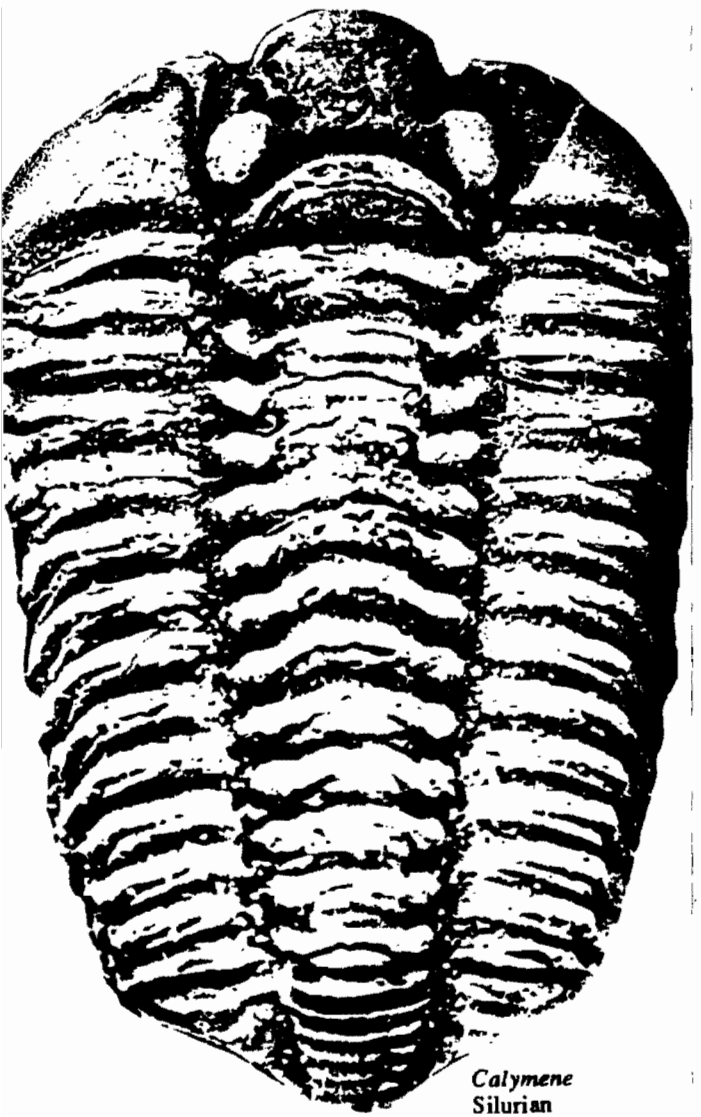
TRILOBITES

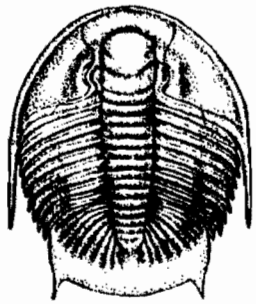


Calymene
Silurian

The Paleontological Society

Olenellus
Cambrian

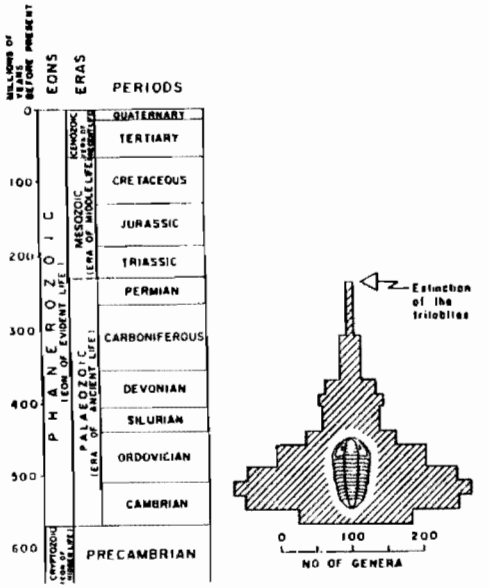
Eodiscus
Cambrian



Dikelocephalus
Cambrian

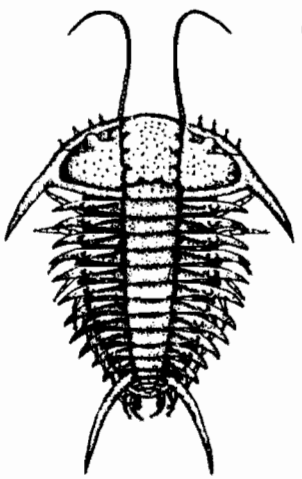
Trilobites are among the most widely recognized prehistoric invertebrate animals. Their fossils are relatively common in Paleozoic sedimentary rocks (sandstone, limestone, shale) throughout the world, and they are highly prized by collectors. They have long attracted the interest of paleontologists and have had considerable importance since they were first described scientifically in the 1600s. More recently, trilobites received notoriety when both Wisconsin and Ohio designated trilobites (*Calymene celebra* and *Isotelus*, respectively) as their official state fossils. It is difficult to find much detailed information about trilobites without access to a major university or public library, and therefore, this pamphlet is meant to provide basic facts about trilobites for the nonspecialist, as well as supplying a list of additional, more readily available information sources.

