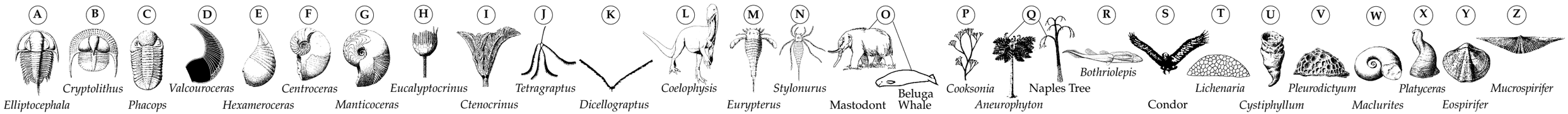
GEOLOGIC HISTORY OF NEW YORK STATE

(Fossils not drawn to scale)



Eon	Era	Period	Epoch	Millions of years ago	Life on Earth
PHANEROZOIC	CENOZOIC	QUATERNARY	HOLOCENE	0	
			PLEISTOCENE	0.01	Humans, mastodonts, mammoths
		TERTIARY / NEOGENE	PLIOCENE	1.6	Large carnivores
			MIOCENE	5.3	Abundant grazing mammals Earliest grasses
		TERTIARY / PALEOGENE	OLIGOCENE	24	Large running mammals
			EOCENE	33.7	Many modern groups of mammals
			PALEOCENE	54.8	
	MESOZOIC			65	Extinction of dinosaurs and ammonoids
		CRETACEOUS	LATE		Earliest placental mammals Climax of dinosaurs and ammonoids
			EARLY		Earliest flowering plants Decline of brachiopods Diverse bony fishes
		JURASSIC	LATE	142	
			MIDDLE		Earliest birds Abundant dinosaurs and ammonoids
			EARLY		
		TRIASSIC	LATE	206	Modern coral groups appear
			MIDDLE		Earliest dinosaurs and mammals with abundant cycads and conifers
			EARLY		
	PALEOZOIC	PERMIAN	LATE	251	Extinction of many kinds of marine animals, including trilobites First mammal-like reptiles
			EARLY		
		CARBONIFEROUS / PENNSYLVANIAN	LATE	290	Earliest reptiles Extensive coal-forming forests
			EARLY		
		CARBONIFEROUS / MISSISSIPPIAN	LATE	323	Abundant sharks and amphibians Large and numerous scale trees and seed ferns
			EARLY		
		DEVONIAN	LATE	362	
			MIDDLE		Earliest amphibians, ammonoids, sharks Extinction of armored fish, other fish abundant
			EARLY		
		SILURIAN	LATE	418	Earliest insects Earliest land plants and animals Peak development of eurypterids
			EARLY		
		ORDOVICIAN	LATE	443	
			MIDDLE		Invertebrates dominant – mollusks become abundant Diverse coral and echinoderms
			EARLY		Graptolites abundant
		CAMBRIAN	LATE	490	Earliest fish Algal reefs Burgess shale fauna
			MIDDLE		
			EARLY		Earliest chordates, diverse trilobites Earliest trilobites Earliest marine animals with shells
PROTEROZOIC	LATE			544	
	MIDDLE			580	Ediacaran fauna
	EARLY				Soft-bodied organisms
ARCHEAN	LATE			1300	Stromatolites
	MIDDLE				
	EARLY				

Millions of years ago: 0, 500, 1000, 2000, 3000, 4000, 4600

Oldest multicellular life

First appearance of sexually reproducing organisms

Transition to atmosphere containing oxygen

Oldest microfossils

Geochemical evidence for oldest biological fixing of carbon

Oldest known rocks

Estimated time of origin of Earth and solar system

Time Distribution of Fossils (Including Important Fossils of New York)

Lettered circles indicate the approximate time of existence of a specific index fossil (e.g. Fossil (A) lived at the end of the Early Cambrian).

Rock Record in NYS

Trilobites, Nautiloids, Ammonoids, Crinoids, Graptolites, Eurypterids, Placoderm fish, Vascular plants, Corals, Gastropods, Brachiopods, Dinosaurs, Mammals, Birds

Earth's first forest

Earth's first coral reef

Tectonic Events Affecting Northeast North America

Rifting

Passive Margin

Rifting

Passive Margin

Subduction

Continental Collision

Transform Collision

Important Geologic Events in New York

Advance and retreat of last continental ice

Uplift of Adirondack region

Sands and shales underlying Long Island and Staten Island deposited on margin of Atlantic Ocean

Development of passive continental margin

Initial opening of Atlantic Ocean
North America and Africa separate

Intrusion of Palisades sill
Pangea begins to break up

Extensive erosion

Appalachian (Alleghanian) Orogeny caused by collision of North America and Africa along transform margin, forming Pangea

Catskill Delta forms
Erosion of Acadian Mountains

Acadian Orogeny caused by collision of North America and Avalon and closing of remaining part of Iapetus Ocean

Salt and gypsum deposited in evaporite basins

Erosion of Taconic Mountains; Queenston Delta forms

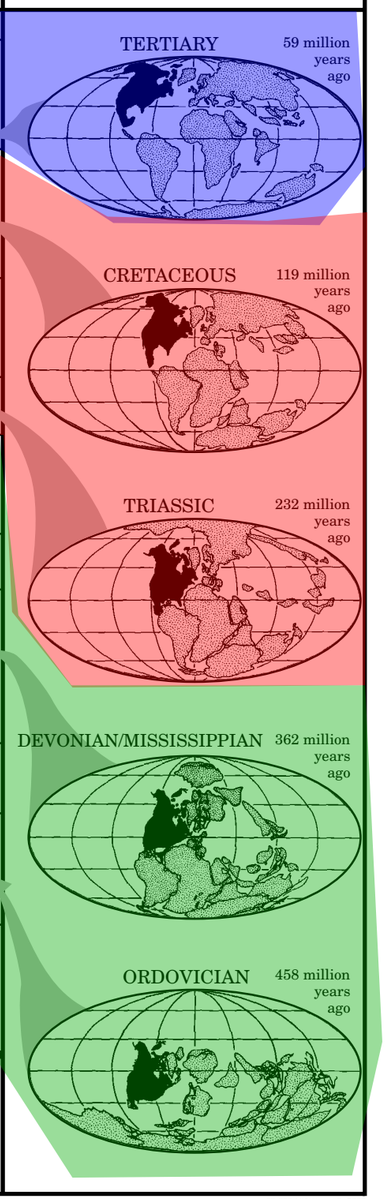
Taconian Orogeny caused by closing of western part of Iapetus Ocean and collision between North America and volcanic island arc

Iapetus passive margin forms

Rifting and initial opening of Iapetus Ocean
Erosion of Grenville Mountains

Grenville Orogeny: Ancestral Adirondack Mtns. and Hudson Highlands formed

Inferred Position of Earth's Landmasses



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