

The Natural Divisions of Arkansas

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by the Arkansas Natural Heritage Commission



This material was originally published in 1978 as:

The Natural Divisions of Arkansas

A Three-Week Unit

Classroom Guide

By Thomas L. Foti

A first and later second printing, in 1979, were both published by the Arkansas Ecology Center in cooperation with the Arkansas Department of Education and funded in part by a grant from the U.S. Office of Education, Department of Health Education and Welfare

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The author, Tom Foti, worked as a consultant to the Arkansas Department of Planning on the first inventory of natural areas in Arkansas, which resulted in the 1974 publication *Arkansas Natural Area Plan* and the creation of the Arkansas Natural Heritage Commission (ANHC). Tom's chapter in that publication was also the first time that the natural divisions of the state were defined and described in print.

Tom joined the ANHC in 1985 as the Plant Community Ecologist, later became Chief of Research, and today serves as a part-time advisor to the Commission and agency staff. He is the author of a second book on Arkansas titled, Arkansas and the Land, published in 1992 and funded in part by the Department of Arkansas Heritage.



When the *Natural Divisions of Arkansas* was first introduced to teachers and students around the state, there was no Internet or World Wide Web and a personal computer might have been a Radio Shack TRS-80, an Apple II, or a Commodore PET. Yet, today, 30 years later, the publication remains one of the most popular downloads from the ANHC website (www.naturalheritage.com).

Therefore, in this third printing of *Natural Divisions of Arkansas*, we have kept as much of the original publication as possible. The wonderful line drawings by David Rose, who also worked at the Arkansas Ecology Center, are still here. The original maps are here too, although they have been reformatted with updated questions. The original text has been updated too, because in the three decades since the first printing, Arkansas and the world have changed. A glossary has been added along with a resource section that includes websites.

The major addition is the use of ANHC's natural community illustrations which include six major types of natural communities that occur in Arkansas, along with representative plant and animal species. These illustrations are also part of an educational poster series developed by ANHC. Here, they supplement the examples of what lives in each natural division.

Finally, we also want to include the original acknowledgements and hope that this edition carries forward their important contributions:

- Mills High School
- Bryant High School
- William Fulton, for work as the environmental education specialist at the Arkansas Department of Education
- Scotta Sheets, for work as a social studies teacher at Mills High School

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The central viewpoint of this look at Arkansas is that history develops in relation to land. When people arrived in the territory which was to become Arkansas, they found mountains, prairies and lowlands. As they fitted their uses of the land to the unique characteristics of the natural environments, their own lifestyles changed, sometimes dramatically.

Goals of this book

- To get better acquainted with Arkansas.
- To learn what an environment (natural system) is, what its parts are, how they are related to each other and in particular, how people relate to the environment as a whole. There are two important terms we will be using: **natural system** and **natural division**. A natural system is an environment made up of interrelated parts. A natural division is a place (a geographical area) which is occupied by a distinctive natural system.
- To use Arkansas examples in teaching science and social studies. Information in this book can be used in meeting general framework requirements, such as L.S.4.2.2 *Describe characteristics of various habitats*, but it is particularly useful in addressing Arkansas-related requirements, such as ESS.8.4.1 *Locate natural divisions of Arkansas*. Specific framework references are listed in Appendix 3.

WHAT IS A NATURAL SYSTEM?

"Natural system" is another name for an environment. This name is used because it communicates the important idea that an environment is made up of a system of interrelated parts. A natural system is composed of many things, but the major components we will consider are geology, climate, plants, animals, soil and people.

Component	Aspect	Example
geology	rock type topography	sandstone, limestone flat, rolling
climate	temperature precipitation	cool, hot wet, dry
plants	general plant communities	upland hardwood forest upland pine forest
animals	communities/species related to plant communities	lowland pine forest -deer bottomland hardwood forest - alligator upland hardwood forest – Scarlet Tanager
soil	pH nutrients texture depth formation	deep, fertile alluvial soils
people	land use (the basic way people relate to the natural system) land-use problems culture history	agriculture, where there is deep soil; recreation in the mountains pesticides "Old South" or "hillbilly" Civil War battlefields on open prairies

WATER

Even though water is not listed as a "component" of a natural system, it deserves a great deal of attention because it is a part of all the components. For example, water in the ground or in lakes or oceans is a part of geology; water as rainfall or snow is a part of climate. It is also found in the soil and in the tissues of plants and animals.

TIME

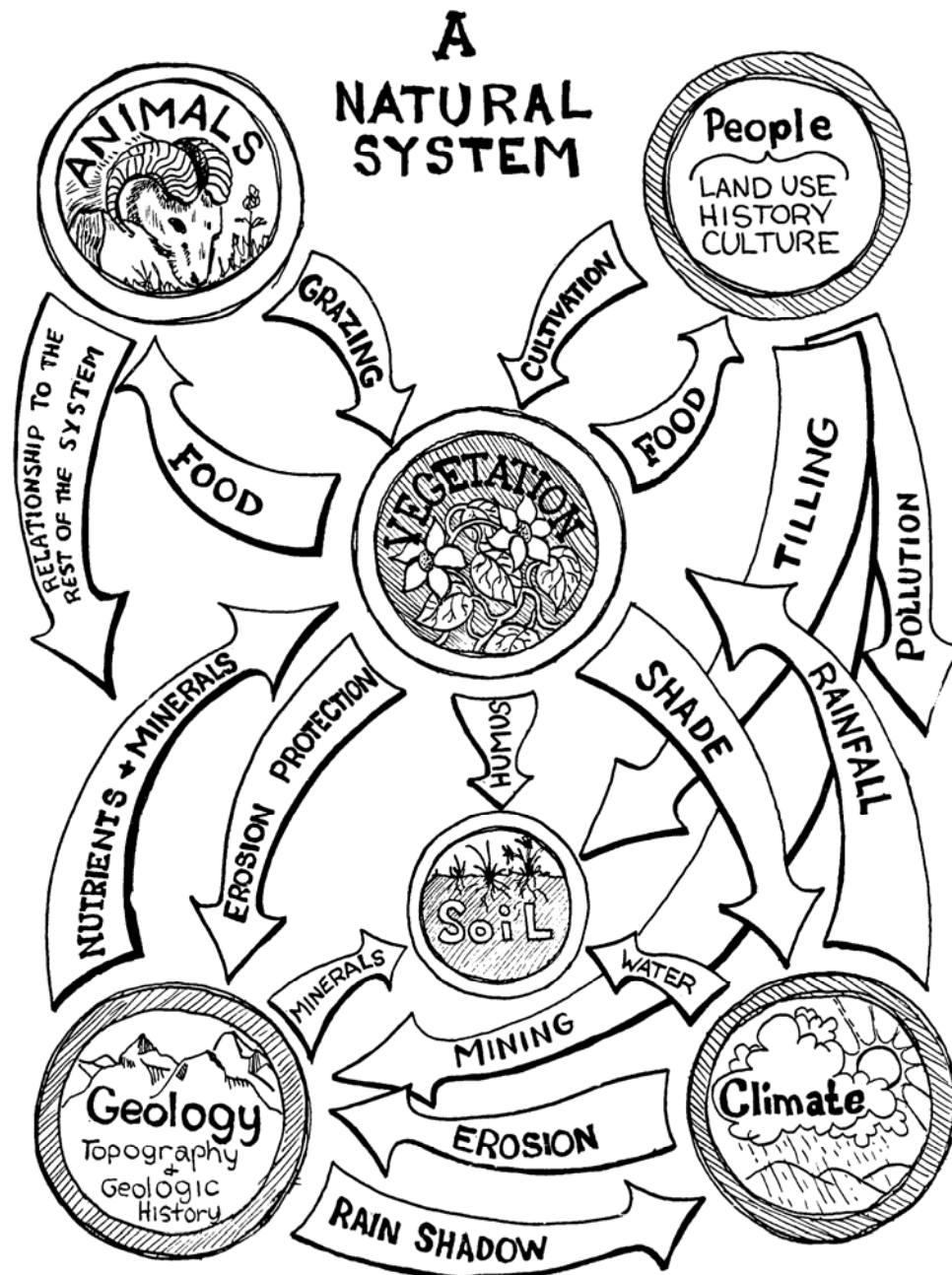
Time is also not a "component" of a natural system, but its importance cannot be overlooked. Given enough time, any natural system will change into a new system. In nature, everything is constantly changing. Time was included in the table in areas such as "geological history", "how soil is formed" and people's "history".

RELATIONSHIPS BETWEEN THE COMPONENTS

Every place on the earth has a distinctive geology and climate. These are the two basic components of any natural system. These two components affect and change each other. They also, in most places, create habitat for plants. Plants affect geology and climate, and they also provide habitat for people and other animals.

People relate to the rest of the natural system through the way they use the land. Their use of the land in turn affects their culture, their history and sometimes leads to environmental problems.

This diagram shows some of the ways the components of a natural system relate to each other:

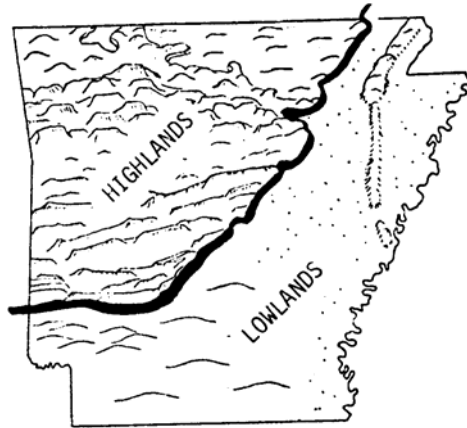


WHAT IS A NATURAL DIVISION?

The easiest way to learn about natural systems is to compare and contrast two or more. In this discussion, the emphasis will be on general natural systems which extend over large geographical areas or natural divisions.

A natural division is a geographic region which is occupied by a major natural system. The natural systems of any two natural divisions are different.

In Arkansas there are two major regions, the highlands in the northwest and the lowlands to the south and east:



There are obvious differences here in all the basic components, with the highlands having mountainous topography, ancient rock geology, upland oak hickory or oak-pine forest, "hillbilly" culture, etc. The lowlands, on the other hand, have rolling to flat topography, moderately recent to very recent sediment geology, bottomland oak-hickory or oak-pine forest and "Old South" culture.

These regions are obvious and knowledge of them and their differences is very valuable. However, they vary enough in themselves to make further division desirable.

NATURAL DIVISION, NATURAL REGION OR ECOREGION?

A natural division is a type of geographic region and this study will concentrate on the six major natural divisions in Arkansas. However, it is important to note that none of these natural divisions or "regions" exists exclusively inside Arkansas's boundaries. We share of each of them with surrounding states. Therefore, Arkansas's natural divisions are part of a larger framework of ecoregions.

To effectively implement assessment, management, and research on an ecoregional scale, across local, regional and national levels, environmental planners need to have a common hierarchical framework. The US Environmental Protection Agency (EPA) has initiated an ecoregional mapping project which includes some new perspectives on the nature and definition of ecoregions, and some new names for the regions which encompass Arkansas's natural divisions. See the EPA website listed in Appendix 1 for more details and copies of the ecoregion maps of Arkansas.

The new names do not invalidate the previous ones used in this publication. Instead, they illustrate the continuing growth of scientific knowledge and the need to increase our understanding of the nature of ecoregion boundaries and the variability of characteristics within ecoregions.

