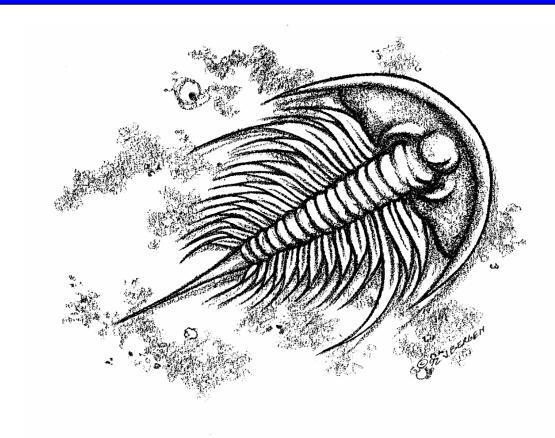
Geological Time Capsule, Part I

by Kenn Oberrecht



In geological terms, earth's history unfolds in a succession of human-defined time divisions that embrace thousands, millions, even billions of years. The basic unit of geologic time is the <u>period</u>, which comprises two or more <u>epochs</u>. An <u>era</u> is a major division consisting of two or more periods. There are longer and shorter divisions, but these three serve well in any description of the features and events that helped shape the earth into the planet we know and formed the environment in which we exist.

Earth's earliest life forms appeared during the Proterozoic Period.

Beginning some five billion years ago, the Archeozoic Period is the earliest division of the Precambrian Era. During that time, the earth's crust gradually solidified. The barren continents that formed then were about only one-eighth the size of current continents. The atmosphere had excessive carbon dioxide, no free oxygen, and no ozone to mitigate the effects of the sun's fierce ultraviolet radiation.

The Proterozoic Period of the Precambrian Era began about 2.5 billion years ago. During this time of relative calm, continents increased to nearly their present size and formed a great supercontinent. Huge bodies of molten matter known as magma were trapped inside the earth's crust. As they cooled, minerals crystallized and settled out, and great layers of metal formed in the crust.

Earth's earliest life forms appeared during the Proterozoic Period. Bluegreen algae began thriving, photosynthesizing, and pumping free oxygen into the atmosphere. Bacteria and primitive multicellular life forms appeared.

The age of marine invertebrates dawned, and shellfish flourished, as did echinoderms, early ancestors of the sea stars, sea urchins, and sea cucumbers. The Cambrian was the first period of the Paleozoic Era, occurring 570 million years ago, when the earth's landmasses settled in a broad equatorial band. The largest, which geologists call Gondwana, comprised what we now know as South America, Africa, India, Australia, and Antarctica.

Extensive seafloor spreading created high mid-ocean ridges that displaced water and raised sea levels worldwide. Encroaching waters flooded continental lowlands, forming vast, warm, shallow seas, conducive to the development of new species. A greater abundance of free oxygen gave rise to the emergence of many new life forms. The age of marine invertebrates dawned, and shellfish flourished, as did echinoderms, early ancestors of the sea stars, sea urchins, and sea cucumbers.

About 450 million years ago, during the Ordovician Period, Europe and North America began to drift nearer each other. In the ocean that eventually developed into the Atlantic, islands collided and crumbled, creating jagged peaks along the continental shelf. Fungi, seaweed, and the first primitive fishes appeared.

The Devonian Period marked the age of fishes, 405 million years ago.

The Silurian Period began 435 million years ago. Ozone was accumulating in the upper atmosphere then, forming a layer dense enough to filter most of the sun's harmful ultraviolet rays. The first land plants appeared and began to colonize. Modern fungi appeared, and shellfish became abundant.

The Devonian Period marked the age of fishes, 405 million years ago. Earth's first amphibians appeared then, along with primitive insects and land animals. The earliest trees began growing in the lowlands and colonizing to form earth's first forests.

Earth had aged billions of years and had become hospitable enough for complex plants and animals to exist. But more than 340 million years would pass before the primitive ancestors of modern humans would leave footprints in the volcanic ash of Africa's Great Rift Valley.