Geologic History Review Activity

Frozen Mammoth

A wooly mammoth was found in 1999 buried in the frozen soil of the Siberian tundra. Carbon-14 dating indicated that it had died about 20,000 years ago. Many fossils represent only the partial remains of organisms. However, a complete mammoth with bones, skin, hair, and internal organs intact represented a unique opportunity for scientists to investigate the lifestyle of this animal and the environment in which it lived.

1. Identify both the period and epoch of geologic time during which the wooly mammoth lived.

2. Identify one New York State index fossil of an organism that lived during the same time as the wooly mammoth.

3. Explain why C-14 is the only radioactive isotope on the ESRT that can be used to date the Mammoth remains.

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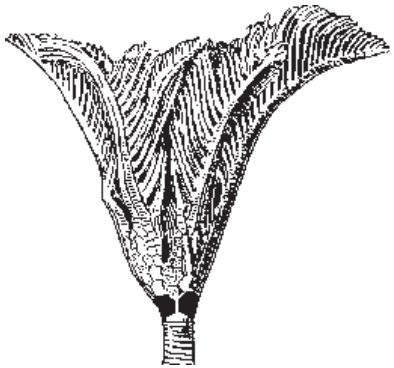
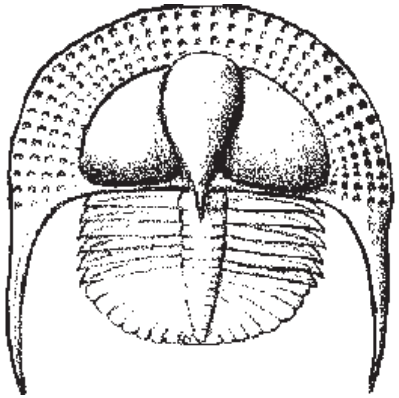
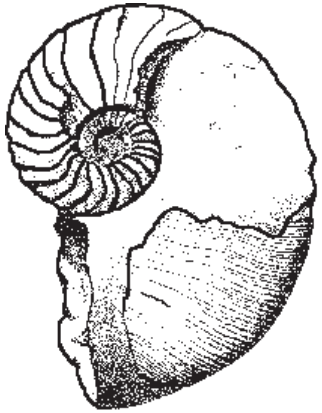
1. Identify both the period and epoch of geologic time during which the wooly mammoth lived. Pleistocene Epoch of Quaternary Period

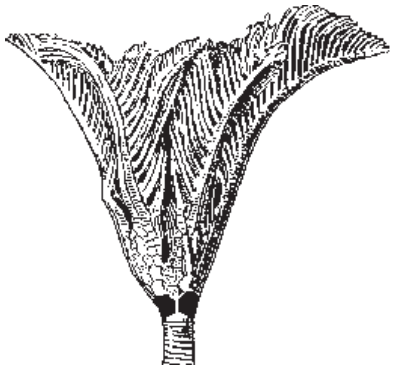
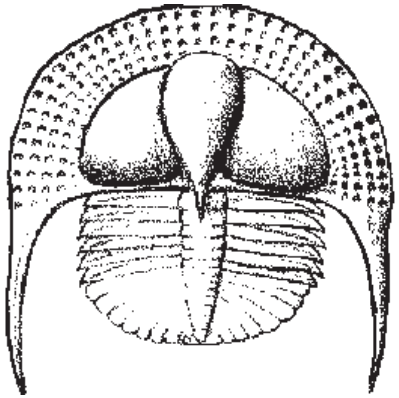
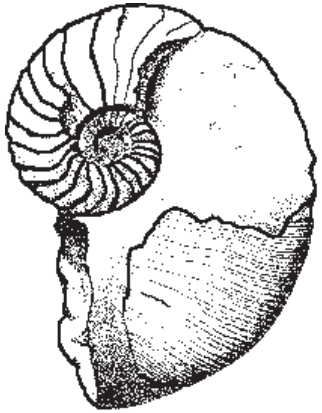
2. Identify one New York State index fossil of an organism that lived during the same time as the wooly mammoth. Mastodont, Beluga Whale, Condor

3. Explain why C-14 is the only radioactive isotope on the ESRT that can be used to date the Mammoth remains. Mammoths are recent living organisms containing C-14. C-14 is used to date recent, organic remains.

