Fossils of the Blue Ridge & Piedmont
Region 1

The rocks of the Blue Ridge & Piedmont are largely metamorphic and igneous, though many of them were initially sedimentary and may have contained fossils from Paleozoic continental seas. Some still contain fossils, but the fossils have been ***deformed*** by stress and strain on the rocks. The Triassic-Jurassic rift basin rocks of the Piedmont, however, formed after the metamorphosing mountain building events of the Paleozoic as the Atlantic Ocean widened. Lakes were common in the basins. Sediment deposited in and around the lakes contains fossils that record life in a freshwater environment and land environments around the margins of large lakes. The most common fossils are fishes, plant remains and footprints.

The Piedmont rift basins are no fossil hunter's paradise compared to other parts of the country. No vast stretches of badlands lure the paleontologist as in the western states; instead the summer months see a tangle of tick-infested poison ivy and kudzu, or (as with the majority of the rift basin rock exposures) concrete jungles! That is not to say that the Southeast rift basins are without fossil treasures. Indeed, for the determined paleontologist, many a creek bed or roadside ditch can yield untold riches, and on rare occasions commercial quarries produces some of the most spectacular Triassic fossils known.

The following pages show common fossils of the Blue Ridge & Piedmont region as well as the types of ancient environments in which these organisms lived. Different types of environments are preserved as particular kinds of rocks. For example, clear, shallow marine environments are generally preserved as limestone. Examining the type of rocks and fossils in your area can help you determine the environments that were once found in your area.

Fossils you might find in the Triassic-Jurassic Rift Basins:

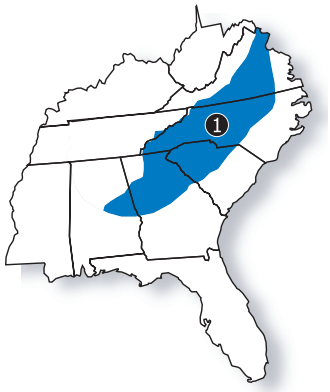
fish: *semionotids, coelacanths, palaeoniscids*
dinosaurs: *footprints and trackways, rare bone and skeletal fragments*
plant remains: *cycad fronds, ferns, gingkos, conifers*
insects: *rove beetles, caddis-flies, water bugs, thrips*
clam shrimps: *conchostracans*

When fossils are deformed:

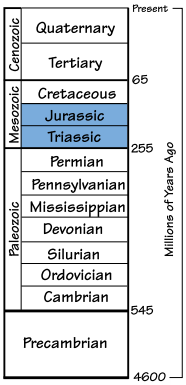
- *the carbonate in the shell material may recrystallize, often obliterating the original shape of the shell;*
- *their shape may be distorted, which can be used by structural geologists to determine the amount and direction of stress;*
- *the sediment surrounding the fossil is sometimes altered so that it is more difficult to discern the type of environment in which the organism lived.*

see Rocks, p.91 for more on the **Rift Basins**.

see Fossils, p.91 for more information on these organisms.



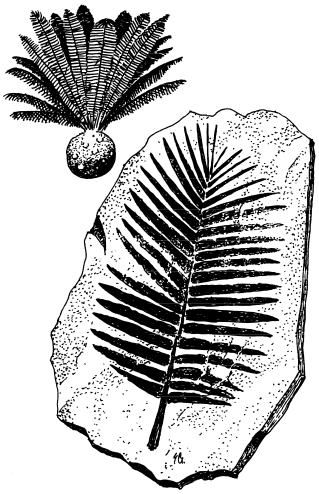
MESOZOIC LAND FOSSILS *common in the Blue Ridge & Piedmont*



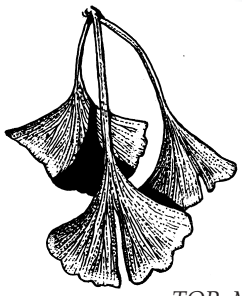
Fossils of Mesozoic freshwater and land animals and plants can be found in a narrow band of rocks along the eastern coast of the U.S. These rocks, in the Piedmont region, accumulated in rifts that formed as Pangea split apart.

