more. Archaeology is the only science that has found a way to study people who lived before there was writing.

3. The **historic past** is that part of human time after writing was invented. Archaeologists use maps, diaries, journals, government records, business records, religious writings, poetry, books, scribbles, court documents, tax records, and more. They discover the details of human life that are missing from the written records. Archaeologists also discover if what was written actually happened and help solve

mysteries about the past when no writing can be found.

4. The **living past** is that part of human time which each one of us creates by living our lives. We also use and make tools, interact with our environment, build houses, have beliefs, organize ourselves into a society, and protect ourselves. You started this lesson in the past, even if it was only five minutes ago. Some archaeologists study the landfills of our cities and how we change our environment and landscape to learn more about us. Others do experiments to see how people in the past made their tools, moved large stones, painted cave art, and more. They hope to learn how these things could have been done in the past.

5. All archaeologists study the things that people have left behind. They sometimes call these things the **remains of human behavior**. There are three different kinds of remains of human behavior which archaeologists study: archaeological sites, things found at archaeological sites, and archaeological context. All of these contain messages about the past, which the archaeologist tries to discover.

An **archaeological site** is any place, large or small, where people have left something behind. It can be as large as a city or as small as an overnight campsite used only once.

Do you think that a big site is more important to archaeologists than a small site? In Pennsylvania, a small site that is ten thousand years old may be very important because we know very little about the earliest Native American settlers**.**

6. **Things found at sites** include portable artifacts, non-portable artifacts, byproduct materials, and ecofacts. An **artifact** is anything that has been changed by people

either by using an object or shaping it for a purpose. **Portable** means that it can be moved and carried without changing it. Examples of portable artifacts include tools, personal ornaments, ceremonial objects, and more.

7. A **non-portable artifact** is sometimes called a **feature**. You cannot move it or carry it without destroying it or taking it apart. Features can tell us about human activities, how people used their land, how they organized their activities, and more. A hole in the ground is a good example of a feature. Can you pick up a hole in the ground? You can remove its contents. You can dig away the sides. But, you can't pick it up. A hole is, after all, just space. Yet there are many archaeological sites with evidence of holes in the ground. Other examples of features include houses, mounds, fences, and campfires.

8. **Byproduct materials** are the remains that are created when people make or use artifacts. Food trash, stone flakes, wood ash, scratch marks, and blood are examples of byproduct materials. When you eat your chicken dinner, only the bones are left behind. When you use a knife, you scratch the knife surface. When you burn wood in a campfire, all that remains is wood ash and burned soil. When the butcher cuts meat, his tools may have some blood on them. When a stone spear point is made, bits of stone called flakes are removed from the piece of stone. All that remains after the spear point is taken away are the flakes. Blood

on a spear point can tell us what kind of animal was killed. By studying byproduct materials, archaeologists can learn about the actual activities which produced them.

9. You may be surprised to learn that archaeologists also study **ecofacts** or evidence of the natural environment. All people use and change their natural environment, everywhere in the world. They have to deal with the weather; collect and use plant, animal, and mineral resources; and need water. Because the natural environment is such an important part of everyone's life, it is important that archaeologists learn about the natural environments of past cultures. Archaeologists work with geologists (soil and mineral scientists), botanists (plant scientists), palynologists (pollen scientists), malacologists (snail scientists), zoologists (animal scientists), and others to answer questions about the environment. For example, by studying plant pollens, they can learn about the climate and growing season. By studying snails in the soil, they can learn about the kinds of plants that lived in an area because certain snails like to eat certain kinds of plants and not others. Because knowledge of the natural environment is important, an archaeologist must collect ecofacts in addition to all of the other remains of human behavior. Without ecofacts, important knowledge of the past will be lost.

10. None of these remains are useful to the archaeologist without **context**. Context is a special kind of environment. Archaeological context refers to the environment within which sites and things found at sites are located. When you ask, "How old is it?" you are asking a question about the environment of time. When you ask, "Where did you find it?" you are asking a question about the environment of space. When you ask, "What did you find next to it?" you are asking a question about the environment of

culture. Without context, even the most beautiful decorated pot and arrowhead are only things. Archaeologists can only measure them and describe them. They cannot be certain of the objects' age, where the remains came from, or what they were used for. For example, an antler found with pieces of wood charcoal, hammer-stones, stone flakes, and a broken spear point might have been used as a soft hammer. That same antler found next to a skeleton in a burial might be something else. Archaeologists can only know the difference if they pay attention to context. Without context, objects are just "stuff." Without context, the archaeologist cannot answer important questions about the past. Therefore, archaeologists are very careful to record the exact location of every kind of remain of human behavior they collect.

11. What kinds of questions do archaeologists ask about the past? They ask questions about culture-history, lifeways, cultural change, and how people thought in the past. When they study **culture-history,** they ask the questions, "Who were the people? When did they live? Where did they live?" and "What characteristics define their culture?" When they study **lifeways**, archaeologists want to learn about the day-to-day, year-to-year, season-to-season, and month-to-month patterns of activities of people. Archaeologists who study **cultural change** often study the natural and social environments with which a culture interacts. They want to learn not just what has changed, but why certain parts of a culture have changed. Archaeologists who study **how people thought** in the past try to understand the symbols people used, what they believed about their world, and how men and women interacted in the culture.

12. How do archaeologists study past cultures? They study the past **systematically**. This means that they study with a plan or **research design**. Their plan must have several important parts. First, they have to decide what question they are trying to answer about the past. Second, they have to identify the best way to answer the question. This includes deciding what sites they will study; finding out what has already been learned; choosing

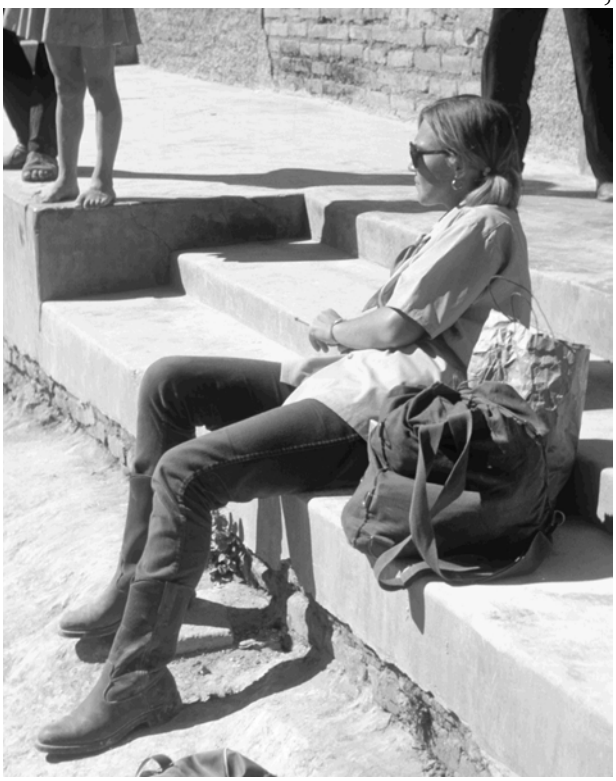
what remains they will collect; identifying the best ways to protect these remains; selecting the kinds of tools they will use, who will be part of the team, who will do the work, what other scientists to include; determining how to record the information they collect, how their collected remains will be studied, where they will be studied, and more. The third part is the actual analysis or study of what they have found. The final part of the plan is to write a report about their work so that other archaeologists can learn from them.

CHAPTER 3

Meet An Archaeologist

Profile of an Archaeologist
Renata B. Wolynec, Ph. D.

Dr. Renata B. Wolynec lives in Edinboro, Pennsylvania. She teaches at Edinboro University of Pennsylvania (as Professor of Anthropology and Archaeology) and directs the Fort LeBoeuf Museum in Waterford, Pennsylvania. She has a B. A. and M. A. in Anthropology from the State University of New York at Buffalo and a Ph. D. in Anthropology from Northwestern University in Evanston, Illinois. She lives with her husband, two cats, one dog, a flock of turkeys, a herd of deer, two foxes, and a very big snake (under the back porch). She loves to talk to her daughter on the telephone, in her spare time.



How did you become interested in archaeology?

When I was in high school, I did not like archaeology. I could not imagine anyone having a steady job doing what archaeologists did. I also didn't like bugs, snakes, and dirt. For some reason, every movie I ever saw always showed bugs and snakes at archaeological sites. Of course, I had never talked to an archaeologist nor had I ever visited a real archaeological site. My inner city school did not provide us with opportunities to learn about such things. When I went to college, I started my studies in engineering. During my second year, I took an archaeology class. This was absolutely the most interesting, wonderful, and awesome course I had ever taken. I immediately decided to change my major because I was sure that I was going to be very happy studying

archaeology and anthropology. I did eventually learn to catch scorpions at our excavations in Mexico. However, I still didn't know if I could get a job.

What kinds of archaeology jobs have you had?

As a university undergraduate student, I was involved in a number of projects in New York State and Mexico. Sometimes I worked at site excavations discovering new information. Other times, I worked in a lab where I washed, catalogued, and analyzed the remains we found.

In graduate school I was involved in more complicated research. While at Buffalo, I set up an obsidian hydration dating laboratory which allowed me to discover how old the obsidian (volcanic glass) tools we found in Mexico actually were. In Illinois, I analyzed over 1,000 archaeological features discovered at the Koster Site. These features included the remains of some of the oldest permanent houses ever found in North America. I was one of the first archaeologists in the country to use computers to analyze large databases. The oldest site I have worked at has remains over 16,000 years old. I someday hope to work on sites in Africa, which are over one million years old.

What are you doing today?

Today, part of my work involves teaching university students at Edinboro University of Pennsylvania about archaeology and anthropology. Another part of my archaeological work focuses on finding the location of a French fort, which was the site of George Washington's first mission at the age of 21 in 1753; discovering details of life at a Pennsylvania farm site from the 1800s; and recording information on tomb stones that are being destroyed by acid rain. I am also director of the Fort LeBoeuf Museum, which enables me to teach teachers and students about archaeology and colonial history in Pennsylvania (www.edinboro.edu/fortleboeuf/index.html).

What are your special interests?

My special interest has always been archaeological methodology. Methodology refers to the different ways archaeologists do their work: how they ask research questions or solve research problems; how they collect and study information about the past. For example, for many years, some archaeologists did not study archaeological features as carefully as they

could. By inventing a new way of studying features, I was able to show that pit features can be a very important source of information about the past. Because my interest is in learning how archaeologists can improve the way they do their work, I am not tied to any part of the world. I have worked on archaeological projects in Mexico, Ukraine, Belize, Illinois, Pennsylvania, and New York. I have taken my students to study archaeology in England, Pakistan, and Morocco. Of course, wherever I am, I always work with people who are experts in the particular archaeological culture being studied.

I am now very interested in archaeology education and site protection. I spend much of my time working on projects such as this book. I want to teach students to value our past and to understand why it is important to save archaeological sites from destruction. Sometimes I teach teachers about archaeology so that they can share what they learn with their students. More recently, I have been teaching other archaeologists how to be good teachers. I also volunteer on public education projects such as Pennsylvania Archaeology Month, which is held in October every year.

You can learn more about Pennsylvania Archaeology Month at www.pennarchaeologymonth.org.

Are you glad you became an archaeologist?

For the past thirty-five years, I have had the most wonderful life because I became an archaeologist. I met my husband during an archaeological excavation. I have enjoyed the company of my daughter on excavations as well. I never get bored. There is always something new for me to do and learn. I also know that I am doing something important. I am sharing what I know with others and helping them appreciate the importance of the past. I believe that the more people learn and know about the past, the more they will be willing to help protect archaeological sites from being destroyed. Saving the past is everyone's responsibility.

Profile of an Egyptologist
Ellen Dailey Bedell, Ph. D.

Dr. Ellen Dailey Bedell lives in Pittsburgh, Pennsylvania, and teaches at The Ellis School, an independent all girls college preparatory school. She

has a B. A. from Chatham College in Pittsburgh, Pennsylvania, and an M.A. and a Ph.D. in Mediterranean Studies with a specialty in Egyptology from Brandeis University in Waltham, Massachusetts.

How did you become interested in Egyptology?

When I was in college I worked part-time at the Carnegie Museum of Natural History. My job was washing and cataloguing artifacts in a large room in the basement of the museum called Room 13. In my spare time I looked around at all of the wonderful things stored in the basement, including a mummy case covered with hieroglyphics. I became obsessed with the hieroglyphic text and decided I wanted to learn how to read this mysterious language.

What kinds of archaeology jobs have you had?

In graduate school, I specialized in reading ancient texts (philology) but I also studied archaeology. My husband and I spent our honeymoon excavating at Tell Ashdod in Israel. The most exciting thing we found was a bathtub filled with perfume bottles and amulets. In addition to the Middle East, I have worked on excavations in Central America and the United States.

What are you doing today?

Today, I enjoy teaching students about archaeology and encouraging them to value our cultural heritage. I once visited a Maya site where I saw a young boy steal a Maya glyph from an inscription in stone. He removed an important piece of the puzzle. His act would make it difficult or impossible

for Mayanists to read the inscription. What was lost? We may never know. I want my students to become defenders of archaeological sites.

What are your special interests?

I am interested in teaching students how archaeology works and what they can learn from it. Recently I designed a web site to teach students about underwater archaeology and about interconnections in the ancient Mediterranean World. The students visiting the site explore a shipwreck with the aid of a diver who moves over the site map and they analyze artifacts and draw conclusions. This is a Late Bronze Age ship that sank off the coast of Turkey. If you want to explore the shipwreck yourself, visit the following web site www.TheEllisSchool.org/shipwreck .

Are you glad you became an Egyptologist?

Yes, Egyptology and archaeology continue to fascinate me. In the last few years I have taken alumnae, from the school where I teach to Egypt and I have been able to share my knowledge of Egyptian culture with them. What a wonderful job to have!

Profile of an Archaeologist
Sarah Ward Neusius, Ph. D.

Dr. Sarah Ward Neusius is Professor of Anthropology and Archaeology at Indiana University of Pennsylvania. She has a B. A. in Anthropology from Beloit College, Wisconsin, and both an M. A. and a Ph. D. in Anthropology from Northwestern University in Evanston, Illinois. She lives in Indiana, Pennsylvania, with her husband, who also is an archaeologist and

professor. They have two children in college.

How did you become interested in archaeology?

I took my first anthropology course when I was a senior at a high school boarding school in New England, and I was hooked! At the time it was just a senior elective that fit my schedule, but I will never forget the impact of that course. Until then, I had not been a serious student though I did okay in school. Most of the standard coursework I had taken was a little boring to me; anthropology was anything but boring! It looked at people elsewhere in the world and over great periods of time, and in doing so, seemed to call into question the conventions of American society that, like most teenagers, I found a little frustrating. That term I was looking seriously at colleges, and a close friend, who happened to be from the Midwest, mentioned that Beloit College in Wisconsin, had an excellent program in anthropology. I looked at Beloit, liked it, and went there to begin studying anthropology.

Initially, I thought that I was most interested in cultural anthropology, but like most anthropology departments in the United States, Beloit required its anthropology majors to take courses in physical anthropology, anthropological linguistics, and archaeology, as well as cultural anthropology. I found all of these courses more fascinating than anything I had had before, and I actually became a top student because of it! While in college I spent a term working as a research assistant in cultural anthropology on a project run by a research psychologist based in New York City. This term convinced me that archaeology actually was the part of anthropology that interested me the most though I did not then acquire any field experience in archaeology, and I couldn't quite figure out if I was most interested in Mesoamerican or North American archaeology.

I spent two years out of school before I started graduate school in archaeology, during which I explored the possibility of social work, and even worked as a tax auditor for the Internal Revenue Service. However, in 1974, I began graduate school in North American archaeology at Northwestern University. The biggest shock of graduate school was that almost immediately my professors wanted me to define what specifically I was interested in studying. For someone who loved all aspects of anthropology and had only gradually settled on North American archaeology, this was a pretty tough question! However, I did remember enjoying a particular research paper I had done in college on the relatively

new interdisciplinary field of zooarchaeology, the study of animal bones from archaeological sites, so I told my professors I wanted to pursue this in graduate school. Amazingly, this turned out to be a good choice of specialization, both because my professors wanted a student to work with them on this aspect of projects they were doing, and because I found that I really loved to work with collections of animal bones. Bone identification work is a little like doing a big puzzle. Explaining what the results mean can challenge your ideas about how people use animal products.

What kinds of archaeology jobs have you had?

Before becoming a university professor, I did a number of jobs in archaeology. I worked as a zooarchaeologist attached to a university research center and was in charge of the zooarchaeological part of a major cultural resource management project in the U. S. Southwest. I taught part-time at several universities. I also held a post-doctoral fellowship and organized a conference on early human adaptations in the eastern United States. Finally, I served as a staff archaeologist at a small archaeological museum, studying artifact collections, running excavations, and interpreting the archaeology for the public.

All of this experience, as well as my love of all types of anthropology, has helped me be a better university professor in a small anthropology department. I began my current job at Indiana University of Pennsylvania in 1986. Since then, I have taught courses in general anthropology, archaeology, zooarchaeology, and physical anthropology, as well as conducted research projects, advised students, and helped my department grow and improve its program for undergraduates. I have gotten involved with state historic preservation efforts, providing archaeological expertise by serving on the Pennsylvania Historic Preservation Board. I also have been fortunate to have been an officer and an active member in both state and national professional archaeological societies, which allowed me to be involved in all sorts of decisions affecting archaeology, and helped me gain insights into all sorts of archaeology.

What are you doing today?

My research at the moment is centered in central Western Pennsylvania, and on the period from A. D. 1,000 to European contact. In the immediate vicinity of Indiana, we know relatively less about this period than to the

south of here, where the Monongahela culture is thought to characterize the period. With the help of my students, I am slowly investigating a series of sites in order to understand whether the people here should be considered Monongahela or perhaps some other cultural group.

What are your special interests?

Besides teaching and researching, I am most interested right now in writing about the work I have done both for professional and student audiences. My biggest, and in many ways most fun activity these days is writing a textbook on North American archaeology. This is a huge project that will probably take another two years to complete, but if you continue to study archaeology maybe you will read my textbook someday!

Are you glad you became an archaeologist?

As I hope you can tell, I think I have a wonderfully interesting job and career that allows me to do many different types of things within archaeology. Although I am still interested in all types of anthropology, I can't imagine being anything but an archaeologist. As I write this, several of my students, my husband, and I have just returned from a two and a half week trip visiting mound and earthwork sites all over the eastern United States. We met and talked with dozens of archaeologists, saw many cool sites and artifact collections, and visited all sorts of archaeological museums. To me all of this somehow made camping in the rain seem worth it. It was fun to see my students learning about North America's past, and it was even more fun for me to experience the sites and museums myself. In short, I'm still hooked on archaeology and anthropology after more than thirty years!

Profile of an Archaeologist
Joseph Baker

Mr. Joseph Baker lives and works in Central Pennsylvania, where he grew up. He has a B. A. in Anthropology from Penn State University and an M. A. in Anthropology from the University of Montana.

How did you become interested in archaeology?

My interest in archaeology sprang from two places. When I was a teenager, I worked on a farm along the Susquehanna River, and from time to time, I used to find stone tools and pottery in the fields while I was picking tomatoes. My discoveries made me very curious about the people who left these things behind. At about the same time, I was placed in a history class taught by a fabulous and inspiring teacher named Tom Nissley. Mr. Nissley was the first teacher I ever had who really challenged his students to debate and re-think history. He made the past come very close to the present, and I've never forgotten him or the lessons he taught me.

What kinds of archaeology jobs have you had?

Since 1979, I have worked for a variety of public agencies testing, excavating, studying, and managing archaeological sites that were in the path of large projects like roads, dams, or timber sales. Over the years I've worked for the U. S. Forest Service, the Bureau of Land Management, the National Park Service, the Pennsylvania Historical and Museum Commission, and most recently, the Pennsylvania Department of Transportation. That work has taken me from Montana and Wyoming back to my home state of Pennsylvania, with a few stops in between.

What are you doing today?

Today, I am producing publications, training, and developing workshops in archaeology for the Pennsylvania Department of Transportation. I manage their historic preservation web site (www.penndotcrm.org) which has quite a few resources for young people. I also do volunteer work for the Appalachian National Scenic Trail, helping to evaluate and manage a Civil War battlefield on the Trail in Maryland (www.iuparchaeology.iup.edu/FoxGap/).

What are your special interests?

I have several. I am interested in how prehistoric people used plants (it's called paleoethnobotany). I actually minored in botany in graduate school. I have dug several battlefield sites, so I have an interest in military archaeology. Most importantly, I'm an author and editor, and I enjoy writing for and educating the public.

Are you glad you became an archaeologist?

There is no better job!

Profile of an Archaeologist
Beverly Chiarulli, Ph. D.

Dr. Beverly Chiarulli lives in Pittsburgh, Pennsylvania, and is Director of an Archaeological Research Center at Indiana University of Pennsylvania (IUP). She also teaches classes at IUP in anthropology and archaeology. She has a B. A. degree from the University of Illinois in Champaign, Illinois and a M. A. and Ph. D. from Southern Methodist University (SMU) in Dallas, Texas.

How did you become interested in archaeology?

Even when I was in elementary school, I was interested in books and television shows about ancient civilizations and human ancestors. The Leakeys were featured in National Geographic books and television shows and I thought the work they were doing in Africa was exciting and fascinating. When I was in high school, I developed other interests and went to college planning to major in Journalism. I took a class in anthropology and discovered that I could major in this field and so decided to change my major to anthropology. At first, I was interested in physical anthropology and wanted to study monkeys in Central America. I went to

my university's archaeological field school at Cahokia Mounds in Illinois, near St. Louis, and found that archaeology was exciting. We were excavating in a large pit that had been created over a thousand years ago when the people who lived at the site used the soil to build a large temple mound. Through time, the pit was filled with trash - broken ceramics, deer bones, corn cobs, and stone tools - which gave us a glimpse into the past.

I decided archaeology was a more practical choice for a career. I changed my focus and decided to go to graduate school. When I was in graduate school in Texas, I had the opportunity to work on archaeological projects there that investigated archaeological sites that were going to be destroyed by the construction of reservoirs, and work on a Maya site in Belize. I did my dissertation research on the stone tools from the Maya site.

What kinds of archaeology jobs have you had?

I have had a lot of archaeology jobs. I worked in graduate school for an archaeological research center that was part of the SMU Anthropology Department. After I left SMU, I moved to Pennsylvania and worked as an archaeologist for a company that designs bridges and roads and does environmental studies. Archaeologists are often needed to find and investigate sites that may be destroyed by new construction projects. These studies are required by federal and state laws. I then worked for another company that was hired by the Pennsylvania Department of Transportation to help with the construction of Interstate 279 through Pittsburgh, again on the archaeological sites, like the Pennsylvania Canal and a historic cemetery that were in the path of the highway. Next, I worked for the Pennsylvania Bureau for Historic Preservation, part of the Pennsylvania Historical and Museum Commission, as a regional archaeologist in the western part of Pennsylvania. My job was to find new sites that might be destroyed by strip mines and to develop educational programs on archaeology. Six years ago, I changed jobs and came to IUP to direct Archaeological Services, our archaeological research center.

