Years from present time (approximate)	Geologic time divisions			Formation and group names	Material	Approximate thickness (feet)	Typical localities	Contemporaneous life and events
	Cenozoic era. Age of mammals. (55,000,000 years)	Quaternary period (2,000,000 yrs.)		*See enlarged chart of Cenozoic era to the right*				
		Tertiary period. (53,000,000 years)						
55,000,000	Mesozoic era. Age of dinosaurs. (106,000,000 years)	Cretaceous period. (55,000,000 years)	Upper Cretaceous epoch.	Monmouth formation.	Dark micaceous sand and greensand; ironstone concretions in places. Marine fossils.	0-50	Good Hope Hill.	Development and dying out of dinosaurs. Clams and oysters abundant. Appearance of flowering plants and hardwood forests. Great chalk deposits. From Alaska to Central America folding of mountains, including the Rockies. Appalachians again uplifted. Shifting seas.
				Magothy formation.	Chiefly gray sand; in places brown sandstone and conglomerate. Fossil plants collected in Maryland.	0-60	Good Hope Hill.	
				Raritan formation.	Clay, chiefly red or pink; sand in northeast extension. Fossil plants.	50	Good Hope Hill.	
			Lower Cretaceous epoch.	Potomac group (Patapsco, Arundel, and Patuxent formations).	Pink, red, and gray clay with sand lenses; basal part, gravel, sand, sandstone, and conglomerate. Fossil bones and plant remains.	0-700	Terra Cotta.	
110,000,000		Jurassic period. (28,000,000 years)		Great erosion interval.			The unconformity representing this great lapse of time may be seen on the north side of the alley between 38th and 39th Streets, north of T Street, Northwest. The exposure shows the eroded crystalline rock (pre-Cambrian) overlain by the sediments of the Potomac group (Lower Cretaceous).	Dinosaurs and reptiles dominant. Appearance of birds with teeth. Mountain building in western United States and British Columbia. Shallow seas.
138,000,000		Triassic period. (23,000,000 years)						Small dinosaurs, flying reptiles, and mammals. Conifers and cycads principal trees. Volcanic eruptions from Nova Scotia to the Carolinas. Seasonal floods. Arid climate in general.
161,000,000	Paleozoic era. Age of fishes. (314,000,000 years)	Permian period. (33,000,000 years)						Many kinds of strange reptiles. Continental uplift and mountain building; development of deserts. Appalachians, Ouachitas, and Urals formed. Glaciation and aridity with rapid evolution and extinction of types of Permian life.
194,000,000		Carboniferous period. (74,000,000 years)						Development of modern types of sharks and crinoids. Appearance of reptiles and insects. Warm moist climate favorable for abundance of vegetation, which later was changed to coal. Widespread continental seas.
268,000,000		Devonian period. (37,000,000 years)						Development of main groups of fishes. Appearance of amphibians. First forests. Uplifts and eruptions in eastern North America. Widespread continental seas.
305,000,000		Silurian period. (22,000,000 years)						First airbreathers (scorpions). Widespread coral reefs. First known land plants. Continental seas. Warm dry climate. Some deserts.
327,000,000		Ordovician period. (79,000,000 years)						Many groups of invertebrates. Crinoids. First appearance of fishes. Volcanoes in eastern United States. Mountain building in western New England and eastern New York. Widespread continental seas.
406,000,000		Cambrian period. (69,000,000 years)						Marine life only. Trilobites and brachiopods dominant. Fossils abundant for first time. Algae (seaweeds), only plants. Seas widespread over lowered parts of continents.
475,000,000	Pre-Cambrian time. Age of primitive life. (1,335,000,000 years)	Pre-Cambrian time. (1,335,000,000 years)		Igneous and metamorphic rocks of the Piedmont.	Gneiss, granite, schist, diorite, soapstone, and other rocks.	About 10 miles.	Along Rock Creek and the upper Potomac and at Great Falls.	Low types of plants and very primitive animals, mostly one-celled. Banks and reefs built by limy algae (seaweeds). Some fossils but most of them too poorly preserved for determination. Widespread seas, followed by continental uplift and mountain building. Glaciation. Volcanism.
1,810,000,000								

Years from present time (approximate)	Geologic time divisions			Formation and group names	Material	Approximate thickness (feet)	Typical localities	Contemporaneous life and events	
	Cenozoic era. Age of mammals. (55,000,000 years) (For clarity chart of Cenozoic era is enlarged 10 times that of other eras.)	Quaternary period. (2,000,000 years)	Recent epoch.	Alluvium and artificial fill.	Gravel, sand, silt, and clay.	0-25	Reclaimed tidal marshes along Potomac and Anacostia Rivers.	Dominance of man. Warm climate. Melting of glaciers.	
			Pleistocene epoch, or Ice Age.	River terrace deposits.	Gravel, sand, and loam; basal part unsorted boulders, pebbles, and sand.	30	Hill east of Connecticut Ave. and north of Florida Ave.	Stone age of man's history. Extinction of great mammals.	
2,000,000				Brandywine formation and Bryn Mawr(?) gravel.	Gravel and sand in orange loam matrix. Coarse material at base and in western part of area.	0-40	Good Hope Hill, Tenleytown, and U. S. Soldiers' Home.	Widespread periodic glaciation. Uplifting of Sierra Nevada and Coast Ranges, and of Rocky Mts. to present height.	
5,000,000		Tertiary period. (53,000,000 years)	Pliocene epoch.	Erosion interval.				Shifting of seas. Several upwarpings of Appalachian Mountains.	Earliest record of primitive man. Widespread uplift and mountain building. Volcanic eruptions.
10,000,000			Miocene epoch.	Calvert formation (basal fm. of Chesapeake group).	Gray or buff to olive-green sand mixed with clay; in eastern part lower beds are largely diatomaceous earth. Marine fossils and plant remains.	20-80	Good Hope Hill, D. C., and Freedom Hill, Va.		Development of many types of mammals. Uplifting of Rocky Mountains. Eruptions and lava flows in northwestern United States. Building of Cascade Mountains.
15,000,000									
20,000,000			Oligocene epoch.	Erosion interval.					Rapid evolution of modern mammals. Rise of great apes in Europe and Asia. Alps and Himalayas uplifted. Climate mild.
25,000,000									
30,000,000									
35,000,000			Eocene epoch.	Pamunkey group: Nanjemoy formation.	Represented by Marlboro clay member only; clay generally pink.	20	Good Hope Hill.		Appearance of modern mammals and extinction of primitive types. Primitive horses.
40,000,000				Aquia formation.	Bluish or greenish-black sand, clay, and greensand; ironstone concretions in places. Organic matter and fossil shells.	0-100			
45,000,000									
50,000,000			Paleocene epoch.	Erosion interval.					Primitive mammals dominant. Appearance of modern plants. Local glaciers.
55,000,000									

EXPLANATION

Estimated length of time divisions adjusted by R. C. Wells, member of Committee on Measurement of Geologic Time, National Research Council.

Information concerning material and thickness of Coastal Plain beds furnished by N. H. Darton.

Wavy line represents an unconformity.

GEOLOGIC AGE OF THE FORMATIONS IN THE DISTRICT OF COLUMBIA, WITH NOTES ON CONTEMPORANEOUS LIFE AND MAJOR GEOLOGIC EVENTS

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