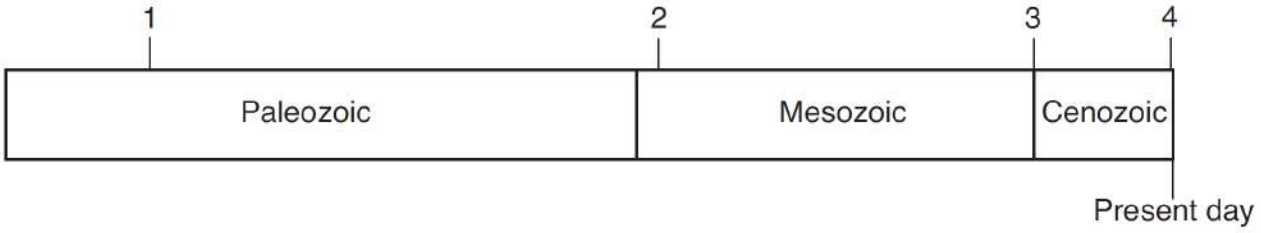
Geologic History Practice

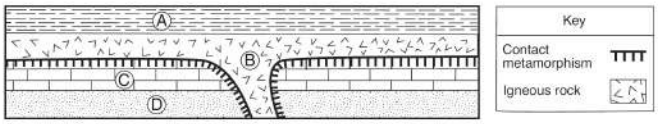
1. The geologic time line below represents the three most recent geologic eras. The numbers represent events in Earth's history.



Which number best represents when humans are inferred to have first appeared on Earth?

A) 1 B) 2 C) 3 D) 4

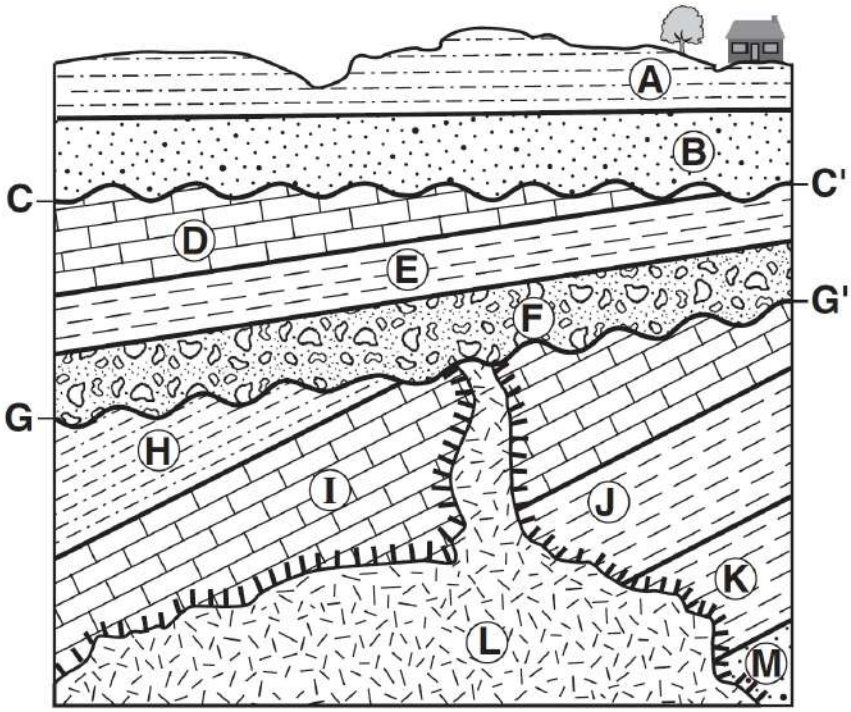
2. The cross section below shows four rock units, *A, B, C,* and *D*.



What is the correct sequence of events for this cross section?

A) A-B-D-C B) *A-B-C-D*
C) *D-C-A-B* D) *D-C-B-A*

Base your answers to questions **3** through **5** on the cross section below and on your knowledge of Earth science. The cross section represents rock units that have *not* been overturned. Lines *CC'* and *GG'* represent unconformities. The geologic ages of some of the lettered rock units are shown below the cross section.



Rock Unit Geologic Age
B = Cretaceous Period
E = Permian Period
J = Silurian Period
M = Cambrian Period

Key	
	Igneous intrusion
	Contact metamorphism

3. What does the bumpy line labeled "G" represent?

   A) faulting B) deposition C) folding D) erosion

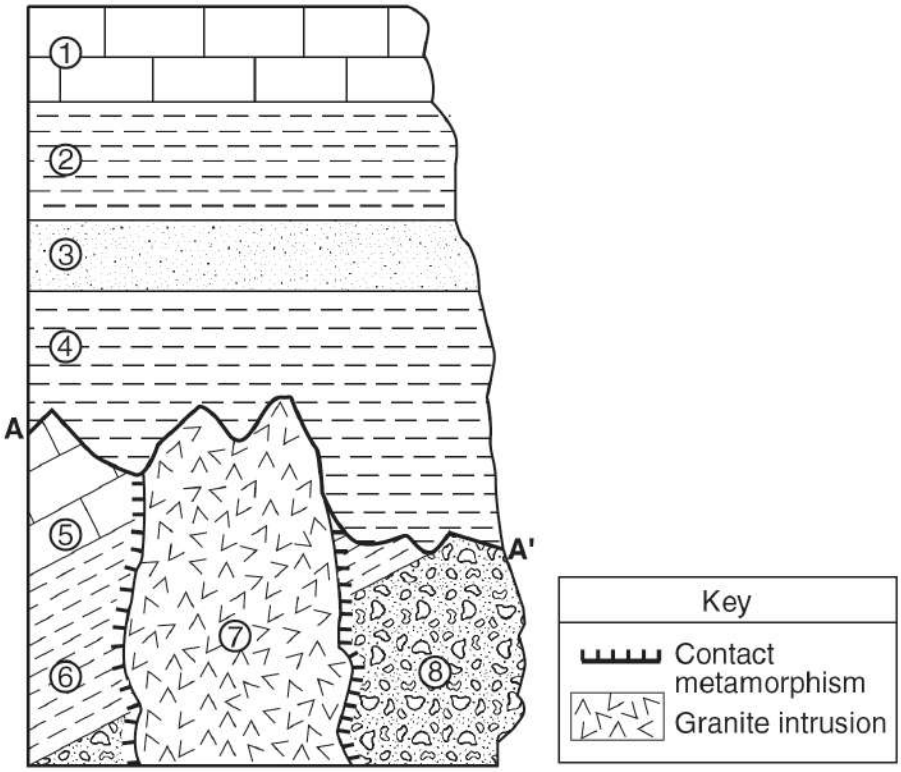
4. Why is there *no* contact metamorphism indicated between rock unit *L* and rock unit *F*?