Six Main Natural Divisions of Arkansas



Main Ecoregions of Arkansas

- Ozark Highlands
- Boston Mountains
- Arkansas Valley
- Ouachita Mountains
- South Central Plains
- Mississippi Alluvial Plain
- Mississippi Valley Loess Plains

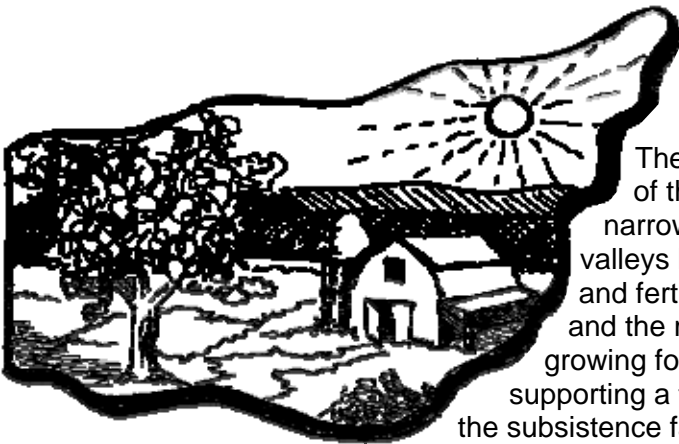
A Brief Look at the Natural Divisions



Ozark Mountains

The Ozark Mountain division occupies the northwestern corner of the state. The flat-topped mountains there are the remnants of eroded plateaus whose horizontal layers of ancient sedimentary rock were forced upward millions of years ago. They are covered with an upland forest of oak and hickory. Settlers eked out a bare living from farms in some of the wider valleys and on the level hilltops. In the process, they developed a unique mountaineer lifestyle. Cash-crop agriculture was seldom practical in the rocky soils of the Ozarks, and most of the residents of the mountains moved away when their subsistence economy became unacceptable.

The Ozarks are currently experiencing a recreational-retirement boom which is bringing people back, this time to enjoy perhaps the greatest resource of the Ozarks region, its beauty. But the new residents bring with them new problems, problems created by the demands they place on the limited water supplies of these headwaters streams and the pressure their sewage places on the life systems of those streams.

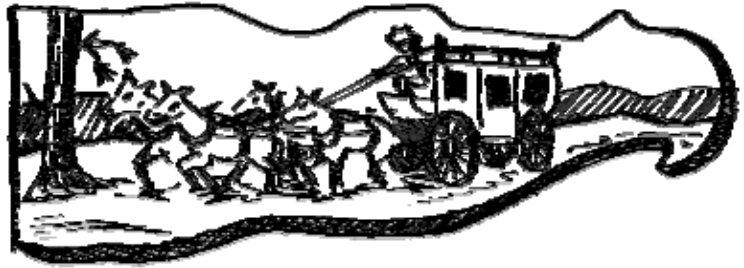


Ouachita Mountains

The Ouachita Mountain division, south of the Ozarks, is characterized by long, narrow ridges of folded rock. Many of the valleys between the ridges are large enough and fertile enough for large-scale agriculture, and the mountains themselves with their fast-growing forest of oak and pine are capable of supporting a thriving timber industry. Therefore, the subsistence farmsteads and the isolation that were so important in developing the Ozarks culture were never as prevalent in the Ouachitas. The culture which did develop was a varied blend of upland and lowland, poor mountaineer and rich planter. Today, the Ouachitas are used for agriculture, forestry and mining. Each of these uses presents potential problems and each must be done carefully in order to protect the natural system which makes the uses possible.

Arkansas River Valley

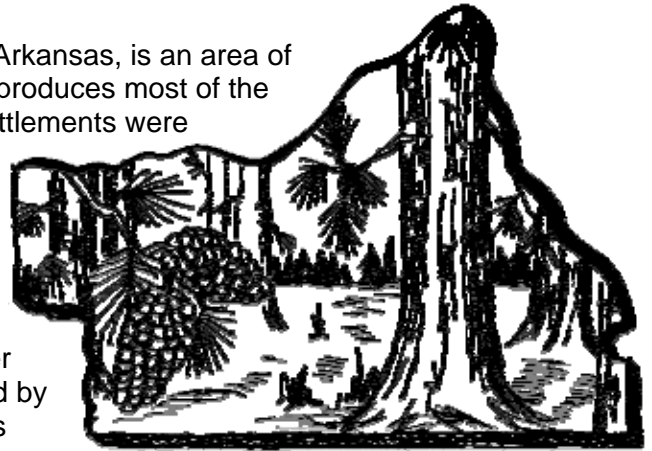
The Arkansas River Valley division lies between the two major mountain systems along the Arkansas River which was an important early path of communications. This division



developed quickly as a focus for settlement in the territory. Dardanelle, Cadron and Ft. Smith sprang up here. Cash-crop agriculture soon became important in the valley and has remained so since. Because the valley possesses scenic quality, abundant water, fertile land and good transportation, it has become and will remain one of the major centers of population growth and industrial development in Arkansas. The problems encountered here spring from an abundance of people and progress, such as air and water pollution.

Coastal Plain

The Coastal Plain division, in southern Arkansas, is an area of rolling, pine-covered hills, which today produces most of the state's forest products. Several early settlements were in this region, in the broad bottomlands along the Red River. Men cleared the forest there for cotton plantations and lived in the grand southern style. The pine forest of the rolling hill-land provided a valuable resource to the northern timber industry. After the timber was cut, much of this land was occupied by small farms, but today most of the farms have been abandoned and most of the

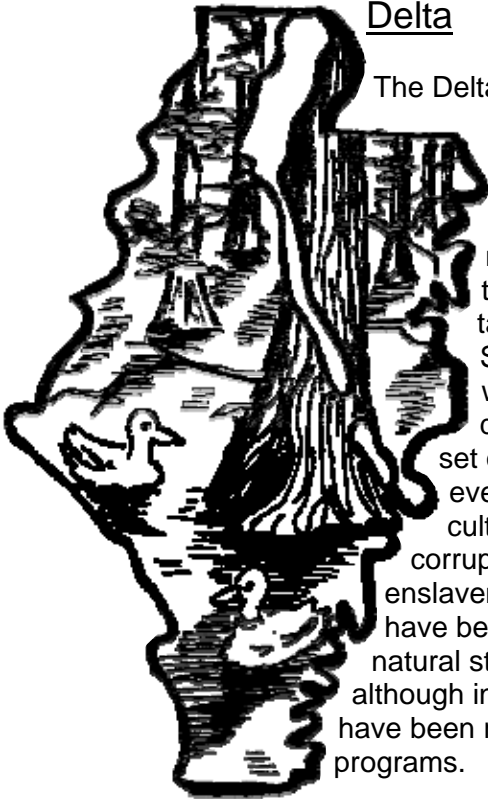


people have left or moved to the towns which are sustained by the timber industry. Their farms were bought by the timber companies early in the twentieth century when they began to realize that this land might be better used for growing trees.

Today the Coastal Plain is again almost uninterrupted forest which is intensively managed for timber production. In the future, the people of the Coastal Plain must deal with such controversial issues as clear cutting, herbicides and other tools of modern intensive forest management. They must also deal with the problems associated with mineral production from their land, particularly petroleum



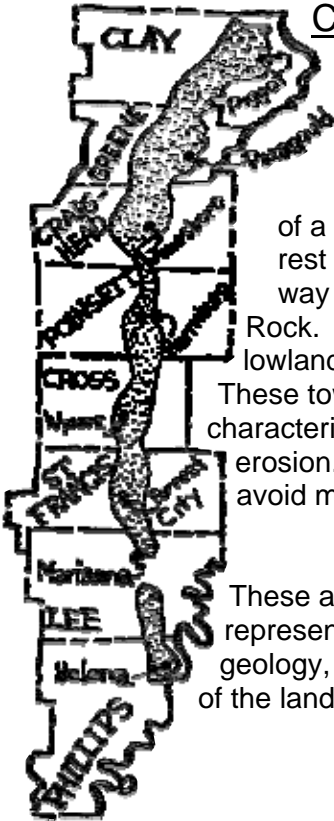
Delta



The Delta division, occupying the eastern third of the state, is a land created by rivers. The ocean-bottom sands and gravels of the Coastal Plain have here been swept away and in their place sand, silt and clay carried by the rivers have been deposited. A majestic bottomland hardwood forest once covered the land, except for a high terrace occupied by the tall grasses and flowers of the Grand Prairie. Settlers found the Delta a harsh, inhospitable land with its floods, mosquitoes and malaria. But the deep soil made it tremendously fertile, and so men set out to conquer it, first with the labor of slaves, and eventually with huge machines. The antebellum culture which developed here was both romantic and corrupt, a refined culture dependent upon the enslavement of people and the land. Though the people have been freed, the land remains conquered. Hardly a natural stream or a bit of the once majestic forest remains, although in recent decades, substantial areas of farmland have been replanted in trees through several government programs.

The people of the Delta must determine whether the remaining few remaining acres of the bottomland forest will be preserved, whether at least a few streams will remain unditched and clear, or whether all this is to be sacrificed to the ever-expanding demand for food and fiber.

Crowley's Ridge

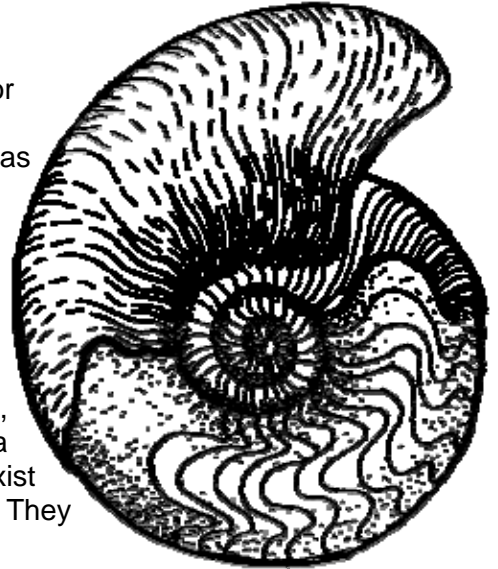


The Crowley's Ridge division is the exception to the character of eastern Arkansas. It is a two to three hundred foot high ridge capped by dust (loess) deposited by ancient winds. It does not flood and is covered with an upland forest of a type more similar to that of Tennessee than to the forest of the rest of Arkansas. Because of its elevation, the ridge was the site of way stations on the first road from Memphis to Batesville and Little Rock. Later, many of the towns which derived their income from the lowlands of the Delta were located on the ridge to avoid floods. These towns include: Jonesboro, Forrest City and Helena. A unique characteristic of the dust which creates the ridge is its susceptibility to erosion. Any human activities there must "tread with light feet" to avoid massive destruction of the delicate soil.

These are the major natural divisions of our state. Each division represents a unified system whose representative components are geology, climate, soil, plants and animals. Humans, through their use of the land, also play an important part.

How Arkansas Got To Be

This look at the story of Arkansas begins after the major continents on the Earth had been formed and started drifting. Arkansas was covered by the sea. The time was the Paleozoic, in Greek, the time of "ancient life."



ARKANSAS IN PALEOZOIC TIME

At the beginning of the Paleozoic, 500 million years ago, Arkansas was completely covered by the sea, but there were islands nearby. Up in what is now east-central Missouri, there were the St. Francis Mountains, masses of granite which had been formed almost half a billion years before and were destined to continue to exist as a recognizable mountain range even to the present. They would also become the structural center of the Ozark Mountains.

