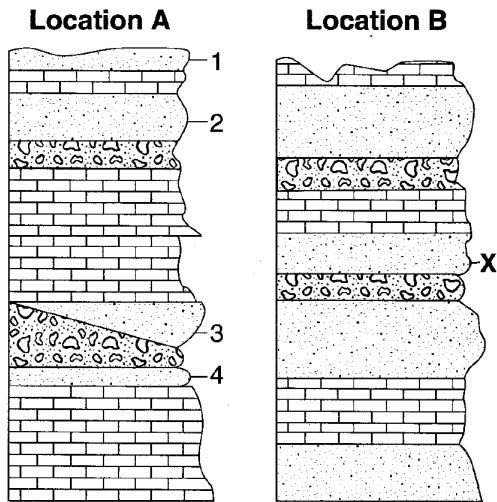
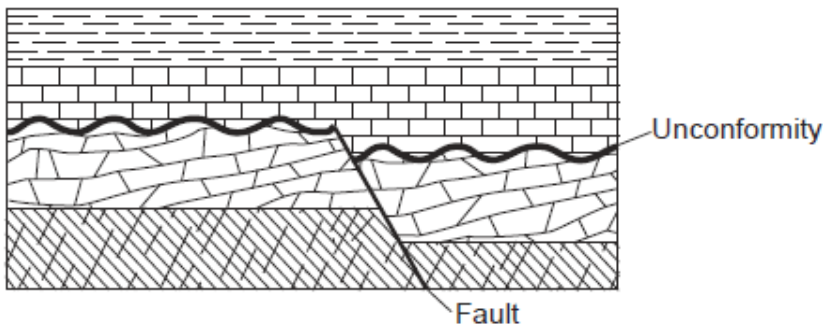


1. The cross sections below show the surface bedrock in two different locations 20 miles apart. Rock layers are labeled 1, 2, 3, 4, and *X*. The rock layers have not been overturned.



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
2. The geologic cross section below shows rock layers that have not been overturned.

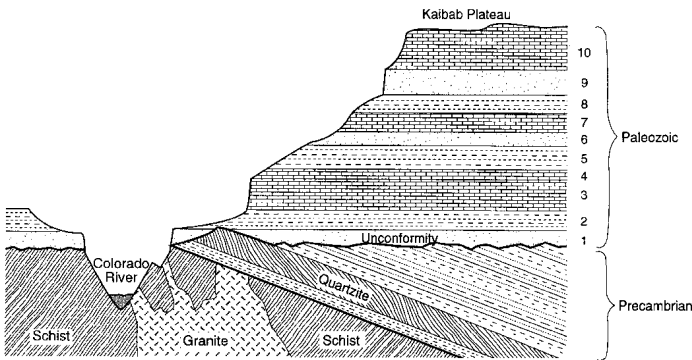


The fault is older than the

- A) slate B) marble C) unconformity **D) shale**

|

3. Base your answer to the following question on the geologic cross section below of the Grand Canyon. The numbers 1 through 10 represent Paleozoic sedimentary rock layers.

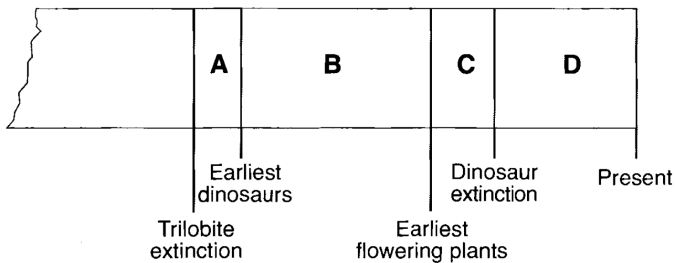


The unconformity between the Paleozoic sedimentary rocks and the Precambrian sedimentary rocks represents

- A) a gap in the geologic time record
 - B) an intrusion of igneous rock
 - C) an abundance of fossils
 - D) a region of metamorphic rock
4. Many parts of the rock record in New York State are missing. These parts are most likely missing because of

- A) uplift and erosion
- B) earthquakes and volcanic activity
- C) subsidence and deposition
- D) folding and faulting

5. The diagram below is a portion of a geologic timeline. Letters *A* through *D* represent the time intervals between the labeled events, as estimated by scientists.