   A) Conglomerate does not metamorphose.
   B) The intrusion was not hot enough to metamorphose rock unit *F*.
   C) The contact metamorphism within rock unit *F* eroded away.
   D) Rock unit *F* was deposited after the intrusion of rock unit *L*.

5. Which rock unit was formed most recently?

   A) *A* B) *F* C) *L* D) *M*

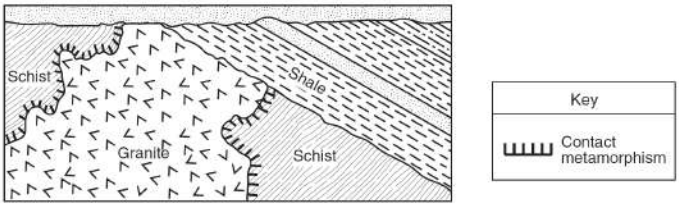
6. Base your answer to the following question on the cross section below. Rock units are labeled 1 through 8. The line between *A* and *A′* indicates an unconformity.



Which event occurred sometime after the formation of the unconformity?

A) formation of rock unit 3
B) tilting of rock unit 5
C) deposition of the sediments that formed rock unit 8
D) intrusion of rock unit 7

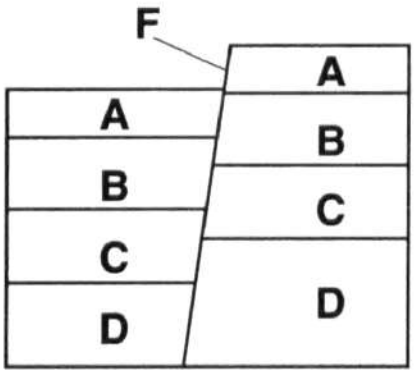
7. The geologic cross section below shows a complex structure containing a granite intrusion.



If the granite intrusion occurred 24 million years ago, what are the most probable ages of the schist and shale, in millions of years?

A) schist – 25; shale – 23
B) schist – 25; shale – 26
C) schist – 23; shale – 25
D) schist – 23; shale – 20

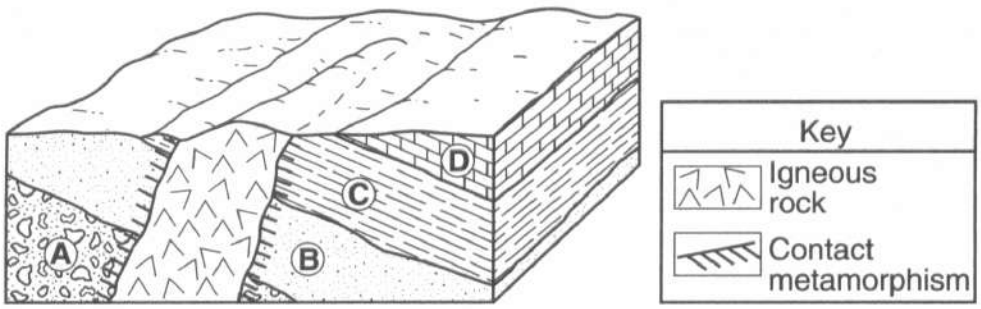
8. The cross section below shows rock layers *A, B, C, D,* and fault *F*. The rock layers have not been overturned.



Which sequence places the rock layers and fault in order from oldest to youngest?

A) $D \rightarrow C \rightarrow B \rightarrow A \rightarrow F$
B) $A \rightarrow B \rightarrow C \rightarrow D \rightarrow F$
C) $F \rightarrow D \rightarrow C \rightarrow B \rightarrow A$
D) $F \rightarrow A \rightarrow B \rightarrow C \rightarrow D$

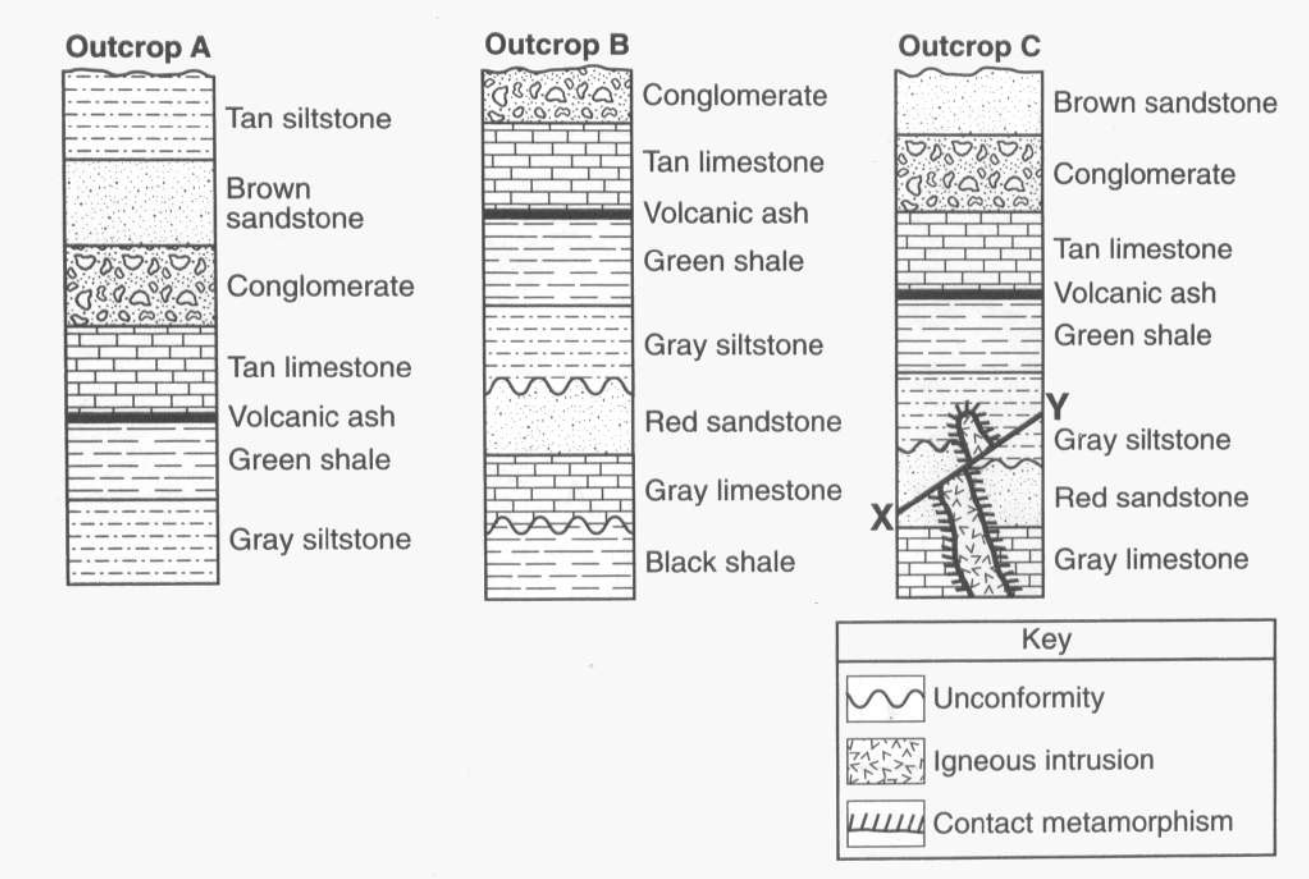
9. Base your answer to the following question on the block diagram below, which shows a portion of Eath's crust. Letters *A, B, C,* and *D* indicate sedimentary layers.