ERA	PERIOD	EPOCH	TIME
Cenozoic	Quaternary	Holocene	10,000 years ago to present
		Pleistocene	1.8 million – 10,000 years ago
	Tertiary	Pliocene	5 – 1.8 million years ago
		Miocene	24 – 5 million years ago
		Oligocene	34 – 24 million years ago
		Eocene	55 – 34 million years ago
Mesozoic	Cretaceous	Paleocene	65 – 55 million years ago
		Jurassic	144 – 65 million years ago
		Triassic	206 – 144 million years ago
Paleozoic	Permian Carboniferous (Pennsylvanian Mississippian) Devonian Silurian Ordovician Cambrian		248 – 206 million years ago
			290 – 248 million years ago
			354 – 290 million years ago
			417 – 354 million years ago
			443 – 417 million years ago
			490 – 443 million years ago
	540 – 490 million years ago		

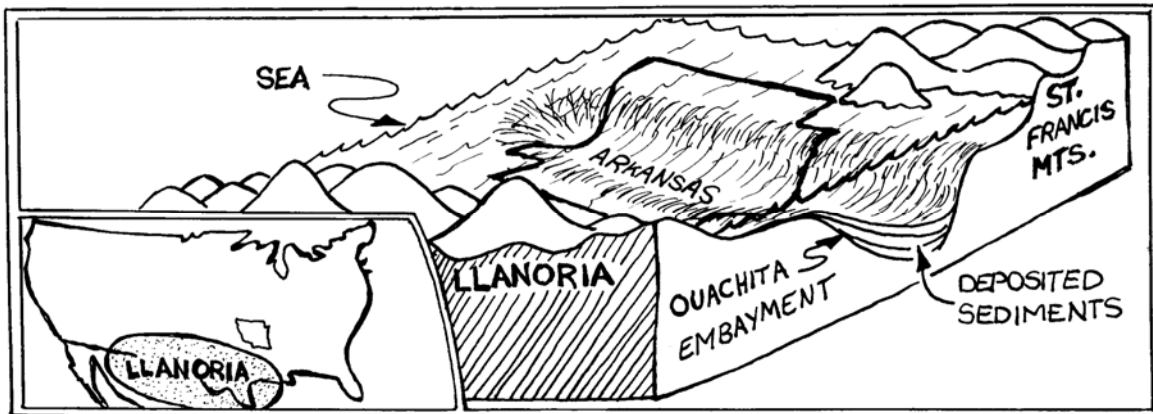
"LLANORIA"

To the south of the Arkansas sea was another land mass, some geologists call "Llanoria." This lofty mountain range was fated to erode away completely. The sediments of Llanoria would eventually form the rock of the Ouachita Mountains.

ROCKS OF THE OUACHITAS

Under the waters of southern Arkansas lay a deep basin called the "Ouachita embayment" or the "Ouachita Basin," where 30,000 feet of sediments from Llanoria accumulated.

The Arkansas sea varied in character. To the south, the rivers of Llanoria were bringing in sediments at such a great rate that the waters were continually cloudy with sand or mud. Few living things existed there. The sandy sediment of Llanoria accumulated to such great thickness in the Ouachita Basin that the tremendous weight compressed the sediment into the sandstones typical of the Ouachitas today. Muds were compressed into shale, and the rocks were ready to be formed into mountains.

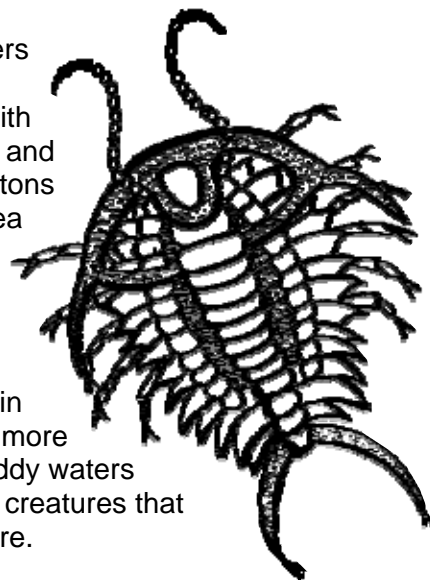


ROCKS OF THE OZARKS

To the north of the Ouachitas, just south of the St. Francis Mountains, the sea was very different in character. The waters there were shallow and quiet and the water was as warm as the water around today's Bahamas. Those waters teemed with life, mostly tiny plants and animals, but also sponges, corals and clam-like brachiopods. When those animals died, their skeletons (even the shells of the one-celled animals) dropped to the sea floor where they accumulated to great thickness and were compressed into limestone and dolomite.

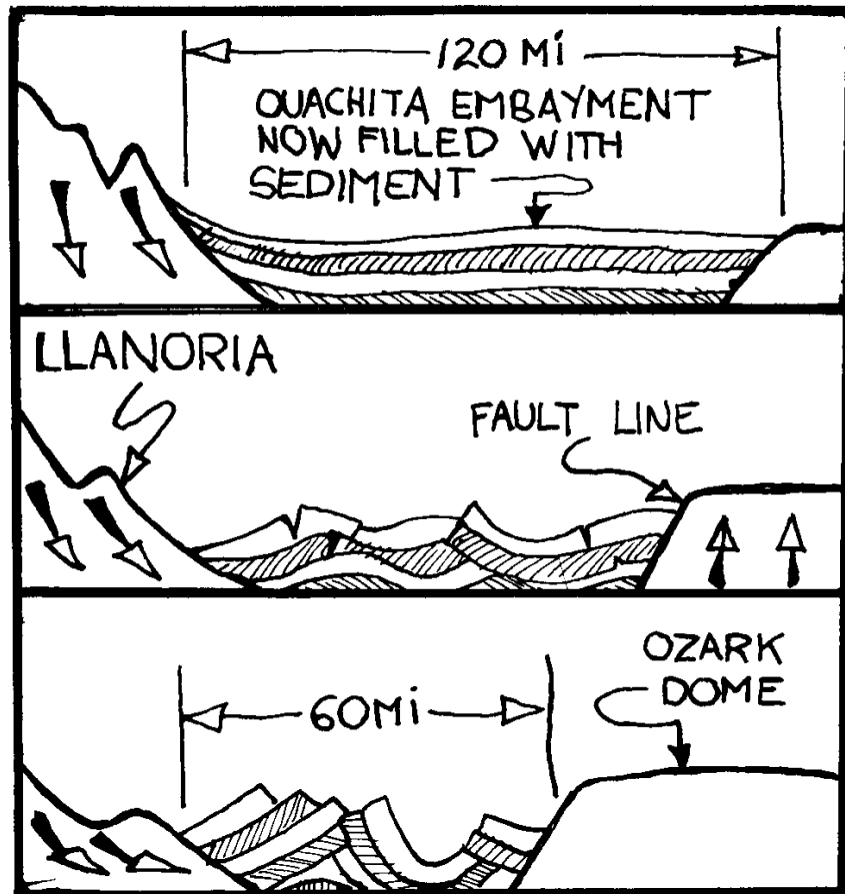
FOSSILS

Occasionally, a complete shell of one of the creatures living in Ozark area of the Arkansas sea would be preserved. Many more fossils are found in the Ozarks than the Ouachitas. The muddy waters of the Ouachita Embayment did not provide good habitat for creatures that could become fossils, therefore fossils are relatively rare there.



MOUNTAIN BUILDING

This quiet period of accumulation and consolidation of rocks lasted for a full 150 million years until the middle of the Paleozoic Era. Then, during a period of the Paleozoic known as the Mississippian, or maybe the slightly later Pennsylvanian period, things got more violent. To start it all off, some geologists think that Llanoria sank! Whatever happened, it just dropped out of sight and hasn't been seen since.

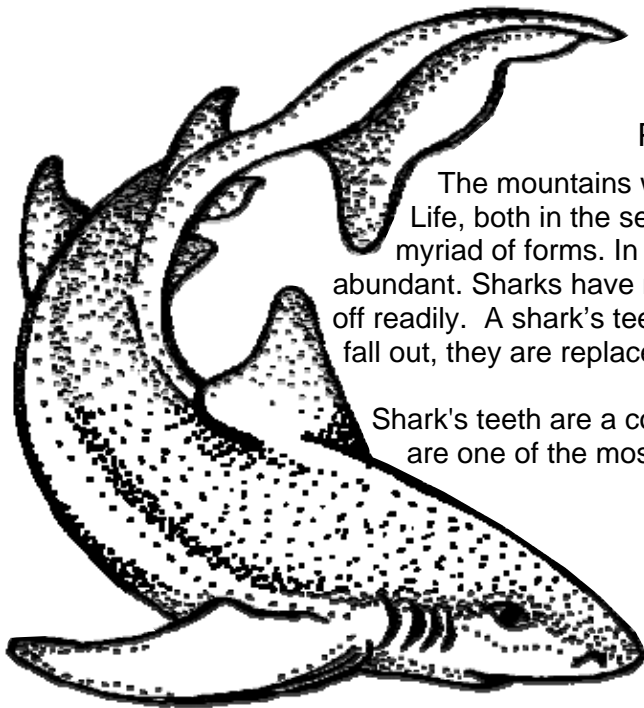


FORMATION OF THE OUACHITAS

Because of that sinking or other actions of Llanoria, the whole Ouachita embayment was squeezed together until it was only half as wide. The violence of this activity can be seen by looking at road cuts and stream cuts in the Ouachitas today. The rocks are tilted, twisted, torn and wrinkled. The rocks themselves offer silent testimony to the fantastic forces involved. Almost as fast as the mountains were squeezed up, they were eroded down. And after this first burst of violent activity, they settled back, resigned to the effects of the wind and weather, which removed approximately 18,000 feet from their height.

FORMATION OF THE OZARKS

While the Ouachita Mountains were undergoing periods of active formation and then erosion, activity started to the north. With the St. Francis Mountains as the center, a large area of rock was pushed straight up. There was little folding there, but rather the earth's forces simply lifted the ocean bottom rock from the sea to an elevation of three or four thousand feet.



PLANTS AND ANIMALS

The mountains were not the only things changing. Life, both in the sea and on the land, was developing a myriad of forms. In Mississippian times, sharks became abundant. Sharks have modified scales for teeth, which fall off readily. A shark's teeth are in rows and as the outer teeth fall out, they are replaced by the teeth of inner rows.

Shark's teeth are a common fossil of Arkansas rock and are one of the most common vertebrate fossil.

THE ARKANSAS RIVER VALLEY

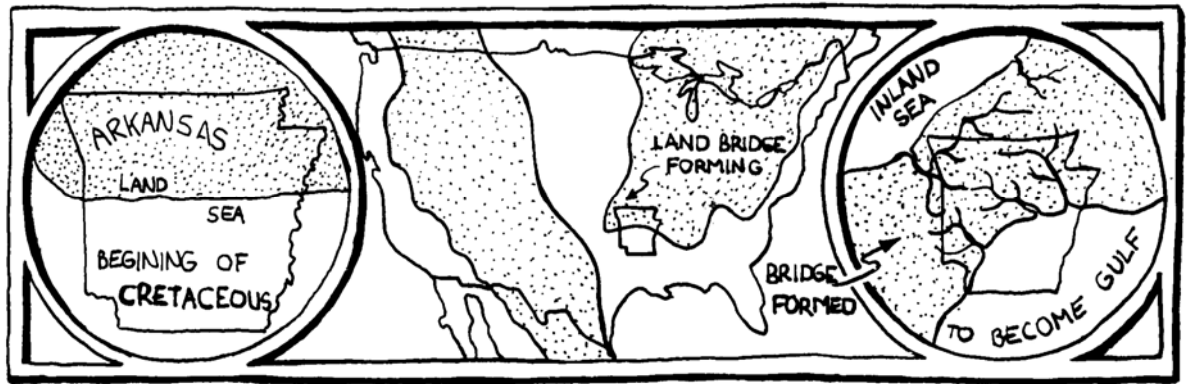
In the lowlands between the two mountain ranges, vegetation developed. Hundred-foot high Scale Trees grew on the edges of pools, shallow lakes and swamps. Their remains formed immense beds of peat which were later transformed into coal. Amphibians, reptiles and winged insects made their appearance.