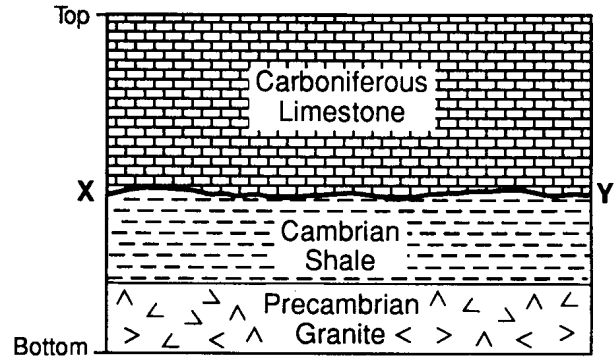


(Not drawn to scale)

Fossil evidence indicates that the earliest birds developed during which time interval?

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

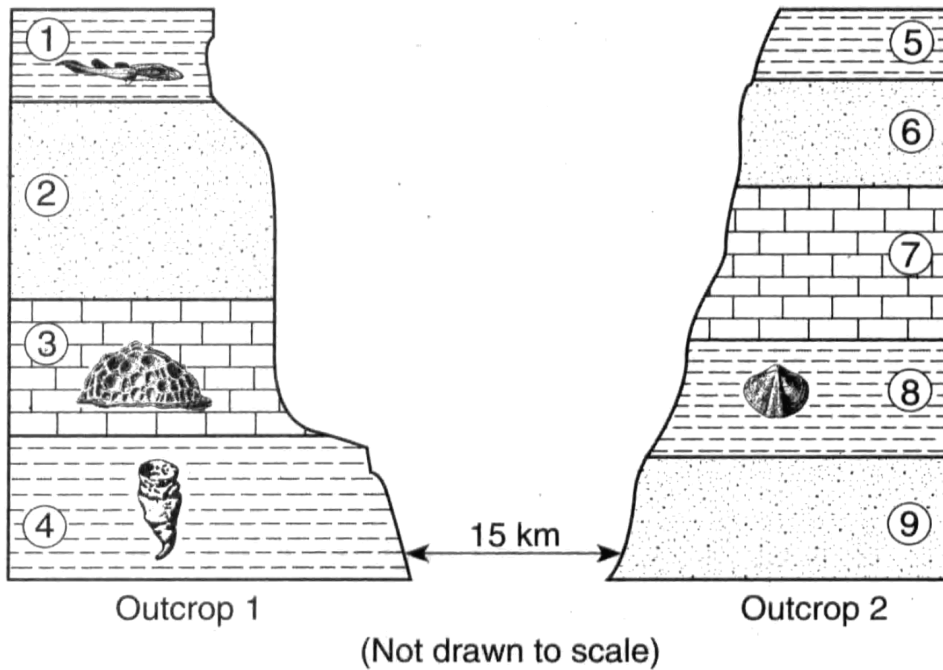
6. The diagram below shows a cross-sectional view of part of the Earth's crust.



What does the unconformity (buried erosional surface) at line *XY* represent?

- A) an area of contact metamorphism
- B) **a time gap in the rock record of the area**
- C) proof that no deposition occurred between the Cambrian and Carboniferous periods
- D) overturning of the Cambrian and Carboniferous rock layers