Even though my jobs have been in Pennsylvania and I have worked on Pennsylvania archaeological sites for the past 20 years, I have still continued to be part of archaeological projects in Belize. I go down every year and either work at the sites of Maax Na, Chau Hiix, or Cerros. This spring, I went to Chau Hiix near the village of Crooked Tree, in central Belize, where I studied all the stone tools that were found this year.

What are you doing today?

Today, I am driving down to Fort Necessity, a National Park in Fayette County, to meet with the staff and plan some archaeological investigations that we may do next year.

What are your special interests?

My special interests are stone tools, the use of technology to find archaeological sites without excavation, Late Prehistoric sites in Pennsylvania, and the Maya.

Are you glad you became an archaeologist?

Yes, I am glad I am an archaeologist. I have had the chance to work with really interesting people in many parts of the United States and Belize. Archaeology gives a way to touch the past. Every day, I study artifacts that haven't been seen or touched since they were lost by the people who made them hundreds or thousands of years ago.

For more information on the archaeological sites we investigate at IUP, visit our web site http://www.iuparchaeology.iup.edu/default.htm.

CHAPTER 4

How Do Archaeologists Do Their Work?

1. Almost everyone knows that archaeologists excavate archaeological sites. What most people do not know is that excavation is only a small part of the toolkit which archaeologists can use in doing their research. You may be surprised to learn that some archaeologists never excavate a site at all, yet they still do important archaeological research. In Chapter 2 of this book, we learned that archaeologists study the past **systematically**. This means that their research is guided by a plan called a **research design**. Every research design has four important parts. By exploring these parts in more detail, we will learn how archaeologists do their work.

2. The first step in doing archaeological research is to identify the research question or problem. A necessary part of asking the research question is to discover what has already been learned about the subject. In other words, the archaeologist is trying to identify what he or she hopes to learn that has not been learned before. Research questions may be about individual sites or groups of sites. Other questions may focus on a region of Pennsylvania such as a particular river valley.

In Pennsylvania, archaeologists ask many important questions. Who were the first people to come to Pennsylvania? How did a particular culture interact with its environment? What is the earliest evidence of farming? How long did people live in a particular part of Pennsylvania? What was the life of coal miners like in central Pennsylvania? Sometimes, the questions are simpler. How big is the site? How old is the site? What are the boundaries of the site? How many sites are there in a particular part of Pennsylvania? There are probably more research questions than archaeologists can ever hope to answer in Pennsylvania.

Some archaeologists ask new questions about the past. Others look at old questions in light of new discoveries and new techniques. Some archaeologists try to answer questions about past behaviors by trying to reproduce these behaviors. These experimental archaeologists try to make and use the tools and features to discover more about the actual processes of manufacture and use.

3. The second step in developing the research design is to identify the best way to answer the question. First, the archaeologist must decide which remains of human behavior and environment they need to answer their question. For example, if they want to study how pottery was manufactured, they will look for sources of clay, pottery remains, the tools used to make pottery, and the features that were used in their manufacture, such as kilns. Archaeologists must always remember not to destroy other sources of data. Other archaeologists may need them for their research.

Next, archaeologists need to determine how and where they will find and collect the evidence they need. They may either find new evidence through survey and excavation, or they will study the remains found by other archaeologists. Universities, historical societies, and museums contain archaeological materials which others can study. Some archaeologists may use different forms of radar and sub-surface detectors, which look below ground for remains of human behavior without disturbing the soil of a site.

Archaeologists find sites by looking for them. They may find them by looking at the records kept by the Bureau for Historic Preservation in Harrisburg, talking to landowners, looking at old records such as diaries and maps, reading archaeological reports, and actually walking the land (called a field survey). When walking the land, archaeologists look for evidence of

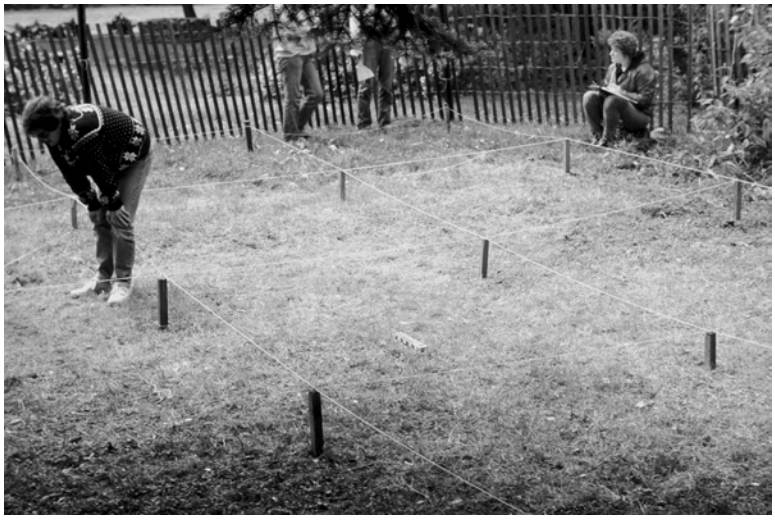
human behavior such as trash, tools, stains on the surface of the ground, fallen foundations, depressions, mounds, and more. Sometimes they see something unusual such as a big pile (a mound) in a flat area or unusually healthy or unhealthy plant life.

If they plan to do a field survey, archaeologists must find a way of recording their discoveries. Making maps showing feature, artifact, and byproduct material remains is a common way to record what the surveyors find. Archaeologists should not pick up what they find and take it away unless they have recorded and labeled everything they remove.

The sites are then officially recorded in Harrisburg where they receive their own label. The Fort LeBoeuf Site in Waterford, PA, has the label 36ER65. 36 stands for the state of Pennsylvania; ER stands for Erie County; and 65 means that it was the 65th site recorded in this system in Erie County, PA.

Of course, archaeologists should never survey or excavate any land without the landowner's written permission. If they don't get permission, they are breaking the law. This is true for state and federal land as well. No one is allowed to remove any cultural material from state and national parks and forests, museum grounds, waterways, or game lands without permission.

4. If archaeologists plan to excavate to recover new data, they must carefully plan every part of the excavation. They must organize the site excavation in such a way that context is preserved and recorded.



Archaeologists start by placing a grid of squares over the entire site. They build this grid from a reference point called a datum. The squares are usually one or two meters on each side. Every corner of every square is measured exactly using a tool called a transit. Wooden stakes or metal rods are placed at each corner and then connected with

strings. Each square is given a label. This label is usually the distance and direction of the southwest corner of the square from the datum. For example, 2S4W means that the southwest corner of the square is two meters to the south and four meters to the west of the datum. Each square is then excavated in small layers called excavation levels.

Notes and maps are kept for every level. Artifacts, byproduct materials, and ecofacts are measured exactly where they are found. All are labeled and collected by site number, square label, level number, exact location, date, excavator initials, and other relevant information. It is important that excavators peal away the soil so as not to disturb the remains. Excavators must always have a "tag and a bag" ready before they remove the item. Everything must be mapped exactly before removal to the bag. All features must be measured and drawn on the map. Photographs are taken. All of the dirt that has been excavated is carefully screened to discover additional remains missed by excavators. These sifted materials are also labeled by site, square, level, etc. Without these techniques, archaeologists will loose important information about context. Remember, without context, archaeologists cannot understand what they have found.

You may be surprised to learn that every excavation destroys archaeological evidence. You cannot put things back the way you found them. Therefore, it is most important that every archaeologist find a way of recording what is found in order to preserve information about the site and its contents. If a site is recorded well, then another archaeologist, who has never worked at the site, should be able to understand exactly what happened and be able to analyze the remains.

5. If archaeologists are finding new evidence, they will have to determine the best way of protecting and preserving the remains. For example, remains that have been under water or in swamps are especially fragile. In some Pennsylvania lakes, piles of woolly

mammoth bones have been found under water. The water, darkness, and cold temperatures have protected them from decay for 14,000 years. If we were to pick them up out of the water, they would start to dry right away. Some bones would dry so quickly that they would fall to pieces in our hands. Others would take a little longer to crack and break apart. Any evidence of cut marks resulting from cutting away meat from the bone would be lost. Not only must the archaeologist anticipate the need to protect the remains during recovery, special steps must be taken to preserve the remains, such as these bones, in the laboratory.

All will have to choose the kinds of tools they will use. Archaeologists use tools ranging from mason's trowels, measuring tapes, sifters, and spoons, to satellites and nuclear reactors in discovering evidence about the past. Because so much archaeological work requires special knowledge, they will have to assemble a team to help them find and study the remains. It is not unusual for a botanist, zoologist, geologist, chemist, computer programmer, or physicist to be part of an archaeological project.

Archaeologists will have to pay special attention to recording the evidence which they find and study. Specially prepared field notes, careful measurements, maps, photographs, computer databases, and satellite images may be part of the recording process.

An archaeologist must consider all of these questions before data collection and study actually take place. Archaeological data may be destroyed if this step is ignored.

6. The third step in a research design is to plan how the collected remains will be preserved and studied, where they will be studied, and more. Once again, the archaeologist must consider such matters as preservation, recording, and special knowledge.

The laboratory where the analysis takes place should have enough storage space for the archaeological remains. If some remains are fragile, special steps must be taken to keep them from falling apart.

Textiles must be preserved as should objects of metal. All organic materials must be protected from further decay. All field records including notes, maps, photographs, and field tags must be protected from mold, decay, and chemical disintegration. Archaeologists do not study things and

then throw them away. They must take steps to preserve these remains for future archaeologists to study.

In the laboratory, remains of human behavior are prepared for analysis by cleaning, preserving, and cataloguing. Cataloguing involves numbering, measuring, weighing, and describing the object. These descriptions and numbers can be stored in card files or in computer databases. The remains are then studied by specialists using whatever tools they need to answer the research questions. Common tools for analysis include computers, cameras, microscopes, drawing tools, statistics, and measuring devices. Some laboratories are highly specialized. They are used for only one purpose such as determining a Carbon-14 date or studying plant pollens.

7. The final part of the research design is to write a report about the work so that other archaeologists can learn from it. If an archaeologist does not write a report and does not share the analysis or conclusions, he or she has destroyed archaeological evidence and is no better than a treasure hunter.

Throughout this decision making process, the archaeologist is always aware that a bad decision may result in the destruction of archaeological remains, especially archaeological context. It is context that gives meaning to the evidence that archaeologists find. You cannot answer questions about who, when, where, and what without collecting evidence of context (see Chapter 2).

Once the research design is completed, the archaeologist can work hard to make the project "come alive." The research design is an important guide for doing archaeological work. Sometimes, an archaeologist may have to change some parts of the plan as evidence is collected and analyzed. However, by following and changing the plan as needed, an archaeologist can be sure that he or she has tried to do his or her best in answering an important research question.

CHAPTER 5

How Old Is It?

1. One of the most important questions that archaeologists ask is, "How old is it?" When archaeologists study a site and things found there, they need to place what they find into the context of time. Therefore, "How old is it?" is one of the important questions, which archaeologists must answer if they are to understand the evidence they discover. Archaeologists use two different ways to date, or discover the age, of the remains they study: relative dating techniques and absolute dating techniques. **Relative dating** techniques identify whether something is older than or younger than something else. These techniques cannot answer the question "When?" **Absolute dating** techniques allow the archaeologists to answer the question "When?" These techniques often use "clocks" that exist in nature.

2. An important relative dating technique is called **stratigraphic dating**. This technique uses **stratigraphy** or the study of the layers of remains found at a site. All kinds of things can occur in layers. Soil, buildings, tools, pollen, bone, and trash are good examples of things that can be found in layers at a site. The important idea, which makes this technique possible, is that things that are at the bottom of a site are older than things on the top. Another way to say this is that the first layers to be deposited at a site are oldest, while the last layers to be deposited are the youngest. This is called the **Principle of Superposition**. This is not always true. Sometimes, people in the past dug so many holes into their campsites and villages, that they mixed-up the deeper and older remains with their own. However, this technique is useful most of the time. By itself, stratigraphic dating cannot tell us how old something actually is, or how much time has passed. It can only tell us whether something is older than something else.

3. Sometimes archaeologists can discover that some things are the same age. When two or more objects are found together in the same archaeological deposit, such as in a pit, it may be because they were buried at the same time. This is called dating by **association**. Archaeologists have to be very careful to show that the remains actually do belong together. For example, if pieces of wood charcoal are found together with pieces of burned deer bone and a fire-cracked spear point at the bottom of a pit feature, which has been covered with fire-cracked rocks and soil, archaeologists could conclude that these objects are from the same time period.

Sometimes archaeologists can date a site by comparing some remains to the environments they are found in. For example, if archaeologists find the bones of a woolly mammoth at a site in Crawford County, PA, they will probably conclude that this site may be an Ice Age site, because woolly mammoth did not live in Pennsylvania after the Ice Age was over. Sometimes archaeologists compare chemicals that are found in bones, which have been discovered together, to determine if the bones are of the same or different time. For example, bones absorb fluorine and uranium from ground water. If the bones, found in association have the same amount of fluorine and uranium, they are probably the same age. If they have different amounts, they were probably deposited at different times. This only works if the bones are found together.

4. Cultural change is also useful in determining if something is older than or younger than something else. People often change the shape, raw material, ways of manufacturing, and decorations of things they use. When something is popular, more of it is used than if something is not popular. By studying many sites, archaeologists can discover the order in which certain remains such as tools and buildings have changed. The order of changes and their descriptions are called a **typology**. Archaeologists can use this

information to identify where in a sequence of change a site or object belongs.

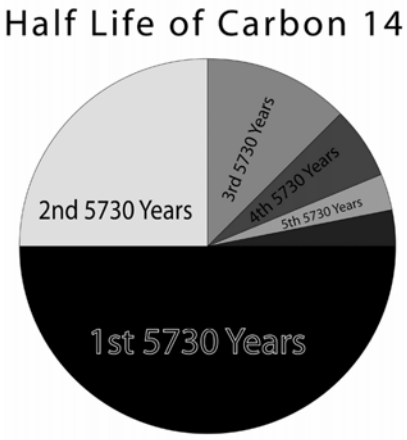
These and other relative dating techniques are useful for determining whether things are older than, younger than, or the same age as something else. They cannot give archaeologists actual calendar dates. To do this, we need to use chronometric techniques.

5. **Absolute dating** techniques are sometimes called **chronometric techniques.** They allow the archaeologists to answer the question "When?"

Perhaps the most obvious dating tool is the calendar itself. A number of cultures in the past invented calendars. Because they kept track of time, archaeologists are able to find out when something happened. The coins in our pockets all have dates on them. These dates tell us when the coins were manufactured. European pioneers in North America may have lost a coin at a site we are exploring. The date will be useful in dating the coin. However, it may not help us date the historic site. If you look at the coins in your backpack or pocket, you will probably find coins with different dates on them. Sometimes people keep old things as souvenirs. If you look around your bedroom at home, you will find objects there from all the years of your life. An archaeologist looking at your room might be able to read a date on each object, but still not be sure when you lived in your room.

Not all calendars measure time the same way. Not all calendars start in the same place. The Maya, Judaic, Chinese, Islamic, and Christian calendars are very different from each other. In the Christian calendar, it may be the year 2003 in April, while in the Islamic calendar it is the year 1424. Therefore, even though archaeologists may find a date from another culture's calendar, they still have the problem of figuring out how that date translates to the calendar they are using today.

6. Some of the most useful ways of answering the question "When?" include clocks that are found in nature. The most useful of these radioactive clocks is **radiocarbon dating**. All plants and animals contain carbon-14. Plants and animals are called **organic remains**. This means that the element carbon is an important building block for plants and animals. When a

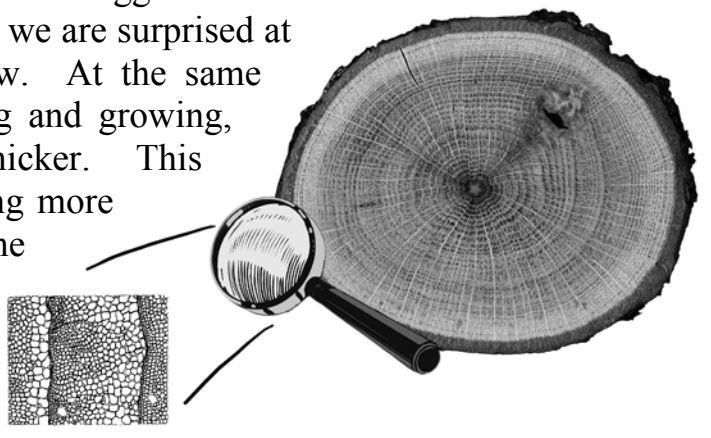


plant or animal dies, a special kind of carbon called carbon-14 begins to change into something else. This kind of change of a radioactive material is called **decay**. Every 5730 years, one-half of the amount of carbon-14 in these organic remains decays. The time it takes for one-half of the carbon-14 to decay is called its half-life. By measuring the amount of carbon-14 left in a plant or animal, the archaeologist can determine when the plant or animal died.

7. Other radioactive clocks are used to date rocks. Potassium-argon and fission-track dating are examples of dating techniques used to date rocks produced by volcanoes. These techniques are used to date very old sites. Archaeologists have to be very careful about the way they use these techniques. For example, a tool can be made from a rock that is two million years old. This does not mean that the tool is two million years old. The tool may have been made 10,000 years ago.

8. One of the most reliable dating methods used by archaeologists is tree-ring dating. The special name for tree-ring dating is **dendrochronology**. This dating technique is very useful where people used wood for building and where this wood is still preserved. How does tree-ring dating work? Before we can answer this question, we have to learn where tree-rings come from.

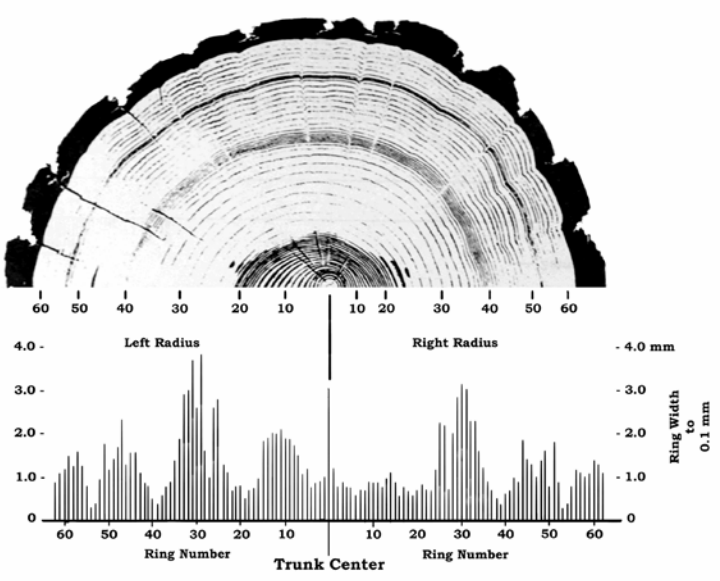
All of us have noticed that in the springtime trees grow very quickly. Overnight, we can see more and bigger leaves as the spring continues. Sometimes we are surprised at how quickly the leaves grow. At the same time the leaves are sprouting and growing, the tree trunk is getting thicker. This means that the tree is growing more wood, very quickly, in the springtime. By summer time, the tree is still growing, but very slowly. By the fall and winter, a tree stops growing. In the springtime, the tree starts growing very quickly again. If we were to look at the new wood under a microscope, we would find that the cells growing in the spring are very big, while the summer cells are very small. In the winter,



there are no new cells. Because the big spring cells are growing next to last year's slow summer cells, it looks as if there is a line in the wood.

If we looked at a cut in the tree, it would look as if the tree had grown rings of wood. Every year the tree grows rings on the outside, under the bark. By counting the number of rings, we can discover how old a tree is. Archaeologists can use this information to date sites in certain parts of the world.

9. How much wood grows each year depends on how old a tree is and on the climate. An old tree will produce narrower rings than a younger tree. In dry climates, such as in New Mexico and Arizona, the amount of rainfall is different from year to year. If there is a lot of rain, the ring will be thicker. If there is little rain, then the ring will be narrower. Therefore, archaeologists can also use tree-rings to learn about the climate of people who lived in the past. Arizona archaeologists can identify when there was a drought and how long the drought occurred. A drought would appear as several very narrow rings found together. In the temperate climate of Pennsylvania, sunshine and temperature will be more important in determining the size of a ring. If it is very cold in the spring, a tree will produce a narrower ring.



Archaeologists measure and plot the thickness of each ring on a diagram called a **skeleton graph**. Trees of the same species that grow in the same area, such as the Douglas Fir in Arizona, can be used to learn about the climate and date archaeological sites in the area. Before they can use the tree-rings for dating, archaeologists have to create a chart, called a **master chart**, which shows the whole pattern of changes in tree-ring thickness for an area. Because the climate can be different from region to region, a different master chart must be prepared for each region. They start by plotting the thickness of tree-rings from a living tree on a skeleton graph. Next, they find an older tree and do the same for

that tree. They then match the thicknesses of the tree-rings to each other. They keep matching older and older tree rings until they have a chart that shows the pattern of tree rings for many hundreds and sometimes thousands of years into the past.

If archaeologists find wood showing tree-rings at an archaeological site, they can match the pattern of rings to the master chart and find out when the archaeological tree sample was cut down. They use this technique to determine when trees were cut down. They then use this information to discover when a site may have been occupied. They have to be very careful because people in the past often reused wood from older sites and buildings when they remodeled. Therefore, it is possible that an ancient house in New Mexico may have wood from trees which were cut fifty or more years apart. Even though dendrochronology is very accurate in dating the death of a tree or changes in climate, archaeologists still have to interpret what this evidence means when they are dating a site. Archaeologists are now trying to develop a master chart for certain kinds of oak trees in Pennsylvania. Even though they may be successful, it will still be difficult to use, because most very old wood in Pennsylvania has rotted away. Tree-ring dating is so accurate that it is used to check the accuracy of carbon-14 dating.

There are many other dating techniques which archaeologists are using today. There will be new techniques in the future. Archaeologists are always finding new ways of dating archaeological sites and things found at sites. They work together with chemists, physicists, geologists, and others to discover how we can use clocks found in nature to ask the question "How old is it?"

SECTION TWO - PENNSYLVANIA BEFORE THE EUROPEANS

CHAPTER 6

History and Culture in Pennsylvania Place Names

People all over the world give names to people, things, and places. A person's name might indicate that he or she has a particular characteristic, occupies a certain job, belongs to a particular family, is the descendant of an ancestor, or is the son or daughter of a particular person. In Japan, it was quite common for people to be named for the job they did such as porter, farmer, fisherman, or pilot. In Ukraine, a young woman's family name might be Stepanivna or daughter of Stephan.