ARKANSAS IN THE MESOZOIC ERA

During the Mesozoic Era (the time of "Middle Life") life began diversifying rapidly. The dominant animals on both land and sea are reptiles, the most famous of which are the dinosaurs. They were so prominent that the Mesozoic is also called "The Age of Reptiles."

But dinosaurs are not the only life form around: birds and mammals also appear during the Mesozoic, as well as deciduous trees and flowering plants. For most of this period, the climate worldwide was warm and tropical, and shallow seas covered low-lying landmasses





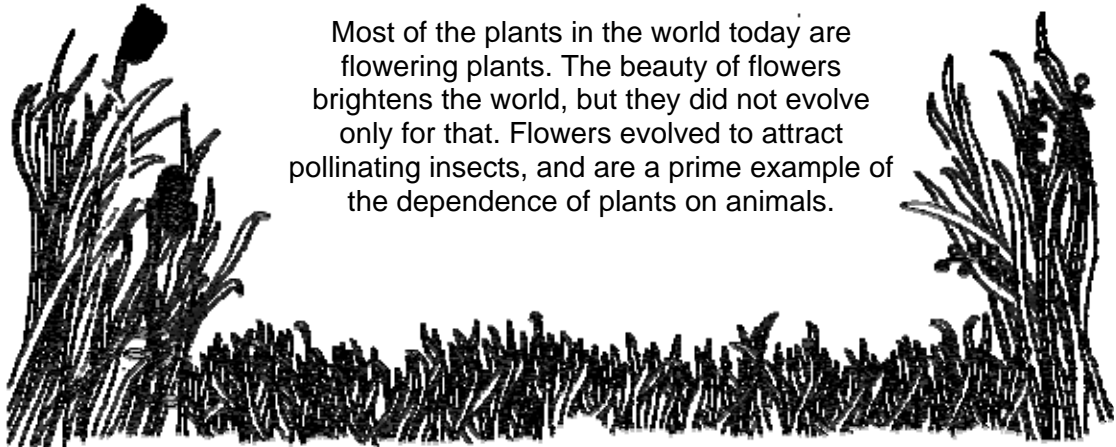
ARKANSAS IN THE CRETACEOUS PERIOD

During the Cretaceous period of late Mesozoic Era, the northern two-thirds of Arkansas and surrounding states had emerged from the sea. At the beginning of Cretaceous, the edge of the sea in the area of Arkansas ran in a more or less east-west direction across the state at about the latitude of Hot Springs.



Dinosaurs roamed the land during the warm climate of those days and a new development made its appearance, one which was to have profound effects on the character of life to come - the flower.

Most of the plants in the world today are flowering plants. The beauty of flowers brightens the world, but they did not evolve only for that. Flowers evolved to attract pollinating insects, and are a prime example of the dependence of plants on animals.



SOUTHWESTERN ARKANSAS (The Coastal Plain)

Tiny animals were abundant in the Gulf of Mexico which covered southern Arkansas during the Cretaceous Period.

Their microscopic remains drifted down in a steady rain to create beds of chalk and to mix with clay to form limey marl. Snails and oyster shells drifted into those deposits to form the heavily laden fossil areas of southwestern Arkansas.

Later in the Cretaceous Period, southwestern Arkansas and nearby areas of Oklahoma and Texas rose from the sea and their limey soils are exposed today as the blacklands.

THE DELTA

Meanwhile in eastern Arkansas another major change was taking place.

At the beginning of the Cretaceous Period, northeastern Arkansas was much different than it is today. It was rocky and hilly much like the mountain areas to the west.

Later in Cretaceous Period, the Paleozoic rocks, leveled by weather and time, began warping downward. As they did, the Gulf of Mexico advanced northward over them and created a bay which geologists would later call the Mississippi Embayment.

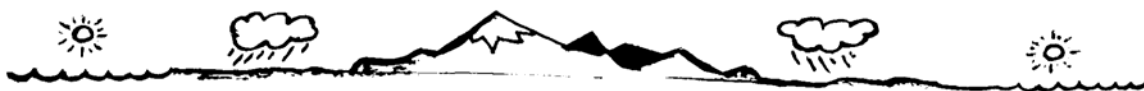
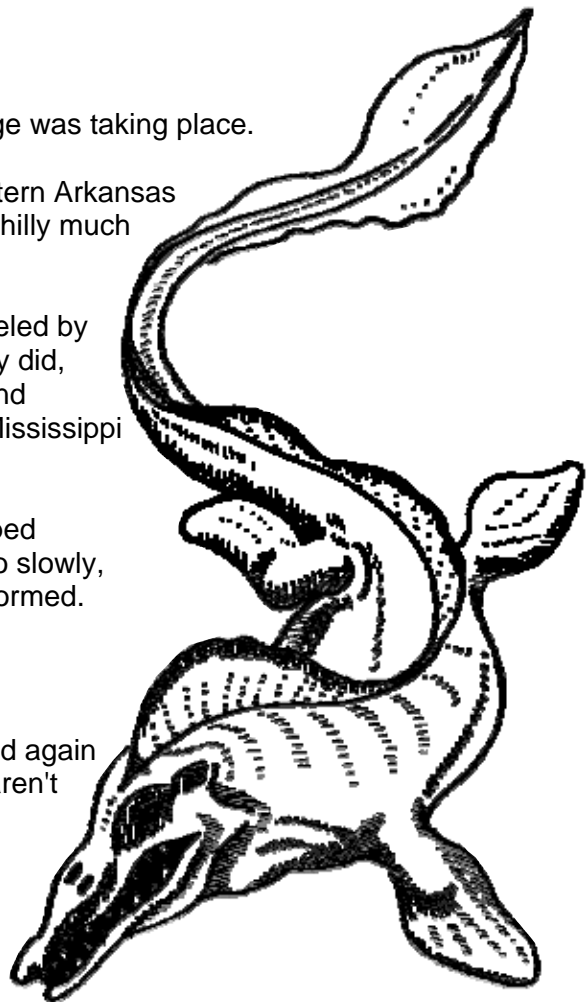
Although the base rocks themselves eventually warped downward over 4,000 feet, this process happened so slowly, that sediments filled the bay almost as quickly as it formed.

PLANTS AND ANIMALS

Toward the end of the Cretaceous, the climate cooled again and the age of the giant reptiles ended. Dinosaurs aren't the only things that died out.

About 50 percent of the species on Earth became extinct. This included many other large reptiles, like pterosaurs and plesiosarus, as well as lots of plant species and marine animals.

Other life forms, such as homeothermic mammals and birds, flourished in what became the Cenozoic Era.



ARKANSAS IN THE CENOZOIC ERA

Cenozoic time began about sixty million years ago and continues today. The first period of the Cenozoic era is known as the Tertiary.

ARKANSAS IN THE TERTIARY PERIOD

THE OZARKS

In the mountains, periods of erosion alternated with slight uplifts which helped form the landscape we see today. During this time, the final plateau surfaces of the Ozarks were formed. Both the Ozarks and Ouachitas eroded two or three times during this period into low-lying, relatively flat lands known as "peneplains." Later, they uplifted again as relatively flat topped mountains all of about the same height. The results of this process are far more apparent in the Ozarks, where three plateau surfaces are apparent: the Boston Mountains, the Springfield Plateau, and the Salem Plateau.

THE COASTAL PLAIN AND DELTA

During the Tertiary period, the Coastal Plain, along with the Delta, was characterized by the advance and retreat of the Gulf of Mexico. The advancing sea was never very deep and occasionally was so shallow that land plants could thrive there. The remains of these plants formed beds of peat which in turn was later transformed into lignite, a form of coal.

Finally about 50 million years ago, eastern and southern Arkansas rose from the Gulf for good. Today, in the Coastal Plain, the sands and gravels which made up the bottom and beaches of the Gulf can still be seen.

ARKANSAS IN THE QUATERNARY PERIOD

Time advanced to the next period of the Cenozoic: the Quaternary, beginning about two million years ago. Much of Arkansas would be familiar to us, and we would see plants and animals we know today, but many others which we would consider odd. Primitive horses, camels, saber-tooth tigers, mammoths, and mastodons all lived in Arkansas during this time. The Oak-Hickory forest, which reached its culmination in this area, was well developed.

The mountains had reached the shape they retain today but there were still important changes to come in the lowlands, especially those of eastern Arkansas. The shoreline of the Gulf of Mexico had more or less assumed its present position, but rivers and lakes were to have a significant effect on the lowlands of Arkansas.



THE DELTA

During the Quaternary, the lowlands of southern and southwestern Arkansas (the Coastal Plain) retained their ocean bottom character with rolling topography and a surface of sand and gravel.

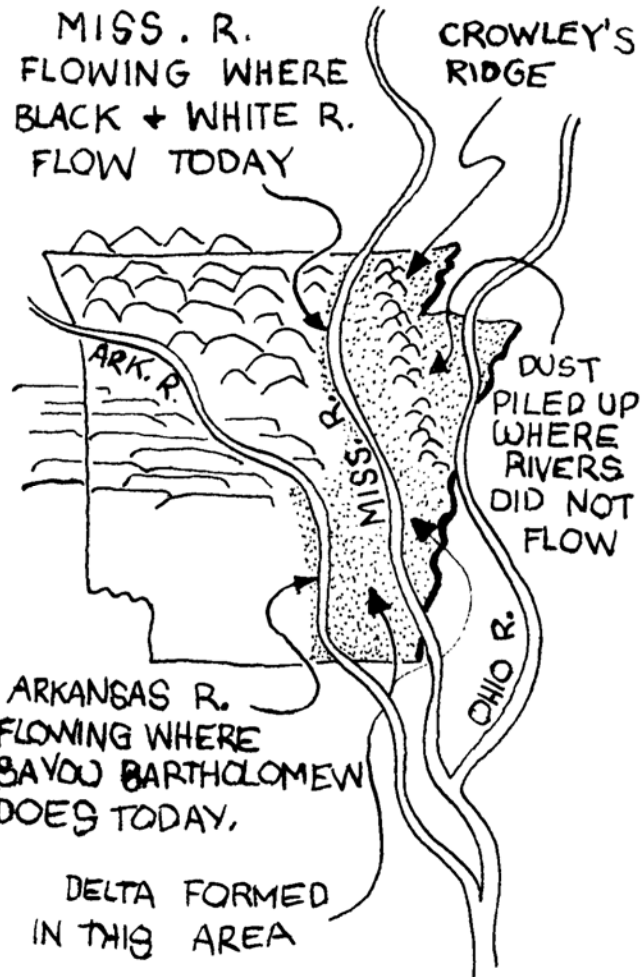
However, as the ocean receded from the Mississippi Embayment in eastern Arkansas, the embayment was traversed by large rivers which completely reworked the land by hauling away the top layers of ocean-bottom sand and replacing them with the sand, silt and clay which those rivers carried.

The rivers meandered over most of the plain of eastern Arkansas. At one time the Ohio River flowed over extreme eastern Arkansas, the Mississippi flowed to the west of it and the Arkansas still further to the west.

These three great rivers didn't join until they were well to the south of Arkansas. Their power to shape the land varied with the advance and retreat of the glaciers.