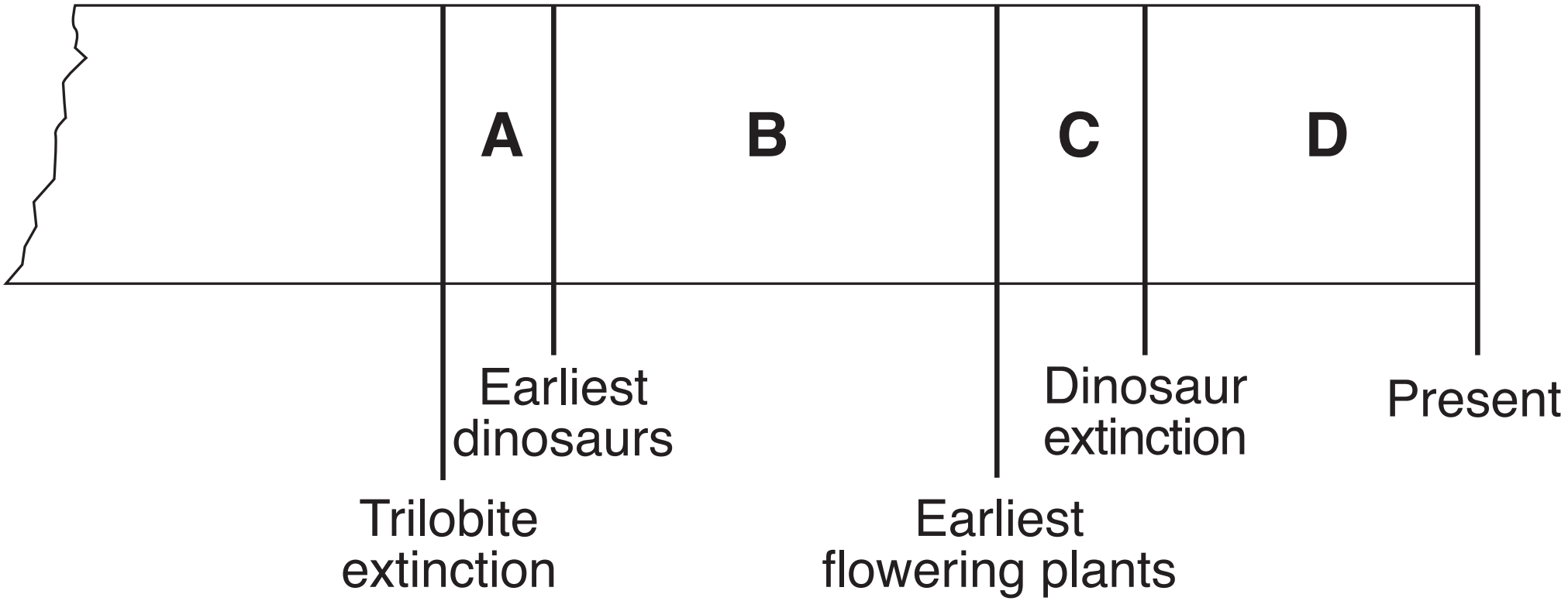

4. List these four index fossils, by name, in order of oldest to youngest.

5. List two characteristics of an organism that make it an effective index fossil.

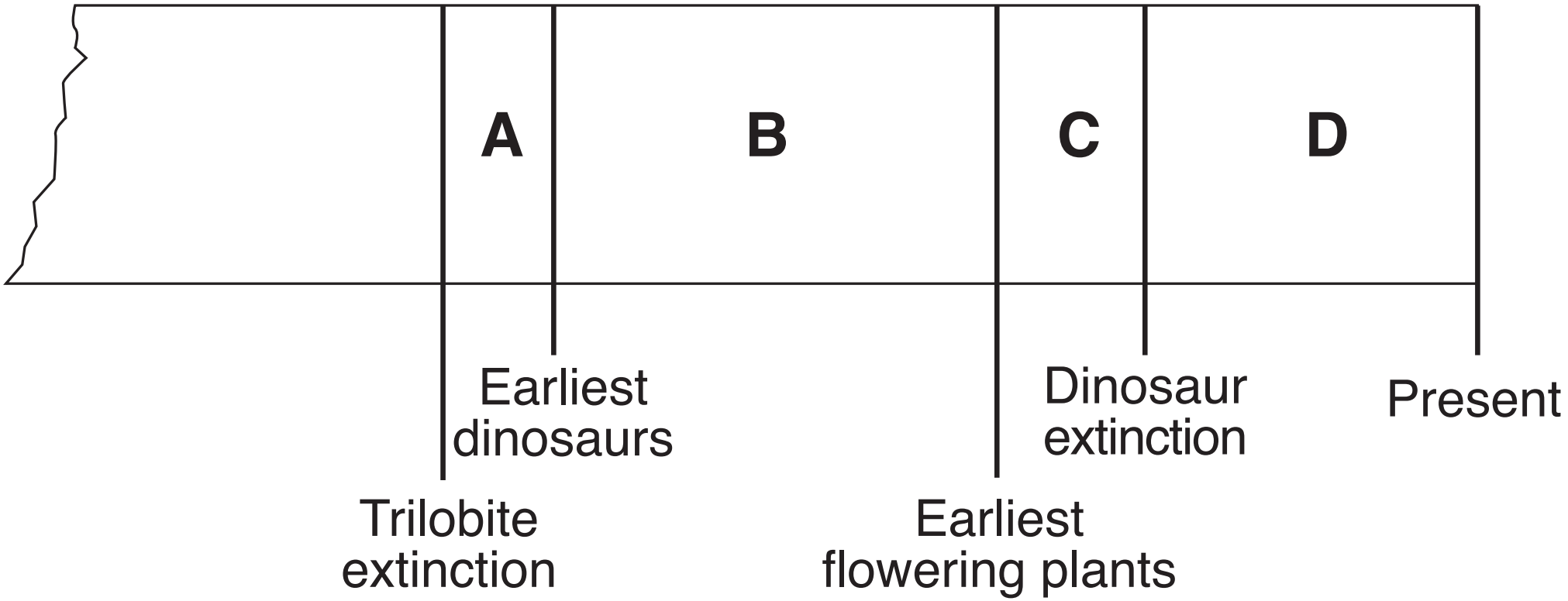

4. List these four index fossils, by name, in order of oldest to youngest.
   Cryptolithus, Cystiphyllum, Ctenocrinus, Centroceras

5. List two characteristics of an organism that make it an effective index fossil.
   Lived over a wide area, but for a short period of time



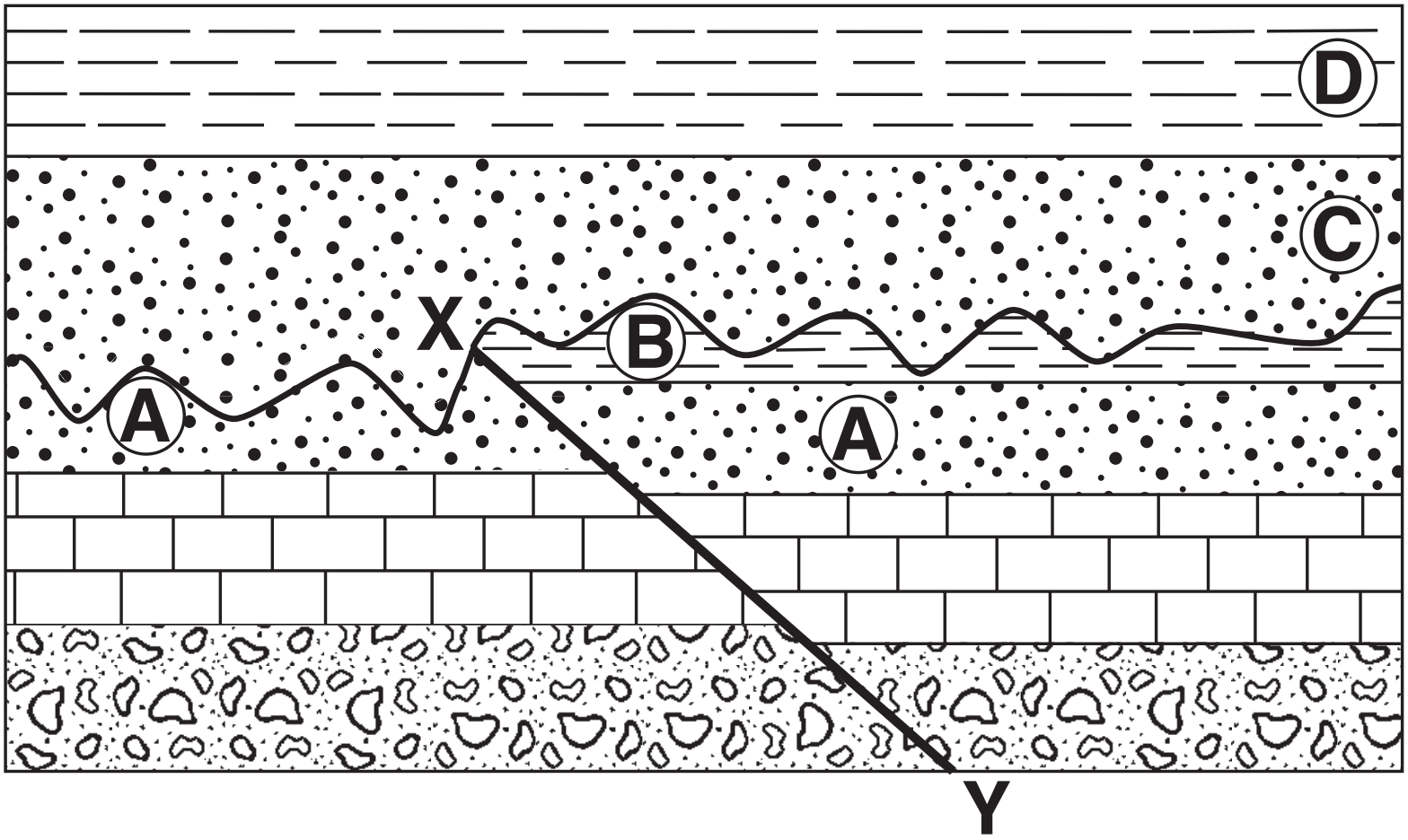
6. How many years did the combined periods marked B and C last for?