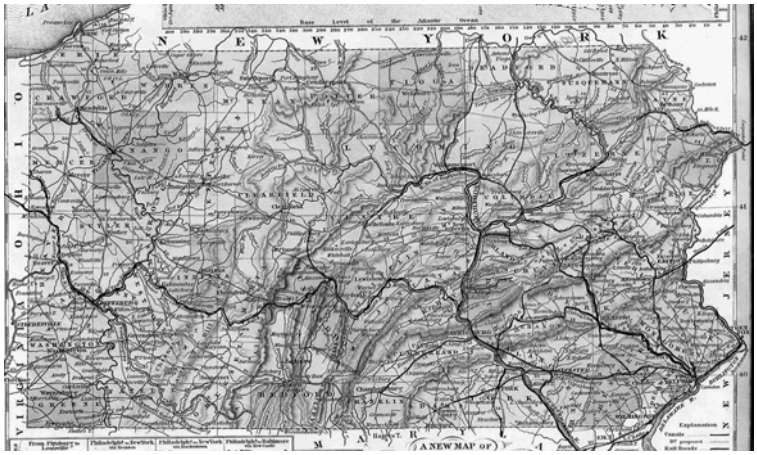
Things may be given names that indicate a purpose. When we hear the words "hammer" or "screwdriver" we think of tools made for a special purpose. Of course, not all names have to have a connected meaning. A computer mouse has nothing to do with the small animal, except that some people think it has a tail. Some names are just invented names.

The name of a place may suggest an event, a characteristic, a person who settled there, or a place where settlers came from. A place called *Agua Caliente* may indicate that there is hot water, possibly from hot springs in the area. Because it is a Spanish name, it may also suggest that the people who named the place were Spanish speakers. English speakers might have called it Hot Springs. Waterford might mean that it was a good place to cross a stream or river.

In the United States, the names of places can come from many different languages. If you travel to Idaho, you may find French names such as Coeur d'Alene. Nebraska comes from an Oto Indian word meaning "flat water." New Jersey is named after the Isle of Jersey in England. The Wasatch Mountains in Utah are from a Ute word meaning "mountain pass," and so on.

Have you ever looked at a map of Pennsylvania and wondered why some places have the names they do? Some names represent Native American words, others European. Each name carries a message about the special

characteristics of the place or its history. Pennsylvania is often translated as "Penn's Woodland." What does that mean? Just by looking at the name, we begin to suspect that maybe someone by the name of Penn was important enough to have this very big place named after him. We may be surprised to learn that it was not named after William Penn, but after his father Admiral Sir William Penn. Why was he so important that Pennsylvania refers to him?

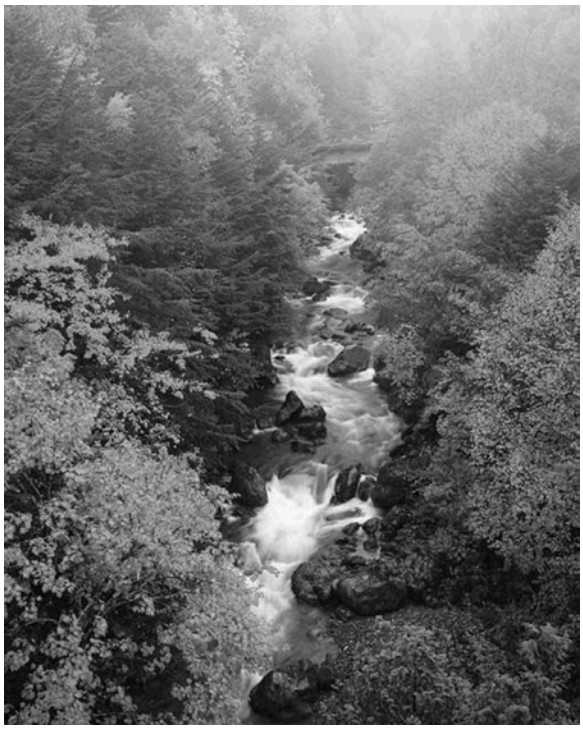


The names of places in Pennsylvania can be important clues to the history of the people who lived there. Native American names are found throughout Pennsylvania, reminding us of the Native Americans who once lived throughout this state. Some of these cultures are now extinct or have moved elsewhere. However, we remember them through the names they left behind. The European settlers of Pennsylvania are now gone as well. By looking at the names they left behind, we can also learn about them, their beliefs, and their history.

In 1928, Dr. George P. Donehoo wrote a book called Indian Villages And Place Names In Pennsylvania. In this book, he gives many examples of why certain places have the names we see today. This book has been so popular that it has been reprinted several times. Let's take a look at some of the place names Dr. Donehoo wrote about.

The word Ohio may have come from a Seneca word which means "beautiful river." A community which has the English name "Canoe Place" may have that name because hundreds of years ago, early explorers or settlers discovered that local Native Americans used that location to put their canoes in the waters. These and other names remind us that hundreds of years ago Europeans and Native Americans were in constant contact with each other.

The Europeans often used existing Native American names instead of always inventing their own. Some names don't sound the same because



some Europeans could not pronounce the Native American words. Sometimes Europeans just translated a Native American name into their own language. For example, Raccoon Creek, which enters the Ohio River in Beaver County, may be the translation of the Delaware name for the stream Nachenum-hanne or "raccoon-stream." At other times European settlers changed the name to a more familiar European name which had no connection with its Native American name.

Sometimes Native Americans gave their own names to European places. The City of Pittsburgh had several Native American names before it became a city. As early as the French occupation, the Delaware called the place Menanchk-sink, "where there is a fence" or a fort. They saw the French place and gave it their own name. In fact, by tracing all of the different names which were used by Native Americans and settlers alike, Dr. Donehoo was able to write a short history of early Pittsburgh, just by discovering the different names for the area.

Punxsutawney is known to everyone in America as the place where a ground hog predicts the weather. Have you ever thought why it has that name? According to Dr. Donehoo, it was once the name of a Delaware Village. Its name may have been originally Ponks-uteney or "gnat town." When we discover that a gnat is a biting fly, we can only guess at how unpleasant life might have been in such a place full of biting insects.

Place names provide us with interesting clues about the people who named them, as well as about the places themselves. They can be a very useful source of information about the past.

CHAPTER 7

What was Pennsylvania Like Before European Contact?

1. Pennsylvania has changed in many ways since Europeans began settling here. Not only has the culture of the people living here changed, but Pennsylvania has changed environmentally as well. Today, much of Pennsylvania is a mix of cities, suburbs, and farmland. The landscape has changed so much that William Penn would hardly recognize "Penn's Woods" as Pennsylvania was once called. Think about this name. It reminds us of the most important feature of Pennsylvania before Europeans arrived: it was a forest.

You have probably enjoyed a Pennsylvania forest when you have been on a summer picnic, gone on a hike, or attended a camp. Maybe you even live near a forested area of the state. However, keep in mind that most of the forests you can visit today are not original. They represent the new growth of a forest that was once cleared for lumber or fuel. One way in which the forests of Pennsylvania are different from those of the past is that they have a lot of shrubs and smaller trees in them. They have a much less open forest floor than the original forests in which the leaves of tall, old trees blocked the light from reaching the forest floor, making it hard for plants to grow below them. Another difference is that some species of trees and other plants are no longer present or are present in smaller numbers than they once were. For example, the American chestnut was once abundant in Pennsylvania's forests but has disappeared due to the chestnut blight, a fungus that was introduced at the beginning of the twentieth century.

2. Just because most of Pennsylvania was forested before modern times, doesn't mean that there was no variety in plants and animals throughout our

state. In the first place, there was a difference between the low coastal areas, the mountain ridges, valleys, and the plateau regions of the state. Altitude, rainfall amounts, and average temperatures weren't the same everywhere, leading to three broad types of forest. The **boreal forest** consisted of mainly evergreen trees (**coniferous trees** like spruce and hemlock). It was found at the highest ridge tops. The **transition forest** contained both evergreens and tree species that drop their leaves in the fall (**deciduous trees** like oak and beech). This forest covered much of central and northern Pennsylvania. The **mixed deciduous forest** didn't have many evergreens at all. It was found in the western and southeastern part of the state. Each of these forest types had other plant and animal species usually associated with it.

Second, rivers and other bodies of water, as well as clearings in which trees gave way to grass and shrubs, broke Pennsylvania's forests. In other words, within the forest types, there was a variety of **habitats,** each with their own interacting **communities** of plants and animals. While large game animals like the white-tailed deer would have been found in many of these communities, other animal species would only have been part of certain communities. Many species of plants also require specific amounts of water or types of soil and so would have been unevenly distributed through the forest.

Finally, within forest communities themselves there were vertical layers of life interacting together. These included the **soil layer** where all kinds of burrowing animals such as woodchucks, moles, and earthworms lived; the **forest floor** where there were plant species like ferns, mosses, and small wildflowers as well as animals like mice, reptiles, and wild turkeys; and the **shrub layer,** with its thickets of species like the wild type of the rhododendrons that may grow at your house. The other forest layers were the **understory**, which contained small trees and animals like woodpeckers

and squirrels; and the **forest canopy,** where tall trees lifted their leaves to the sun and hawks and owls as well as bats could be found.

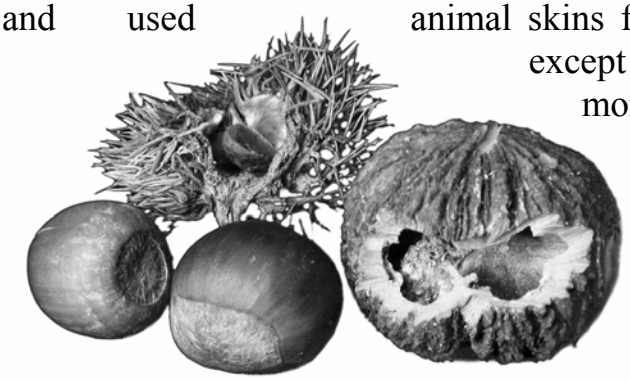
As you can see, Pennsylvania's forests were complicated **ecosystems** that you could spend your life trying to understand, even if they hadn't been changed so much over the last few centuries. However, what is most interesting to archaeologists about these forests of the past is that humans were part of them. Attracted to the many kinds of plant and animal foods and other **resources**, humans settled in Pennsylvania's forests long before Europeans arrived here. Pennsylvania's forests made a good home for these people, who were the ancestors of the American Indians of Colonial times. The ways in which they used and changed the forest were both similar to and different from those that later Pennsylvanians adopted. Archaeology helps us make comparisons between these people and ourselves.

3. You may think that modern people are the only ones who have changed the environment. Certainly, because of the large number of people living in Pennsylvania today, not to mention our advanced technologies, we have a great effect on the land in which we live, and we need to become more aware of the ways we are hurting the environment.

However, you shouldn't think that the Native Americans who lived in Pennsylvania before Columbus didn't change the forests at all. Like people everywhere, they used the plants and animals around them for various reasons. In fact, they knew a lot more about these plants and animals than most of us do today. As a result, Native Americans were able to influence and change the habitats of the plants and the animals around them in desired ways. These practices didn't cause the degree of environmental destruction we worry about today, but they did change the forests in important ways.

In fact, Native Americans may have caused some of the characteristics of Pennsylvania's forests found by the Europeans. Clearings within the forest were not just the result of natural factors, but also the result of clearing by natives for villages or to create fields and gardens. Indians used fire to clear their fields. They also used it to help various species of plants and animals they hunted and gathered. For example, plants that easily grew in disturbed areas produced many wild seeds that could be eaten. Burning off some of the forest meant that these plants had a better chance of sprouting. Deer, which were often used for meat by most of Pennsylvania's native people, also prefer open woodlands or the edge of clearings. This means that the numbers of deer in an area probably would have gone up as people cleared areas of dense forest. Archaeologists have evidence that Native Americans did some of this kind of changing of their environment, on purpose, long before the Europeans arrived.

4. The first humans to live in Pennsylvania, the Paleo-Indian and Archaic people described in Chapter 9, were **hunter-gatherers** who used the large amounts of wild plants and animals in the forests for survival. At first, these people moved around a great deal, camping in one spot for only a short period. They hunted deer, trapped smaller animals like squirrels, took birds like turkey and ducks, fished and collected mussels in the rivers and streams, and collected nuts and berries. They made a variety of stone and bone tools and used animal skins for clothing. It was a good life, except at the end of the cold winter months when plant foods were uncommon and other animals were lean. Archaeologists think that this fact probably led people to store what food they could in pits and caches.



Over time, this way of life involved less and less moving around. Groups began to settle into small

communities and population increased. These changes required many small adjustments in lifestyle, but one of the most important changes people made was to begin to encourage and then actually grow some of the wild plants they used. What's interesting is that many of these plants are ones you and I would probably pull out of our gardens. We don't recognize their food value, but early Native Pennsylvanians did. Long before the beginning of our current calendar, Native Americans began to grow these plants on purpose, altering them to increase the size and amount of seeds.

Archaeologists call the plants that people began to grow the **Eastern Agricultural Complex.** One important indication of cultivation is an increase in size of the seeds compared to wild varieties. Although evidence for this complex from Pennsylvania is incomplete, there is enough to believe that Native Americans here also began to use plants in this way. However, people in Pennsylvania and further north may not have begun this practice quite as early as elsewhere in the East. The first plant Native Americans began to cultivate was a gourd, which is a type of squash. By 7,000 years ago, people in some areas of the East were growing gourds probably for use as a container or maybe for use as a float on their fishing nets. A little later, at about 6,000 years ago, the sunflower was being grown as well. The weed species in this group are called sumpweed, chenopodium, maygrass, knotweed, and little barley. The seeds of these plants are either high in carbohydrates or in fat. They were probably important in native diets. By 4,000 years ago, an American variety of tobacco had been added to the complex.

Native Americans were farmers long before Europeans came here. However, you shouldn't imagine fields like you see in farmlands today. What these people were doing was much more like gardening. That is, they planted and tended a small number of plants of several of these species in small plots. Besides this gardening, hunting and gathering continued. Therefore, native people had a **mixed economy** long after they began planting native seed crops. Although they were using burning and other methods to make room for their crops, they continued to rely on all the kinds of forest products that had been important for centuries.

5. Farming among Native Americans changed again, throughout the Eastern Woodlands, somewhere between A.D. 800 and 1,000. At this time, agriculture based on corn, beans, and squash became important. When Europeans arrived, nearly all Native Americans living in Pennsylvania grew

these plants, although the earlier crop plants probably were still cultivated by some groups.

Neither corn (or maize) nor beans originally grew in Pennsylvania or even in nearby areas. These plants were imports from Mexico by way of the southwestern part of the United States. Corn was first brought to the East several centuries before this shift to corn, beans, and squash agriculture. Pennsylvania Native Americans first simply added it to the small garden plots they were already planting. Beans arrived in the area much later in time, but their importance is harder to figure out because they don't preserve as well archaeologically.

The Iroquois called corn, beans, and squash the "three sisters" because they grew them together in their fields. We know today that these plants complement each other in terms of nutrition and that they also work together to keep soils in better condition. You may have learned stories about Native Americans in other parts of the East teaching colonists to grow these plants. Certainly this type of agriculture was productive and efficient.

Thus, farming based on corn, beans, and squash yielded large quantities of food. Archaeologists link this kind of development with the presence of large numbers of people in big villages and towns. They also link the surplus food produced at this time with more complicated systems of political control, though not all Pennsylvania Native Americans fit this model.

Corn, beans, and squash agriculture required people to clear large fields. Archaeologists believe this was done through a version of **slash and burn**

agriculture. This means that people cut down brush and burned it in field areas in order to clear the land. Fields prepared in this manner benefited from the nutrients in the burned brush and could be farmed for a number of years. People continued in this way by clearing fields around their villages, working them until they were not productive, and then clearing new fields (while the original ones were abandoned). Deer and other animals were attracted to the abandoned old fields and could be hunted there. Eventually, maybe every 20 to 30 years, villages had to be moved so that more land could be cleared. This process certainly opened up the forest, created new habitats, and established new plant and animal communities.

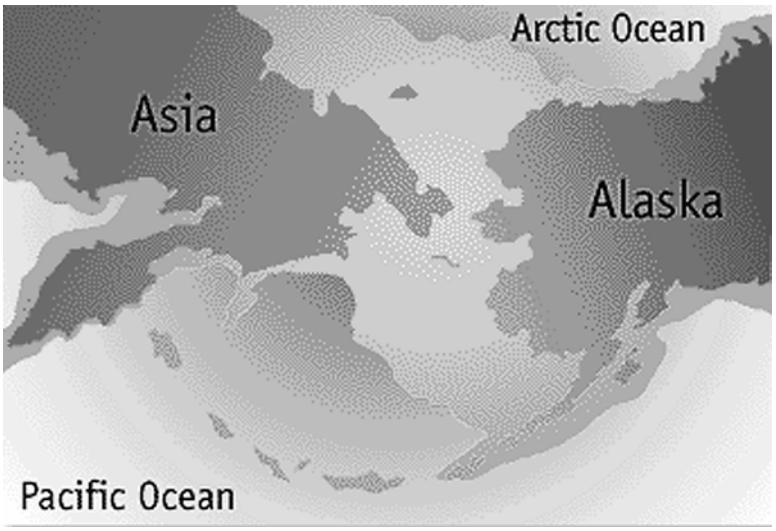
6. In many ways, the Native Americans who lived in Pennsylvania before the Europeans arrived were not different from European settlers. Both groups relied on the land for farming and used the products of Pennsylvania's forests to meet their needs for food. Both groups changed the environment in the process of surviving. As you read about the lives of early European settlers in your continuing studies, think about their similarities with Pennsylvania Native Americans and try to make comparisons with what you have read here.

CHAPTER 8

Where Did the Ancestors of Native Americans Come From?

1. Every culture tries to define and explain the universe in which it exists. Religion, philosophy, and science are all used to do this. In our culture, we often try to describe and explain the world we live in by using science. Sciences such as geology, astronomy, biology, medicine, and others provide us with evidence with which we can understand our world. For many people, religion is also used to define and explain the universe. If we were to ask some Native American religious leaders where their ancestors came from, they might answer, "We have always been here." They would be correct. The ancestors of the Native Americans were the very first people to live in the Americas. There were no other people who lived here before them.

When the Europeans came to North America, they discovered a continent full of people. Archaeologists estimate that there may have been over 20 million people living in North and South America at the time of Christopher Columbus' voyage in 1492. All Native Americans were not the same. If you traveled across the continents, you would encounter hundreds of different languages and cultures. Archaeological evidence suggests that Native Americans and their ancestors have been in the Americas for over 15,000 years. Some archaeologists believe that the ancestors of Native Americans arrived in the Americas before 20,000 years ago. There are archaeologists hard at work today looking for evidence of these earliest Native American ancestors. Have you ever wondered where the ancestors of the Native Americans came from?



2. Archaeologists, working with geologists, botanists, zoologists, human biologists, linguists, and others, have found evidence

that the earliest ancestors of Native Americans may have come from northeast Asia. It may surprise you to learn that they may have walked from Asia to North America.

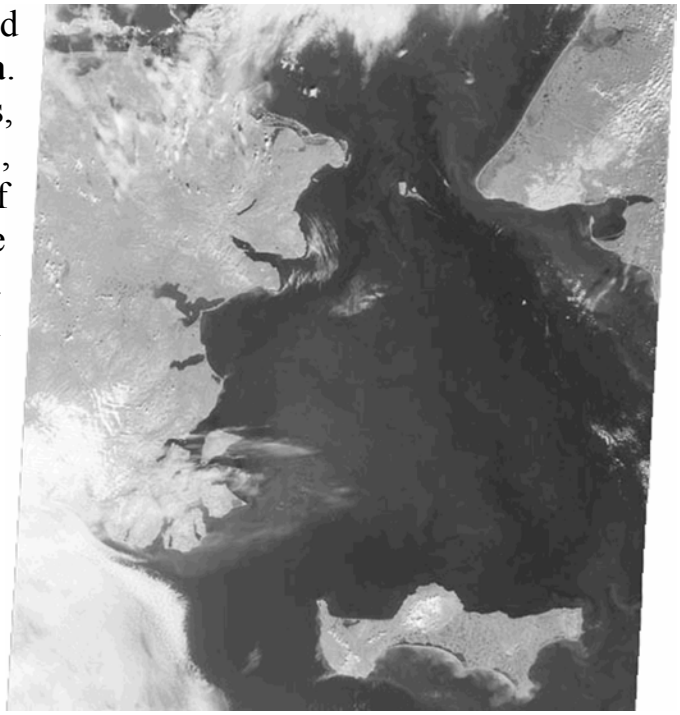
If you look at a map, which shows northeast Asia and Alaska, you will see a body of water, called the Bering Strait, separating Asia from Alaska. If there was water there, how could people have walked across the strait? The surprising answer is that sometimes there was dry land. Where did the land come from? The land is still there, but covered by the waters of the Bering Sea and Arctic Ocean. To find a better answer, we have to look at the earth's climate.

3. For the past 100,000 years, parts of the earth were sometimes covered with large ice sheets called glaciers. When the earth's climate was very cold, for thousands of years at a time, glaciers would form, covering parts of many continents. When it warmed up again, the glaciers would slowly melt. Then, it would get cold again, glaciers would form again, and so on until today, when we are in a warming climate.

Glaciers are made of ice, which is made of water. Where did the water come from? This water came from the oceans. Next time you watch the weather on television, take a look at where many rain clouds come from. They often form over a sea, lake, or ocean and move onto land, where the moisture falls in the form of rain or snow. Imagine a time, when it was so cold that the snow never melted. It was winter every day of the year. Year after year it snowed, but the snow never melted. After thousands of years, the snow pressed upon itself and formed ice, which could be many miles thick. Geologists tell us that the glacier which formed Niagara Falls was over one mile thick. Now, let's look at the oceans at the time of the big glaciers. When the snow didn't melt, water did not flow back into the oceans.

Huge glaciers covering large parts of a continent, trapped the water on land. As a result, the ocean levels dropped, sometimes by as much as 400 feet and more all over the world. Shallow sea floors around the world became dry land. The Bering Strait Land Bridge was a good example of such an exposed sea floor. When it was very cold for thousands of years, the sea level dropped hundreds of feet. This drop in sea level exposed a land bridge over 1,000 miles wide. When it warmed up, the land bridge was covered with water again. Sometimes the land bridge was completely

covered, other times parts of the land were visible. Archaeologists suggest that people from Asia may have crossed this land bridge into North America. It is important to remember that the land bridge was not covered with glaciers. This was a real land bridge.