When the glaciers advanced (never nearer than the middle of Missouri), the rivers would dry to only a trickle.

But when the glaciers began melting, the rivers would swell to torrents which would cover the land with sediments. Occasional minor subsidence, or lowering, of the land would create large swamps where deep beds of clay would be deposited.



CROWLEY'S RIDGE

In northeastern Arkansas, a slight divide was left where the Mississippi River and the Ohio river did not meander. During times when the glaciers retreated, these large rivers coated with lowlands with ground-up rock picked up from the north. After the glaciers locked up most of the water and this rocky mud dried up, the winds began to blow. The divide between the two rivers acted like a fence and the dust piled up against it, to a depth of as high as 50 feet.

By late Quaternary, the Mississippi Delta and Crowley's Ridge were formed and Arkansas had reached its present shape.

RECENT CLIMATE

Since the last glaciers retreated, about 8,000 years ago, the climate of Arkansas has changed dramatically. Part of the story of those changes is told by areas around the state where the land surface is covered with low mounds two or three feet high and 40 to 50 feet in diameter. These mounds are usually referred to as prairie mounds or more expressively as "prairie pimples," and the explanations for them are numerous.

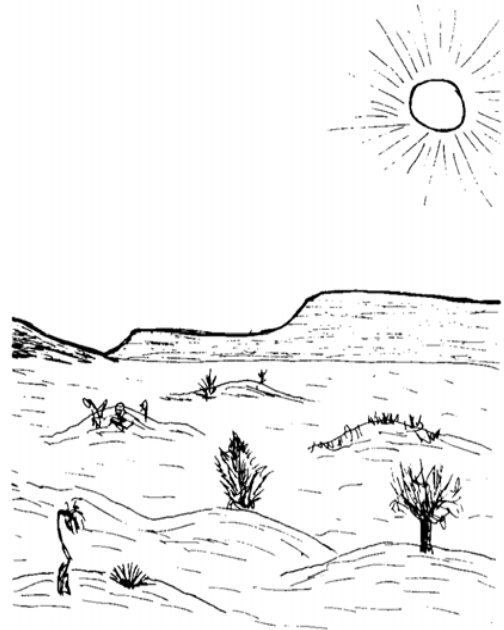
For many years, some people thought that the mounds were constructed by Native Americans, but archeological research has not found artifacts or other data to support this theory. Other ideas or explanations that are not supported by any evidence include: the mounds being formed by pockets of gas pushing up the surface, very large ant hill origins, or even very large prairie dog colonies.

A more scientifically acceptable theory is one that looks at the climatic history of the region. During the last 7,000 years, there were periods when the climate of Arkansas was cold and arid. The driest sites were occupied by desert-like shrubs. These sites were flat or gently rolling which allowed the wind to circulate freely and dry out the surface. These sites also had a subsoil of clay or rock that limited the ability of the plants to obtain groundwater, especially during the dry periods. This, in turn, limited any plant growth or groundcover between the scattered shrubs. Winds eroded away exposed soil on these sites and deposited it under the shrubs, leading to the formation of mounds.

The climate has moderated gradually since that time, and prairie vegetation replaced the desert plants. Prairie grasses are adapted to a climate which is too dry for trees and too moist for desert, so when Arkansas's climate moderated enough for these conditions to exist, the areas which had been desert became grassland.

When settlers arrived, they associated the mounds with prairie, so they called them "prairie" pimples but they might more appropriately be called "desert" pimples instead.

Though the pimples were generally associated with prairie, they are often to be seen in forests as well. The climate of the state has continued to become more moist and as it has done so, trees have gradually overgrown the prairies. People have hurried the process by plowing the prairies and even leveling off the pimples.



The largest prairie in the state at the time of settlement was the 400,000 acre Grand Prairie which extended from Lonoke to Arkansas Post. Now, due to the pressures of rice and soybean cultivation, virtually all evidence of its prairie history has been obliterated. Elsewhere in the state, prairie habitat and the pimples have fared somewhat better.

Prairie pimples can still be seen around Fayetteville and along the terrace land in the Arkansas River Valley, especially around Ft. Smith and Conway. Look along the terraces from Jonesboro to Brinkley, from Bald Knob to Searcy and from Monticello to Crossett and look from Arkadelphia to Hope. They occur elsewhere too, but you might have to look closer to find them.

THE OZARK MOUNTAINS

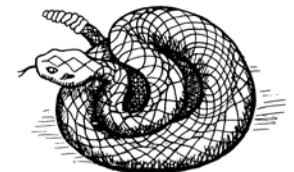


The Ozarks have a special mountainous topography. Although the mountains are quite rugged in places, the tops tend to be flat and at the same height. An extensive land area having a relatively level surface raised sharply above adjacent land on at least one side is defined as a “plateau”; therefore, this region is more formally called the “Ozark Plateau.”

The Ozarks were formed when the bedrock was uplifted into high plateaus which were then eroded down into the present rugged shape. In a stream or road cut you can get a feeling for the geology of the area. The rocks that make up the Ozarks were deposited at the bottom of an ocean that covered Arkansas 300 million years ago. When certain creatures in the ocean died, their shells fell to the ocean floor and, over time, were compressed into limestone. Limestone is easily dissolved by water, so many caves, including the well-known Blanchard Caverns, have been formed by underground streams flowing through cracks in the limestone. The water flowing in these streams is not purified or filtered by passing through the limestone, so polluted water that enters a cave may very easily appear miles away as a polluted spring. A well drilled into the same underground stream will also be polluted.

The streams of the Ozarks are usually small and quite beautiful. As they carved mountains out of plateaus, they made bluffs, waterfalls, and even a natural dam on Lee Creek. The larger streams, like the Buffalo and White Rivers are well known by outdoor recreation enthusiasts. Some of the larger streams are crossed by man-made dams which form other recreational impoundments such as Beaver, Bull Shoals and Norfolk Lakes. It should be remembered though, that under these lakes were rivers that were themselves once scenic and recreational resources.

Two of the chief natural communities found in the Ozark are upland hardwood forests and glades. See Appendix 4 for descriptions and illustrations of these natural communities.



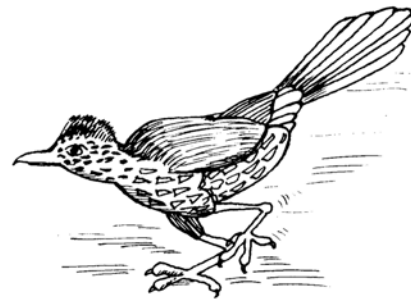
Early residents of the Ozarks were pre-historic Indians known as bluff dwellers, because they often took shelter under overhanging bluffs. Their belongings and decorations can still be seen in many of the bluff shelters.

By the time the first Europeans arrived in the Ozarks, the bluff dwellers had been replaced by the Osage Indians. The Osage were warriors and lived a wandering life similar to the bluff dwellers before them. The early Europeans in this area adopted a similar lifestyle, but eventually settled down and became farmers.

The few places in the river valleys and on the flat tops of the mountains where the soil was deep enough for farming were far apart. The resulting isolation helped to develop the unique Ozark mountaineer or “hillbilly” lifestyle. This way of life was characterized by independence, suspicion of strangers and a unique type of mountain music, which is promoted as part of Arkansas’s tourist image today.

Between World War I and World War II, the subsistence lifestyle in the Ozarks became less and less desirable. Growing enough corn to eat (or sometimes maybe drink) was no longer enough. People wanted cash to buy kerosene and canned food. Some tried to grow cotton on the hillsides and when the topsoil eroded away, they left the mountains. Many other simply chose to leave the hard, isolated life.

Now people are coming back to the Ozarks to enjoy what may be the area’s greatest natural resource: the scenery. But with more people come more problems. Water supplies for an increasing population are limited and the natural system is delicate. The small, high-quality streams are very limited in the amount of sewage that they can tolerate; therefore, sewage must be treated at additional expense to avoid the destruction of stream quality.



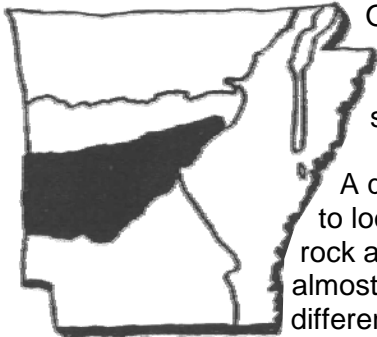
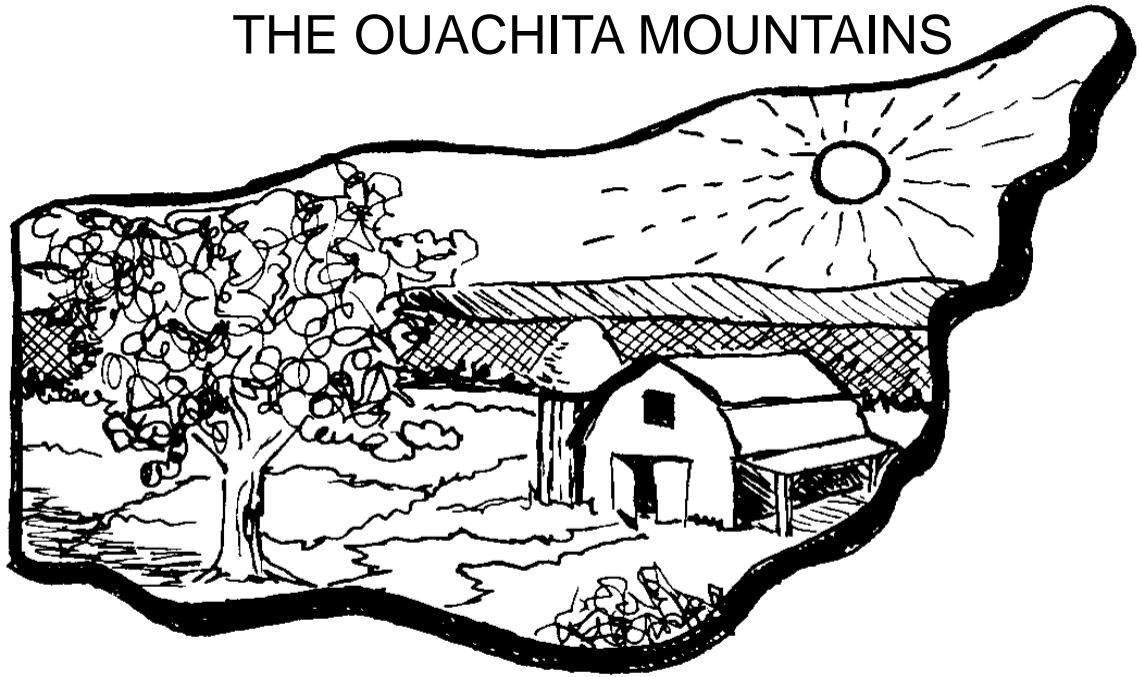
The area now hosts several industries which employ the added residents. The poultry industry is perhaps the largest, and care must be taken to keep chicken litter out of streams and underground channels. With beef prices rising, more land is being cleared for cattle grazing. The land clearing and overgrazing of pasture can lead to erosion and loss of soil. Anything put on the land to help grow pasture, such as chemicals or chicken litter, can run-off into the streams and caves.

The timber industry of the Ozarks is not large but much of it involves public land where intensive timber management practices may interfere with other public uses of the forest. Major population growth has taken place around retail, trucking and educational centers.

The natural system of the Ozarks has seen less degradation than most other natural divisions of Arkansas. Yet this system, particularly the cave-spring-stream water component, is probably more delicate than any other in the state, and needs sensitive, detailed plans for its protection.