7. What is the name of the era marked by letter D?

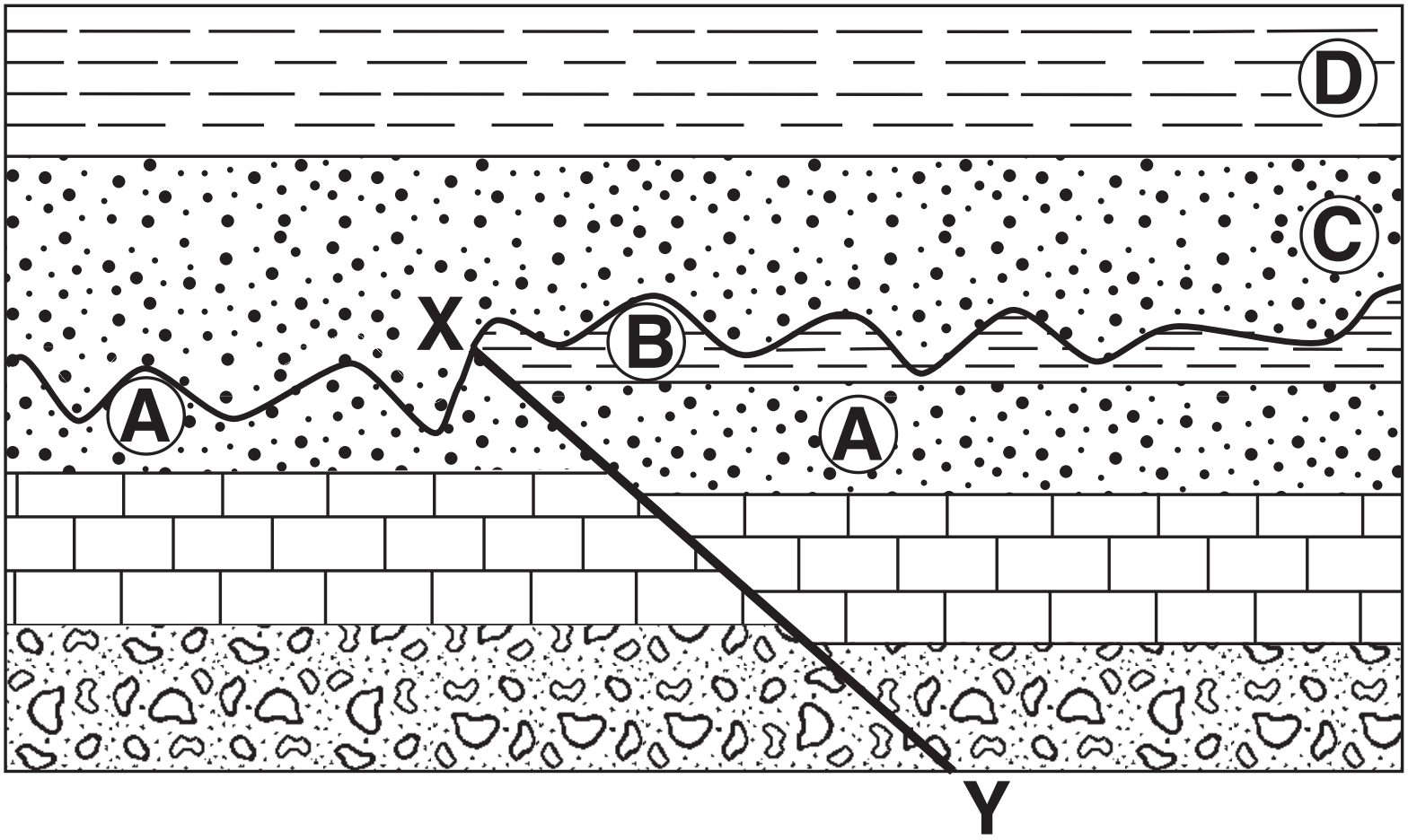


6. How many years did the combined periods marked B and C last for?
   175 million years

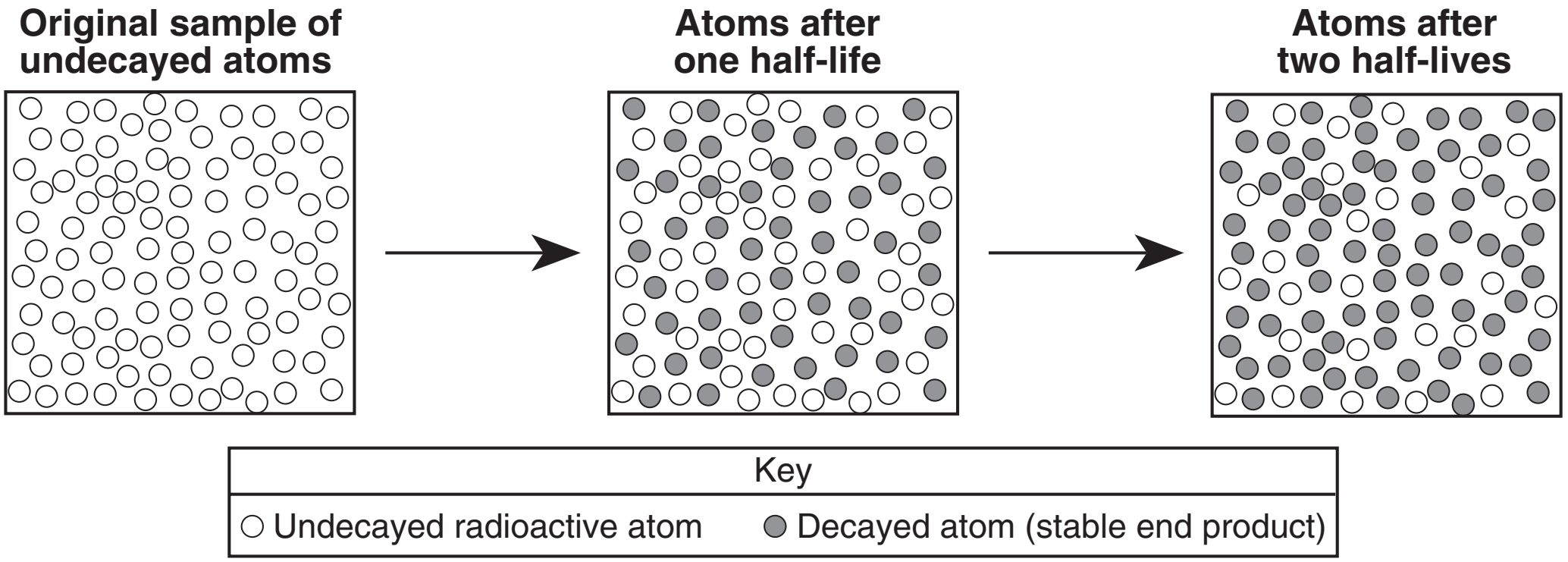
7. What is the name of the era marked by letter D? Cenozoic



8. Record the complete sequence of events that resulted in the formation of this geologic cross-section.