Which event occurred most recently?

A) formation of layer *A*
B) formation of layer *D*
C) tilting of all four sedimentary rock layers
D) erosion of the igneous rock exposed at the surface

Base your answers to questions **10** and **11** on the cross sections of three rock outcrops, *A*, *B*, and *C*. Line *XY* represents a fault. Overturning has not occurred in the rock outcrops.



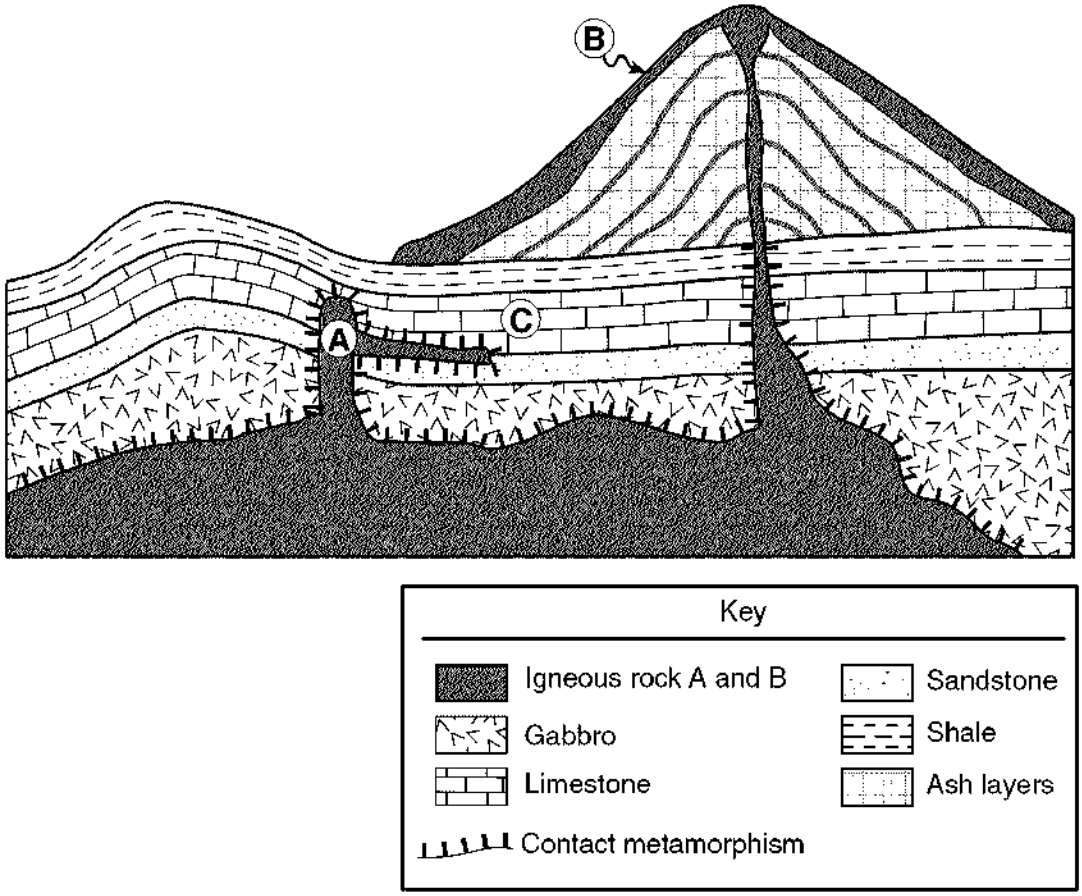
10. What is the youngest geologic feature in the three bottom layers of outcrop *C*?

A) fault
B) igneous intrusion
C) unconformity
D) zone of contact metamorphism

11. Which sedimentary rock shown in the outcrops is the youngest?

A) black shale
B) conglomerate
C) tan siltstone
D) brown sandstone

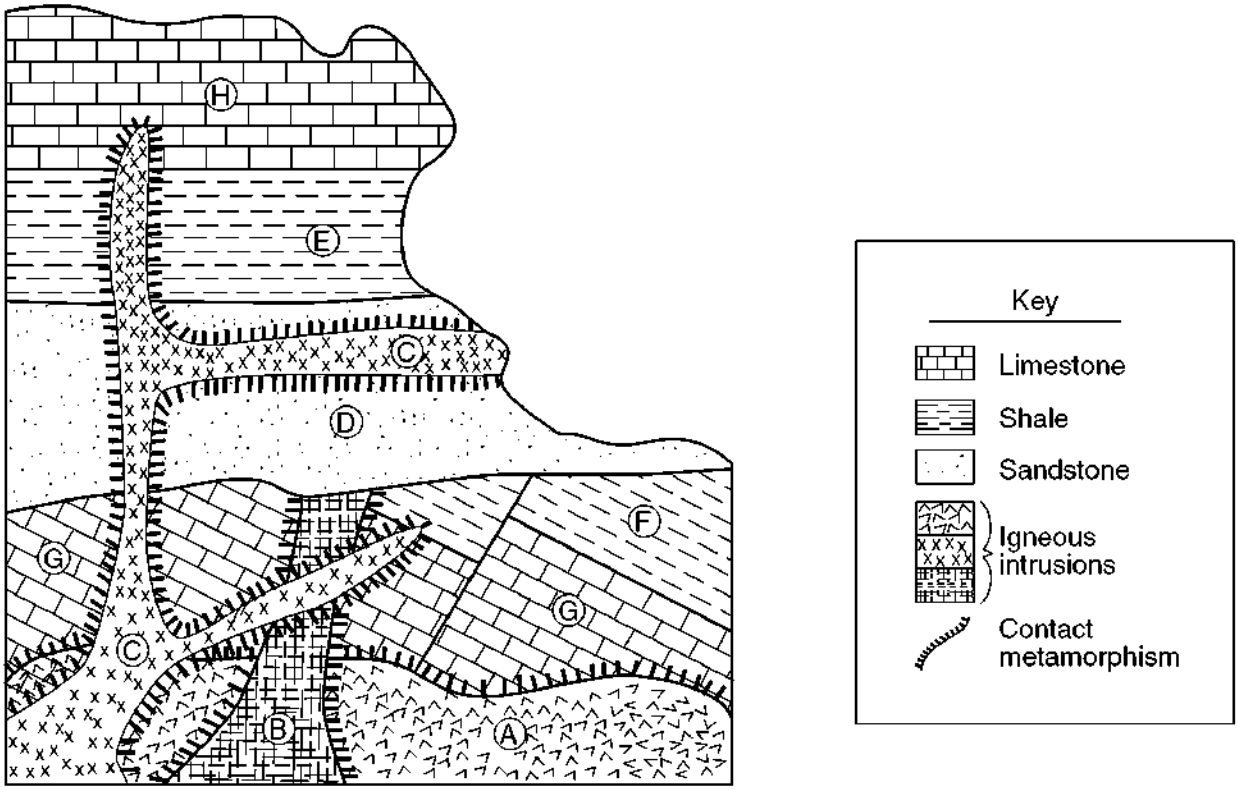
12. Base your answer to the following question on the geologic cross section below. The large cone-shaped mountain on Earth's surface is a volcano. Letters *A, B,* and *C* represent certain rocks.