THE OUACHITA MOUNTAINS



One good way to understand the Ouachitas is to compare them to the Ozarks. Many people are surprised to find that the Ouachitas differ from the Ozarks in several significant ways.

A quick way to visualize the difference in the two systems is to look at road cuts of each: in the Ouachitas, the layers of rock are almost always tilted; in the Ozarks, the rock layers are almost always horizontal. These differences result from the different geological histories of the two systems.

In the Ozarks, bedrock was pushed up into rugged, flat-topped mountains. In the Ouachitas, a belt of land about 120 miles wide was "squeezed together" until it was only half that wide. When that happened, the rock did what might be expected - it wrinkled up.

The mountains of the Ouachitas are big wrinkles in the earth's crust: long east-west trending, sharp-pointed ridges that may be a couple of miles wide and over a hundred miles long. The most common rocks of the Ouachitas are sandstone and shale rather than the limestone and dolomite that are so common in the Ozarks. Sandstone weathers into a sandy soil, and sandy soil is favorable to the growth of pine. It's not surprising then that pine forest is more widespread in the Ouachitas than the Ozarks.

The unusual east-west orientation of the mountain range means that the southern slopes of the mountains are warmer and home to pine hardwood natural communities, whereas the northern slopes are cooler and home to upland hardwoods. See Appendix 4 for descriptions and images of these natural communities.

The valleys of the Ouachitas tend to be much wider than the valleys of the Ozarks: up to 20 or 30 miles wide. This topography has influenced lifestyles in the area from the beginning, because there is fairly deep soil in these valleys. The Caddo Indians were some of the first people known to live in the Ouachitas. They wandered the hills, hunting and fishing, but they were also able to live in settled villages made possible by the agricultural crops which thrived in the relatively deep soils of the wide Ouachita valleys.

Early European settlers continued clearing the valleys for farms. Many of them grew into large plantations where the planters lived an elegant "Old South" lifestyle. Up on the ridges, though, folks lived a rugged pioneer life, more similar to that of the Ozark Mountaineer. Therefore, in the Ouachitas, there was a blend of lifestyles, with rich planter and poor mountaineer living close together.

The tremendous forces that wrinkled the Ouachita Mountains also evidenced today in many aspects of the area's tourism: quartz crystals and Hot Springs National Park. Early Native Americans recognized the Hot Springs area as a source of high-grade novaculite for arrowheads and for the healing value of the springs. The hot springs were first described by an exploring party led by Dunbar and Hunter in 1804. They had been sent out to describe the springs by Thomas Jefferson after the Louisiana Purchase.

The value of the springs was officially recognized in 1832 when the United States Congress formally withdrew the land around the springs from homestead or private purchase. This was the first time in history that the U.S. Government had reserved land for public use. The dominant public use of the springs has been therapeutic bathing. Bathhouses were built, and in 1921, government land surrounding the springs was declared a National Park.

Originally, the 45 to 70 hot springs flowed from the lower slopes of Hot Springs Mountain into Hot Springs Creek. The valley through which Hot Springs Creek flowed was not wide. In fact, in the area of the springs, it was too narrow for large bathhouses to be built.

In 1883, a rock vault was built over the stream and the valley was filled to a depth of approximately 20 feet which created a wide enough flat place to build the present bathhouses and private buildings along Central Avenue. Today, the upper and lower ends of the vault are visible. In between, the stream, with riffles and pools intact, is flowing through the vault, under the street or under the porches of the bathhouses. It can be traced by the manholes and drains which lead to it.

As Hot Springs grew, the vault's design could no longer accommodate flood flows and sometimes water backed up and flooded the streets. All but two of the original springs have been covered over, with pipes now carrying their water to a central distribution center.



Major uses of land in the Ouachitas also differ from the major land-uses of the Ozarks. Much more of the land is managed intensively for timber production, on sites owned by either the National Forest Service or private timber companies. Associated with timber production are a variety of controversial practices, such as clearcutting and large-scale applications of herbicides.

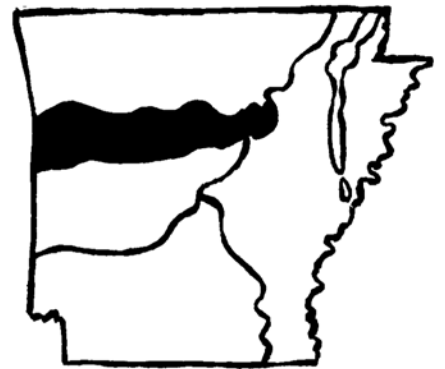
Another major use of land in the Ouachitas is mining: minerals such as barite, novaculite, and quartz, which were formed during mountain-building. Mining can cause several environmental problems, such as destruction of plants and animals by acid water which drains from mines into watersheds. Also, if the mine area is not reclaimed, the productivity of that land is lost. Mining, then, is a land-use which is important to the economy of Arkansas, but must be done carefully.

THE ARKANSAS (RIVER) VALLEY



The natural division known as the “Arkansas River Valley” is now called simply the “Arkansas Valley” and the name encompasses not just the lowlands along the Arkansas River but also the trough up to forty miles wide between the mountains to the north and south.

Within the Valley are flat-topped mountains, typical of the Ozarks, and folded ridges, similar to those of the Ouachitas. Some of the rocks have flat strata typical of the Ozarks and others have tilted layers like those of the Ouachitas; however, there are also some unique features in this division found nowhere else in the state.



The Arkansas Valley is home to high, isolated, flat-topped mesas, buttes, or monadnocks such as Mount Nebo and Petit Jean Mountain, and the highest point in the state: Mount Magazine. At one time, these monadnocks were connected to the Ozarks and their structure is very similar to the southern Ozarks. They are capped by massive sandstone which helps to keep them from eroding away, and there are layers of shale below the sandstone. Under the sandstone ledges are bluff shelters like those found in the Ozarks. These bluff shelters may have been used by the same ancient bluff dwellers who also lived in the Ozarks. Later, others sought refuge in the bluff shelters. One of these was Belle Starr, a colorful Fort Smith outlaw. According to legend, she walled in the front of a bluff shelter along Rock Creek to make it into a fortress.

The streams of the Valley meander across shale, gradually exposing the soil that formed in the Valley by the weathering of this shale over millions of years. Along the Arkansas River and other major streams that cross the Valley, are deep alluvial soils deposited by the rivers. These soils are the most productive crop lands of the Valley.

The Arkansas River has a tremendous effect on both the wildlife and the people of the Valley. Along the river, in the wintertime, hundreds of thousands of ducks are found. On the river sandbars, eagles come to fish and sometimes prey on sick or crippled ducks. The Arkansas River is a primary migration corridor for many birds. Along the river, "sea gulls," such as the ring-billed gull, are common. These gulls nest in the far north and spend their winters on the gulf coast or further south. As they pass through Arkansas they often fly along the Arkansas River. Large rivers, such as the Arkansas, are recognized as a type of natural community. See Appendix ___ for more plants and animals that are adapted to life on large rivers.

The rolling upland nature of the Valley has strongly influenced the lives of the people who live there. The first settlers lived a rugged pioneer life, but the gentle rolling hills of the Valley allowed people to quickly clear large farms. Most of the Valley has remained cleared and in agricultural production since. Today, there are pastures on the rolling hills and row-crops closer to the Arkansas River.

The Valley's landscape and the presence of the Arkansas River helped the area become a communications and transportation corridor through the mountains. The Arkansas River itself was the first major transportation artery, bringing Europeans from the eastern U.S. They traveled up the river into the territory that would become Arkansas on flatboats, keel boats and eventually steam boats. By the second half of the 1800s, overland transportation became more common. The Butterfield stage line ran over the rolling country of the Valley, instead of attempting to cross the rugged mountains on either side. Stage houses were built along the line to provide resting stations for the horses and riders. Around these way-stations, small towns developed which eventually grew into larger cities. Today, a major interstate highway runs through the Valley connecting these cities, including Ft. Smith, Clarksville, Ozark, Russellville, Morrilton, and Conway.

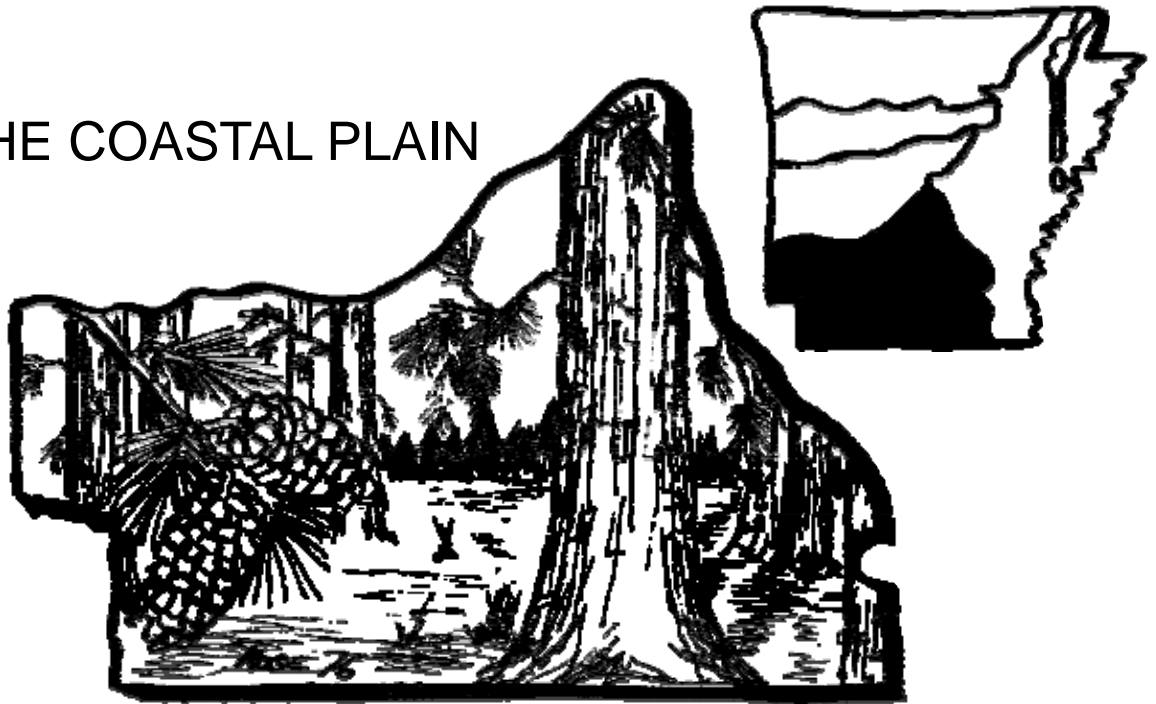
One of the largest of these former way-stations is the city of Fort Smith, which has a rich history. In 1818, Major Stephen Long of the U. S. Army was sent up the Arkansas River to locate the site for a fort to be the last outpost on the western frontier. The fort would also serve to keep peace between the Indians and the settlers who were moving into the territory. As Long neared the site of present-day Fort Smith, he saw the prairies becoming larger and more numerous. He picked out a site, Belle Point, on a hill overlooking the Arkansas River at the mouth of the Poteau River for the site of the first Fort Smith.

Later, Fort Smith was abandoned by the Army when there was no longer a need for an Indian outpost in the area. One of the fort buildings was turned over to Federal Judge Issac Parker who was assigned to Arkansas. Parker served as federal judge for the Federal Court of the Western District of Arkansas. During his first term, his court found eight men guilty of murder and six of them died on the gallows on the same day. During his time as judge, he tried 13,490 cases, with 9,454 of them resulting in guilty pleas or convictions. His court was unique in the fact that he had jurisdiction over all of Indian Territory, covering over 74,000 square miles. He sentenced 160 people to death, including four women. Of those sentenced to death under Parker, seventy-nine men were executed on the gallows.