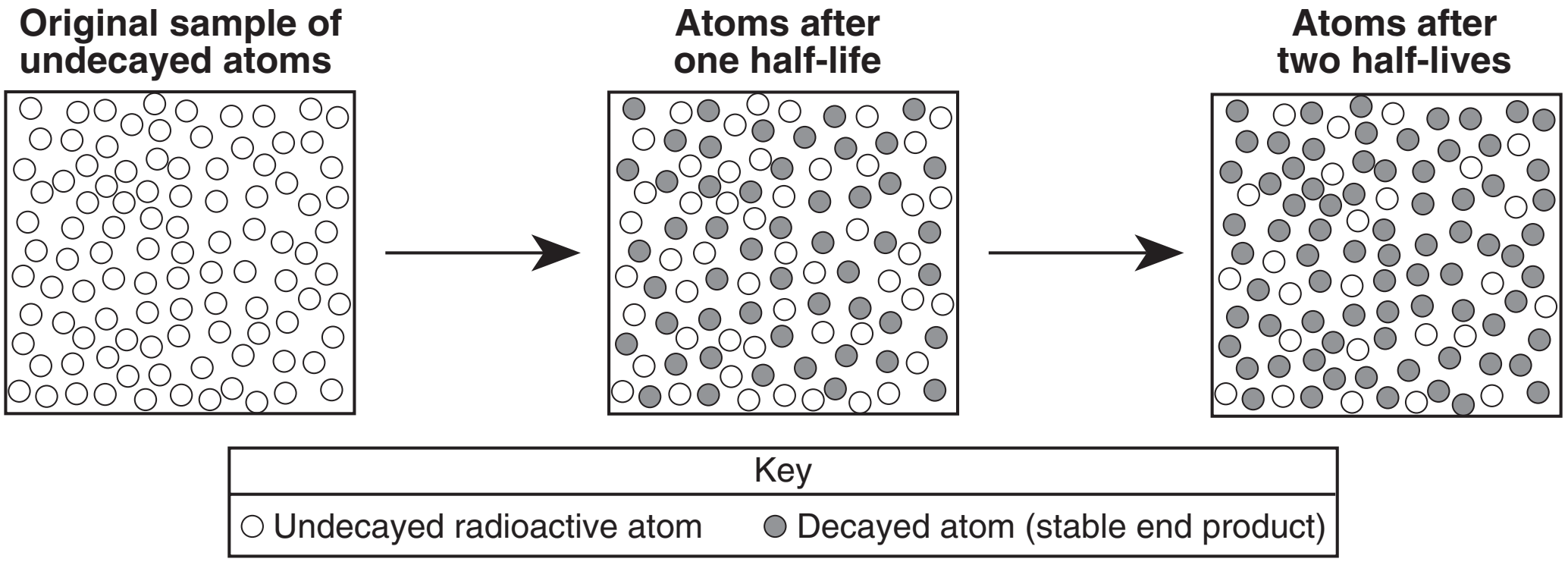


8. Record the complete sequence of events that resulted in the formation of this geologic cross-section. Conglomerate, Limestone, Sandstone, Shale, Faulting, Uplift, Weathering and Erosion, Subsidence, Sandstone, Shale



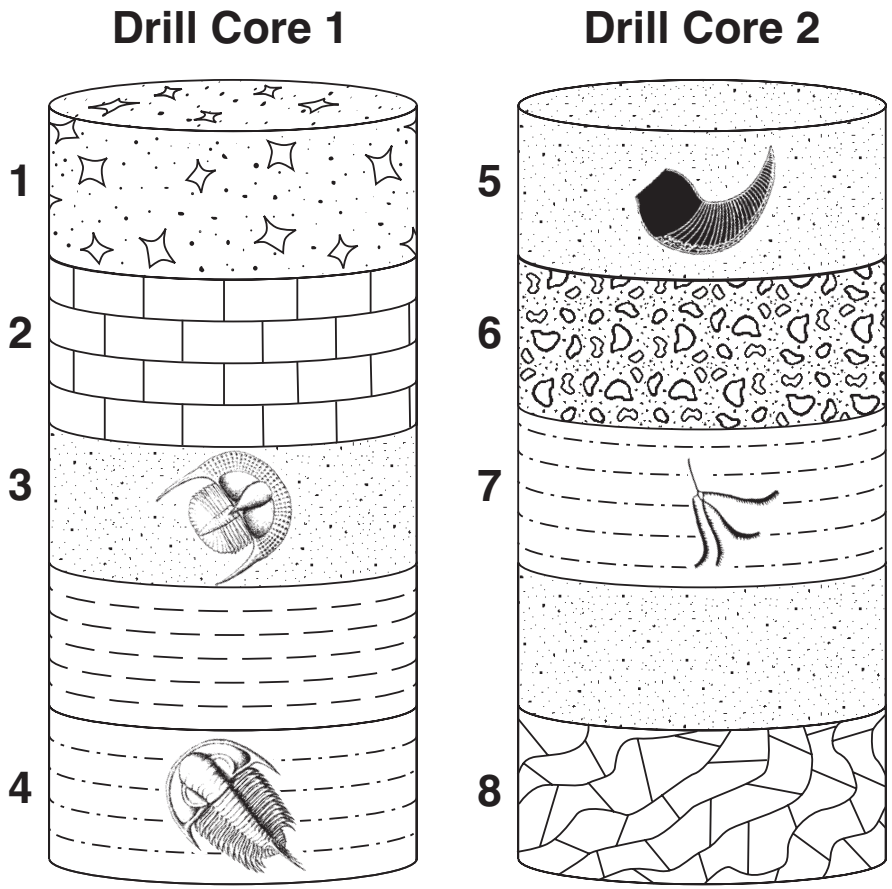
8. If this diagram is representing the decay of Carbon-14, how may years have passed after two half-lives?