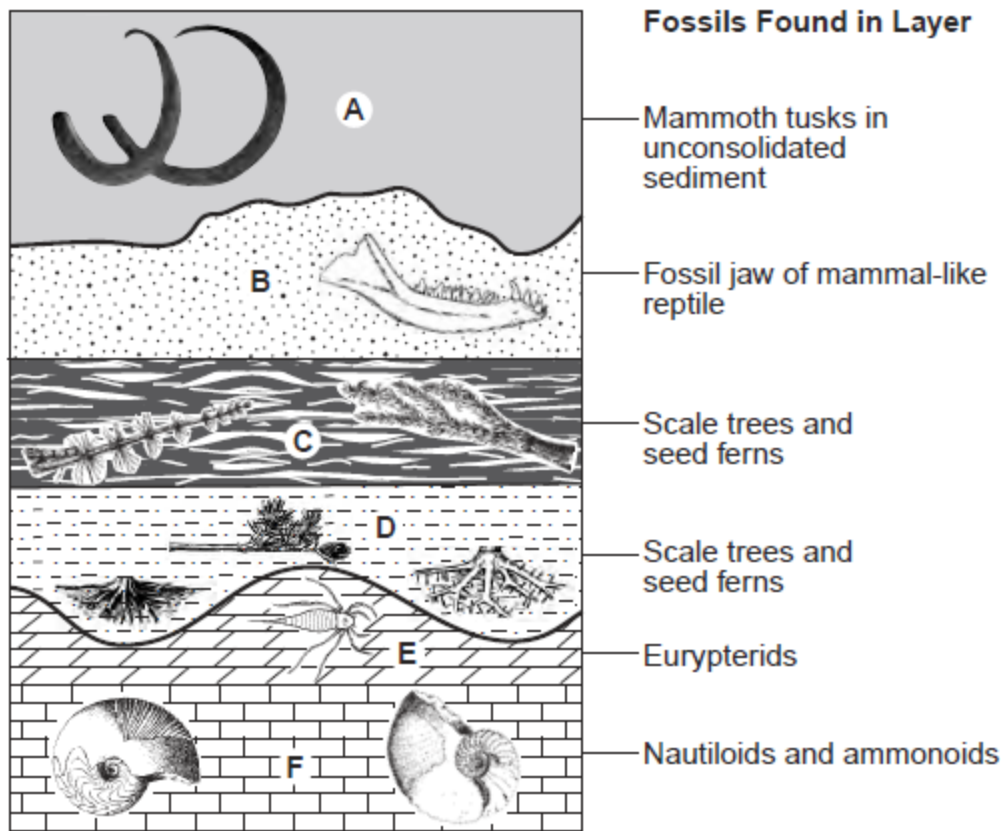
7. Base your answer to the following question on the cross sections below, which represent two bedrock outcrops 15 kilometers apart. The rock layers have been numbered for identification and some contain the index fossil remains shown.



Evidence best indicates that rock layers 4 and 8 were deposited during the same geologic period because both layers

- A) contain the same index fossil
- B) are composed of glacial sediments
- C) **contain index fossils of the same age**
- D) are found in the same area

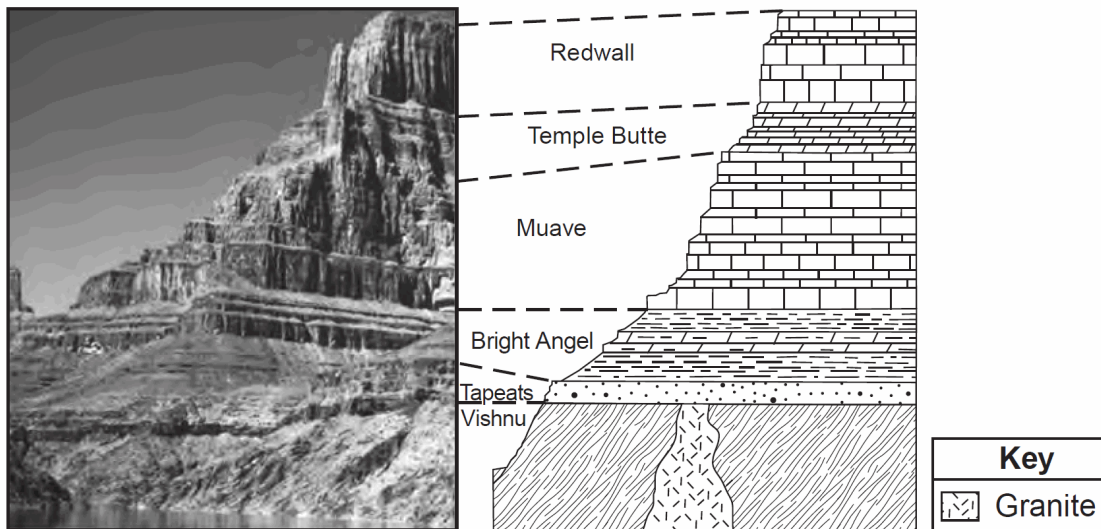
Base your answers to questions 8 through 11 on the geologic cross section below and on your knowledge of Earth science. The cross section represents rock and sediment layers, labeled *A* through *F*. Each layer contains fossil remains, which formed in different depositional environments. Some layers contain index fossils. The layers have *not* been overturned.