He is often called the "Hanging Judge." At the time, capital offenses of rape and murder were punished by death. However, it was not for the judge to decide guilt. Determining guilt was left up to the jury. Parker actually had no say in whether a person was to be hung; in fact he was quoted as being against capital punishment. His court did, however, sentence some of the most notorious outlaws to hang. Outlaws such as Cherokee Bill, Colorado Bill, and the Rufus Buck Gang are some of the well known who were sentenced to death and executed during Parker's tenure. His courtroom is now the Fort Smith National Historic Site.

Today the Arkansas Valley is still a major transportation and communications corridor, including the McClellan-Kerr Arkansas River Navigation System, Interstate 40, a major railroad, and many other highways, pipelines, and power lines. The Valley also hosts several scenic tourist destinations and offers easy access to additional areas in the mountains to the north and south. With transportation comes population growth and industrial development, which in turn, present new problems with pollution and increased water supply needs.

THE COASTAL PLAIN



The Coastal Plain covers the southern quarter of Arkansas. Its principal cities include Texarkana, Hope, El Dorado, Magnolia, Monticello, Pine Bluff and Little Rock.

It is a rolling lowland, and, along with the rest of southern and eastern Arkansas, was once covered by the waters of the Gulf of Mexico. When the Gulf retreated to its present position, it left the sands and gravels that made up its bottom and beaches exposed in the Coastal Plain. With sandy soil and abundant water, the forest of the Coastal Plain is dominated by pine trees. These pine forests are home to typical pine-land bird species such as the Pine Warbler and the endangered Red-cockaded Woodpecker. There are also several large rivers in the Coastal Plain and along these rivers are typical bottomland hardwood forests. Images and descriptions of all these natural communities can be found in Appendix 4.



One of the most interesting portions of the Coastal Plain is extreme southwestern Arkansas.

Southwestern Arkansas has wide river bottoms with deep soil along the Red River and the Ouachita River. Also in this area are the blackland prairies, very special prairies that were found in a belt from Arkadelphia down to Texarkana and then extending on into Texas. These blackland prairies, along with the Red River bottomland, were thought, in the early days, to be the most fertile lands in Arkansas.

If you look beneath the surface of the blackland prairies, you will see that only the top foot or so is black. Beneath this black top layer is a second, deeper white layer of chalk. The black color of the surface comes from the richness of the soil which has allowed an abundance of organic material to accumulate. The white chalk layer is made up of the shells of marine animals that that accumulated when this area was the bottom of the Gulf of Mexico.

In some places, this chalk has accumulated to depths of over a hundred feet thick. Some of the thick chalk layer is exposed along the Little River in a place called White Cliffs. White Cliffs is the same sort of formation as the White Cliffs of Dover in Great Britain and was formed at the same time. The White Cliffs in Arkansas are now protected as a natural area.

Native Americans were drawn to the fertile soils of the Red River bottoms and the blackland prairies in southwestern Arkansas. The Caddo Indians had their major population centers there even though they roamed up into the Ouachitas. With rich agricultural resources, larger villages were able to support more people. Often these villages had mounds that were used in their religious ceremonies. The Caddo also gathered salt at salt springs along the Ouachita River (one of the earliest industries in Arkansas was the production of salt at Arkadelphia).

As European settlers moved into Arkansas, they were also attracted to the fertile lands in the Red River bottoms and the blackland prairies. One of the earliest cities in this area was Washington, founded in 1824 on the legendary Southwest Trail that connected St. Louis, Missouri, to the nearby Fulton Landing on the Red River. This route was one of the eight major trails that pioneers traveled on their way to Texas and the Great Southwest.

Washington was a thriving community and a major service center for area farmers and plantation owners. Washington was the cultural, political and economic center of Southwest Arkansas. Sam Houston, Davy Crockett and Jim Bowie each traveled separately through Washington on their way to the Alamo to fight for Texas independence from Mexico. Here too, James Black made a weapon for Jim Bowie that would become famous as the "Bowie Knife."

The colorful history of the Coastal Plain continued through the Civil War, with the Camden Expedition. Part of the Red River Campaign, the Camden Expedition resulted from Union brigadier general Frederick Steele's orders to strike south from Little Rock and converge with Major General Nathaniel P. Banks's column in northwest Louisiana before marching to Texas. Because of poor logistical planning, horrible roads, and strong

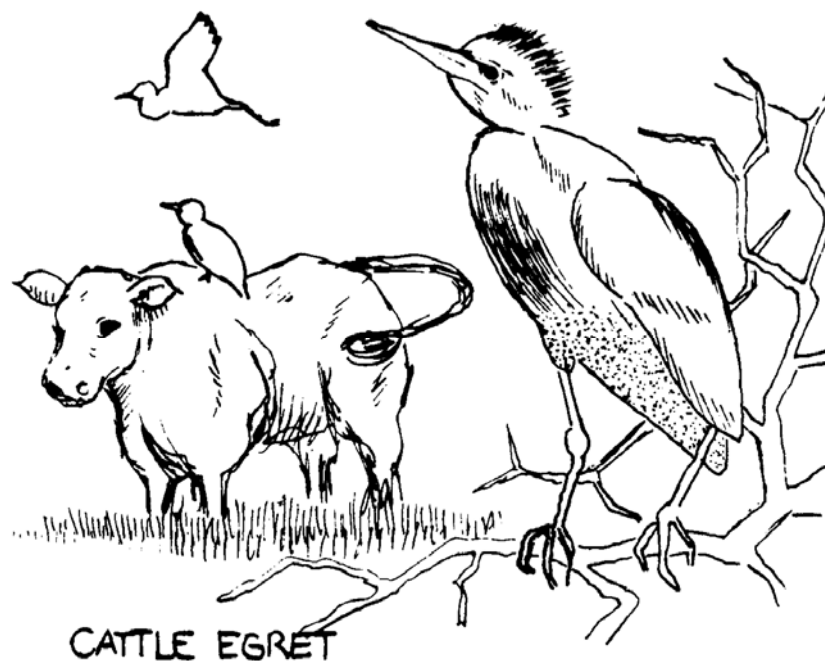
Confederate resistance, Steele abandoned this plan to occupy Camden. Losing battles at Poison Spring (Ouachita County) and Marks' Mills (Cleveland County), Steele became unable to supply his army and retreated toward Little Rock. The Confederates caught Steele while he was crossing the Saline River engaging in the last battle of the campaign at Jenkins' Ferry (Grant County).

The pine forests of the Coastal Plain have shaped its history and its present industry. During the latter part of the 19th century, large population centers in the eastern U.S., such as Chicago, began looking for new sources of timber for expansion of their cities and the railroads. Companies invested in building railroads to the area began to cut timber over the Coastal Plain and across the entire state. These early logging practices were often referred to as "cut and run" because a company would buy the land, cut it over and then abandon the land and let it go back to the state for failure to pay taxes.

Settlers tried to move into these cutover lands and turn those sandy hillsides into productive farmlands; however, they found out that the land would not produce cotton or any other cash crop. Eventually, the timber companies realized that there was no longer any "virgin" forest nearby for them to cut over. Some companies began to buy the land and hold on to it permanently. They harvested the trees, let the trees grow again, harvested them again and began using what is termed "sustained yield" timber management.

Much of the Coastal Plain today is owned by the timber industry which carries on intensive timber management of that land. Some of the timber management practices have been very controversial, such as spraying herbicides and clear-cutting forests.

A major use of land today in the Coastal Plain is for pasture. This has led to the appearance in Arkansas of a new species of bird in these pastures - the cattle egret. Cattle egrets are African birds which are typically found on the plains of East Africa. More recently they have expanded their range into North and South America, including the southern United States. They can sometimes be seen in the pastures around cattle and occasionally even perched on their backs.



Another important use of land in the Coastal Plain today is mining, for minerals such as nepheline syenite in central Arkansas, and perhaps someday lignite in the southern part of the state. Bauxite was an economic mainstay for Arkansas through much of the twentieth century. The first attempts to mine Arkansas bauxite commercially began around 1898, inspiring the founding of a town, Bauxite (Saline County). The industry remained centered in a 275 square mile area in Pulaski and Saline counties throughout its history.

Arkansas's bauxite deposits proved to be the largest commercially exploitable deposits in the nation. Throughout most of the twentieth century, Arkansas remained the nation's major bauxite producer, providing about ninety percent of all domestic tonnage mined. Because of changing domestic and world economic market conditions, demand for Arkansas bauxite fell in the last decades of the twentieth century. Small tonnages continued to be mined and used in the production of alumina-based materials, including chemicals and abrasives.

Lignite is a form of coal, often called brown coal, with a high content of volatile matter that makes it more convertible into gas and liquid petroleum products than the higher ranking coals. Lignite was mined in south Arkansas by underground methods and used before the Civil War. It was first used for steam-boiler fuel and later as fuel for small locomotives near the mines in Ouachita County.

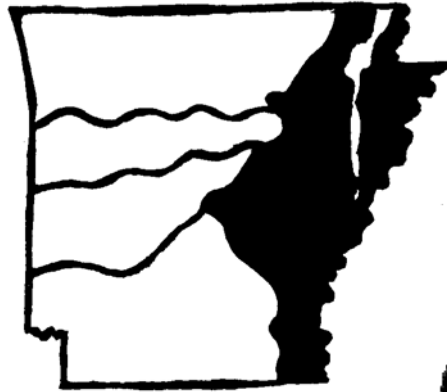
In 1907, two small oil-distilling plants were operating in Ouachita County. The plants produced oils from lignite mined by open pit methods in the Camden field in Ouachita County. In 1913, lignite from the Camden area was yielding up to 38 gallons of oil per ton, although the average oil recovery was about 25 gallons per ton. Even though large quantities of lignite remain in the Coastal Plain, it has not been mined extensively because of its relatively low heat content. As we look for answers to the energy crisis and new sources of fuel, lignite mining could return to south Arkansas.

Most of the mining in the Coastal Plain is done as "surface mining", including strip mining and open pit mining. Surface mining is a type of mining in which soil and rock, overlying the mineral deposit, are removed. In most forms of surface mining, heavy equipment, such as earthmovers, first remove the soil and rock above the deposit. Next, huge machines, such as dragline excavators, extract the mineral.

The large impact of surface mining on the topography, vegetation, and water resources has made it highly controversial. Surface mining is subject to state and federal reclamation requirements, but adequacy of the requirements is a constant source of contention. Unless reclaimed, surface mining can leave behind large areas of infertile waste rock.



THE DELTA



The Mississippi Alluvial Plain, or Delta, covers the eastern third of Arkansas. It is a unique part of the state which has made major contributions to our heritage and economy. Its major cities include Stuttgart, Lake Village, Blytheville and Helena.

The area once was covered by the Gulf of Mexico. When the Gulf receded, it left behind the sands and gravels that had made up the ocean bottom and beaches, just as it did in the Coastal Plain.

But then rivers - the White River, the Mississippi River, the Arkansas River and even the Ohio River - flowed through the Delta, sweeping away the old ocean-bottom sands and gravels, replacing them with sand, silt and clay that the rivers themselves carried.

Oxbow lakes have played an important role in the character of the Delta, too. They are formed when a river abandons its channel and leaves its old course isolated as still water. Sometimes the lakes are very shallow and cypress trees grow across them to form beautiful swamps which are a notable feature of eastern Arkansas. These rivers have also been responsible for depositing the deep, rich soil of the Delta.