Which statement correctly describes the relative ages of rocks *A* and *C* and gives the best supporting evidence from the cross section?

A) *A* is younger than *C,* because *A* is a lower sedimentary rock layer.
B) *A* is younger than *C,* because the intrusion of *A* metamorphosed part of rock layer *C.*
C) *A* is older than *C,* because *A* has older index fossils.
D) *A* is older than *C,* because the intrusion of *A* cuts across rock layer *C.*

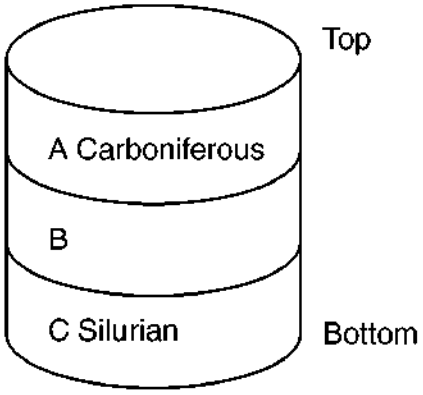
13. Base your answer to the following question on the diagram below, which shows a cross section of Earth's crust.



Which statement gives an accurate age relationship for the bedrock in the cross section?

A) Intrusion *A* is younger than intrusion *C*.
B) Intrusion *C* is younger than intrusion *B*.
C) Intrusion *B* is older than intrusion *A*.
D) Intrusion *C* is older than layer *E*.

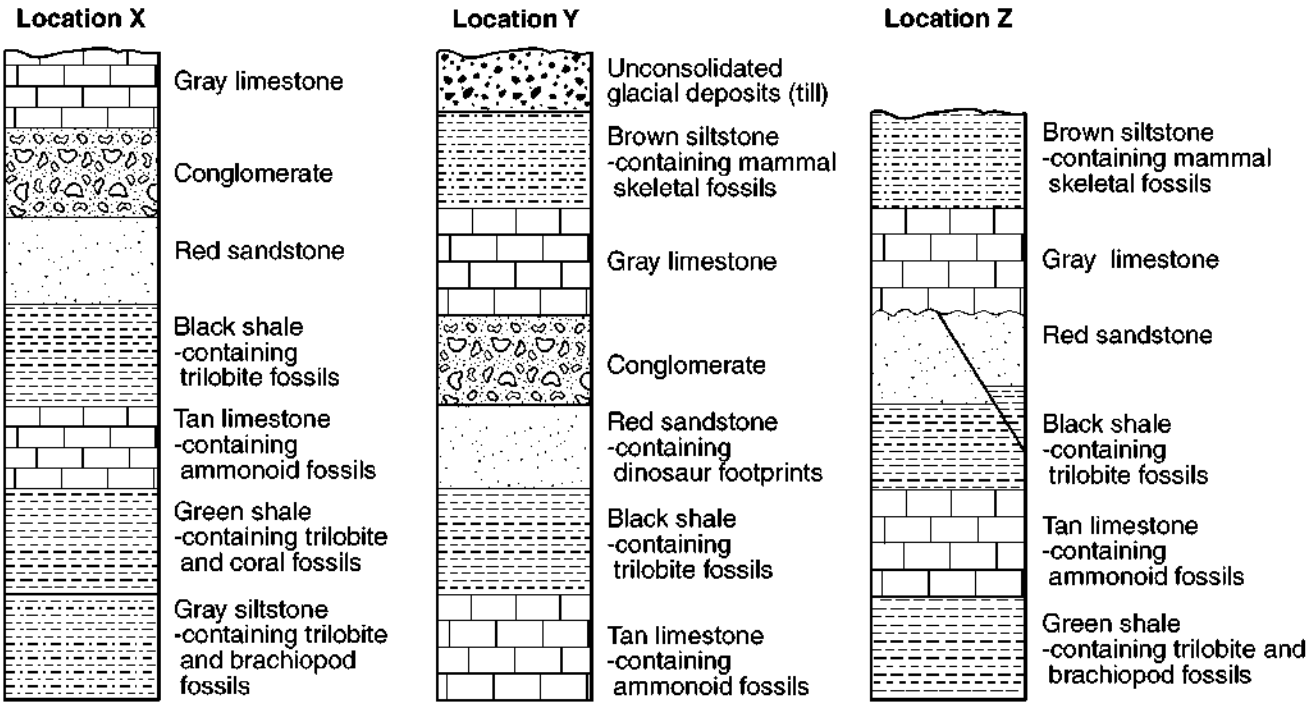
14. The geologic drill core below shows bedrock layers *A, B,* and *C* that have not been overturned. The geological ages of layers *A* and *C* are shown.



What is the geologic age of layer *B*?

A) Cambrian
B) Ordovician
C) Devonian
D) Permian

Base your answers to questions **15** through **19** on the cross sections below, which show widely separated outcrops at locations *X, Y,* and *Z.*



15. Which layer or event is the oldest?

    A) green shale B) gray siltstone C) black shale D) faulting

16. Which rock layer was the sixth (6th) layer deposited?

    A) conglomerate B) red sandstone C) gray limestone D) brown siltstone

17. An unconformity can be observed at location *Z.* Which rock layer was most probably removed by erosion during the time represented by the unconformity?