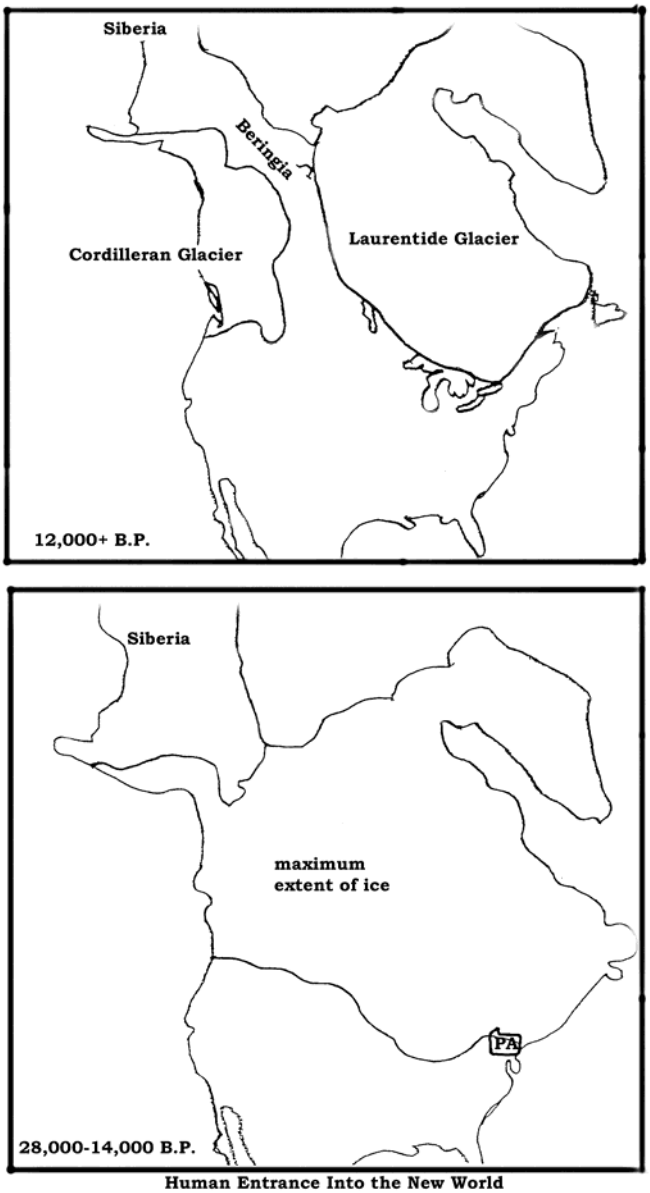


4. Archaeologists have named this land bridge **Beringia**. Working with geologists, botanists, zoologists, and others, some archaeologists spend all of their time discovering what life was like on the land bridge. They suggest that once the land was exposed, plants and animals settled on the land and lived there for thousands of years at a time. They are trying to reconstruct the ecosystem of Beringia. An **ecosystem** is the way plants and animals interact with each other in an environment. This is very difficult work, since today the ancient land bridge surface is not only under water, but also under a layer of silt.

Why did people cross Beringia? Archaeologists believe that they did so in their search for food. The plants and animals on Beringia could have been used by the hunters and gathers of northeast Asia as part of their food supply. Because the distance is only a little over 50 miles at the narrowest point, they could have easily traveled into North America and not known that they had left Asia. Some people may have lived all of their lives on Beringia and never entered either continent. Eventually their descendents traveled south until they occupied both North and South America.

5. When did people cross Beringia? Archaeologists still don't know how many times different groups of people traveled from Asia across Beringia. They still don't know when the earliest people may have arrived in North America. It may have been as early as 25,000 years ago, since the land bridge was no longer under water at that time. These questions continue to be important research problems for archaeologists. Archaeologists are busy

looking for the places where these early peoples lived in both northeast Asia and Alaska. They hope to find evidence of tools and byproduct materials, which will allow them to make a cultural connection between the people of the two continents. Everyone agrees that Native Americans were here for at least 15,000 years before the Europeans moved into the Americas.

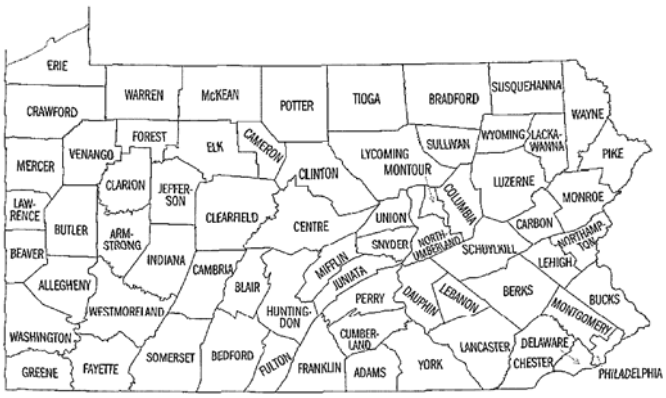


Human Entrance Into the New World

CHAPTER 9

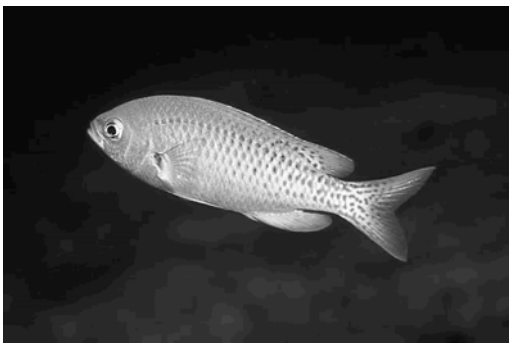
Native American History in Pennsylvania Before the Europeans

1. People have been living in what is now Pennsylvania for over 15,000 years. The ancestors of the earliest Native Americans in Pennsylvania may have crossed the Bering Strait Land Bridge as early as 25,000 years ago. The land bridge from northeast Asia to Alaska was open for travel from 25,000 to 10,000 years ago, during the last glaciations. Archaeologists are still looking for evidence of these early people. They are still not sure when the first people came to North America. Archaeologists do know that Pennsylvania history is at least 15,000 years long.



During these 15,000 years, the people who settled this area successfully interacted with their environments, changing their way of life as the environment changed. This kind of change is called an **adaptation**. By studying archaeological sites, things found at sites, and archaeological context, archaeologists have identified three major cultural adaptations in this 15,000-year period. They do not know how many actual cultures existed here, nor do they know what the early Native Americans called themselves. Therefore, archaeologists have given names to the three major cultural periods: Paleo-Indian, Archaic, and Woodland. These same names are used by archaeologists throughout the Eastern Woodlands. Archeologists agree that the land, now called Pennsylvania, could be a good place to live because of the abundance of plant, animal, water, and mineral resources.

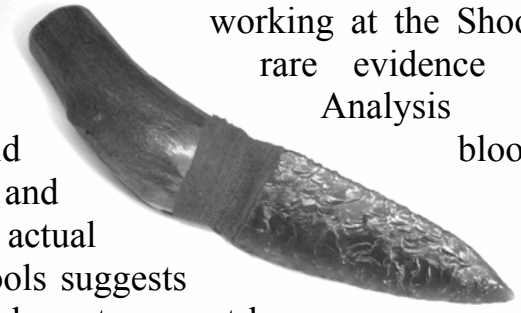
2. The earliest cultural period is called the **Paleo-Indian Period**. It begins when the first people traveled from Asia to North America and ends at the end of the last Ice Age, about 10,000 years ago. During the last Ice Age, glaciers covered the northern third of Pennsylvania until about 13,000 years ago. Life immediately next to the glaciers would have been very difficult.



In addition to the extreme cold, very strong winds would have blown from the glaciers making life almost impossible. However, as one moved away from the glaciers, a more friendly and abundant environment was available for use by people. This Arctic environment could provide fish; migratory animals such as musk ox, mammoth, caribou, moose, and elk; in addition to a limited variety of berries. As the glaciers began to melt and move north, forests and grasslands replaced the Arctic environment. Plants and animals which preferred this new environment replaced those which preferred an Arctic environment.

3. Most Paleo-Indian sites in Pennsylvania have very few remains. Many include a few stone tools and pieces or flakes of stone, which resulted from the manufacture of these tools. Why are there very few plant and animal remains? There are at least three reasons. First, plant and animal remains are scarce because most of these would have decayed and disappeared. Because stone does not decay, it tends to be found at these sites. Second, the sites were often occupied for a short time by a very small number of people. Therefore, they may not have left much behind. Third, some of these sites were studied by archaeologists before they had the tools with which to discover evidence of plant and animal remains.

4. However, there are several sites in Pennsylvania, which provide more abundant clues. Archaeologists working at the Shoop site, in Dauphin County, have found rare evidence of blood remains on stone tools. Analysis of this blood residue has identified cervid blood. Cervids include deer, elk, moose, and caribou. Although they did not find actual bones, the presence of this blood on tools suggests to archaeologists that a variety of cervid meat was cut by the tools. At the Shawnee Minisink site, in Monroe County, archaeologists found fish bones and hackberry remains, suggesting that fishing and berry gathering were important at this site. Although there is very little evidence of food remains, archaeologists suspect that Paleo-Indian people in Pennsylvania hunted mostly small game and collected plant foods when available. Evidence of large game hunting is rare.



The most famous site in Pennsylvania is the Meadowcroft site, located in Washington County. This site may be as old as 15,000 years, making it the oldest continuously occupied site in the United States. Remains represent a series of hunting camps, which used this rock shelter for protection. These hunters probably hunted small game animals.

5. Many Paleo-Indian sites in Pennsylvania are found near rivers. It is no surprise that these sites would be located along rivers. Water is a very useful resource. First, people need to drink water in order to stay alive. Second, many plants and animals live near or in the water. These would have been useful to people as food and as sources of raw materials. Third, water can be a useful tool in preparing food and in processing some raw materials such as plant fibers and animal skins. Fourth, rivers can be used as highways for easy travel from one place to another, for trading resources from one place to another. Finally, some river valleys can provide a more sheltered environment than high areas away from the valleys. Because most of the sites have very few remains, archaeologists can only make educated guesses about the importance of living along the rivers and the quality of life of these early people.

6. Stone tools are among the most studied remains. In addition to a variety of cutting and scraping tools, archaeologists have found spear points, which they call **fluted points**. The oldest of these are called Clovis points, named after a site in New Mexico where they were first found. They are found in many parts of the United States. These spear points are longer than they are wide and are thinner in the area away from the point. This thinning is called a **flute**. Archaeologists suspect that this flute was used to attach or **haft** the stone spear to a wood or bone shaft. By experimenting with hafted fluted points which they made themselves, archaeologists suggest that they would be most useful as

thrusting spears and not throwing spears. They have often been compared to a bayonet on a rifle.

7. Because fluted points are difficult to make, only certain types of stone were commonly used. Paleo-Indian people in Pennsylvania used the best quality stone they could get. Because this stone was not always available where they lived, archaeologists suggest that Paleo-Indian people often traveled to places where these types of stone were abundant. Some sources for a stone called jasper are near Allentown, in northern Virginia, and Delaware. Another useful stone called chert was found in eastern New York, western New York, and Ohio. Some archaeologists have suggested that the need for good stone to make spear points was so important, that Paleo-Indian people planned their yearly activities to include trips to the stone quarries.

8. Archaeologists suggest that overall population size was very small. However, people did not live the same way everywhere. They certainly did not stay in one place all the time. The way people move and settle over a landscape is called a **settlement pattern**. Paleo-Indian people planned their seasonal movements based on the need for food and resources such as high quality stone. For example, in southeast Pennsylvania, the sites are small and close to the jasper quarries of Pennsylvania, Virginia, and Delaware. In the center of the state, the sites are very large and near the chert quarries of New York State. In the Ohio River Valley of Western Pennsylvania, the evidence is still unclear.

There is no evidence which can tell us about the social life of Paleo-Indian people in Pennsylvania. However, by studying living hunter and gatherer groups around the world, archaeologists have learned that family life is a very important part of survival. Many hunter and gatherer groups are **patrilineal**. This means that the children of a marriage belong to the father's family and not to the mother's family. Brothers and their families might live together, while the mothers had to leave their families to live with their husbands and children. This may have been true of the earliest people in Pennsylvania.

Paleo-Indian people in Pennsylvania probably lived within groups formed of related families. Anthropologists call this kind of society a **band**. A child might live with his or her parents, brothers and sisters, and sometimes grandparents, cousins, aunts and uncles. This kind of extended family

would include no more than 25 people at a time. That may not seem like many people, but think of how many plants and animals would be needed to supply the food for such a large group everyday! Each group would probably collect their own food and raw materials. Men, women, and children would all be involved in collecting food. They would share these among themselves. Sharing of food and resources would have been a very important part of their survival. Each group would also make its own tools. Occasionally, when they met with other groups for special activities such as marriage, sharing of knowledge, or other rituals, they might exchange or trade for other things they needed. The adults of the group would make the important decisions. There would be no government, only agreement among equal people after they had discussed a particular problem. This type of agreement is called **consensus**.

Life for Paleo-Indian people in Pennsylvania involved hard work every day. But, because they learned where to find important resources and how to get and use these resources, they were able to plan their activities. By planning their seasonal activities, they were able to survive not just the easier summer months, but the harder winter and early spring months. In fact, their lives probably followed a pattern of food and resource collection, movement, and social gathering year after year. However, this pattern was not exactly the same every year. As the Ice Age continued to end, changes in the environment continued to influence changes in this pattern of life.

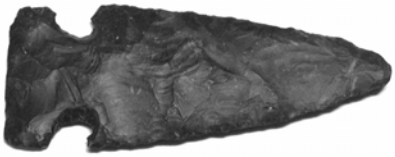
9. The next cultural period defined by archaeologists is called the **Archaic Period**. It started at the end of the last glaciation, about 9,000 years ago, and continued to about 3,000 years ago.

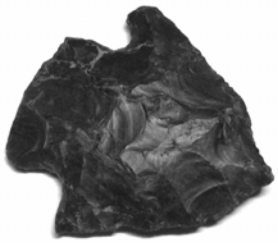
By the time the glaciers retreated, and the last Ice Age came to an end, much of Pennsylvania was covered with forests. At first, when it was colder, spruce, pine, and hemlock trees were more common. As the climate became warmer, oak, hickory, and chestnut trees became more common. Mixed in with the forests were a variety of wetlands, rivers, and clearings. Animals such as fish, deer, rabbits, squirrels, foxes, bears, beavers, turkeys, ducks, geese, and others were abundant. Bush plants living in the clearings were full of berries. Wetland plants produced edible seeds and fibers. Trees bore edible nuts and acorns in addition to wood. Rivers, lakes, and seashores were full of fish and shellfish. Pennsylvania was full of abundant useful resources. Archaeologists have discovered that Archaic people learned to use these resources very well.

Archaeologists have found a variety of food remains at sites. Burned deer bones, found in fireplaces called hearths, suggest that deer were an important source of meat. But deer were not the only sources of meat. Archaic people also hunted and trapped bear, rabbits, squirrels, birds, and rodents. Fish bones and the shells of shellfish suggest that fishing was important in some parts of Pennsylvania. Seeds from blackberries, raspberries, and wild grapes suggest that these were gathered when in season. Plant remains such as hickory nuts, walnuts, and acorns suggest these were collected in the fall. They are particularly important because they can be stored for use during the difficult winter and spring months.

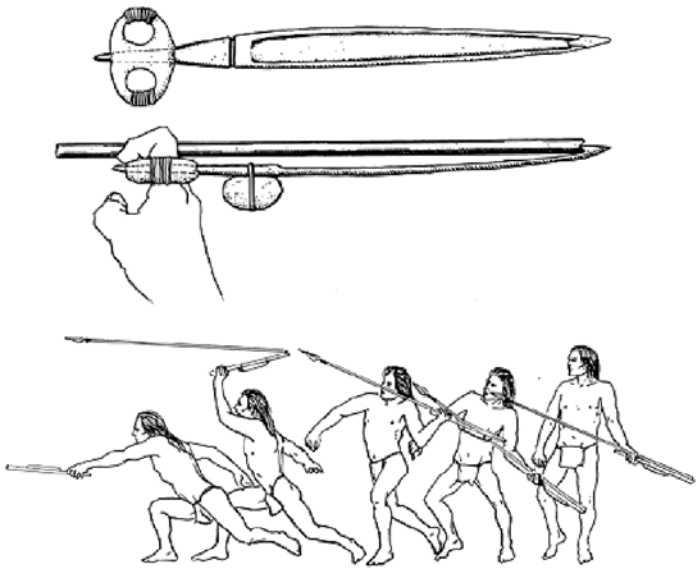
Although Pennsylvania was full of useful resources, they were not the same everywhere across the state. Differences in rainfall, ground water, soil type, sunlight, temperature, growing season, altitude, and forest cover influenced what kinds of resources were available in a particular part of Pennsylvania. Food resources, in particular, were usually available during certain seasons of the year and not others. For example, berries ripen in the summer and early fall, while hickory nuts and walnuts ripen in the late fall. Deer and turkeys may be available throughout the year. Large amounts of migratory birds such as ducks and geese may be available in the spring and fall, when the birds are flying north for the summer or south for the winter. In order to survive, Archaic people in Pennsylvania learned where and when food resources would be available during the different seasons of the year. In some parts of Pennsylvania, Archaic people had to cover a larger territory and move more often to get the resources they needed to live. In other parts, they used a smaller territory and moved less often. All Archaic people in Pennsylvania adapted to their environment by developing tools which helped them use the available resources and moved their camps whenever their needs for particular resources changed.

10. Stone tools are still the most abundant tools found by archaeologists at Archaic sites. Wood and bone tools were also probably used, but most of these have decayed or dissolved in the acid soils of Pennsylvania. Stone tools were made by either chipping the stone or grinding and polishing a stone. Chipped stone tools such as spear points, knives, scrapers, and drills are common stone tools. These continue to be made from high quality stone such as chert or jasper.





These tools are made by hitting a stone with a stone, bone, or antler hammer in a planned way. Pieces of stone called flakes are removed until a particular shape and sharp or dull edge are produced. The spear points do not have flutes anymore. They either have a stem or notches in the sides for use in hafting them onto wooden shafts. Archaeologists suggest that these were thrown spears using a special tool called a spear-thrower. By using a spear-thrower, a hunter could increase the force with which a spear entered the body of an animal. The spear's point would enter the body more deeply than a spear thrown without a spear-thrower. Animals could also be trapped. Knives would be used for cutting anything that needed to be cut. Scrapers could be used to scrape fat from animal hides as they were turned into useful leather. Stone drills could make fire or make holes in skin, wood, shell, or bone.

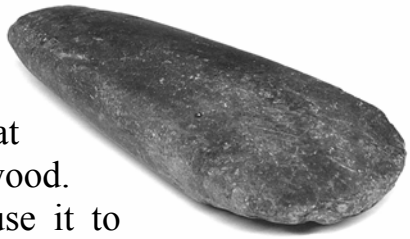


These drawings show how an atlatl was held, and how it was thrown.
RBCM drawings: top, after Butler (1966); bottom, after Fladmark (1986).
Bottom drawing by Jaclynne Campbell.

From The Royal British Columbia Museum

Adze

Ground stone tools were made by pecking, grinding, and polishing a softer stone. Many woodworking tools were made in this way. These tools included axes for cutting down trees and adzes, celts, and gouges for shaping the wood. If you go to a hardware store, you will see woodworking tools made of metal that are used in a similar way to make things of wood. Wood is a wonderful resource. You can use it to build more solid houses. You can make bowls, boxes, spoons, fishing poles, and other useful items. You can burn it to make fire. You can carve a spear-thrower from wood. Although archaeologists have found very little evidence of wood, the presence of woodworking tools at sites suggests that wood was a very important resource.

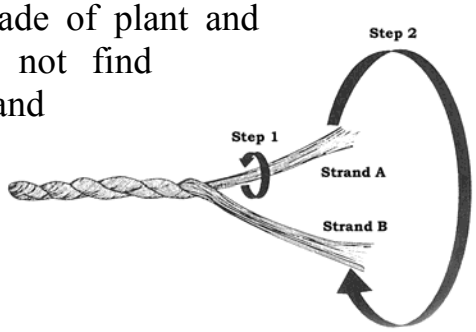


Ground stone tools were also used to crack nuts, grind seeds, or grind colored rocks for use in paints or tattoos. Netsinkers are ground stone tools, which are found, at many Archaic sites. Netsinkers are flat stones which have notches on each side. They were used to sink fishing nets. A fishing net will float on the surface of the water and catch no fish. When it is weighted down with netsinkers, a net can be stretched across a river to catch many fish. Fish may have also been caught be spearing or with hooks and line.

Celt

Near the end of the Archaic Period, some people in Pennsylvania began to make stone pots. These were carved from a very soft stone called soapstone or steatite. The pots were heavy and could not be carried easily. This suggests to archaeologists that in some parts of Pennsylvania, Archaic people were able to stay in their camps for a longer amount of time. Perhaps they had all of the food they needed nearby for much of the year. Steatite is found in southeastern Pennsylvania and northeastern Maryland. Because it is found at sites in other parts of Pennsylvania, archaeologists suggest that steatite was traded across the state.

11. Of course, there are the many tools made of plant and animal materials, which archaeologists do not find because they have decayed. Baskets, strings and rope, nets, leather clothes and shoes, bone needles, and other tools would have been made and used by Archaic people. These are sometimes found in other parts of the Eastern Woodlands.



From Intrigue of the Past, U.S. Dept of the Interior, Bureau of Land Management

12. Campsites were not the same throughout Pennsylvania. Some camps were occupied seasonally. They were occupied only during the time needed to collect a particular resource. Some of these sites are stratified. They show evidence that people returned to the site year after year during an important season. There are no substantial houses found at these sites. Some camps were found near important sources of raw materials or near good locations for getting food. In a few rare places, sites contain more permanent-looking houses and pits for storing food. These camps may have been occupied for a longer period of time. People may have left these sites to hunt and gather nearby. They may have occasionally spent a night away from camp at a temporary camp.

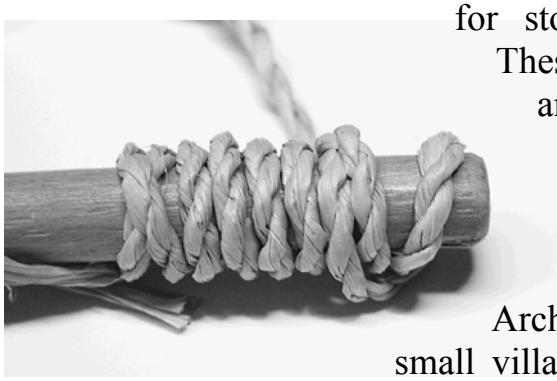
Archaic people in Pennsylvania learned to schedule or plan their activities around the resources which were available. For example, if they knew that the fishing season was coming soon, they could make new nets and fix old nets in time to take advantage of the good fishing. When berries and nuts were available, they could spend much of their time gathering these food resources. They planned their daily activities and work around a seasonal cycle. They moved their camps as they needed to gather the food and raw materials. They hunted and gathered foods that were available seasonally. They continued to live in family-based bands. They shared their food, made their own tools, and traded for needed raw materials. Sometimes when food was abundant, one family group would meet with other family groups to form a larger temporary community. This was a time for ritual, marriage, friendship, sharing of knowledge, trade, and other social activities. By 3,000 years ago, people in Pennsylvania were ready for important changes in their way of life.