With abundant water and deep soil, the forest trees of the Delta grow to enormous size. Forests and timber have played an important role in the economy of the area. Oak is harvested for railroad ties and barrel staves. Persimmon trees are turned into golf club heads. Pecan trees are native to the Delta and are now cultivated in orchards.

However, not all of the Delta was covered by forest. At least a half-million acres from Arkansas Post to Lonoke were covered by six-foot tall prairie grasses and flowers. Even though most of this prairie has been plowed or converted to agricultural fields, it is still called the "Grand Prairie," and today is the center of rice production in the state. Details about tallgrass prairie natural communities, as well as the bottomland hardwood forests and the large rivers of the Delta can be found in Appendix 4.

The first European explorers in Arkansas, led by de Soto in 1541, described numerous, well-populated villages supported by vast fields of maize. The Spaniards had entered Arkansas during what archeologists refer to as the "Mississippian Period." The residents here were noted for their mound-building and hierarchical political systems.

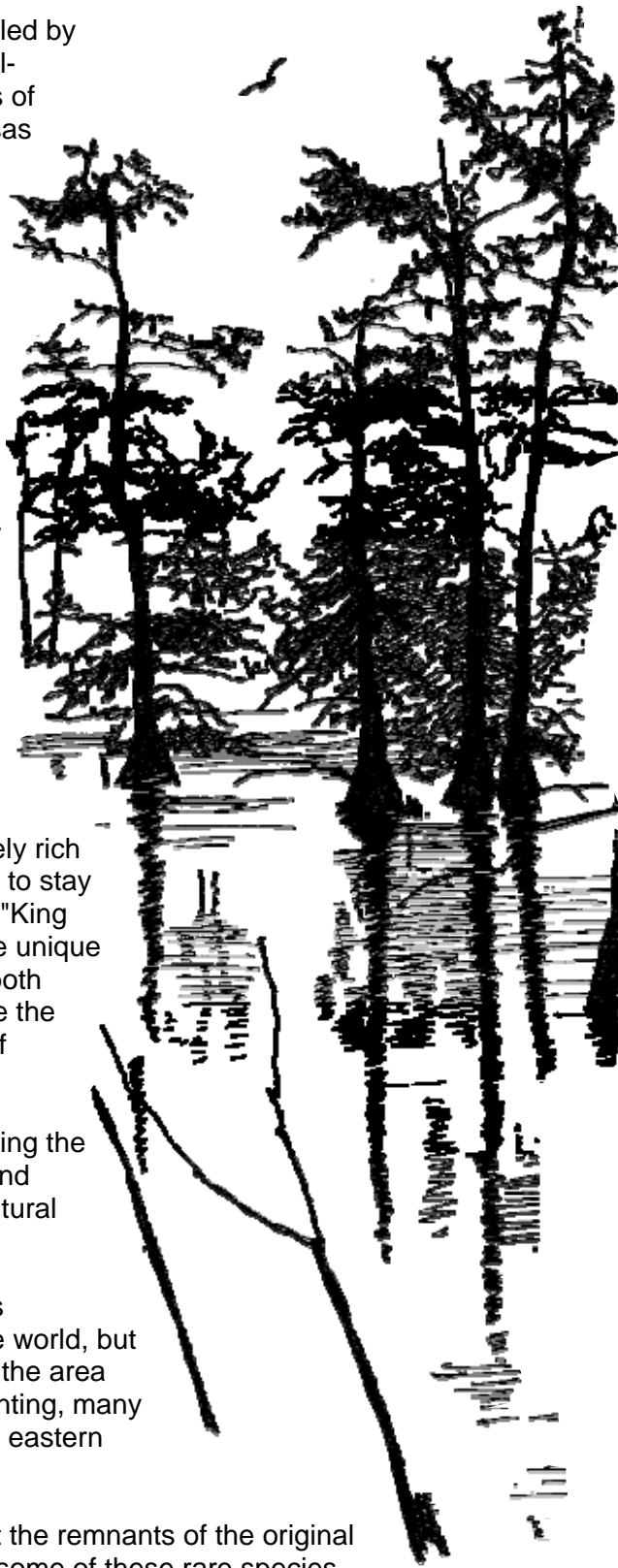
By the time of the first French expeditions 130 years later, Arkansas was sparsely populated with isolated villages and tribes but with an abundance of wild game and other natural resources. Water provided transportation by canoe or later flatboat in a land that could support only a few roads. The residents hunted, fished, and practiced subsistence farming, making little impact on the land. This was wild territory, with cane-brakes, swamps, and bayous making travel difficult. The people adjusted their lifestyles to the dramatic fluctuations in the rivers and to the impenetrable virgin forests.

The river floods also deposited an extremely rich and deep soil offering settlers an incentive to stay and grow cotton. They built an empire on "King Cotton" and created an "Old South" culture unique to this country's history. This culture was both romantic and corrupt in that the elegant life the planters led was dependent on the labor of slaves.

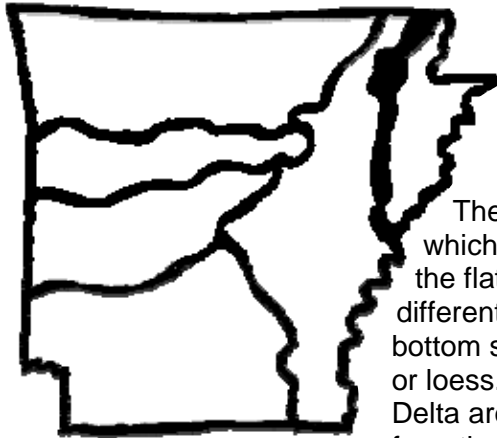
After the Civil War, people continued clearing the forests of the Delta, channeling its rivers and draining its swamps to create more agricultural land.

Today, the Delta is the heart of Arkansas's agricultural economy and helps to feed the world, but 90% of its forest has been cleared. While the area sees the tourism benefits from ducking hunting, many other plants and animals that once lived in eastern Arkansas are gone.

The public lands which remain and protect the remnants of the original landscape may provide a last foothold for some of these rare species, as evidenced by the excitement in 2004 with sightings of the Ivory-billed Woodpecker, long believed to be extinct.



Crowley's Ridge



The smallest of Arkansas's Natural Divisions is Crowley's Ridge. It extends from southeastern Missouri to Helena-West Helena (about 150 miles) and is half a mile to twenty miles wide, except for one break just north of Marianna.

The ridge stands about 200 feet higher than the Delta which surrounds it and the steep slopes contrast with the flat Delta topography. The Ridge geology is also different from the Delta. The Ridge is composed of ocean-bottom sand, gravel and clay capped with wind-blown dust or loess. The river-deposited soils which make up the Delta are not found on the Ridge. These differences result from the unique geological history of the Ridge.

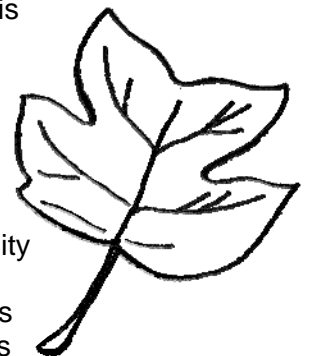
Like all of eastern and southern Arkansas, the Ridge was covered by the waters of the Gulf of Mexico until about 50 million years ago. When the shore of the Gulf retreated to its present position, it left exposed ocean bottom and beaches which make up the sandy rolling hills of the Coastal Plain today. In the Delta, the rolling hills were carved away by large rivers, primarily the Mississippi and Ohio, which deposited a deep alluvial soil of sand, silt and clay.

At one time the Ohio River was flowing where the St. Francis and Mississippi now flow along the eastern border of Arkansas, and the Mississippi was flowing far to the west, about where the Black and White Rivers now flow. As they carved out their valleys, they left a narrow strip of ocean-bottom material between them which became the base of Crowley's Ridge. Then, about 20,000 years ago, as the last glaciers began to retreat, the rivers deposited glacier-ground rock in their floodplains.

When the silt dried out and was picked up by the wind, Crowley's Ridge was tall enough to act like a "drift fence" and caused dust to pile up 50 feet deep on the southern half, and the ridge took on its final shape.

As a result of this geological history, marine fossils such as shark's teeth may be found in the clays at the base of the ridge. Gravel is also common in these marine sediments. Since the rivers that formed the Delta did not deposit much gravel, it is one of the most valuable mineral resources on the Ridge. The top of the Ridge, especially at the southern end, is covered with a blanket of loess up to 50 feet thick. This loess forms a deep soil that has helped to give the area several of its unique features.

One of these distinctive features of the Ridge is the forest. It is an upland hardwood forest but contains species which are rare or absent elsewhere in the state, such as white walnut and tulip tree. Streams are typically small and have high water quality. Because the water quality has been maintained, some support aquatic life found nowhere else in eastern Arkansas. As they cut through the marine deposits, the streams sometimes form pure sand beaches. The deep valleys of these streams provide the best impoundment sites in eastern Arkansas, but sometimes the loess and underlying sand fail to hold water well.



A road from Memphis to Little Rock, which crosses the Ridge north of Forrest City, was one of the earliest in the state. In places, the roadbed has been eroded 50 feet or more into the ridge. Westward bound travelers from Memphis first had to cross the swamps along the St. Francis River. Next, they climbed onto the drier ridge, which was a logical place to rest before crossing the additional Delta swamps ahead.

This natural elevation above the swamps set the stage for much of the later history of the Ridge. First a man named Strong built a way-station which became one of the state's earliest settlements. Later, others who made their living farming the nearby Delta land chose to live on the ridge. It offered house sites which were above the floods and on scenic hills.

That pattern has continued today. Seven counties straddle Crowley's Ridge and the largest town and county seat of each one is located directly on or next to the Ridge. Cities like Paragould, Jonesboro, Forrest City and Helena-West Helena, which most people think of as Delta towns, are actually Crowley's Ridge towns. Residential and municipal development is an important land use for Crowley's Ridge.

The Ridge also played a part in the Civil War in Arkansas. At Helena, Federal troops placed cannon on the Ridge, which commanded a view of the Mississippi River. From that vantage point, any Rebel boat trying to move upstream or down could be destroyed.

Other uses of land on Crowley's Ridge today are varied, including timber forests, mines, peach orchards and row-crops. Any land modification on the Ridge must beware of one potential problem - erosion. The loess which caps the Ridge is uniquely susceptible to erosion, because its physical and chemical structure causes it to maintain a vertical slope. Loess grains are angular, with little polishing or rounding, composed of crystals of quartz, feldspar, mica and other minerals. Because the grains are angular, loess will often stand in banks for many years without slumping. This soil has a characteristic called "vertical cleavage", which makes it easily excavated but it is also highly erodible by water or wind,

The slope literally melts when it gets wet and can cause disastrous land-slides. In many cases, people have attempted to stabilize slopes with what became a well-known invasive plant species - kudzu. A climbing, semi-woody perennial vine, kudzu (*Pueraria montana*) was widely planted to combat soil erosion. Unfortunately, it grows out of control, smothers native plants and even uproots entire trees by the sheer force of its weight. Kudzu kills or damages other plants by smothering them under a solid blanket of leaves, encircling woody stems and tree trunks, and breaking branches or uprooting entire trees and shrubs. Once established, kudzu grows at a rate of one foot per day; mature vines can be 100 feet long.

Because of the unusual geology, forest and land-use problems of Crowley's Ridge it is often considered the most unique of Arkansas' natural divisions.