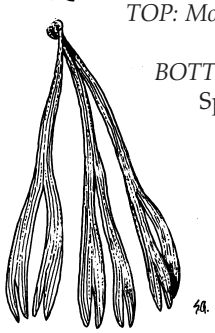
GINGKOS & CYCADS

Gingkos and cycads are primitive seed plants, with the usual characteristics of gymnosperms: they have seeds without a protective coating, and do not have flowers. Gingkos were very common and diverse in the Mesozoic, but today only one species exists (Gingko bilboa). *Cycads are palm-like trees that also were very common in the Mesozoic.*

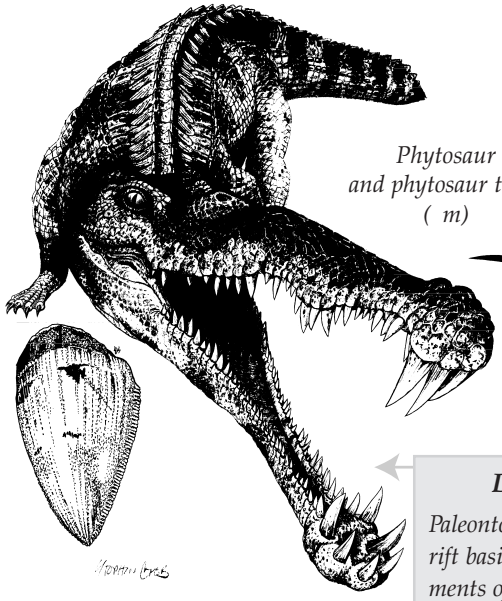


BOTTOM: Cycad (m)
TOP: reconstruction of a Cretaceous cycad





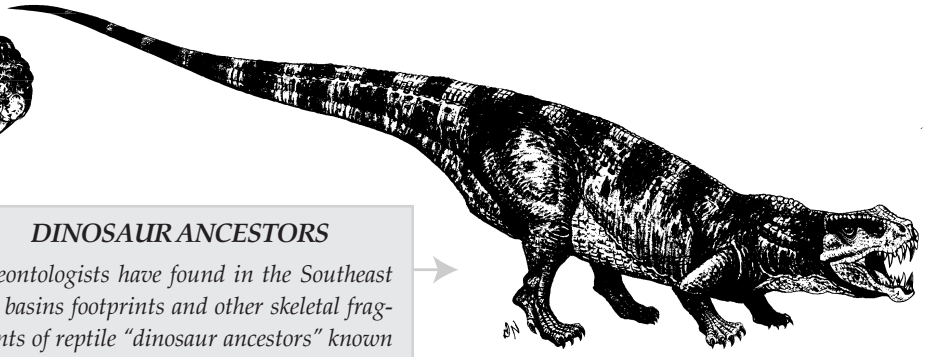
TOP: Modern Gingko bilboa
(m)
BOTTOM: Gingkophyte Sphenobaiera
(m)



Phytosaur and phytosaur tooth (m)

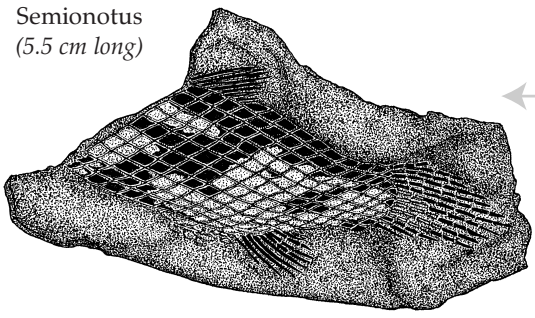
DINOSAUR ANCESTORS

Paleontologists have found in the Southeast rift basins footprints and other skeletal fragments of reptile "dinosaur ancestors" known as thecodonts, including phytosaurs (crocodile-looking reptiles) and rauisuchians.