    A) conglomerate B) gray siltstone C) black shale D) brown siltstone

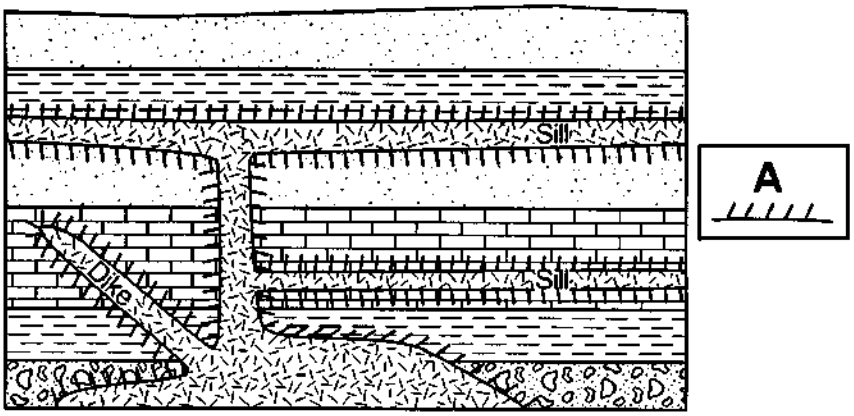
18. At location *Y,* the boundary between the red sandstone and the black shale marks the

    A) beginning of the Cenozoic Era B) beginning of the Mesozoic Era
    C) end of the Cenozoic Era D) end of the Mesozoic Era

19. Which rock layer is youngest?

    A) unconsolidated glacial deposits B) green shale
    C) tan limestone D) brown siltstone

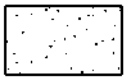
Base your answers to questions **20** and **21** on the geologic cross section below. Overturning has not occurred. The dike and sills shown in the cross section are igneous intrusions.



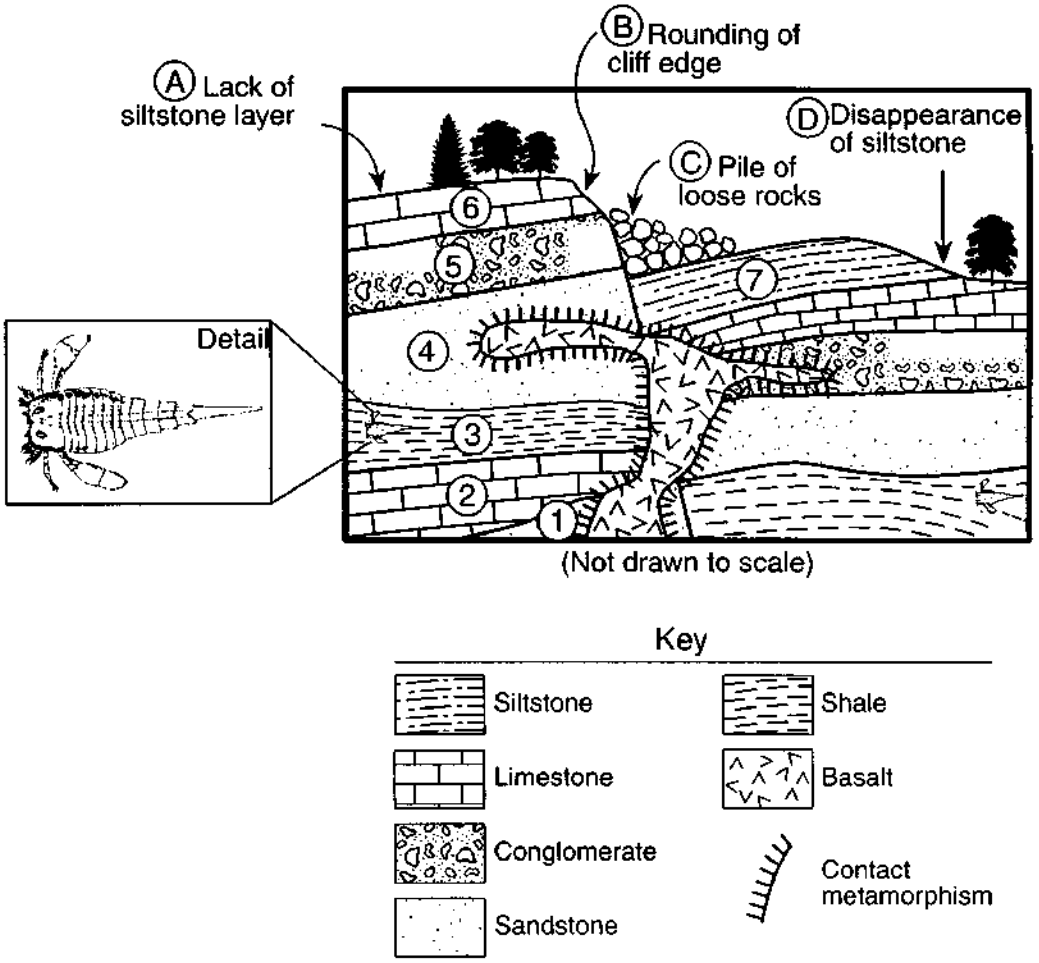
20. Which feature is represented by symbol ***A*** along the edges of the dike and sills?

A) contact metamorphic rock
B) an unconformity
C) a glacial moraine
D) index fossils

21. Which rock type is the oldest?

A) 
B) 
C) 
D) 

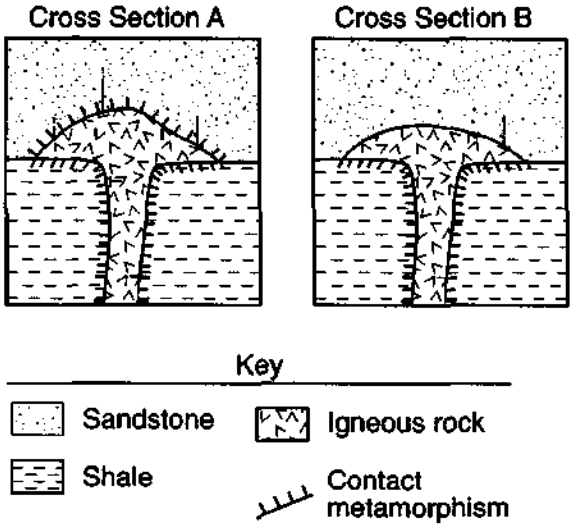
22. Base your answer to the following question on the diagram below of a cross section of a portion of Earth's crust. Letters *A* through *D* represent landscape features, and numbers 1 through 7 represent rock layers. The detail shows a fossil found in layer 3.



What is the correct sequence of events from oldest to most recent in the geologic history of this area?