Trilobites are an extinct group of marine arthropods. They cannot be viewed as a failure, however, because they lived on Earth for more than 300 million years--longer than the dinosaurs or man. The appearance of trilobites in the fossil record 570 million years ago marks a significant evolutionary event. Whereas microscopic single-celled organisms are found in rocks dating back 3.5 billion years and more complex multicellular organisms appeared shortly before the trilobites, their fossils are rare because these organisms lacked readily preservable hard parts. Trilobites were among the first forms of life to secrete a hard shell that could be fossilized easily. This new feature permitted a major evolutionary radiation in the history of life. For the first 65 million years of their existence trilobites were among the most common and diverse organisms in the ocean -- so common, in fact, that this time interval, the Cambrian Period, usually is called the Age of Trilobites. As new forms of life evolved, including possible predators such as cephalopods and fish, the number and diversity of trilobites declined, and they eventually died out about 245 million years ago at the close of the Paleozoic Era.



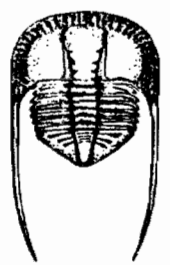
Geologic Time Chart (after Ludvigsen, 1979)

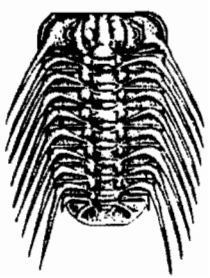
Trilobites are the oldest of the four major arthropod groups, which include insects, crabs, and spiders. All arthropods are bilaterally symmetrical (each half of the body being a mirror image of the other when the body is divided down the middle from front to back), segmented animals with jointed appendages and a rigid mineralized exoskeleton. The hard exoskeleton must be shed, or molted, periodically throughout the arthropod's lifetime to allow it to grow. More types of arthropods live on Earth today than all other types of animals and plants combined, and they are found in every environment from deep ocean trenches to high mountain peaks.



Ceraurus
Ordovician

Cryptolithus
Ordovician

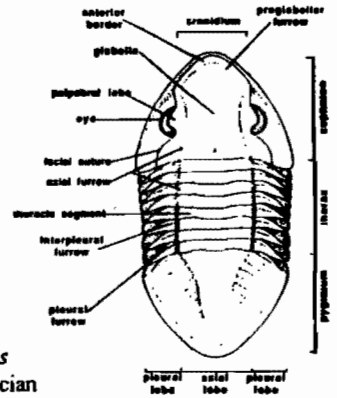




Selenopeltis
Ordovician

Although trilobites may share a common ancestor with, or be ancestral to, other arthropod groups, no close relatives of the trilobites exist today. Horseshoe crabs and pill or sow bugs occasionally are compared to trilobites because of some similarities in outward appearance or behavior, but they are only very distantly related. Several thousand species of trilobites have been named and described scientifically, and all are considered to have been marine organisms. Although a few may have been able to swim or float in the water column or burrow into the soft mud on the sea bottom, most probably crawled around on the surface of the seafloor. Fossil trails and trackways attributed to trilobites are common in some sedimentary rocks.

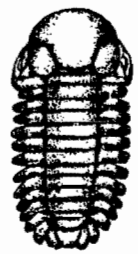
The hard calcified upper (dorsal) surface of the trilobite body is divided laterally into three main parts: cephalon or head, segmented thorax, and pygidium or tail. However, the name trilobite, meaning "three-lobed" in Greek, is derived from a different three-fold body division that runs from front to back longitudinally, forming a central axis with a pleural lobe on either side.



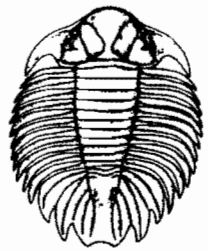
Isotelus
Ordovician

The trilobite cephalon, where most of the internal organs were located, is composed of four fused segments, the first bearing a pair of antennae. Also on the cephalon is a pair of well-developed compound eyes (although some trilobites are secondarily blind) and facial and marginal sutures along which the shell splits during molting. The pygidium may contain as many as thirty fused segments. In the thorax are from two to forty articulating (interlocking) segments that allow the trilobite to enroll for protection in a manner similar to modern pill bugs. The number of segments remained constant throughout the life of adult trilobites of the same species.

Each segment of the trilobite body bears a pair of appendages which are branched into walking legs and gill-like structures used for respiration and possibly swimming. Trilobites with preserved appendages are among the rarest of all fossils. This rarity suggests that the lower (ventral) surface of the trilobites was not as well mineralized as the dorsal surface. Trilobite appendages were unspecialized in comparison to the pincers, jaws, and claws of most modern arthropods, and this difference is a major reason for their



Sphaerexochus
Silurian
outstretched & enrolled



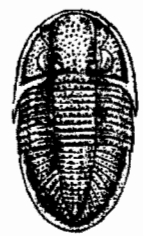
Arctinurus
Silurian

separate classification. Although some trilobites may have been predators on soft-bodied invertebrates, most were detritus feeders.

During molting the exoskeleton split along sutures on the cephalon, allowing the trilobite to crawl out of its shell. The old molted shells usually separated into their component parts while they lay around on the seafloor, and these account for the vast majority of trilobite fossils. Even most complete trilobite fossils probably are molts rather than bodies of dead individuals. The average size of most adult trilobites was from one to three inches in length, although portions of specimens have been found that indicate some trilobites may have been as much as three feet long.

Trilobite fossils can be found in most Paleozoic sedimentary rocks throughout the world; they have been discovered on every continent and in most states, and they are relatively common in some places. Nearly every natural history museum has trilobite fossils on exhibit. To find out if trilobite fossils are found in your area, contact your state geological survey, local natural history museum, or university geology department. Most literature about trilobites is at a fairly advanced level and not widely available; however, the following sources should be available in larger university libraries, and a few of the more popularized works should be in many public libraries.

Phacops
Devonian



Phillipsia
Carboniferous

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