13. The **Woodland Period** in Pennsylvania started 3,000 years ago and ended a little after the first Europeans came to Pennsylvania 400 years ago. It is a time of important cultural changes in the way people get their food, the tools they use, and in the way they organize their communities. Because these changes did not happen all at once, archaeologists find it useful to divide the Woodland Period into three parts: Early, Middle, and Late.

Early Woodland (1,000 - 300 B. C.) Life in Pennsylvania during the Early Woodland Period was similar to the late Archaic way of life. People were still hunters and gatherers. They still planned their activities and movement around the need for certain types of foods and other resources. They continued to hunt deer, bear, wild turkey, squirrel, raccoon, groundhog, and other animals. They collected edible roots, berries, nuts, wild seeds, and acorns. Roasted nuts, wild seeds, and acorns could be ground into flour which could then be baked into a cake or boiled with water to make a gruel. Dried meat, nuts, and acorns could be stored for use in the winter and spring. This does seem very much like the Archaic way of life. What were the differences?

One important change was the way Early Woodland people took care of some wild plants. They were still gathering wild plants for food. However, they were cultivating the soil and weeding around the seed plants which they liked to collect in the wild. These seed plants included chenopodium (lambs quarter), amaranth (pig weed), and polygonum (knot weed). These wild plants were healthier and produced bigger seeds because people were taking care of them. After a while, some people began to collect the seeds for planting new plants and not for eating right away. This was the very beginning of what eventually became a farming way of life. Even though they were taking care of some wild plants, Early Woodland people in Pennsylvania were still hunters and gathers who got their food from wild plants and animals.

14. Early Woodland people in Pennsylvania began to make baked clay containers called pottery. These pots were very simply made with thick walls. They could have been made by pinching the clay or by smoothing out coils of clay and then baking the clay until it became as hard as stone. Pots were very useful. They could be used



for storing things and for cooking food. These pots were often heavy, broke easily, and were hard to carry over long distances. The use of these important tools suggests to archaeologists that Early Woodland people did not travel from place to place as much as the Archaic people did. They began to live in small villages, composed of several families, in order to take care of their wild plant gardens. As more and more people began to live together for a longer time, ideas about social organization and their place in the world also changed.

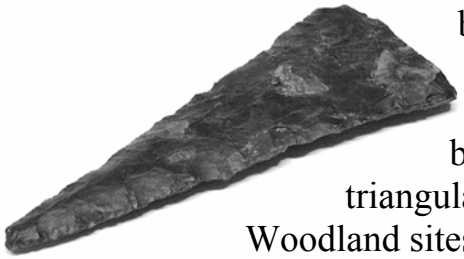
15. In western Pennsylvania, along the Ohio and Monongahela Rivers, archaeologists have found evidence of an Early Woodland culture, which they named Adena. Evidence of the Adena culture is found in Indiana, Ohio, Kentucky, and West Virginia. Adena people are different from other Early Woodland people in Pennsylvania because they built large cemetery mounds. Not everyone was buried the same way. The bodies of some people were burned (cremated). The bodies of others were left out in the open, so that after a time only the bones remained. These ashes and bones were then buried in the mounds. Still others were buried in specially prepared stone or log tombs in the middle of the mounds. Sometimes burials included grave goods, or objects, which were buried with the dead. These objects included stone tools, carved stone smoking pipes in the shape of animals and people, and carved stone jewelry. Archaeologists suggest that differences in burial and grave goods provide evidence that not everyone who lived in Adena culture was equal to everyone else. Some people may have been more important than others when they were alive. This suggests that people no longer live in a band level society. Because they spent a lot of energy and time burying their dead, Adena people must have believed that this was important. Some archaeologists have suggested that the Adena people practiced a religion, which involved special treatment of their ancestors.

16. <u>Middle Woodland (300 B. C. – A. D. 900</u>) In most parts of Pennsylvania, the life of Middle Woodland people was similar to the Early Woodland people. People were still hunters and gatherers who kept small gardens and lived in small villages. Pottery was still important. But as people learned more about pottery-making, they made pottery that was

harder and had thinner walls. It was also more decorated. Archaeologists call this pottery cord-marked pottery. While the clay was still soft, the surface of each pot was hit with a paddle, which was covered by a rope or cord. This left marks on the surface of the clay in the shape of the rope or cord. The clay pot was then baked so that the pot became hard as a stone. By studying some of these marks, archaeologists have discovered how the cord was manufactured.

17. In western Pennsylvania, Adena culture continues until it is replaced by a new culture which archaeologists call Hopewell. Hopewell people lived throughout the Midwest but especially in Illinois, Indiana, and Ohio. Hopewell people also buried their dead with special grave goods. The raw materials of these objects often came from many parts of the continent. Mica from the Carolinas, obsidian from northwest Wyoming, copper from the Lake Superior region, fresh water pearls, and precious metals and stones all found their way into burials in the form of carved figurines, tools, and jewelry. Evidence of Hopewell people has been found in the Allegheny Valley of Pennsylvania. Archaeologists have discovered small villages, burial mounds, and grave goods similar to those found in Hopewell sites in Ohio.

18. <u>Late Woodland (A. D. 900-1,600</u>) Changes in tools and food brought about changes in the lives of Late Woodland people. First, the bow and arrow was introduced. For thousands of years, Pennsylvania hunters used spears and spear-throwers to kill game animals.



Although these were very good hunting tools, the bow and arrow was better because game could be killed a much greater distance from the hunter. People continued to hunt deer, bear, wild turkey, and other animals. Small triangular stone arrow points are found at many Late Woodland sites.

The second major change was the introduction of corn, beans, and

squash. These very nutritious foods could be farmed by people. By increasing the food supply, Late Woodland people in Pennsylvania were able to feed many more people, than in the past. Villages became larger and more permanent. Some villages were carefully planned and organized. Archaeologists have discovered evidence of oval houses made of bent saplings and covered by hides or bark near the center of some villages. These were surrounded by smaller buildings made of the same materials in the shape of a keyhole. Not surprisingly, archaeologists call them keyhole structures. The people who lived there probably used the buildings in the center of the village as houses. The keyhole-shaped buildings may have been used for smoking meat or as ritual sweathouses. A wall or stockade of large wood posts surrounds all of these buildings. This stockade may have been built to protect the people of the village at times of war.

Archaeologists find evidence of many more different cultural groups than from the past during the Late Woodland Period. For example, they have found evidence of three different Late Woodland groups in central Pennsylvania along the Susquehanna River. They have called these cultures Clemson Island, Shenks Ferry, and Susquehannocks. In western Pennsylvania they have discovered evidence of a culture called the Monongahela culture. These sites are found along the Monongahela and Ohio Rivers. Each of these cultures was a farming culture, which also hunted and gathered for food. The people of each lived in villages made of buildings used for different purposes. Some were surrounded by walls called palisades; others such as the Clemson Island were not. House shapes could be oval or long.

The last and perhaps most important cultural change came when the Europeans arrived in Pennsylvania. Warfare increased. Many Native Americans died from diseases such as smallpox, measles, and the flu. Others died from warfare and starvation. Most lost their lands to the

Europeans. Some groups moved away, some stayed, while others became extinct.

SECTION THREE – COMPARING CULTURES

CHAPTER 10

What Basic Needs Do All Cultures Meet?

Sometimes when we look at people around the world we notice how different they are from us. They may have different clothes, houses, religions, foods, languages, educational systems, governments, and ideas. You may be surprised to discover that people everywhere in the world, living in the past, present, and future are alike in one very important way. All people must meet certain needs in order to stay alive or survive.

All people need food, water, and air to keep their bodies and minds working. They need basic nourishment to keep their bodies alive. Therefore, not only do they need a certain amount of food (quantity), but also the right kinds of food (quality). Many of you already know about the "food pyramid," developed by the American scientists as a guide to healthy eating. Some of you take vitamins and minerals to be sure you get all of the nutrients you need. In other cultures, all nutrition must come from food only, because no food supplements are available. Not all cultures are able to provide all of the necessary nutrition, which our scientists tell us, is important for healthy bodies. Some cultures provide all of the food they need, while other cultures trade or buy food from others in order to add to the food which they produce themselves.

Food can be produced in a number of ways: hunting, gathering, farming, gardening, and trade. Not everyone agrees what is good food. We may think that chickens and ducks are useful foods. In some East African cultures such as the Nuer, eating duck was considered disgusting. We may prefer low fat foods. Eskimos of the past would enjoy eating seal blubber, which is pure fat, in addition to the seal meat. Clean water and air are also an important part of everyone's survival. Polluted water or air can cause many different kinds of health problems. No matter what choices are made, all people must have food, water, and air to survive.

All people need to protect themselves from the weather. The clothes we wear and the houses we live in provide protection from the weather. Clothes can be used to keep us warm or cool. In a very cold climate, people need

ways to keep themselves warm. They may use layers of clothing, a campfire, a furnace, or an insulated house. In a very hot climate, people need to keep themselves cool. They may use their clothes or no clothes, an insulated or well-ventilated house, natural shade or air-conditioning to keep cool. A hat may be useful on either a sunny hot day or a rainy cold day. Of course, the kind of hat we would use might be different each day. In some cultures people make their clothes from the raw materials they gather from nature such as animal skins and plants. In other cultures, people buy clothes, which are made in factories, often from man-made materials.

People build their houses from the materials that are available to them. Houses can be built of wood, stone, dirt, baked or hardened clay, ice blocks, animal skins, animal bones, or other materials. Sometimes, people use natural shelters such as caves or rock shelters. Although the materials and physical appearance of clothes and houses may be different, the need is the same. People need to protect themselves from the weather.

All people need to be part of a culture and society. A society is a group of people who live in a particular territory, often speak the same language, and interact to meet their basic needs. The culture provides the rules for this interaction. It defines the manners or rules for a civil society. Values, beliefs, family life, education, technology, and more are defined by each culture. The clothes you wear, the games you play and how you play them, the houses you live in, the tools you use, the kind of job you might want to have are all learned by each of us from the people who share our culture. Every culture defines what a family is. Yet, in some cultures a child calls all of her mother's sisters by the word "mother."

In some cultures, children learn how to do things by working side by side with adults. In other cultures, children learn by going to a school such as yours. Yet, in both situations, the children are learning what they need to be active and useful members of their society.

All people need to explain the world around them and their place in the world. Religion, philosophy, and science are ways in which people in different cultures try to understand and explain their world. We all experience the sun, stars, plants, animals, minerals, weather, disease, birth, and death. Yet, how we explain our world and what happens to us in this world depends on how our culture defines our world. For some people, a sickness can be explained by an insect bite or a bacterial infection. For other

people it may be the result of a punishment because of something they did to someone.

In our culture, today, we know that an eclipse of the sun is a natural event involving the passing of the moon between the earth and the sun. In some cultures, including many cultures of the past (including ancient European cultures), that same eclipse of the sun was considered a message that something important or dangerous was about to happen. What we know about our world is defined by what our culture teaches us to be true. Not all cultures define and explain the world the same way. Yet, all cultures do provide such descriptions and explanations.

All people need to communicate. People communicate using spoken language, symbols, and body language. Anthropologists estimate that there have been over 2,000 spoken languages in the history of the world. Some communication is in the form of symbols. These can include written languages and visual images in the form of abstract or realistic pictures. Body language includes facial expression, gestures, posture, and distance from a speaker. All of these are used to communicate the wants, needs, ideas, history, and interactions of people in a particular culture. People in every culture use combinations of these forms of communication to express themselves. Not every culture has developed a writing system. Yet every culture has a developed a communication system which is useful to the people of that culture.

Every culture in the world tries to meet the basic needs of its people. Archaeologists have learned that cultures in the past also met human needs. Evidence of food, shelter, clothing, religion, social organization, and communication is found in the things archaeologists find at sites. The following three chapters will examine some of things that archaeologists have learned about three cultures from the past by focusing on symbolic communication.

CHAPTER 11

Written in Stone:
Pre-European Rock Art in Pennsylvania

Introduction "The rock I wanted to show you is just ahead, Mr. Cadzow". The boatman carefully guided the wooden dory through the shallows while archaeologist Don Cadzow strained to see through the thick fog on the chilly Susquehanna. It was the Fall of 1928, and the Pennsylvania Historical Commission had sent Cadzow to the lower Susquehanna Valley to investigate a report from some local residents of strange marks on some of the mid-river rocks near the little town of Washington Boro, just above the great rapids at Safe Harbor. Suddenly a large gray shape loomed up in the fog, and the boatman expertly swung the dory into an eddy below the huge rock. Cadzow and his guide clambered up on the dark boulder, and the guide led the way to a spot where a cluster of faint shallow grooves were barely visible on the surface. The guide dipped his hat into the river.

"They show up better when they're wet" he said, and emptied the hat onto the rock. Cadzow's eyes opened wide in amazement as a human face, a turkey track, a spiral, and a variety of other strange and fanciful shapes leapt from the rock, thrown into sharp relief by the hat full of water. Over the next several hours, as they continued their exploration of the boulder and other nearby rocks, dozens of mysterious shapes revealed themselves, some so old and worn that they looked like they could have been pecked into the rocks thousands of years ago.

"My grandpa discovered them many years ago, Mr. Cadzow. He used to say it was the Indians who put them on the rocks back in the old days. I've always wondered what they mean. Do you suppose it's some kind of writing?" Cadzow climbed back in the boat and scratched his chin, "I don't

know exactly what they mean, but I do know they're an attempt to communicate." The boatman pushed off into the river, and Cadzow sat down in the bow of the boat, turning around to talk to the boatman, "I sure would like to talk to the people who made them!"

Kinds and Locations of Rock Art

There are two basic kinds of Native American rock art: petroglyphs and pictographs. Petroglyphs, a kind of sculpture, are pecked or chiseled into the surface of a rock, using another harder rock to do the work. Pictographs, which are more common in the western United States, are actually rock paintings done with natural pigments like walnut hulls (for a rich brown color) and iron oxide, a mineral sometimes referred to as ochre (for reds and yellows). Pennsylvania's rock art sites are almost all petroglyphs, probably due to our damp climate. Pictographs fade and disappear relatively quickly unless they are applied in a very dry and sheltered place.

There is currently no reliable way to assign a date to most rock art sites. **Radiocarbon dating**, a technique that measures the rate of radioactive carbon decay in samples of organic (or formerly living) remains like charcoal or bone, won't work on rock. Unless the pictograph or petroglyph contains an image of something of a known age, like horses or guns which appeared in the 1600s in Pennsylvania, we simply have no way to tell how old most rock art sites are. In some cases they may date back thousands of years. This also means we have no idea what groups of Native Americans made them. While we're certain **prehistoric** people (that is, people who lived here before the Europeans arrived) had spoken languages and had names for themselves just as we do, they do not appear to have had complex written languages beyond the symbols they painted and chipped on rocks. Since we have no translation for these symbols, and

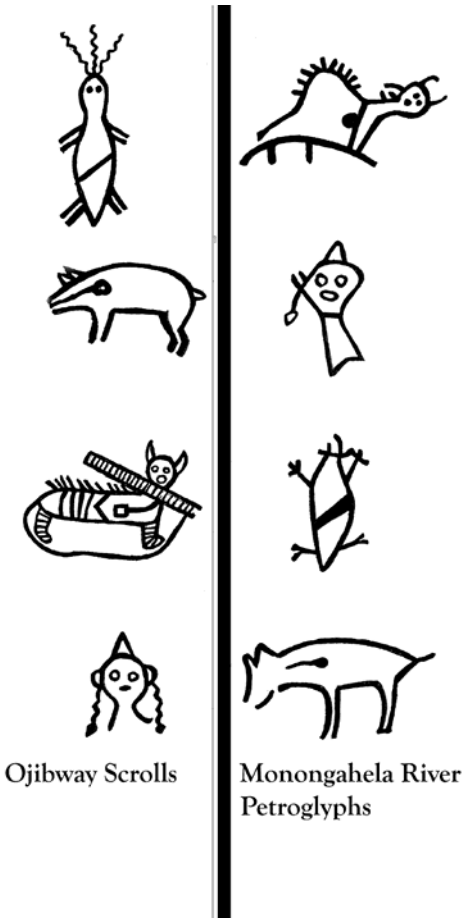
since some of them may be very old, we simply have no idea what groups of people or individuals made them.

Pennsylvania's petroglyphs are found in a wide variety of settings and rock types in many parts of the state. There are whole panels of petroglyphs found on mid-river and riverside boulders such as the famous Safe Harbor petroglyphs investigated by Don Cadzow and the Indian God Rock petroglyphs on the upper Allegheny river in western Pennsylvania. More common are the dozens of smaller groups of petroglyphs, or even single figures, pecked into smaller rocks and boulders scattered in many out of the way places. In all cases, the petroglyphs are a mix of easily recognized subjects (animals and animal tracks, human hand prints, and faces), abstract or geometric shapes (spirals, curves, and lines), and very strange and fanciful figures (half-bird/half- human figures, deer/human figures). As long ago as the 1700s, European Americans have marveled at these works of art left by their Native American predecessors, and tried to guess their age, their origin, and most importantly, their meaning.

The Meaning of Rock Art As Cadzow guessed, petroglyphs are clearly an attempt to communicate. The real question is: Exactly *what* is being communicated? Currently, there are several competing theories about the meaning of Pennsylvania rock art. Some archaeologists believe they are **boundary markers**, signposts that mark the borders of tribal territories and warn or welcome visitors. The prominent riverside petroglyphs like those at Safe Harbor or the Indian God Rock are cited as examples of such boundary markers. They would have been visible to anyone traveling on or along the major rivers, a clear and obvious message for those who understood the symbols. The problem with this theory is not all petroglyphs are, or were, obviously visible. For a boundary marker to be effective, it must be visible.

Another theory for the meaning of petroglyphs has been proposed. Some modern Native American tribes have a tradition of teaching rocks. These petroglyphs and pictographs are locations used by tribal elders to educate young people. The symbols tell ancient stories of the history, beliefs, and values of the tribe, and youngsters are taken to the rocks, which are often carefully hidden, where the stories are passed along to them by the elders. The rocks are hidden from view because a student must be judged mature enough to accept and understand the stories before they are passed along. Teaching rocks are something like the written history and code of conduct of the tribe, and are considered very important and sacred places. Perhaps

Pennsylvania's petroglyphs are the teaching rocks of tribes that formerly lived in what's now the Commonwealth. Of course, that leaves us with the problem of the large, prominent, and visible riverside petroglyphs. If teaching rocks are supposed to be kept hidden, then these large petroglyphs don't really fit the model.



Some archaeologists think that rock art sites are an attempt to communicate not with other people, but with the supernatural. Based on observations made of 20th Century Stone Age people in Australia and southern Africa, some archaeologists believe petroglyphs could be examples of **hunting magic**. According to this theory, prehistoric hunters may have inscribed the figures on the rocks during the course of certain rituals intended to provide the hunter with good luck in the search for wild game. Many of the figures inscribed as petroglyphs in Pennsylvania are game animals such as deer or turkeys. If this model is correct, then the petroglyphs are places for hunters to pray for good fortune in the search for food. Of course, many petroglyph figures are not game animals, and the social structures, hunting and gathering methods, and other aspects of the cultures of Native Australians and Southern Africans are very different from those of Native Americans. We have no guarantee that the Australian and African practice of hunting magic was also practiced in North America.

CHAPTER 12

Ancient Egyptian Hieroglyphics

1. **The Girl Who Wanted to Be a Scribe** Every day Meres-ankh watched her father prepare the tools of his trade before he went to work. Nebamun was a scribe (a writer of documents) who worked in the tax collection office in Thebes, the Egyptian capital. Meres-ankh loved to look at the beautiful lumps of black and red pigment that her father carefully ground with a small stone mortar and pestle. Sometimes he would let her grind the pigment for ink and mix it with water and gum (gum Arabic). She knew that the black ink was made from the carbon that the servants scraped from the bottom of cooking pots. She saw old Heria remove the pots from the fire after she prepared the family's meal and scrap the black soot from the bottom. Then Heria presented it to her father as if it was a necklace of pure gold. Her father always smiled at the old servant and told her that she did a very good job. Meres-ankh was told that the red pigment she ground was a mineral called red ochre but she wasn't sure where her father got it. It must have come from the colorful market in Thebes, where merchants sold things from all over Egypt and from foreign lands.

After Meres-ankh ground and mixed the pigment, she poured it into two round depressions in her father's square wooden palette. She knew that the pigment would dry into two solid lumps, one red and one black. Her father would then dip his brush in a small pot of water that he carried and rub it on one of the cakes of ink. When he stroked his brush on a piece of pottery or papyrus, he made the most beautiful signs. Meres-ankh longed to reproduce the birds, animals, and household objects that her father drew or the equally beautiful curved black lines of his cursive script.

Her father's brushes were made of reeds or rushes that grew in the marshes in northern Egypt so they had to come by boat down the Nile to Thebes. Her father never let her chew the end of the rush to make it into a fine bristled brush because it was important for him to get just the right edge on his brush. He was also very careful about cleaning his brushes and putting them back in the long narrow depression in the center of his palette after he used them.

Nebamun would pick up his palette containing his brushes and cakes of ink, his water pot, and small sticks of sandstone, which he used as erasers

and he would hurry off to work. Meres-ankh was always sad to see him leave. He was not the only one to leave home each day. Meres-ankh's two older brothers also ran out of the house each morning. They went to the House of Life where they were learning to be scribes. The House of Life was a school attached to one of the Egyptian temples. When they were gone, Meres-ankh moped about the house. She was tired of playing with her dolls and she didn't have anyone to play senet with. Her father had given her a senet game (a board game similar to chess) because he knew she was intelligent and needed something to stimulate her. Her mother was too busy running the household to play senet with her and her father and brothers were gone. What could poor Meres-ankh do? You couldn't ask servants to play a game with you.

One day Meres-ankh had a wonderful idea. She had been playing with a ball in the courtyard when a servant tripped and broke a large water jar. The servant knew her mistress would be very angry and Meres-ankh told her that she would hide the pieces of the jar in her room. She told the servant not to say anything and her mother would never know about the accident.

Meres-ankh was very happy that she now had something to write on. She would try to draw signs on the pieces of pottery and become a scribe like her father and brothers. She already knew how to grind pigment for ink and she had watched her father make brushes. It was her dream to learn how to write the beautiful signs. She had asked her father if she could go to the House of Life with her brothers but he only laughed at her. He explained that girls never went to school because it was their job to marry and raise children not to learn how to write. So Meres-ankh decided that she would learn how to write in secret.