A) deposition of layers from 1 to 7 → intrusion of basalt → faulting
B) deposition of layers from 1 to 7 → faulting → intrusion of basalt
C) deposition of layers from 7 to 1 → intrusion of basalt → faulting
D) deposition of layers from 7 to 1 → faulting → intrusion of basalt

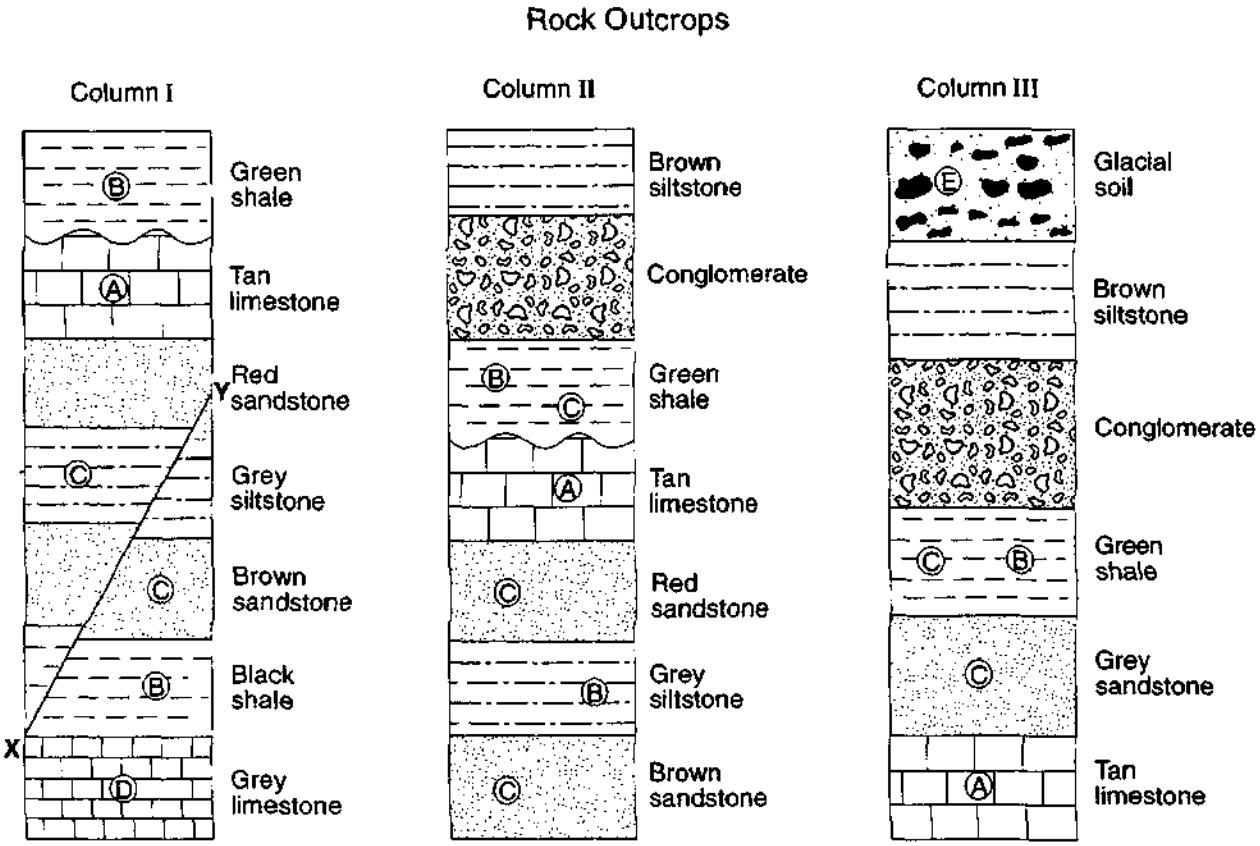
23. The diagrams below represent two different geologic cross sections in which an igneous formation is found in sedimentary bedrock layers. The layers have not been overturned.



Which statement best describes the relative age of each igneous formation compared to the overlying sandstone bedrock?

A) In *A*, the igneous rock is younger than the sandstone and in *B*, the igneous rock is older than the sandstone.
B) In *A*, the igneous rock is older than the sandstone and in *B*, the igneous rock is younger than the sandstone.
C) In both *A* and *B*, the igneous rock is younger than the sandstone.
D) In both *A* and *B*, the igneous rock is older than the sandstone.

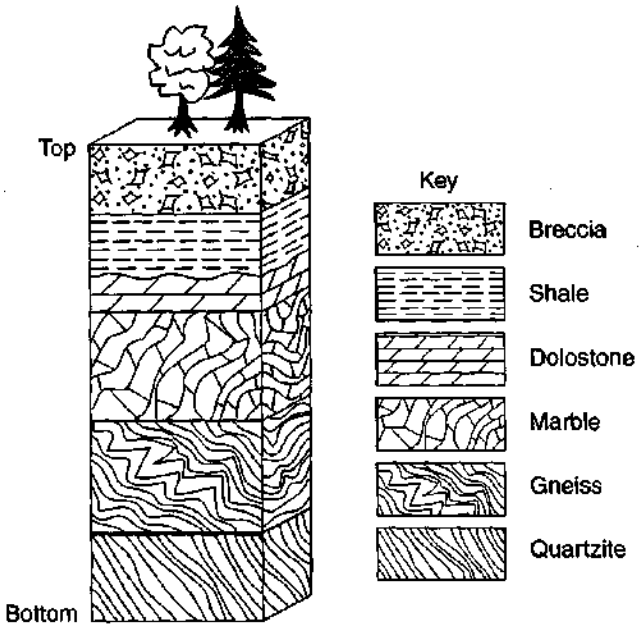
24. Base your answer to the following question on the diagram below which shows three geologic columns representing widely separated rock outcrops. Letters *A* through *E* represent fossils found in the outcrops. Line *XY* represents a fault in column I. The layers have not been overturned.



When did fault *XY*, located in column I, most likely occur?