(Not drawn to scale)

8. The depositional environment during the time these layers and fossils were deposited
- A) was consistently marine
 - B) was consistently terrestrial (land)
 - C) changed from marine to terrestrial (land)**
 - D) changed from terrestrial (land) to marine
9. Which pair of organisms existed when the unconsolidated sediment in layer *A* was deposited?
- A) birds and trilobites
 - B) dinosaurs and mastodonts
 - C) ammonoids and grasses
 - D) humans and vascular plants**
10. During which geologic epoch was layer *F* deposited?
- A) Late Devonian
 - B) Middle Devonian**
 - C) Early Devonian
 - D) Late Silurian
11. Which rock layer formed mainly from the compaction of plant remains?
- A) *E*
 - B) *B*
 - C) *C*
 - D) *F*

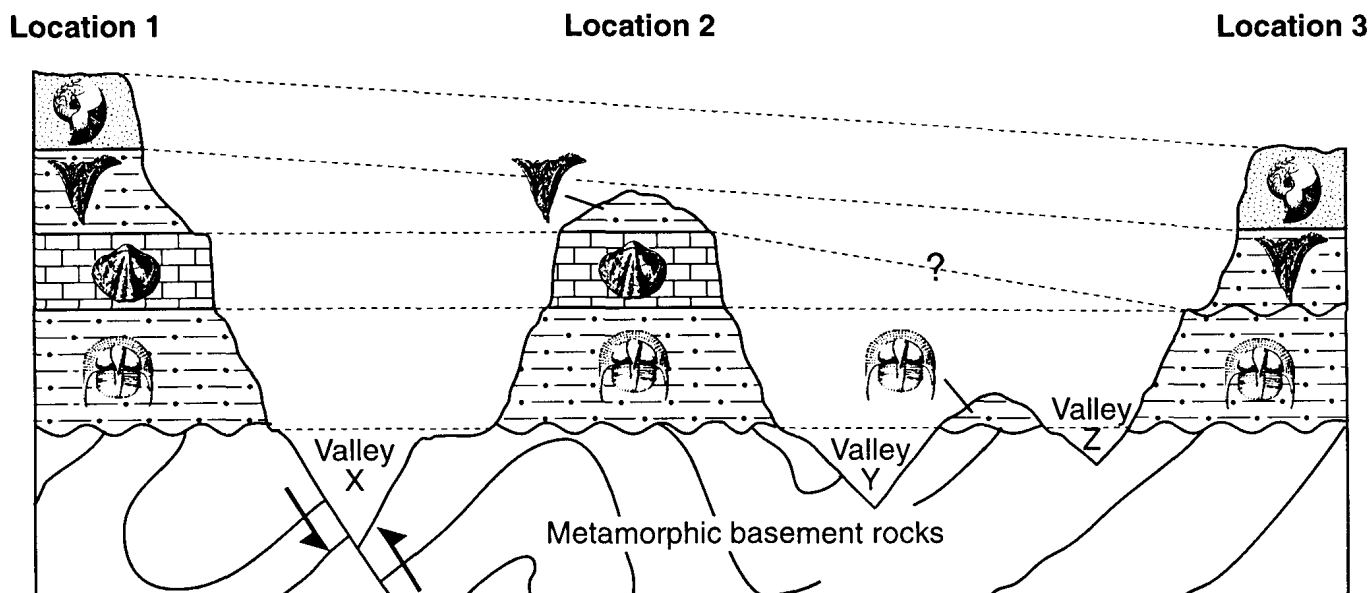
12. Base your answer to the following question on the photograph and cross section below and on your knowledge of Earth science. The sequence of rock types found in the walls of the Grand Canyon are shown. The names of rock formations are shown and the upper and lower boundaries of each formation are indicated by dashed lines. The rock layers have *not* been overturned.