9. Is radioactive dating an example of absolute or relative dating?



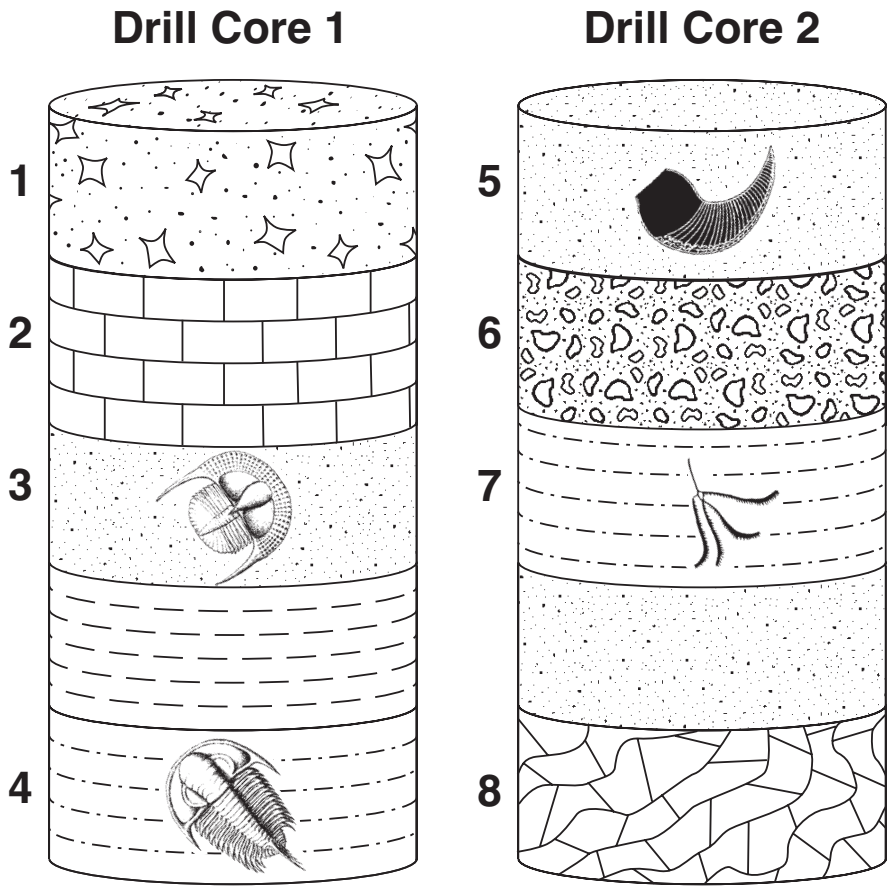
8. If this diagram is representing the decay of Carbon-14, how may years have passed after two half-lives? 11,400 years

9. Is radioactive dating an example of absolute or relative dating? Absolute



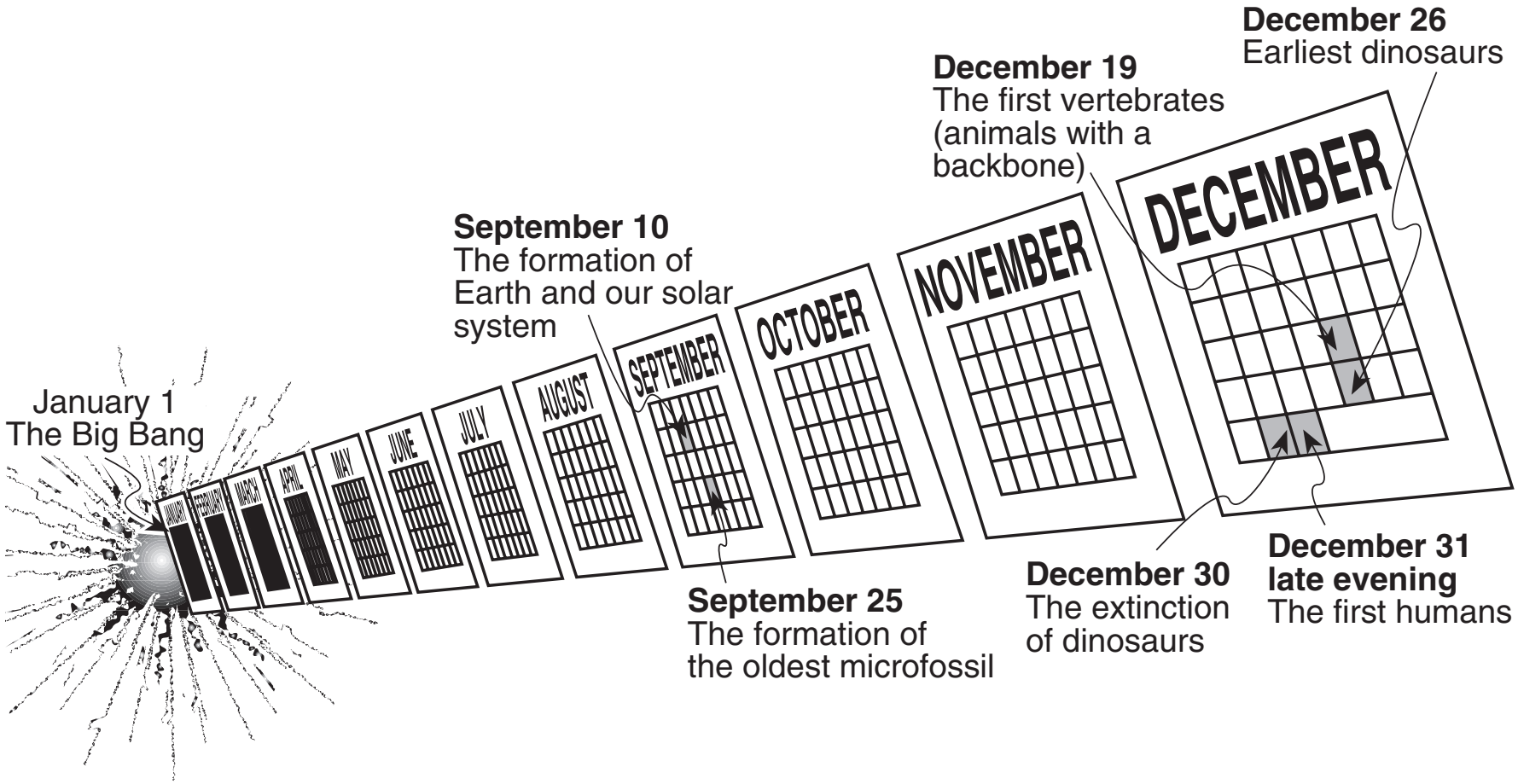
10. Which two layers likely formed at the same time?