A) before the formation of the grey limestone
B) during the formation of the grey siltstone
C) during the formation of the black shale
D) after the formation of the red sandstone

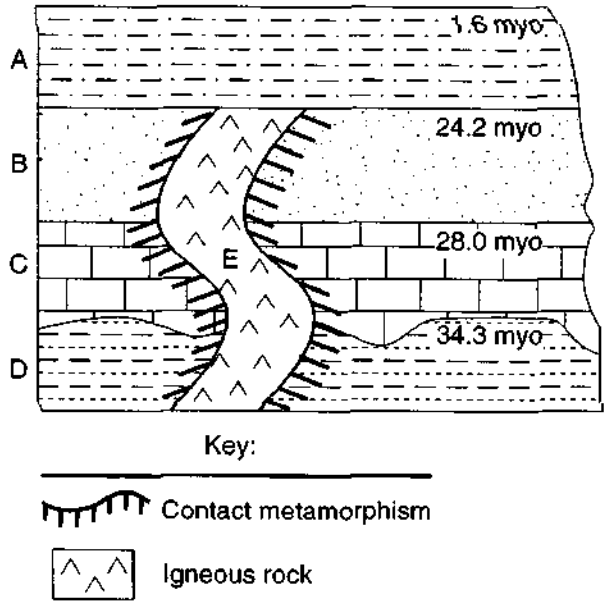
25. Base your answer to the following question on the diagram below, which represents a cross section of rock layers that have not been overturned.



If the breccia layer formed during the Carboniferous Period, the shale layer below it could have formed during which geologic time period?

A) Cretaceous B) Triassic C) Permian D) Carboniferous

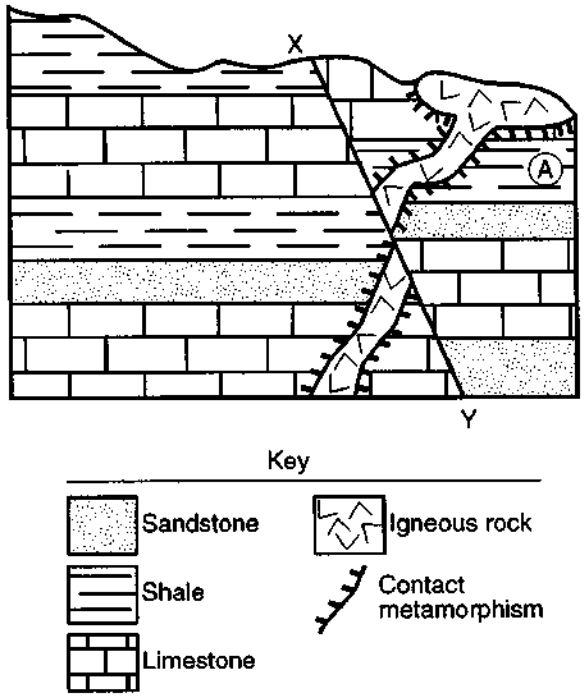
26. The geologic cross section below represents a cliff outcrop. Some bedrock layers are labeled as millions of years old (myo). Letters *A* through *E* represent different rock types.



What is a possible age of igneous rock *E*?

A) 1.5 million years old
B) 12 million years old
C) 28 million years old
D) 40 million years old

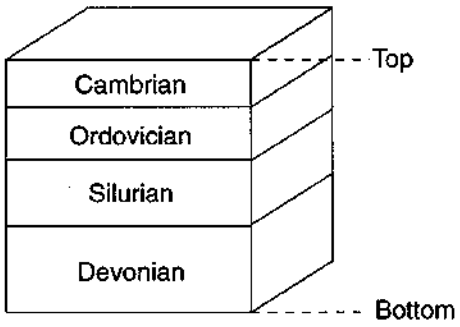
27. A geologic cross section for a portion of Earth's crust is shown below. Letter *A* is a location in a rock layer, and line *XY* represents a fault.



Which of these events occurred most recently at this location?

A) deposition of the layer at *A*
B) igneous intrusion
C) contact metamorphism
D) faulting along line *XY*

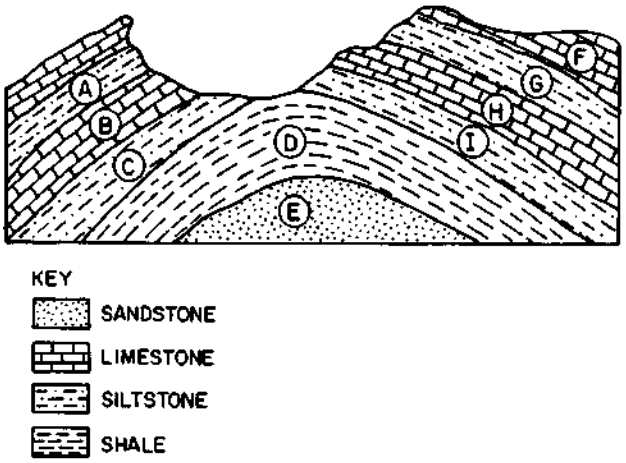
28. The diagram below represents a cross section of a series of rock layers of different geologic ages.



Which statement provides the best explanation for the order of these rock layers?

A) The oldest layer is on the bottom.
B) A buried erosional surface exists between layers.
C) The layers have been overturned.
D) The Permian layer has been totally eroded.

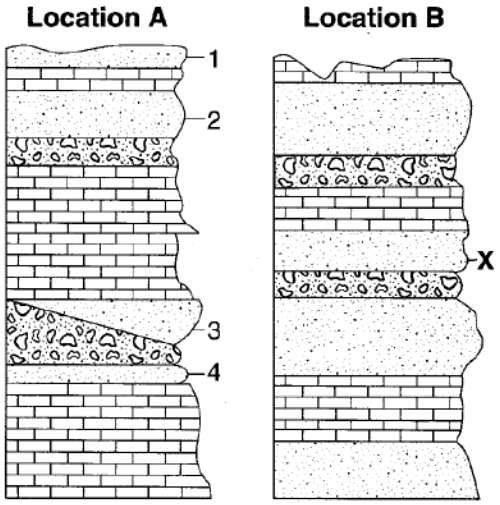
29. Base your answer to the following question on the diagram below which represents a cross section of an eroded fold that has *not* been overturned.



The fossils found in rock layer *G* will most closely resemble those found in rock layer

A) *A* B) *I* C) *C* D) *E*

30. The cross sections below show the surface bedrock in two different locations 20 miles apart. Rock layers are labeled 1, 2, 3, 4, and *X*. The rock layers have not been overturned.



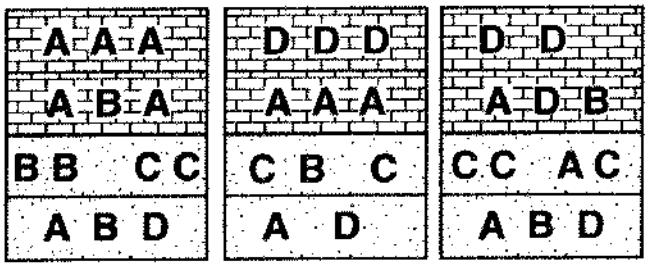
Rock layer *X* at location *B* is most likely the same relative as which rock layer at location *A*?