The sequence of rock layers in the cross section provides evidence that the Muave formation is

- A) younger than the Temple Butte, but older than the Bright Angel
- B) younger than both the Temple Butte and the Bright Angel
- C) older than the Temple Butte, but younger than the Bright Angel**
- D) older than both the Temple Butte and the Bright Angel

Base your answers to questions 13 and 14 on the geologic cross section below, which shows a view of rock layers at Earth's surface. The dashed lines connect points of the same age. Major fossils contained within each rock layer are shown. The valleys are labeled X, Y, and Z.



13. The sedimentary rock layers at the three locations can be most accurately correlated by comparing the

- A) thickness of the sedimentary rock layers
- B) foliation bands in the metamorphic basement rocks
- C) fossils in the sedimentary rocks**
- D) minerals in the igneous rocks

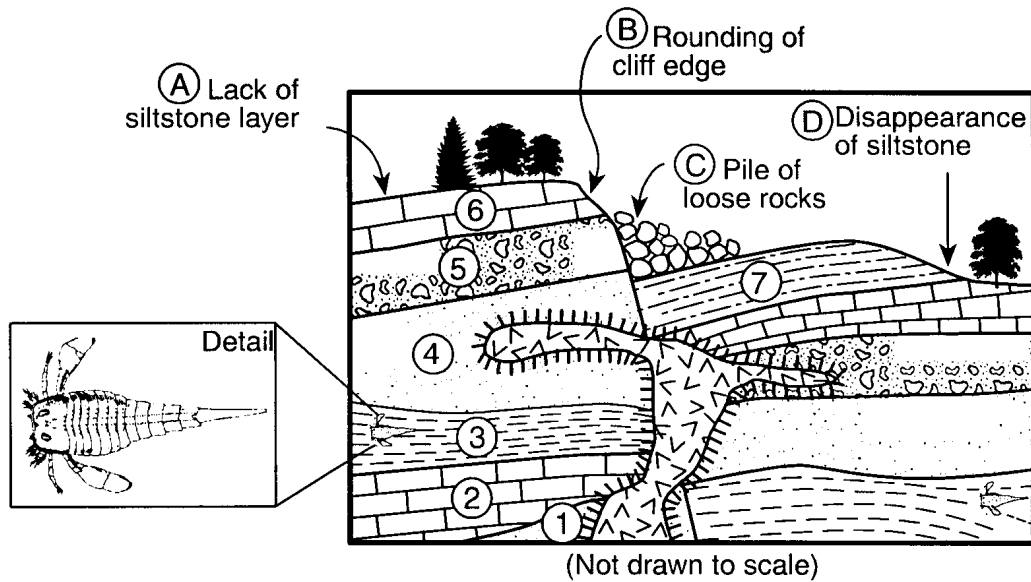
14. In which type of environment were the sediments that formed these sedimentary rock layers most likely deposited?

- A) glacial
- B) mountainous
- C) marine**
- D) terrestrial plateau

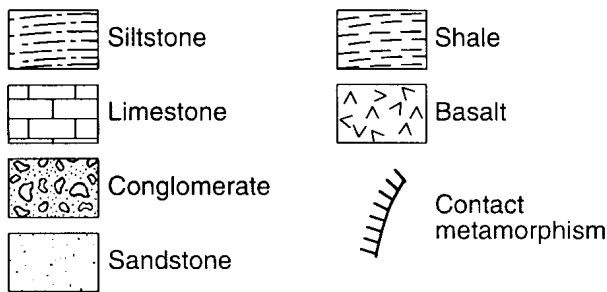
15. A volcanic ash layer between sedimentary rock layers is used by geologists to

- A) determine Earth's absolute age
- B) predict global warming
- C) locate an earthquake epicenter
- D) correlate widely separated rock formations**

16. 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.