11. What is the name and approximate age of the oldest fossil shown in the drill cores?



10. Which two layers likely formed at the same time? 3 and 5

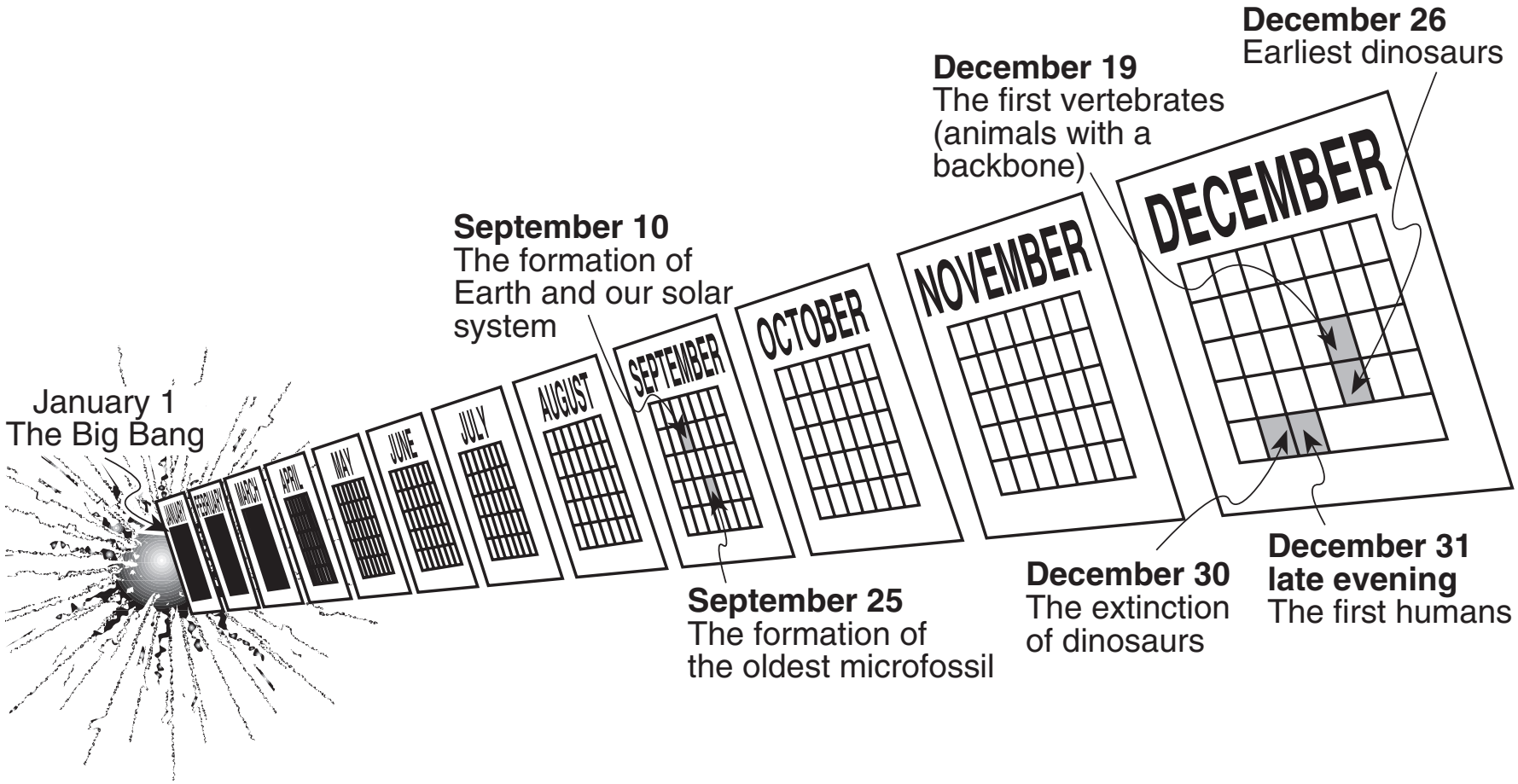
11. What is the name and approximate age of the oldest fossil shown in the drill cores? Elliptocephala, 525 million years old