A) 1 B) 2 C) 3 D) 4

31. According to the fossil record, which group of organisms has existed for the greatest length of time?

A) gastropods B) corals
C) mammals D) vascular plants

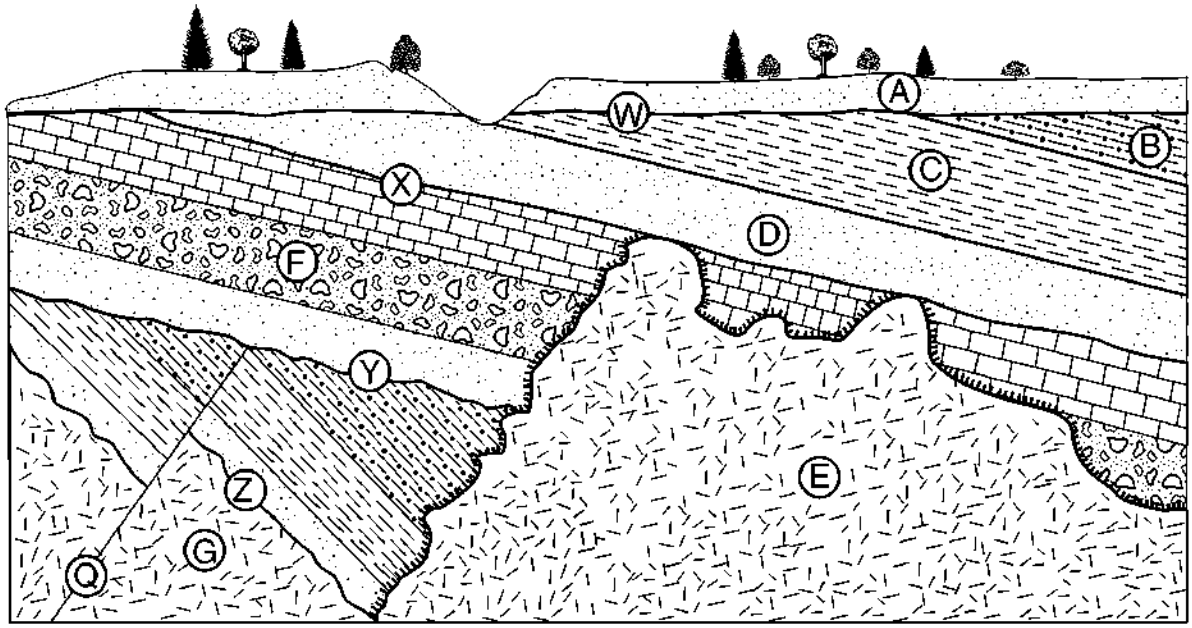
32. The three cross sections of sedimentary bedrock shown below represent widely separated surface exposures of layers that contain fossils. Letters *A, B, C,* and *D* represent four different marine fossils found in these rock layers.

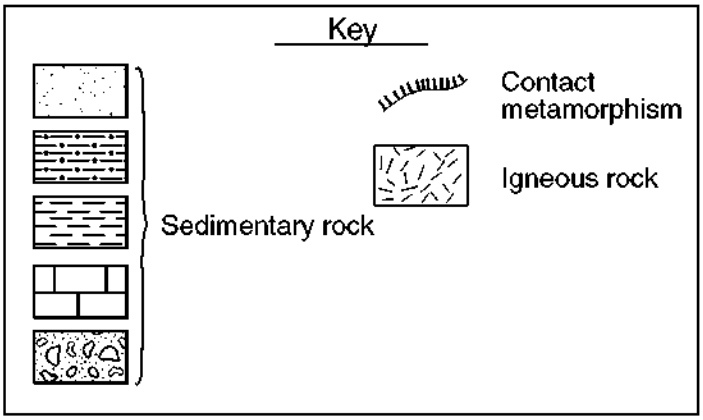


Which letter best represents an index fossil?

A) A B) B C) C D) D

Base your answers to questions **33** and **34** on the geologic cross section of bedrock shown below. *A* through G identify rock layers and Q represents a fault. Lines *W, X, Y,* and Z are locations of unconformities. The rocks have not been overturned.

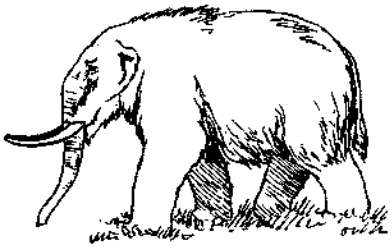




33. The unconformities shown in the cross section represent

A) buried erosional surfaces
B) locations of index fossils
C) volcanic ash deposits
D) boundaries between oceanic and continental crust

34. Rock layers *B*, *C*, and *D* formed during the Devonian Period. Which fossil might be found in these rock layers?

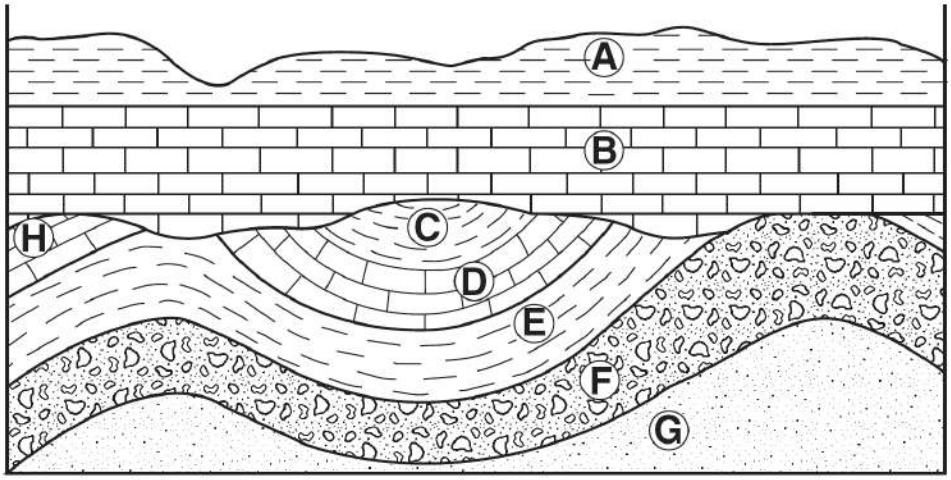
A) 
Mastodont

B) 
Elliptocephala

C) 
Phacops

D) 
Cystiphyllum

35. Base your answer to the following question on the geologic cross section below in which overturning has not occurred. Letters *A* through *H* represent rock layers.



Which two letters represent bedrock of the same age?

A) *A* and *E* B) *B* and *D* C) *F* and *G* D) *D* and *H*

36. In New York State there are no rocks of the following ages

A) Permian and Paleogene
B) Ordovician and Cretaceous
C) Ordovician and Cambrian
D) Triassic and Jurassic