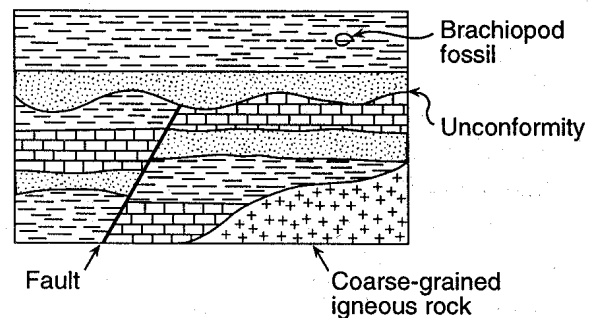
Key



The fossil found in layer 3 indicates that the age of this shale layer is approximately

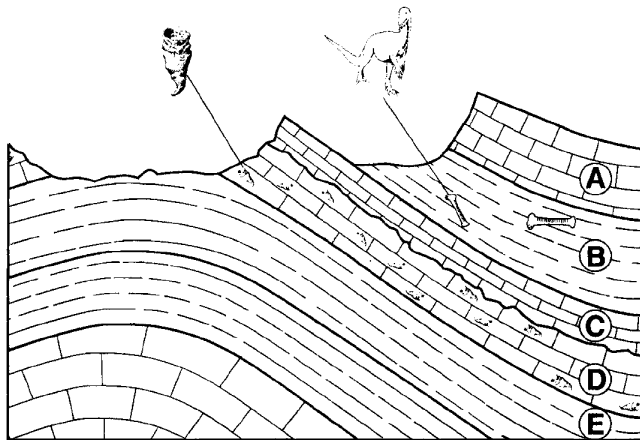
- A) 70 million years B) 220 million years
 C) **430 million years** D) 520 million years
17. Which statement about the species of animals and plants that lived on Earth in the past is best supported by the fossil record?
- A) **Most became extinct.**
 B) Most lived on the land.
 C) Most were preserved in metamorphic rock.
 D) Most appeared during the Cambrian Period.

18. Which feature in the geologic cross section below was formed by erosion?



- A) **unconformity**
 B) fault
 C) brachiopod fossil
 D) coarse-grained igneous rock

Base your answers to questions 19 and 20 on the geologic cross section below of a region of Earth's crust. Rock layers A through E have been labeled. Two index fossils are shown and their locations within the rock layers are indicated.



19. Which list of rock layers best matches the deposited sediments from which they were formed?

- A)

A—calcite precipitates
B—clay
C—calcite precipitates
D—shell fragments
- B)

A—quartz sand
B—silt
C—quartz sand
D—shell fragments
- C)

A—plant remains
B—mica
C—plant remains
D—clay
- D)

A—calcite precipitates
B—halite precipitates
C—hematite
D—gypsum

20. Approximately how many million years older than bedrock layer B is bedrock layer D?

- A) 150 B) 220 C) 340 D) 420

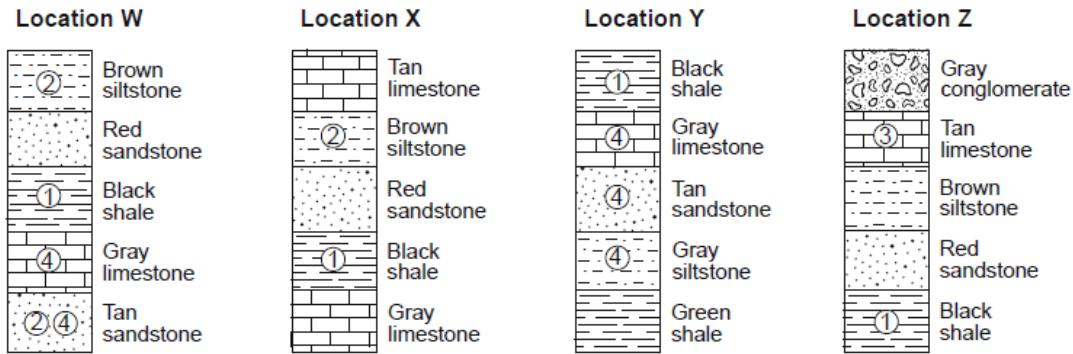
21. One reason *Tetragraptus* is considered a good index fossil is that *Tetragraptus*

- A) existed during a large part of the Paleozoic Era
- B) has no living relatives found on Earth today
- C) existed over a wide geographic area**
- D) has been found in New York State