Late at night Meres-ankh would sneak out of bed and go to her brothers' room. She would take their school assignments to the courtyard and by the light of the moon she would carefully copy them on the pieces of broken water jug. Students and scribes used pieces of broken pottery (called ostracon or plural ostraca) as paper in ancient Egypt. Papyrus was very expensive and was only used for important documents. Meres-ankh worked and worked and would rub out her mistakes with a wet cloth. Then she returned her brothers' school assignments to their room and got into her own bed at dawn. She could often be seen napping during the day and all of the servants wondered why she was so tired. Heria also wondered why there wasn't as much soot on the bottoms of her cooking pots.

One night Meres-ankh was so tired that she forgot an ostracon as she gathered up her writing instruments and staggered off to bed. In the morning her father found the ostracon and smiled broadly. Meres-ankh saw him pick up the ostracon and she hung her head in shame. What would her father think of her? But Nebamun called his sons into the courtyard and asked which one had completed the ostracon. He said that it was the finest piece of writing he had ever seen. The boys both shook their heads and said that they hadn't written the ostracon.

Nebamun was confused until he looked at his daughter. "Did you write the signs on this ostracon Meres-ankh?" "Yes, father. I am very sorry but the writing was so beautiful and it was my dream to create such a beautiful thing." Her father said: "Meres-ankh it is obvious that the great god of the scribes, Thoth , spoke to you in your dreams. He has given you greater talent than either of your brothers. You can already draw the signs and now I will teach you to read and write the language."

Each day when Nebamun returned from work he gave his daughter a lesson. Meres-ankh learned that the language was a lot more than just copying signs. Her father taught her that there were sentences with nouns, verbs, pronouns, adjectives and other parts of speech. Her told her that in hieroglyphics the verb always comes first in a sentence and the verb is followed by a subject. Meres-ankh first learned to write in hieratic, the cursive form of the language. Students always learned hieratic first before they learned to draw hieroglyphs. Hieratic was a much easier script to learn.

Meres-ankh was indeed blessed by the god Thoth because she became an accomplished scribe. Although she could never work in the Pharaoh's offices like her father and brothers, she taught other women how to write. When she grew up and married another member of the nobility, she managed her husband's estates while he was away working for the Pharaoh. People would come from great distances to ask her to write letters for them because she could write the symbols so beautifully. Meres-ankh's dream had come true. Even in ancient Egypt, if a person wanted to do something that was unusual and they tried hard enough, they could accomplish their goal.

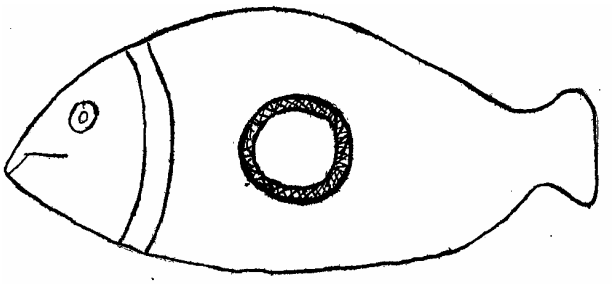
2. **Writing in Ancient Egypt** Archaeologists have found written documents on many sites in ancient Egypt. Documents found in official state archives, are usually written on papyrus (paper made from a plant) and documents found in villages, such as the tomb workers' village of Deir el Medina, are usually written on ostraca (pieces of broken pottery). These documents tell

Egyptologists a lot about ancient Egyptian culture. Archaeologists have also excavated tombs that contain painted scenes of daily life in ancient Egypt. So there are at least three sources of information about ancient Egypt:

A. archaeology
B. written documents
C. tomb paintings.

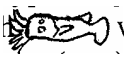
Writing in ancient Egypt started as a series of symbols. The Egyptians drew a picture of an object that they wanted to talk about. These objects were things that they saw in everyday life. A picture of a bird's head would mean bird and a picture of a ceramic container like the ones in which the Egyptians stored beer would mean a jug of beer. This type of sign is called a logogram and it is the oldest form of hieroglyph. Eventually these picture signs were given a phonetic value or sound value. So that the picture of a foot no longer meant foot, it had the sound value of the B like the B in our alphabet. The symbol for foot could then appear in lots of Egyptian words with the phonetic (sound) value of B:

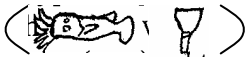
3. **Egyptian Palettes** Before the first Pharaoh ruled in Egypt (c. 3100 BCE), the ancient Egyptians used stone palettes, like an artist's palette today, to grind the paint they used for eye makeup. Both men and women wore eye paint. These stone palettes took many different shapes including the shapes of fish and animals. They always had a depression in the center where eye paint was ground. A palette might look like the one below:



Eventually the Egyptians started carving symbols on these palettes to record important events that happened. Archaeologists excavated a palette that contained pictures of many different animals carved in the stone. They

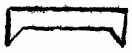
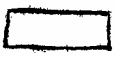
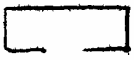
called it the hunter's palette and it is thought that it either tells the story of a very successful hunt or it is the wish for a successful hunt in the future.

The most important palette that archaeologists found is called the Narmer Palette and it records the union of Upper (southern) and Lower (northern) Egypt by a king from southern Egypt called Narmer. Narmer became the first Pharaoh of the first Egyptian dynasty. On this palette, the Egyptians used true hieroglyphic signs. This is our earliest evidence for phonetic hieroglyphic signs. There is a fish with the phonetic value  n'r (nar) and a chisel with the phonetic value mr (mer). The picture of a  fish no longer means fish and the picture of a chisel no longer means chisel. These two pictures have now been given sound values and together they spell the name of Narmer:

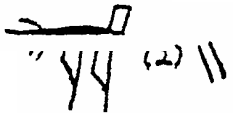
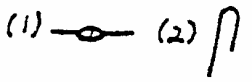
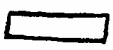
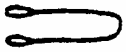
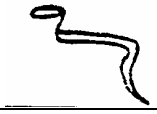


4. **Symbols, Signs, and Alphabets** The ancient  Egyptians did not use an alphabet. The alphabet was invented much later by the Phoenicians, a people living along the coast of what is today Lebanon and Israel. The Greeks learned about the alphabet from the Phoenicians and after that alphabets were used to write European languages. The ancient Egyptians used some symbols more often than others but they had hundreds of symbols or signs in their language. The following uniliteral sign list represents the most common signs used for writing words in hieroglyphics. In this sign list one sign is equal to one sound or phoneme. Remember the foot that had the sound value of B. You will find it in the uniliteral sign list. The Egyptians used some sounds that we don't find in English. Many of these sounds are found in modem Middle Eastern languages like Hebrew and Arabic.

EGYPTIAN LOGOGRAMS

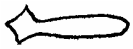
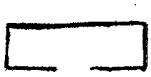
Man	
Woman	
Eye	
Ear	
Tree	
Sky	
Sun	
Stone	
Copper	
Desert	
Town	
House	
Knife	
Hoe	
Cup	

Uniliteral Signs

Sign	Transliteration	Sign	Transliteration
	3		ḥ
	i		ḫ
	y		ẖ
	(		S
	w		š
	b		ḳ
	p		k
	f		g
	m		t
	n		ṯ
	r		d
	h		ḏ

5. **More Egyptian Signs and Sounds** In addition to the uniliteral signs, Egyptians had signs that represented two sounds. See the single signs below that represented two phonetic sounds.

BILITERAL SIGNS

 — b3	 — ms
 — ʿ3	 — Pr
 — K3	 — ỉr

There were also single signs that represented three phonetic sounds. See the single sounds below that represented three phonetic sounds.

TRILITERAL SIGNS

 — nfr	 — sḏm
 — ʿnḫ	 — ʿḥʿ
 — ḥtP	 — ḫPr

Egyptians did not write any vowels but they must have had vowels in their language so they could speak it. Since we don't know what the vowels were, we don't know what ancient Egyptian actually sounded like. This makes it impossible for you to write your names in hieroglyphics. People who write their name in hieroglyphics just invent symbols for the vowels or they use those sounds that are found in Hebrew and Arabic and change them into English vowels. This is just making up symbols to represent sounds. This gives people the wrong impression of what the language was like.

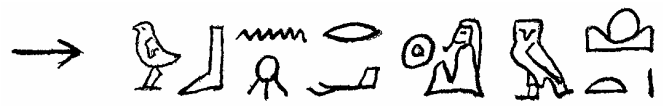
6. **Egyptian Numbers** The Egyptians used numbers for many things. They used numbers for measuring their fields, taking inventories, calculating taxes, and building temples, tombs, and houses. Just like ours, their counting system was based on the number 10. But instead of using a different symbol for the numbers 1 to 9, the Egyptians had one hieroglyph for 1, one for 10, one for 100, etc. They did not have the 0, which made some calculations very difficult. The symbols they used for numbers are shown on the following page.

Egyptian Numbers

Numbers	Hieroglyph	Represents
1		Stroke
10		Cattle hobble
100		Coil of rope
1,000		Lotus plant
10,000		Finger
100,000		Tadpole
1,00,000		God holding up the sky

7. **How to be an Egyptian Scribe** Now you know a lot about ancient Egyptian hieroglyphics. A few more points and you will be ready to write in hieroglyphs or hieratic. Hieratic is the cursive form of hieroglyphs. Hieroglyphs are like our printing and hieratic is like our cursive handwriting. When scribes wrote on tomb walls, they used hieroglyphics just as we use printing on tombstones. When they wrote on papyrus or pottery, they used hieratic just as we use handwriting on paper because we can write faster in the cursive form.

Hieroglyphics can be written from left to right or from right to left or in columns from top to bottom. The question is how do you know in which direction to read? You read into the face of the signs. Since we have seen that the Egyptians took their sign designs from nature, they had many signs that represented the different birds that are native to Egypt. They also had other animals and even people signs. When a scribe wrote in hieroglyphics, all of the signs faced the same direction. So when you read hieroglyphics, it is easy to determine the direction in which you read.



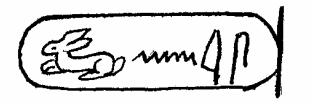
Another problem with reading hieroglyphics is that there is no punctuation. You don't know where one sentence ends and another begins. It is often difficult to know where one word ends and another begins. However, sometimes the Egyptians put signs known as determinatives at the end of words and this helps to determine where the word ends, and it helps to determine the meaning of the word. Determinatives are those old logograms but now they have no sound value. They are tacked onto the end of a word to help with the meaning but they were not pronounced.  For instance, the sun sign would be put at the end of a word that meant sun, day, daylight, etc. The symbol for a man would be placed at the end of a man's name and the symbol for a woman would be placed at the end of a woman's name. Now it is time for you to practice you hieroglyphic and hieratic hand.

8. **Ancient Egyptian Scribe Training** Ancient Egyptian scribes trained in the House of Life (per-ankh in hieroglyphics). The House of Life was a school that was usually associated with an Egyptian temple and was part of the temple precinct. Only men could study

in the House of Life to become scribes. These men were members of the Upper Class.

That doesn't mean that all women were illiterate. There is evidence that some women could read and write hieroglyphics. They were either taught by tutors in their home or they were taught by their fathers or brothers. All male professionals, such as doctors, learned to write first in the House of Life. We know that there were women doctors in ancient Egypt and they must have learned to write at home. There is a text in which one woman is called the "Chief of Physicians". After learning to write, doctors became apprentices to already established doctors and went with them to visit patients.

If a scribe wrote a royal inscription, he would put a cartouche around the name of the pharaoh or his chief wife. The cartouche is a circle around a royal name. So if you see a cartouche in an inscription, you know it is a royal text. In the following line of text, you see a cartouche.



9. **The Scribes Equipment** consisted of the following:

Papyrus Ancient Egyptian scribes used papyrus for important documents. Papyrus, which is a plant belonging to the sedge family, grew in the Nile Delta in northern Egypt. The stems of this plant are 7ft. to 10 ft. in length and 1 1/2 inches in diameter. They have a tough outer rind and an inner cellular pith.

In order to make the papyrus plant into paper, the stem was cut longitudinally into thick slices and the outer rind was peeled off. The succulent pithy strips were placed on an absorbent cloth on a table. They were placed parallel to each other and slightly overlapping one another. Additional strips were placed across them at a right angle. This design was covered with a cloth and beaten with a stone or wooden mallet. This material was then placed in a small press overnight. The strips of succulent papyrus would adhere to each other and once they were pressed together, they looked like woven fabric. After the papyrus paper dried, it was ready for the scribe to write on it.

Brushes Archaeologists have found many ancient Egyptian brushes that were used by scribes to paint hieroglyphics or hieratic on Papyrus. The brushes were made of vegetable fiber but they were preserved in Egypt's dry

climate. The fibers (rushes or reeds) were chewed at one end until they separated to form bristles. (The Anasazi did the same thing with yucca fiber brushes. Although they didn't have a written language, they used the brushes to paint symbols on pottery).

Pigments Egyptian scribes used only black and red ink. Black ink was normally used to write on papyrus or on ostraca (broken pieces of pottery) and red ink was used for headings or a statement that the scribe wanted to emphasize. The ink was in the form of small cakes of solid material similar to our watercolors. It was made by mixing finely ground pigment with gum Arabic and water and then letting it dry. The pigment for black ink was carbon and it was obtained by scrapping it off the bottom of cooking pots. Red ochre, a naturally occurring mineral, was used for red pigment.

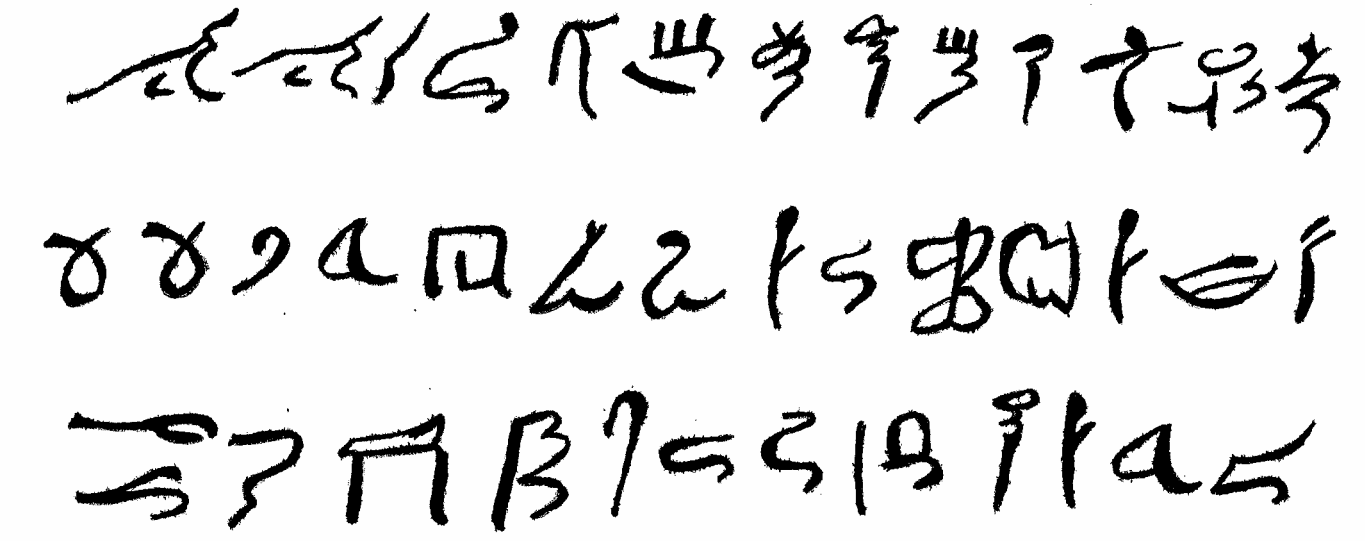
Erasers The Egyptians used wet rags or sticks of sandstone to erase mistakes.

Palettes The ancient Egyptian scribes palette was rectangular in shape and provided with depressions for cakes of red and black ink. It also had a recess for holding pens. The palettes could be made from a variety of materials including ivory, wood, wood covered with gold, alabaster, sandstone and schist. The hieroglyph for scribe is a picture of one of these palettes with the brushes in a holder on the side.

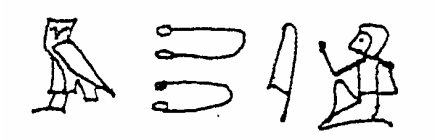
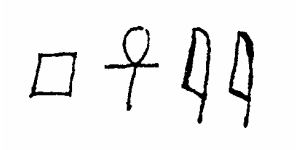
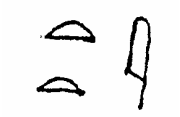
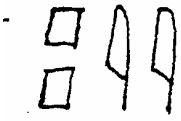
Painting on tomb walls Egyptian paintings are tempera paintings, not oil paintings. Tempera is a mixture of water, pigment and some adhesive (gelatin, glue, or gum). The Egyptians used albumin (the whites of eggs) to bind paint. The paintings were then coated with beeswax to preserve them. As pigments, they used soot from the bottom of cooking pots, red and yellow ochre, azurite, malachite, and blue and green frits.

Hieroglyphics

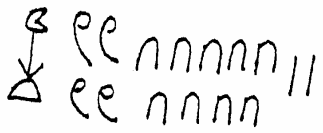
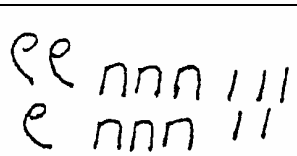
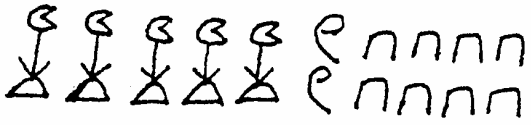
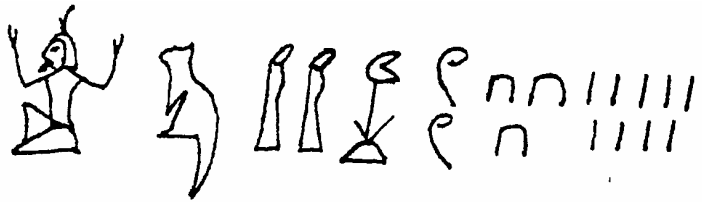
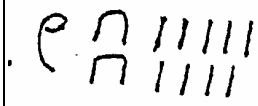
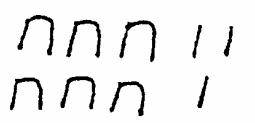
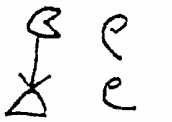
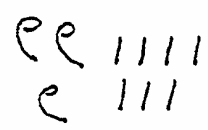
Hieratic (Cursive Script)



Egyptian Names - Matching

1		**A**	Nofret (woman's name)
2		**B**	Teti
3		**C**	Mechechi (man's name)
4		**D**	Pepy
5		**E**	Piankhy
6		**F**	Neferhotep

Egyptian Numbers - Matching

A	
B	
C	
D	
E	
F	
G	
H	
I	

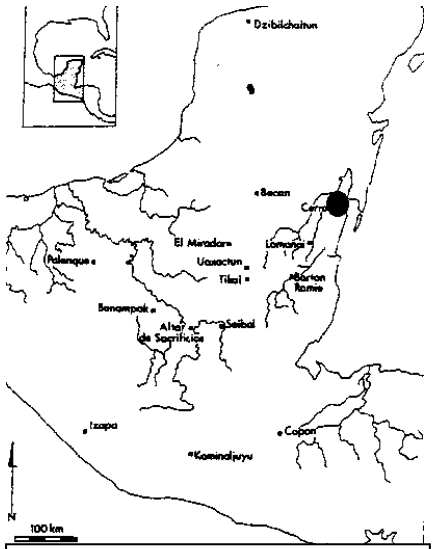
CHAPTER 13

Who Are the Maya?

1. The Maya are native people who live in the modern countries of Mexico, Guatemala, Belize, and Honduras. They have lived in this same location for at least the past 3,000 years. The Maya are divided into groups who live and lived in the mountainous areas of these countries (except Belize), along the Pacific coast, and in the lowland tropical forests along the Caribbean coast.

2**.** Archaeologists have studied the ancient Maya for more than 150 years. To be able to compare Maya sites to each other, the archaeologists have used artifacts, Maya writing, and excavations to tell when the Maya lived in their different cities. When archaeologists talk about Maya cities, they often refer to them as sites. A site is a place where people lived in the past. Many sites are well known and are visited by thousands of tourists each year. The Maya site that we will study in this lesson is called Cerros. It is not as well known, but has been well excavated by archaeologists. It is located on the east coast of Belize near the Caribbean. Archaeologists have found that the Maya lived at the site from 100 B. C. until A. D.1500, but our visit will be to see what the archeologists have discovered about the site in A. D. 900.

3. What is the Maya environment like? The Maya in Belize lived in a tropical environment. The temperature is hot all year, but in the summer and fall, there is much more rain than in the winter and spring. In fact, there are really only two seasons – the rainy season which lasts from May through December and the dry season from January through April. The rain and warm temperature is an ideal environment for plants and the Maya forests are thick with trees over 200 feet tall or as tall as a 20 story building. At ground level the tree trunks are wide in diameter and separated as if placed in a park. The trees have to have space between their trunks so the branches and leaves have room to grow. The tree tops grow closely together, so that little light reaches the



Map of the Maya area showing the location of Cerros

ground. In the forest, it always seems overcast or like dusk because little sunlight reaches the ground. To imagine what it's like in the Maya forest turn off the light in the classroom and close the blinds. Below the tall treetops, the Maya forest has three other layers of vegetation each of which is home to plants and animals.

The tops of Maya Pyramids at Tikal rise above the Tropical Forest

Even though there is not a "winter" in the Maya area when trees lose all their leaves, many leaves fall from the trees during the dry season. However, these leaves don't accumulate on the ground but rapidly decompose. Tropical forests, like the deciduous forests in Pennsylvania are called "mature or primary forests" if the trees haven't been cut for thousands of years. It's easy to walk through a mature tropical forest. Once the trees are cut, the undergrowth quickly re-grows. Without the large trees blocking the sun, vines, shrubs, and grasses combine to form a thick undergrowth. Many of these plants have sharp thorns making this a difficult environment. This stage of forest re-growth is called a secondary forest. The Maya cleared many acres of forest to build their cities and open areas for farming. One type of farming used by the Maya is called "slash and burn." The Maya cut down large trees to open small fields for growing corn. The large trees would be left cut in the field for a season and then burned to release the nutrients from the tree back into the soil.

Open Mature Forest

Mature Forest

Burned Forest

Mature tropical forests are stratified because some plants grow to different heights. The layers are called: **the Emergent Layer, the Canopy, and the Understory**.

The **Emergent Layer** is the uppermost level of the rainforest. It is made of tall trees that rise up above the canopy. The emergent layer lacks the diversity of life found in the canopy.