Rauisuchian Postosuchus
(m)

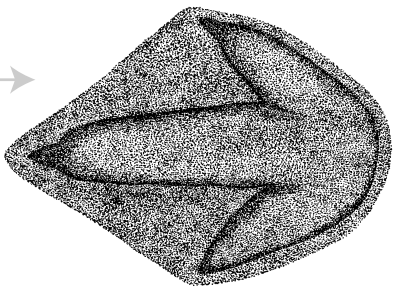
Fish Semionotus
(5.5 cm long)



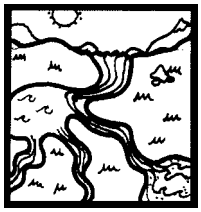
FOOTPRINTS & FISH SCALES

Vertebrate skeletal remains are rare in the Southeast rift basins, but footprints and extensive trackways are quite abundant in many localities. During the Mesozoic, lakes often filled the rift basins. The fish scale fossils found today record the aquatic history of the Southeast rift basins!

Three-toed dinosaur track (13 cm long)



Ancient Landscapes *of the Piedmont*



Terrestrial Environments: rivers, lakes, land
preserved as conglomerate, sandstone, siltstone, shale

The Piedmont rift basins rocks preserve a variety of terrestrial environments that include rivers, lakes and adjacent land with diverse fossils including fish, plants, footprints, and insects. One of the most productive fish localities in Virginia was the Midland Fish bed. This site, which has since been inundated as a the result of a dam construction in the 1980s, yielded a wealth of exquisitely preserved articulated Early Jurassic fishes, in particular semionotids. Other common fishes are coelacanths and palaeoniscids. However Midland is not the only locality for such finds and throughout the Culpeper Basin remains of fishes can be found, even in streambeds and road cuts. Undoubtedly the most abundant invertebrate fossils are ***clam shrimps.***

Clam shrimps or conchostracans are small (< 10mm) bivalved arthropods that sometimes cover whole bedding planes.

Plant remains can be particularly abundant, and include a variety of foliage types such as cycad fronds, ferns, ginkgos and conifers. Petrified wood can also be encountered at a variety of locations, including near Danville, KY and to the west of Richmond, VA.

The Triassic-Jurassic rift basins of the east coast have been renowned for dinosaur ***trackways*** since the early work on fossil footprints by Edward Hitchcock in the Northeast, and North Carolina and Virginia do not disappoint in this respect. The Culpeper Stone Quarry at Stevensburg, Virginia is well known for its extensive "ballroom" of dinosaur tracks and trackways. Crocodile, phytosaur and lizard-like tracks are also well documented from sites such as the Solite Quarry on the Virginia-North Carolina state line. Skeletal fragments (including teeth and rare bones) are also occasionally found.

Trace fossils, including **tracks,** *feeding traces, burrows, and others, receive Latin names independent of the species name of the organism that created them, largely because the species is not known with certainty. Therefore, most dinosaur footprints have different names than the dinosaurs that made them!*

The Solite Quarry is most renowned, however, for its insect fossils. It is the only site in the world producing abundant complete insects from the Triassic period, and includes the oldest records for many living orders and families. These include staphylinid beetles (rove beetles), caddis-flies, belostomatid water bugs and thrips. However, within the Triassic sediments of Virginia and North Carolina insects are not just confined to Solite, and one should always be on the look out for tiny insects, particularly on beds rich in clam shrimps.

The Age of Reptiles

*The Mesozoic Era is commonly known as the Age of Reptiles, a time dominated both on land and in the sea by large reptiles. **'Dinosaur'** technically refers to the group of land reptiles with a common ancestor and thus certain anatomical similarities, including long ankle bones and erect limbs. At the same time as the dinosaurs, other reptile groups also became important: the pterosaurs, flying reptiles with wingspans up to 15 meters, and plesiosaurs, mosasaurs and ichthyosaurs, marine reptiles that were probably similar in size and habitat to toothed whales, dolphins and large sharks of today. Mammals evolved from a group known as the 'mammal-like reptiles' (proto-mammals) that were a dominant land animal in the Permian and Triassic. Mammals appeared at roughly the same time as the dinosaurs in the mid-Triassic. Mammals, however, occupied only rodent-like niches until the dinosaurs went extinct. All the large reptile groups disappeared at or before the mass extinction at the end of the Cretaceous.*