12. During which geologic period did the event represented by December 19 actually occur?

13. How many millions of years ago did the event represented by September 10 actually occur?

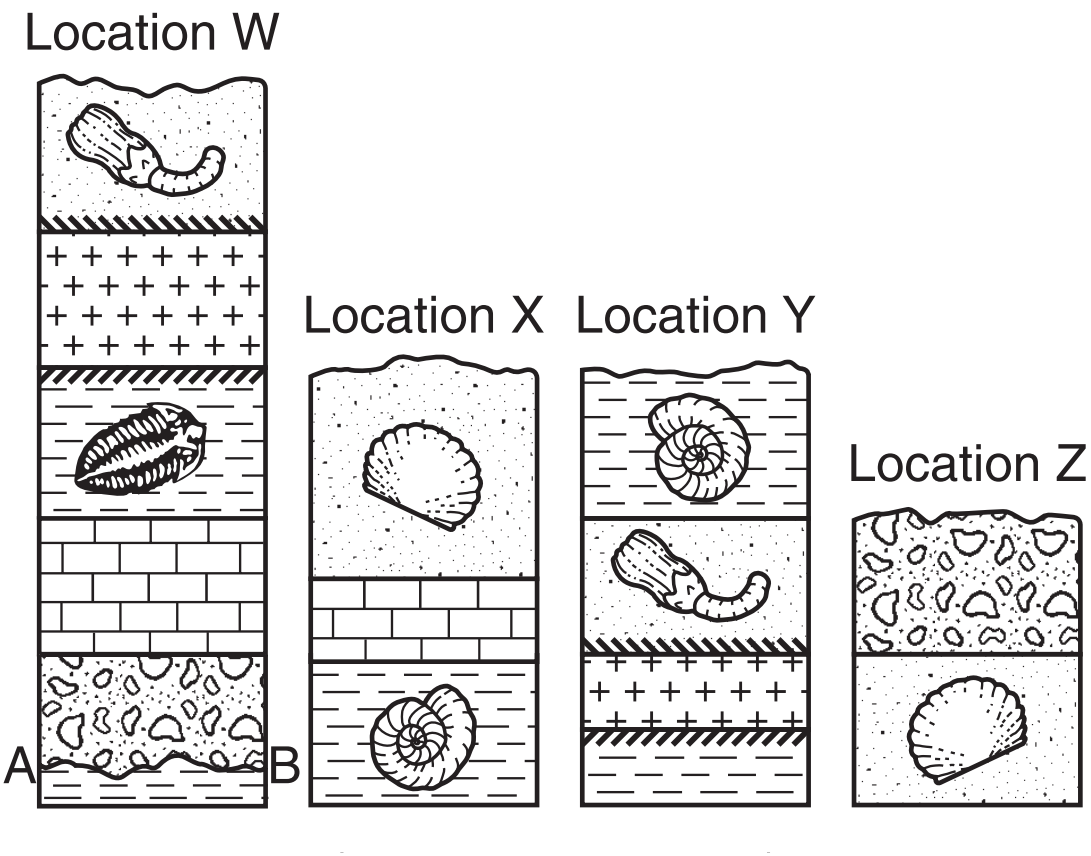
14. How many millions of years actually passed between the events represented by December 26 and December 30?

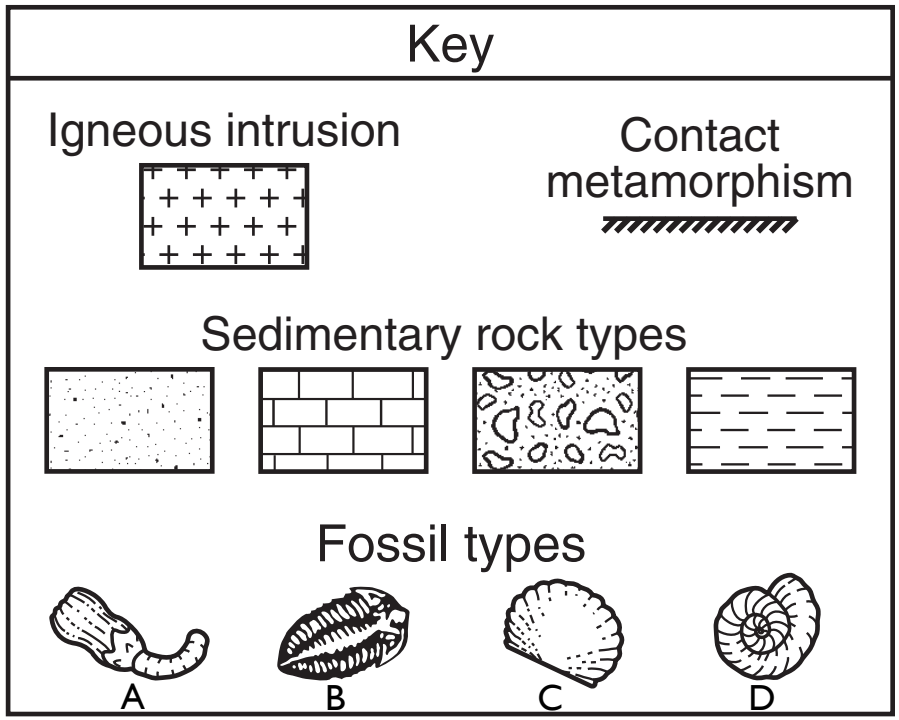


12. During which geologic period did the event represented by December 19 actually occur? Cambrian (not on new chart)

13. How many millions of years ago did the event represented by September 10 actually occur? 4.6 billion years ago

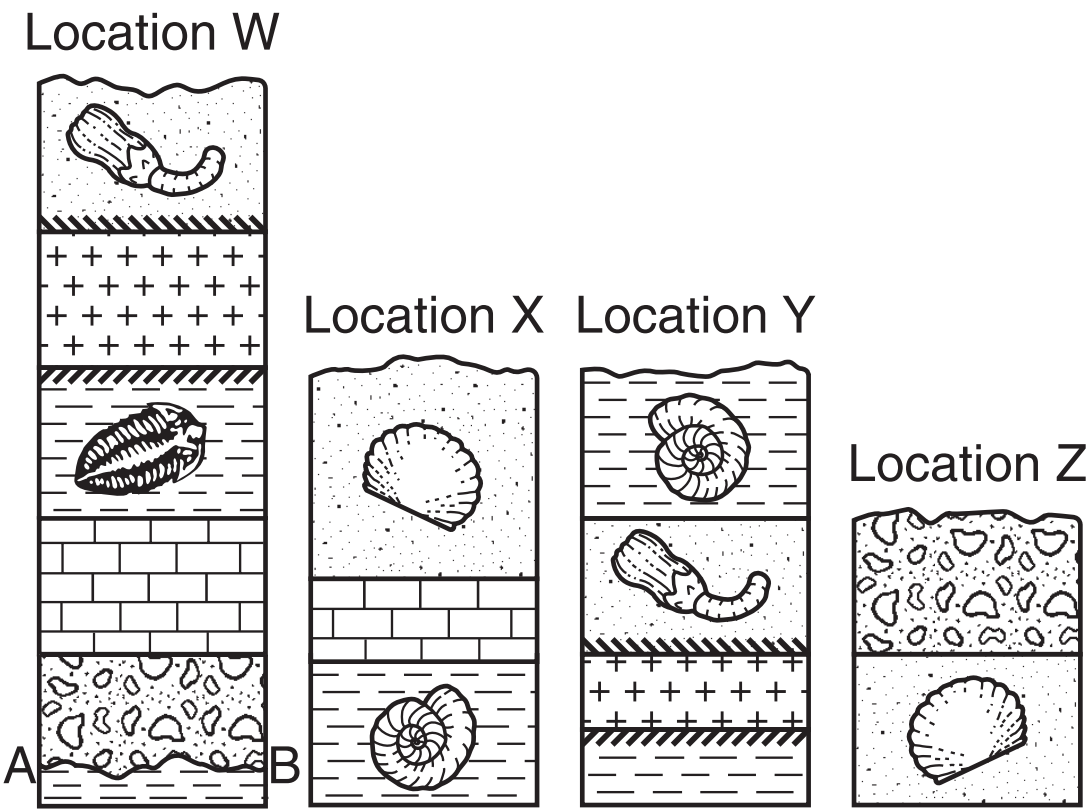
14. How many millions of years actually passed between the events represented by December 26 and December 30? 175 million years