The **Canopy** is the layer of broad-leaf and evergreen trees that grow year-round in the rainforest, sheltering the lower forest levels. Most trees are 75 to 150 feet tall. Most of the photosynthesis occurs in this layer. Trees have slender stalks and branch out at their crowns like umbrellas. This layer protects the lower part of the forest from rainfall. Most of the flowering plants and fruits are found in the canopy, so insects, birds, and mammals are also found here.

Toucan

Fruit Bat

Howler in Forest Canopy

The **Understory** is the third forest level found directly below the canopy. This level is made of small trees, vines, and palms. Because it is protected by the canopy it is shady and very humid. It is the ideal habitat for vines such as strangler figs.

As many as 40 species of plants are found in each acre of the forest. One common tree species is the Mahogany tree. You may have furniture made from this wood in your house. The soil is thin in the Maya area and trees often have "buttresses" extending from the trunk to support them. They are also often covered by vines which use the trees to reach the sunlight.

Tree covered by Strangler Fig

Tree with buttress roots

Canopy tree

The Maya forest is home to many species of animals besides those from the canopy. We know that many of these were important to the ancient Maya, because we see drawings of the animals on their pottery and in their books. Some forest animals include: jaguars, panthers, ocelots, spider monkeys, howler monkeys, coati mundis, peccaries, deer, rabbits, bats, and armadillos. Reptiles and amphibians are also common and include: poisonous and harmless snakes, iguanas, alligators, crocodiles, tree frogs, toads, and turtles. Insects are everywhere from biting flies, to mosquitoes, spiders and scorpions, and brightly colored butterflies. Colorful birds including macaws, parrots, and toucans fly overhead. The rivers and seas were full of fish and shell fish.

4. Archaeologists and historians have investigated Maya sites for over 150 years. In that time, we have learned about Maya cities from accounts left by the Spanish colonists who conquered some of the last Maya cities, from the Maya writings, from oral histories or traditions passed down to the Maya who live today from their ancestors, and from archaeological excavations. In the next two sections, we will compare what we know of the Maya from their writings (in this section) and from archaeological excavations (next section).

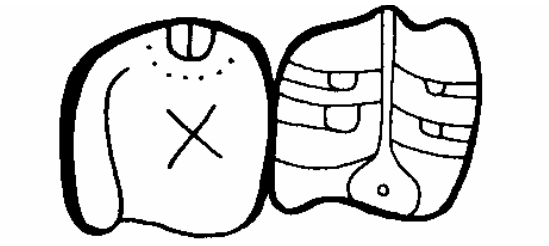
The Maya written language was thought to be undecipherable until the 1960s when researchers began to realize that the hieroglyphic symbols represented syllables rather than individual letters as in our writing. Maya writing was confusing because several written symbols might be used to represent the same syllable and because the Maya often used a type of calligraphy in their texts. Our first understanding of Maya hieroglyphics came from one of the Spanish priests, Bishop Landa of Merida, who wrote

Example of Maya Vase showing animals

about the Maya in the 1570s. Bishop Landa is a controversial figure in Maya history. Much of the information we know about the Maya comes from a book he wrote about the Maya in 1573. At the same time, because he believed that the Maya were using their written books to practice their native religion, he burned all he could find. So we lost the chance to learn about the Maya from their own writings.

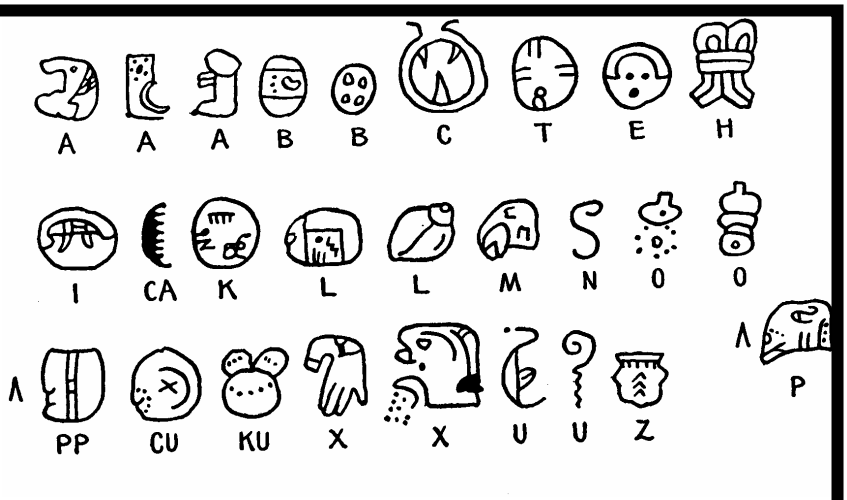
Bishop Landa recorded some of the symbols and their translation into Spanish sounds. However, in some cases, he listed two or three symbols to represent the same sound. We now know that his list was incomplete and we have been able to identify more symbols by comparisons with the Maya text.

Here's an example of how one symbol was translated:
The Maya word for turkey is *cutz (pronounced kootz)*. In several Maya books, a picture of a turkey is found with two symbols:



From Landa's symbols, we know that the first of these glyphs is *cu.*

Here are Landa's symbols:



(From Sharer 1994)

The *cu* symbol looks different because it is turned to the left. You can recognize it by the x in the center, the arc of dots or a line next to the x, its round shape and the little mouth on one edge. These differences are differences in writing styles, as if we wrote the letter A in all these. If you look at the second symbol from the left in the bottom row, you will see that it is different –

A a A A **A A a A A a A A A**

(The last three versions of "A" are in gothic style.)

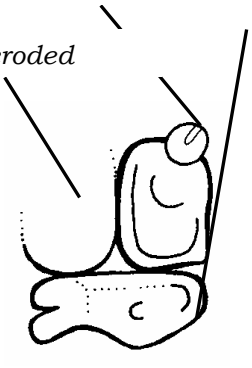
None of Landa's symbols match the second symbol in turkey. Since we know the Maya word for turkey is *cutz*, we can hypothesize that the second syllable is *tz*. How can we find out if these is the case?

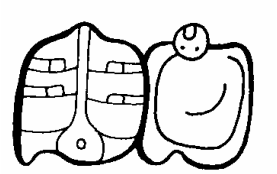
When we discover the meanings of ancient writings we say we have **deciphered** the writing. Mayanists **decipher** these symbols by comparing combinations of known and unknown symbols and looking for similar patterns. So to decipher the symbols for turkey, the Mayanists found other sets of symbols that contained some of the same ones. For example, Mayanists found this combination in one of the surviving Maya books, the Dresden Codex:

Second glyph- unknown/ lu

Third glyph- cu

First glyph- eroded



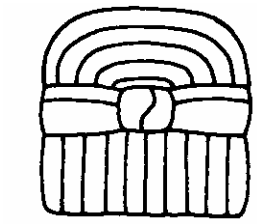


tz ***ul***

The first glyph is eroded, the second is unknown and the third is another version of the *cu* glyph. Mayanists call a group of hieroglyphs written together a **glyph block**. This **glyph block** is for the number 11 or *bu-lu-cu*. Now we know the glyphs for cu and lu and we think the second glyph for turkey is *tz*. So if we could find a word that combines the *tz* and *lu* glyphs, we could be sure of our *tz* identification.

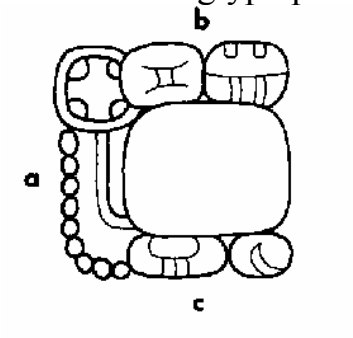
There is such a word in Maya. *Tzul(u)(zul)* means dog. We have examples of this combination in several codices found with a picture of a domestic dog. By making thousands of these kinds of comparisons, Mayanists have discovered the meanings of thousands of these symbols.

5. Once Mayanists understood this basic structure of Maya hieroglyphic writing, they began to look for recurring sets of glyphs that could be used to translate Maya writing on stone monuments called **stelae** and pottery. They found glyph blocks that were the names of cities and glyphs that there the titles of rulers. For example, the glyph for the site of Tikal is this block.



It means "Place of the sacred bundle." It is pronounced as *Mutul* and so we know that the ancient name of Tikal is *Mutul.* These types of glyphs are called **emblem glyphs.** Mayanists were able to identify the emblem glyphs because they noticed that they always found one glyph that never changed in front of a second glyph that was different in the writings of different cities. This first glyph is called a **prefix** glyph or a glyph that says "Here comes the name of a city."

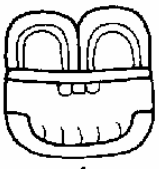
The emblem glyph prefix looks like this:



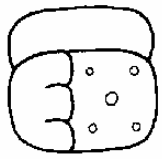
Some of the other Maya emblem glyphs are shown in the drawing box below:

Copan
(a bat)

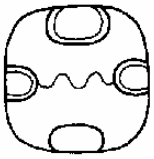
Quirigua
(a cacao tree and chocolate pod)



Yaxichilan
(cleft or notched sky)



Piedras Negras
(the Quincunx or symbol of 5 dots)



Palenque
(a bone)

Palenque (another version)
(a skull)

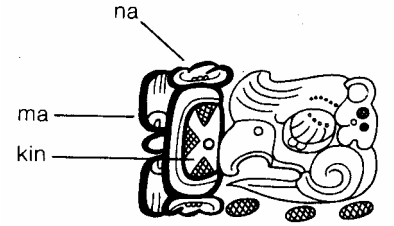
Seibal
(the sky)

Naranjo
(crossed sky bands)

Petexbatun
(a bundle)

(from Sharer 1994)

6. The Maya used many types of prefix glyphs to alert the reader that something important is coming. They used prefixes to tell us that the name of a Maya king is coming. One of the ways that Mayanists have learned about Maya kings is by reading carvings or texts that list the names of Maya kings. This has given us the history of many Maya cities. The Maya prefix that identifies a ruler's name is:



(from Coe 1992)

The second glyph in this block is "Great Sun Quetzal" the name glyph of one of the last rulers of Palenque.

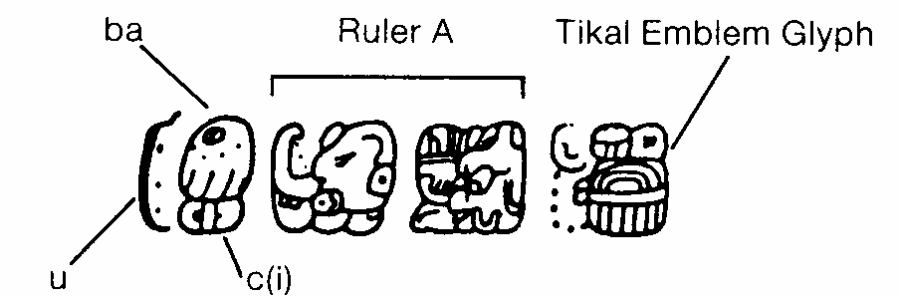
The Maya also used prefixes to tell us that the text is going to tell us about something that belonged to someone. Mayanists were surprised to discover that many glyph blocks were just name tags telling us things like "This is John's pot" or in Maya word order "his pot, (he is) John." The glyph that means his (or hers) can take several forms. It may look like this

or this 

. The glyph is pronounced *u.*

(from Coe 1992)

Here is an example from Tikal:



(from Coe 1992)

A Maya would read this as *u bac,* [Ruler A's name of] *Mutul*. In English we would read this as "This carved bone belongs to Ruler A of Tikal."

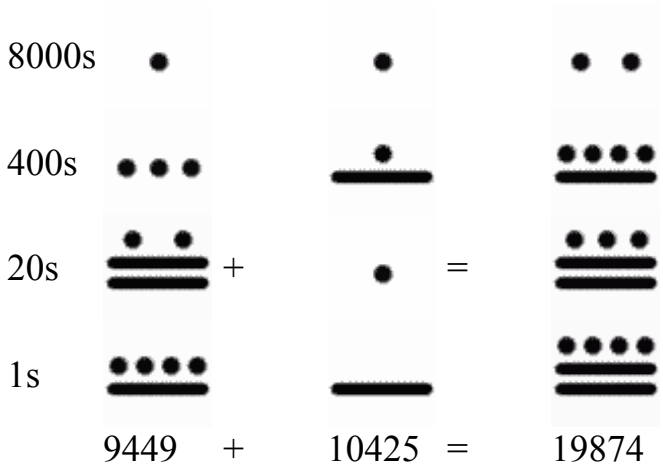
7. Numbers were an important part of Maya texts as they are in our texts. We use dates to tell us when something happened. Numbers tell us the distance between places, the age of people, the number of people or things involved in some activity, even street addresses. For example, a story about a football game will include scores, the number of people who attended the game, the time the game lasted, the yards covered by plays, the total offensive yards, the number of penalties, and even the ages of some of the players. The Maya used many types of numbers as well, but their numbers were written in a different format and were based on a different number or system. Our number system is a **base 10** system. This means that we count in groups of ten and multiples of 10. Our numbers are made of combinations of 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. The Maya number system is a **base 20** system made of a combination of only three figures: 0, 1, and 5. One way to think of these base 10 and 20 systems is that a base 10 system is based on counting on your fingers. The base 20 system is based on counting on your fingers and toes.

Our number system is made of larger groups of numbers like tens, hundreds, thousands, millions, billions, and others. These can be written as numbers because we have a system that uses place holders to mark the number of tens in the number. So one million can be written as 1,000,000 or one million + zero hundred thousands + zero ten thousands + zero thousands + zero hundreds + zero tens + zero ones. In each case, each number is multiplied by 10 will result in the next number to the left. So a number like 153,982 means (2 x 1)+ (8 x 10) + (9 x 100) + (3 x 1,000) + (5 x 10,000) + (1 x 100,000).

The Maya number system is based on multiples of 20.

A Maya zero is written as	
One is written as	
Five is written as	

Numbers are written from top to bottom with the lowest a number between 1 and 19. The next group contains 20s and includes numbers from 20 to 380 (19 twenties). The third group contains 400s which are numbers between 400 and 7,600. The last group are the 8 thousands. The table below shows how three large Maya numbers are written and how they can be used in addition.



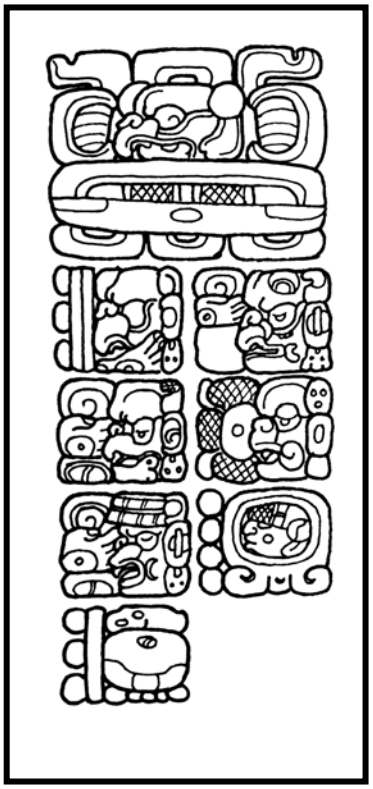
(Number drawings courtesy of the MichaelB website http://www.michielb.nl/maya/math.html)

8**.** One important use of Maya numbers is for calendar dates. The Maya calendar system is like ours in that it is based on days, months, years, and larger groups that can be used to write any date in the past or future. It differs because these dates are divided into large groups based on multiples of 20, instead of 10s like our dates. In our calendar, a decade is 10 years, a century is 100 years, a millennium is 1,000 years.

The Maya term for a day is *kin.* All of the other terms used in the calendar are based on increasing numbers of days. So, used in the calendar are kins, uinals, tuns, katuns, and baktuns.

20 Kins = 1 Uinal	**A uinal is a 20 day month.**
18 Uinals = 1 Tun	**A tun is a 360 day year.**
20 Tuns = 1 Katun	**A katun is 7,200 days.**
20 Katuns = 1 Baktun	**A baktun is 144,000 days or 400 tuns**

A cycle of 13 Baktuns is called a ***Great Cycle***. The last Great Cycle began on August 13, 3114 B. C. A Great Cycle lasts for 1,872,000 days. An example of a long count date might be 8 baktuns, 11 katuns, 15 tuns, 3 uinals, and 18 kins. A shorthand way to write this date is 8.11.15.3.18. It corresponds to 1,236,678 days since the start of the current Great Cycle or Wednesday July 9, 273 AD.



Maya dates can be written in glyph blocks in texts. The long count for January 1, 2004 is 12.19.10.16.3 or 1,868,723 days since the start of the Great Cycle. On carved stelae, the Maya wrote dates using numbers with glyphs for kin, uinal, tun, katun, and baktun.

To the left is an example of a Maya long count date.

This large glyph is a type of prefix glyph called an **Introductory Glyph.** When you see it you know a date will follow.

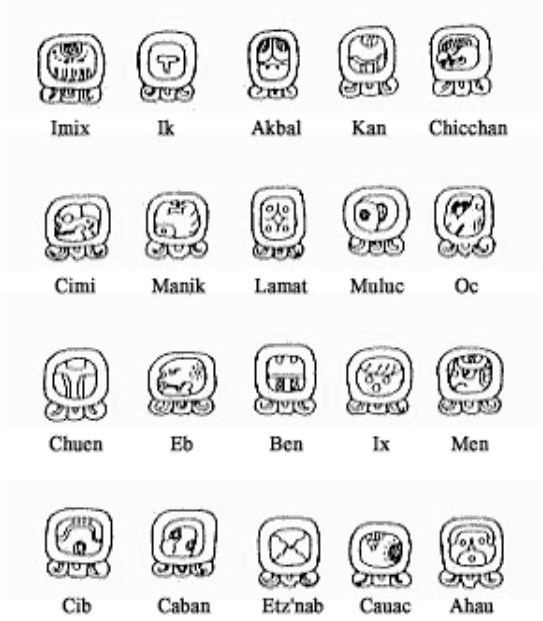
Maya glyphs are read in columns from left to right and top to bottom. The two glyphs in the row just below the Introductory glyph are the Baktun and Katun glyphs. This date is 13 Baktuns, 0 Katuns. The next two dates are the Tun and Uinal glyphs. In this case there are 0 Tuns and 0 Uinals.

In the third row are the glyphs for the Kin or day and one of the month signs. In this example, the date is 4 Ahau. The remaining row shows another month sign. In this case it is 8 Cumku. The date is carved on Stela C from Quirigua. It is the date for the end of the current Great Cycle or December 21, 2012. The next section will describe the two types Maya months.

9. The Maya used two yearly calendars. One called the vague calendar or *haab* had 365 days made of 18 months of 20 days and one month of 5 days. In this calendar, the Maya combined a sequence of days numbered from 0 to19 with months numbered from 1 to 19, except for the last month, Uayeb, that had only 5 days. The days are named in the calendar as:

The months of the Haab are read 1 Pop, 2 Pop, 3 Pop..19 Pop, 1 Uo, 2 Uo, 3Uo…to 19 Cumku, 0 Uayeb, 1 Uayeb, 2 Uayeb, 3 Uayeb, 4 Uayeb, 1 Pop…

The haab calendar started on 8 Cumku.



The sacred calendar or *tzolkin* had 13 months of 20 days for a total of 260 days. These are more similar to weeks of 13 days and are read 0 Ahau, 1 Imix, 2 Ik, 3 Akbal, 4 Kan, 5 Chicchan, 6 Cimi, 7 Manik, 8 Lamat, 9 Muluk, 10 Oc, 11 Chuen, 12 Eb, 13 Ben, 1 Ix, 2 Men, 3 Cib, 4, Cuban, 5 Etz'nab, 6 Cauac, 7 Ahau…

The length of the Tzolkin year was 260 days and the length of the Haab year was 365 days. The smallest number that can be divided evenly by 260 and 365 is 18,980, or 365×52; so in the Calendar Round each day and month combination occurs only once in 52 years. So for example, the day month combination "4 Ahau 8 Cumku," will not reoccur until 52 years later.

10.1 **Stelae, Codices, and Pots and Archaeological Context** We've seen how the Maya used glyphs to record numbers and words. Now we can look at the way the Maya used their glyphs and the places the glyphs were painted or carved. For archaeologists to decipher the glyphs, it is important they know where glyphs are found to be able to interpret their meanings. In fact, before archaeologists discovered that the glyphs represent syllables from Maya languages, they deciphered some glyphs just from analyzing where certain glyphs occurred. For example, the emblem glyphs (Text 5) that stand for the names of Maya cities were discovered in this way as was the glyph for *Ma'kina* (Text 6).

In Text 6, we also learned that the Maya carved "name tags" on many of their possessions, like jade earrings or carved bones. So archaeologists could use these discoveries to compare sets of glyphs that were found in similar locations. The Maya used glyphs in many places in their sites, but we most commonly find glyphs carved on large stone pillars called ***stelae***, carved on stones that form parts of buildings (like staircases or benches), painted as part of murals in tombs or rooms of palaces or temples, painted or carved on pieces of pottery, painted on the pages of Maya books called ***codices***, or carved on jade, bone, or shell jewelry.

The location of a hieroglyphic text and the glyphs that are found together in a text provide the ***context*** for the text. ***Context*** is an important concept used by archaeologists not only for deciphering texts, but also for deciphering information from archaeological excavations. The items that archaeologists find in their excavations are called ***artifacts.*** The context of artifacts or glyphs helps archaeologists understand what happened in a place or what is being said in a text. For example, if an archaeologist came to your house, she might look at all the things (your ***artifacts***) in your bedroom. Even without knowing you, the archaeologist could know a lot about your from your possessions. She might be able to tell how big you are from your clothes, what your favorite colors are, and whether you are a boy or girl. Even more, the archaeologist could tell what you like to do. If you like to read, you probably have books in your room. If you like sports, you may

have balls, bats, uniforms, team pictures, and trophies in your room. So even without knowing you, the archaeologists could know about you. By studying the ***context*** of other rooms in your house, the archaeologist could learn about your family as well- what you like to eat, what hobbies your family has, even how many people are in your family. Archaeological context is fragile and easily destroyed. That is why archaeologists have to be so careful to record everything they excavate in journals and on maps. Imagine if the context of your house was destroyed by taking everything out of your house and out of all of your neighbors' houses. Then imagine that half of all this stuff was thrown into a dump, that most of the rest was tossed into a river, and that the really valuable things like you mother's jewelry was sold to people in another town. Archaeologists would have lost the opportunity to learn about you and your neighbors.

Each of the places in which Maya glyphs are found provides the ***context*** for that text. Archaeologists have found that there are patterns to the types of glyphs found in the different contexts. By studying the patterns even before the glyphs could be understood, archaeologists were first able to understand some of their meanings.

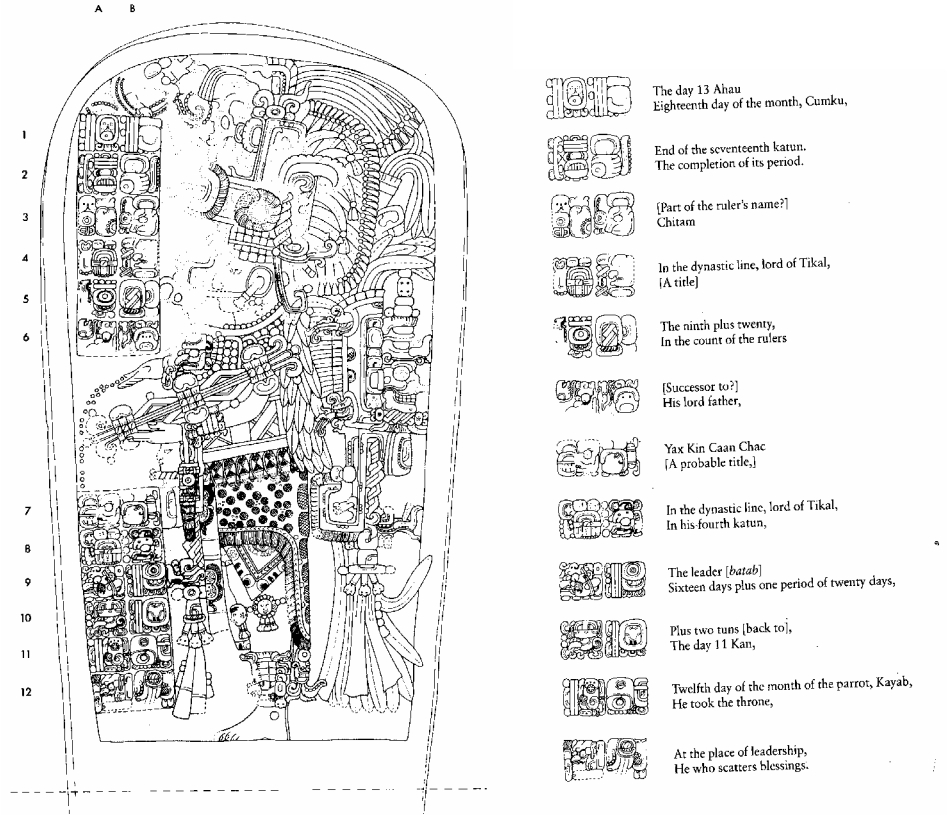
10.2. One of the most visible locations for glyphs at Maya sites are large carved stones that are often seen standing in front of Maya temples. These are called stela (singular) or stelae (plural). Some stela are carved on all sides, others are carved in the round so they look almost like statues. Most have a carving of a Maya ruler on one side, sometimes other carved figures on the stela may include the ruler's heir or parents. They often describe the ruler taking part in a ceremony that recognizes his accession to the throne or celebrating an important anniversary of his rule or victory in battle. A few stelae were dedicated to women usually either wives or mothers of a ruler. Most stelae are very large. Some from the site of Copan are more than 20 feet high. Some still stand in Maya cities; others have fallen to the ground or have been knocked over and broken into pieces by conquerors of their cities. The Maya called stela "*Tze-tun*" or tree stones.

3 Alfred P. Maudslay, seated at the base of Stela A in 1885.

The photograph shows one of the stela from the site of Copan in 1885. Pictured in the photo is Alfred Maudsley, one of the first archaeologists to explore the site.

The glyphs on Maya stela usually include a long count date, the name of at least one Maya ruler, and a description of an important event. The stela shown below is Stela 22 from Tikal. The stela has been translated by Christopher Jones of the University Museum at the University of Pennsylvania.

Archaeologists have a standard way of identifying glyphs written in a text or on a stela. Since Maya texts are usually made up of a set of two glyphs and read from top to bottom, the columns of glyphs are identified by letters, starting from left to right. The rows are given *(from Fash 1991)* numbers for identification. As you can see below, there are only 24 glyphs on Stela 22. Reading from the top of the stela, these are identread in order as Glyph A1, B1, A2, B2 A3, A4 and so on to the end of the text B12. The translation of the text is shown next to the drawing of the stela. Sometimes stela are paired with large flat circular stones which are also carved and are called altars or "Banner stones".



(from Sharer 1994)

Other Maya stone carvings were used to decorate buildings. At several Maya cities, hieroglyphic staircases were constructed. These listed the history of a city and named all the rulers. At Tikal, several of the tallest pyramids had high ***roof combs*** at the top of the building which also told important parts of the city's history. At the city of Palenque, carved panels in rooms at the top of small pyramids showed rulers engaged in activities like those on the stelae at Tikal. At Palenque, there is a famous carving that listed all the rulers of the site placed as the lid for a stone sarcophagus in which the most famous ruler of the site was buried. His name was Pacal and the discovery of his tomb and translation of the glyphs on his sarcophagus was one of the great discoveries of Maya archaeology.

10.3. The Maya also used paint to create texts on uncarved stelae, in murals on the walls of temples, on pottery, and in books called codices (codex is the singular form). Because the wall murals and painted stelae contain texts similar to those carved in stone, this section will describe the kinds of information found on pottery and in codices.

The Maya made pottery in shapes like bowls, plates, jugs, basins, statues, and vases. Some vessels were used for cooking, others for serving food or carrying water. Archaeologists love to find and study pottery. Pottery is made by digging clay from the ground, cleaning it, shaping the clay into a shape, decorating it, and then heating or "firing" the clay to make it hard and strong. So the potter can be endlessly creative and can make items that are beautiful as well as useful. Fired clay pottery also lasts a very long time. We find pottery in the tombs or burial places of Maya rulers and in the trash dumps around all Maya houses. The pottery could be over 3,000 years old so it helps us tell when the Maya lived in these buildings. Because pottery is so easy to make, the Maya made many different styles. Archaeologists use these styles to tell us when the pottery was made.

Maya pottery shapes from Lamanai. The shapes on the bottom row are two pots one on top of the other. Together these form an oven that could be used for roasting. These pots were also often used as containers for special caches or offerings in Maya buildings.

The Maya decorated one style of pottery called Codex-style vases with hieroglyphic texts. These pots are like large cups without handles that are

decorated with hieroglyphs and scenes of Maya kings or myths.

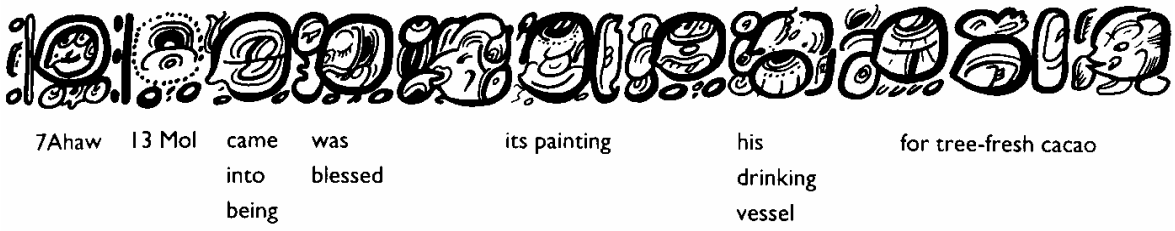
Most of the pottery shown in these pages was made between A. D. 600 and 800.

Maya pottery found by archaeologists at the site of Lamanai in Belize. The pots on the left are types of codex vases

Broken Shards as household trash.

Many of these pots are shaped like cylinders with a flat base. The Maya decorated many of these cylinder vases with hieroglyphic texts, so we also call these **Codex-style vases**. These pots are like large cups without handles that are decorated with hieroglyphs and scenes of Maya kings or myths. The hieroglyphs tell us that these pots were used as drinking vessels for a chocolate drink. Cacao or chocolate beans were grown by the Maya and were made into a frothy drink sweetened with honey.

This is an example of the glyphs that tell us the pot was used for the chocolate drink.

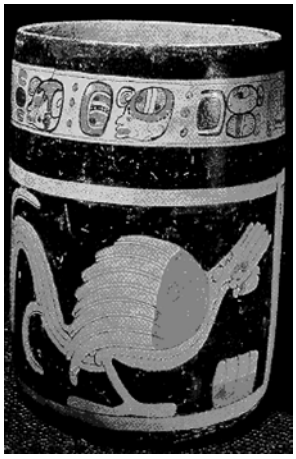


(from Reentz-Budet 1994)

Maya pottery is found by archaeologists in **tombs** or burial places of Maya rulers and as broken pieces in the trash deposits around Maya houses. Most of the pots shown above were found in tombs or special deposits called **caches**. Caches are like time capsules placed as a dedication during the

construction of a building.

Archaeologists also find that Maya pottery tells us about the environment. Pots were decorated with drawings of animals like deer, rabbits, monkeys, iguanas, toads, bats, parrots, vultures, or cormorants (a type of water bird). The pictures below show some Maya pots decorated with animal pictures **(A-E)**. The Maya dressed in animal costumes in some of their ceremonies. On some Maya pots, we see Maya musicians wearing the animal costumes **(C)**. Sometimes pots were made in the shape of animals, like **E** below which looks like an armadillo.



A

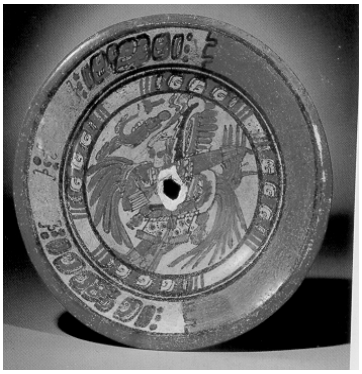
B

C

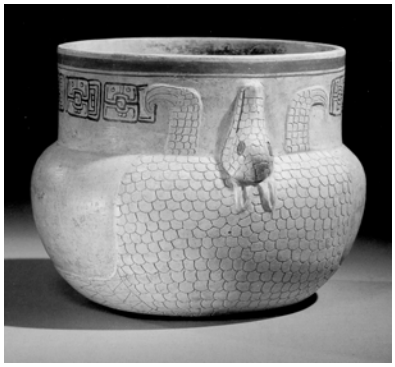
A codex vase showing a Quetzal (bird) made in the Altun Ha region of Northern Belize and found at the site of Copan in Honduras (Page 339)

B *Camazotz',* the killer bat of the Maya underworld, pot from the highlands of Guatemala (page 237)

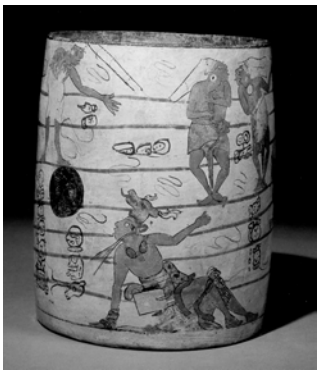
C armadillo drummer playing a drum covered with jaguar skin, part of a procession of animal musicians including a rabbit playing a turtle drum and an unidentified animal playing the maracas (page 340)



D



E

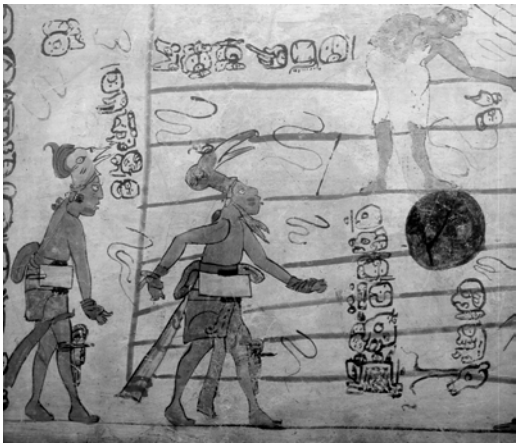


F

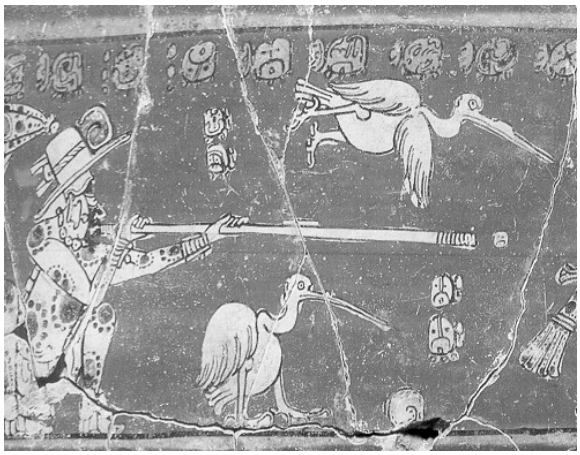
D a plate from the Tikal region of Guatemala (page 339) (There is a hole in the vessel because the pot was ceremonially "killed" before the Maya placed it in a tomb.)
E a jar decorated with a carved armadillo from Guatemala (page 344)
F a cylinder vase showing a scene from a Maya ballgame (page 265)

Many of the scenes shown on Maya pots were taken from scenes that might be taken from the great Maya myth called the **Popul Vue**. The Popul Vue is a story of the history of the Quiche Maya who were the Maya who lived in the highlands of Guatemala. One part of the story is the story of two sets of twin brothers who were ballplayers and challenged the Maya gods of the underworld to a ballgame. (Scenes F and G show the Maya ballgame). The first brothers lost the game but one of them was the father of twin sons who also went to the underworld to play the game. These twins had many adventures and eventually triumphed over the underworld lords and won the game. In one of their adventures, the brothers hunt birds with a blowgun like the one in Scene H below.

Scenes from Maya pots (G and H)



G



H

G another part of the Maya ballgame scene shown on the pot in F above (page 266)
H hero twins hunting birds (page 247)

10.4. Maya archaeologists have identified several styles of cylinder vases. The styles were produced by master artists and scribes in different Maya cities. One style is known as the "Altun Ha" style because it was produced in or near the site of Altun Ha in Belize. Picture A in Text 10.3 is an example of an Altun Ha vase. A Maya archaeologist named Dorie Reentz-Budet identified these styles. She defined different styles based on the colors the Maya artist used and the subject of the scene on the Maya pot. The Altun Ha style pots have black backgrounds. The main scenes were painted in browns, reds, oranges, and yellows. Many of the images were of water birds like cormorants or quetzal birds. These pots had a band of hieroglyphs near the top or **rim** of the pot.

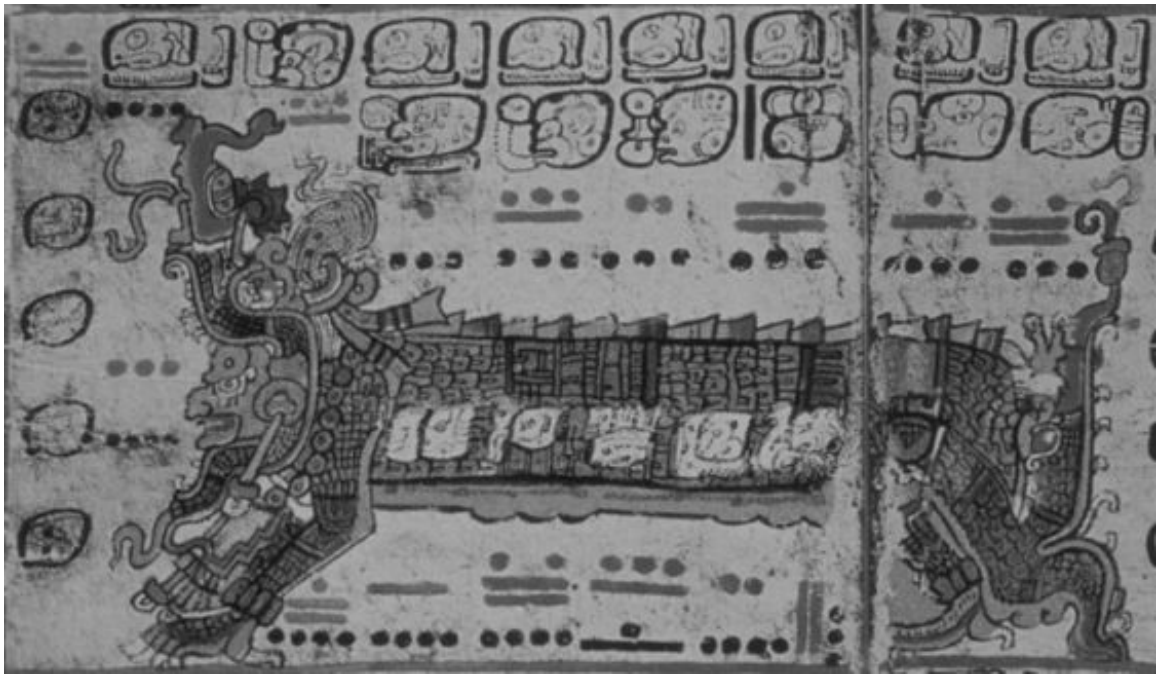
Dorie also analyzed the minerals that were found in the clay used to make the pots. Deposits of clay in different areas contain different **trace elements**. So a tiny piece of the pot can be analyzed and traced back to the location where the pot was made, even though it was discovered far from that location. Maya pots were traded between the rulers of the sites. The Quetzal pot (A) was found far from Altun Ha in a tomb at Copan in Honduras. Other Altun Ha pots were found in northern Belize and southern Mexico. This pottery dates from 650-759 A.D.

Maya noble on a journey

These codex vases were often traded from one site to another or were given to visiting rulers during special ceremonies like katun celebrations or accession ceremonies (remember Text 10.1). The picture above may show a Maya noble on his way across country to such a ceremony. He is accompanied by two trumpet players and his dog. Often the group traveling with a noble to a ceremony included traders. During the ceremonies, the traders exchanged jade, obsidian (volcanic glass), feathers, cotton cloth, and animal hides area in addition to codex vases. Many of the codex vases record these journeys.

10.5. **Maya Codex Books** The Maya used hieroglyphs in books called **codices** (singular is codex). When the Spanish arrived in the Maya area, they found the Maya using books made of bark paper. Because they seemed to reinforce traditional Mayan religion and the Spanish were interested in converting the Maya to their Catholic religion, the books were viewed as evidence of "paganism." You should remember Bishop Landa of Merida from Section 10.3 who provided us with the information on the Maya syllabery that we now use to translate the hieroglyphs. Landa was shown several books by a converted Maya priest, Nachi Cocom, one of the descendants of a noble Maya family that recorded his family's history, rituals, and prophecies. Later, to prevent what he thought was a resurgence

of Maya religion, Landa burned all of the books he could find. Estimates are that 26 books were burned. However, at least three and maybe a fourth codex have survived. They are named after the cities where they are found today: the Madrid Codex, the Dresden Codex, the Paris Codex, and the Grolier Codex (named after a club in New York city).



Page from the Dresden Codex (http://www.archaeoastronomie.de/codex/cdstart.htm)

The Madrid Codex is made of a long strip of bark paper that was folded like a screen. The pages are 9 inches by 5 inches. Bark paper is made by soaking strips of bark in lime until it becomes mushy. The Maya then used a stone tool called a barkbeater to spread the mushy fibers to a rough surface and scrape them until they form a thin layer that dries into a thin sheet of paper. The pages were then covered with a thin layer of lime. Brightly painted columns of glyphs, pictures of gods, or animals were painted on this white background. All four of the surviving books contain almanacs and horoscopes rather than Maya history.

The four books that we have today were all written just before or after the Spanish arrived in the Maya area. No books have survived from the Classic Maya period, but we have found several in tombs. The books are not readable, because through time, the humidity has caused the paper to decay

and the lime to coalesce into a mushy blob. One of the great finds in Maya archaeology would be a preserved Classic period book, perhaps from one of the dry caves in the area. While no Classic Maya books have survived, books painted on deerskin pages from the Mixtec-Mexica or Aztec part of Mexico have been found.

11. **Maya Scribes** What do we know of these artists and scribes that created the stelae, codex vases, Maya folding books, and other hieroglyphic texts? Archaeologists have identified Maya scribes using the same techniques we use to make all archaeological inferences. We look for patterns in the associations of artifact types with the context in which they are found. We use the pictures that the Maya scribes have drawn of themselves on their codex pots to tell us about the artifacts used by scribes and even some of their names. For example, a vase and a plate from Guatemala show Maya scribes painting in a codex and carving shell masks.

This scene from a codex vase shows two scribes or artists. The one on the left holds a paintbrush and bowl of paint, while the one on the right seems to be carving or painting a mask. This artist wears a distinctive headdress that looks like a turban. Often an unopened water lily extends from the turban as is seen in scene below. Scene B is a close-up of the artist in Scene A. You can see his turban with the unopened water lily protruding from the front.

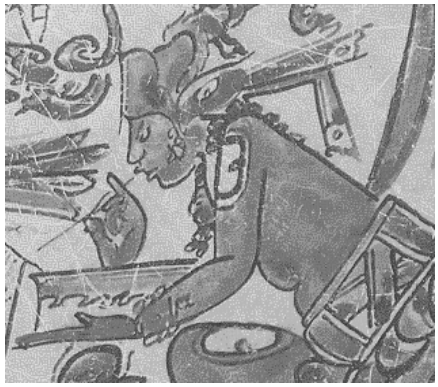
A

B

Artist's name

The artist also included the glyphs for his name. The placement of his name suggests that he is a member of the noble family. Another scribe is shown below painting a codex.

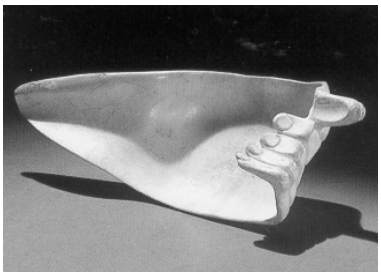
D



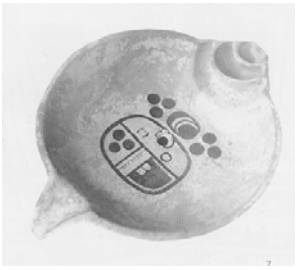
E

Maya Paint Pots

F



G



H

Maya artists used either conch shells cut in half or ceramic dishes to hold their paints. Conch shells were ideal containers because they would not absorb the paint. Maya paint brushes were made of either animal or human hair attached to the end of hollow tubes, like in calligraphy brushes. Other brushes may have been like the brushes used by the Hopi today (in the southwest) made of Yucca fibers attached to a stem. Maya paints were made of a mixture of the smallest clay particles with small amounts of pigments to make the colored paints. Reds and oranges were made from iron oxides or hematite. Adding magnesium or cobalt adds even more colors to the base paint color.

We know more about the Maya scribes from two tombs. One of these at Tikal was the tomb of Hasaw-Ka'an-K'awil, the great ruler who constructed Temple 1. Included in his burial goods was the paint dish. Spanish accounts written during the colonial period say that "they did not teach [their letters] to any except noble persons, and for this reason all the priests, who were those most concerned with them, were persons of rank." (from the *Relaciones de Yucatan* by Bishop Landa. Another tomb at the site of Copan contained a set of paint pots with other pottery vessels, and a decomposed codex. As with the tomb at Tikal, the person buried in this tomb seems to have been a close relative of the ruler at the site. From other sites and inscriptions on pottery, it seems that many scribes were the younger sons of site rulers.