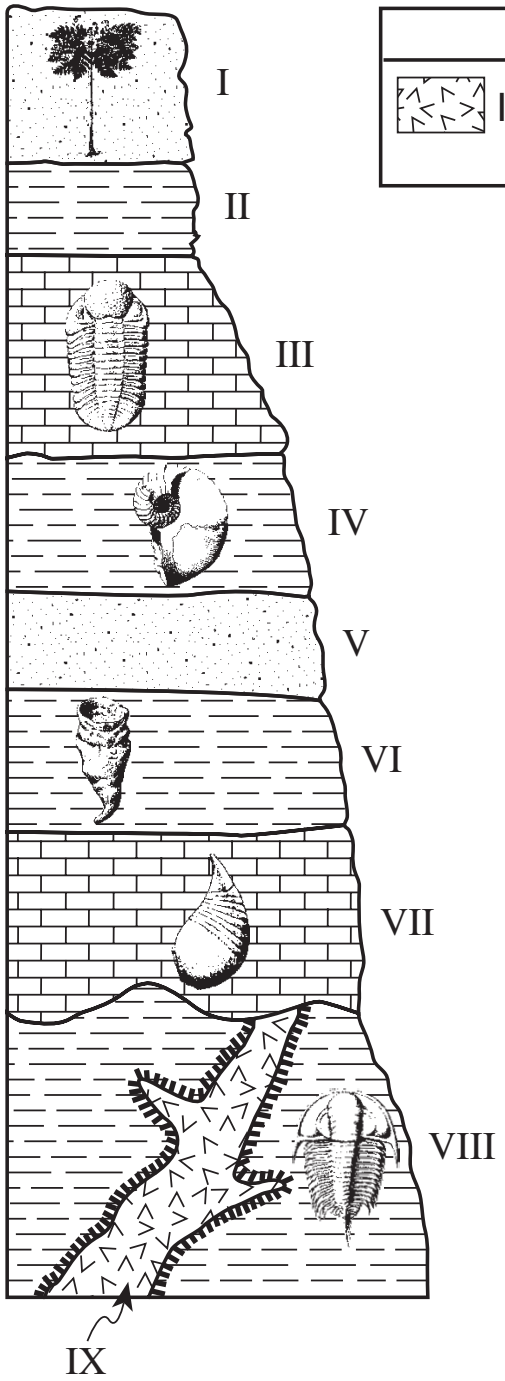
15. Which fossil is the oldest (these are not in your ESRT, you must use the four sequences to figure out which one is oldest)?

16. Which formed first, the igneous intrusion, or the sandstone layer above it? Explain how you know.



15. Which fossil is the oldest (these are not in your ESRT, you must use the four sequences to figure out which one is oldest)? Fossil B

16. Which formed first, the igneous intrusion, or the sandstone layer above it? Explain how you know. Sandstone

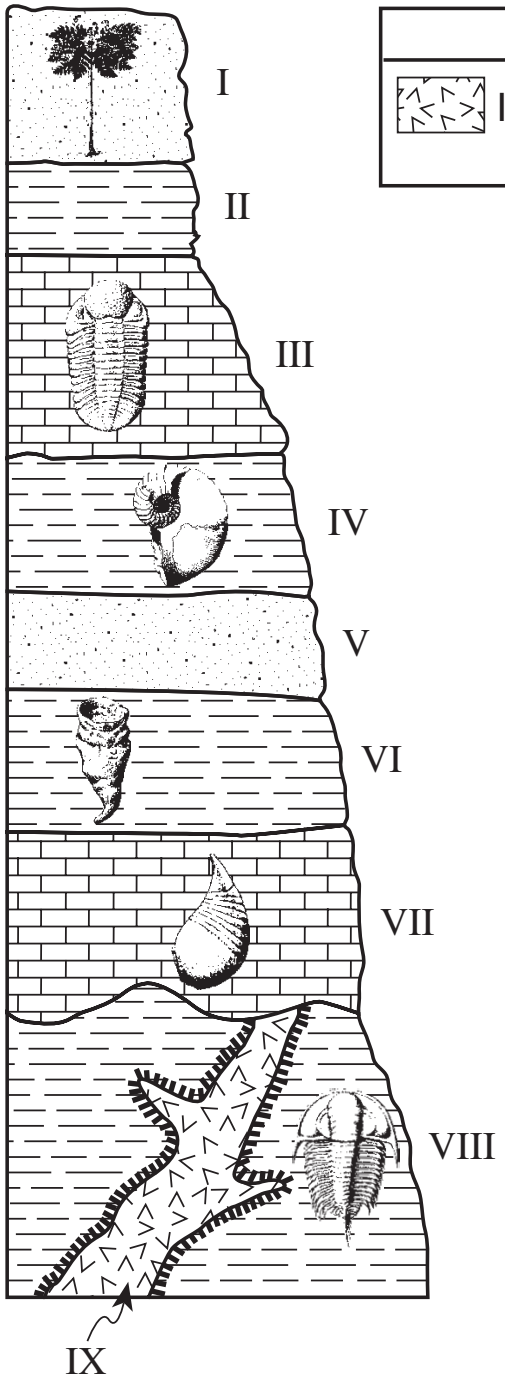


17. The fossil shown in rock unit VIII is a member of an extinct group of fossils. State two other index fossils that are also members of the same group of extinct fossils.

18. Based on the fossils shown in the limestone and shale layers, state the type of environment in which these sedimentary rocks were deposited.

19. Name one geologic event that occurred during the same period in which rock layer VI formed.

20. Explain why not fossils are found in intrusion IX.



17. The fossil shown in rock unit VIII is a member of an extinct group of fossils. State two other index fossils that are also members of the same group of extinct fossils. Cryptolithus and Phacops

18. Based on the fossils shown in the limestone and shale layers, state the type of environment in which these sedimentary rocks were deposited. Marine (underwater) environment

19. Name one geologic event that occurred during the same period in which rock layer VI formed. Salt and gypsum deposits

20. Explain why not fossils are found in intrusion IX. Fossils would be destroyed by the heat of the magma.