22. What evidence suggests that a mass extinction of the dinosaurs occurred at the end of the Cretaceous Period?

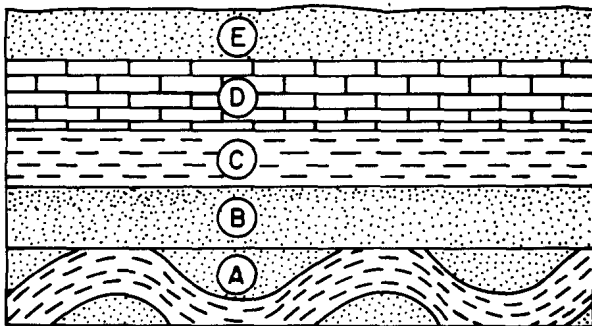
- A) an absence of dinosaur fossils in Paleocene bedrock**
- B) drawings of dinosaurs made by humans in caves during the Paleocene Epoch
- C) an abundance of dinosaur fossils in Early Cretaceous bedrock
- D) evolution of dinosaurs during the Late Cretaceous Epoch

Base your answers to questions 23 through 25 on the rock columns below and on your knowledge of Earth science. The rock columns represent four widely separated locations, *W*, *X*, *Y*, and *Z*. Number 1, 2, 3, and 4 represent fossils. The rock layers have *not* been overturned.



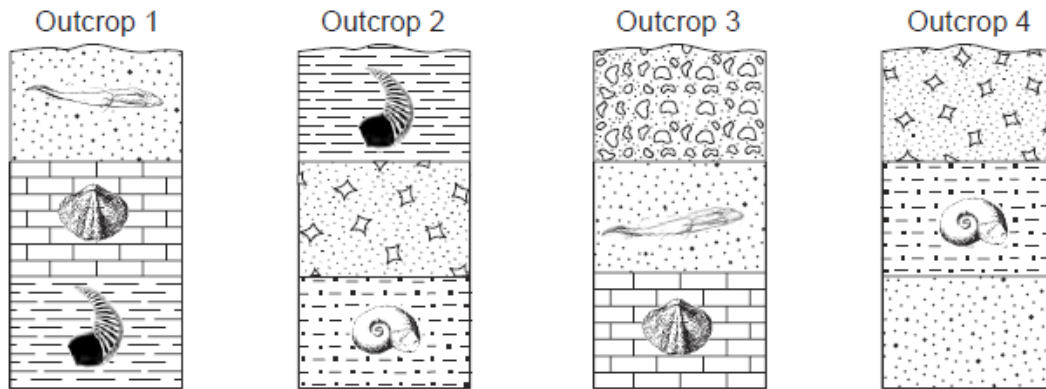
23. Which rock layer is the oldest?
- A) tan sandstone B) gray limestone C) **green shale** D) black shale
24. Which numbered fossil best represents an index fossil?
- A) **1** B) 2 C) 3 D) 4
25. Which rock layer formed from the deposition of land-derived sediments that had a uniform particle size of about 0.01 cm in diameter?
- A) brown siltstone B) black shale
C) gray conglomerate D) **red sandstone**

26. In the geologic cross section shown below, between which two layers is part of the rock record most likely missing?



- A) **A and B** B) B and C
C) C and D D) D and E

-
27. Four rock outcrops, labeled 1, 2, 3, and 4, found within the same plateau, are represented below. Index fossils found in some of the rock layers are shown. The rock layers have *not* been overturned.



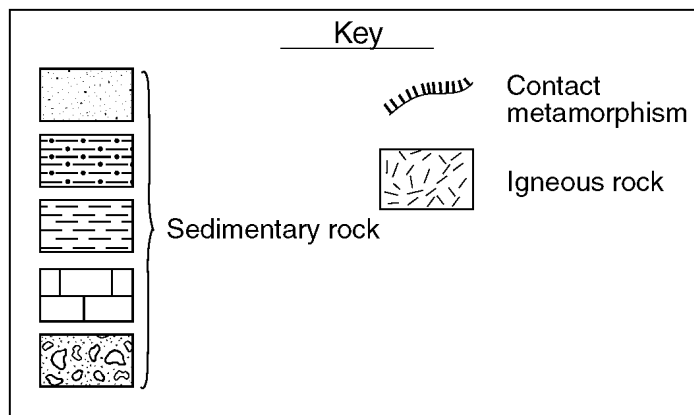
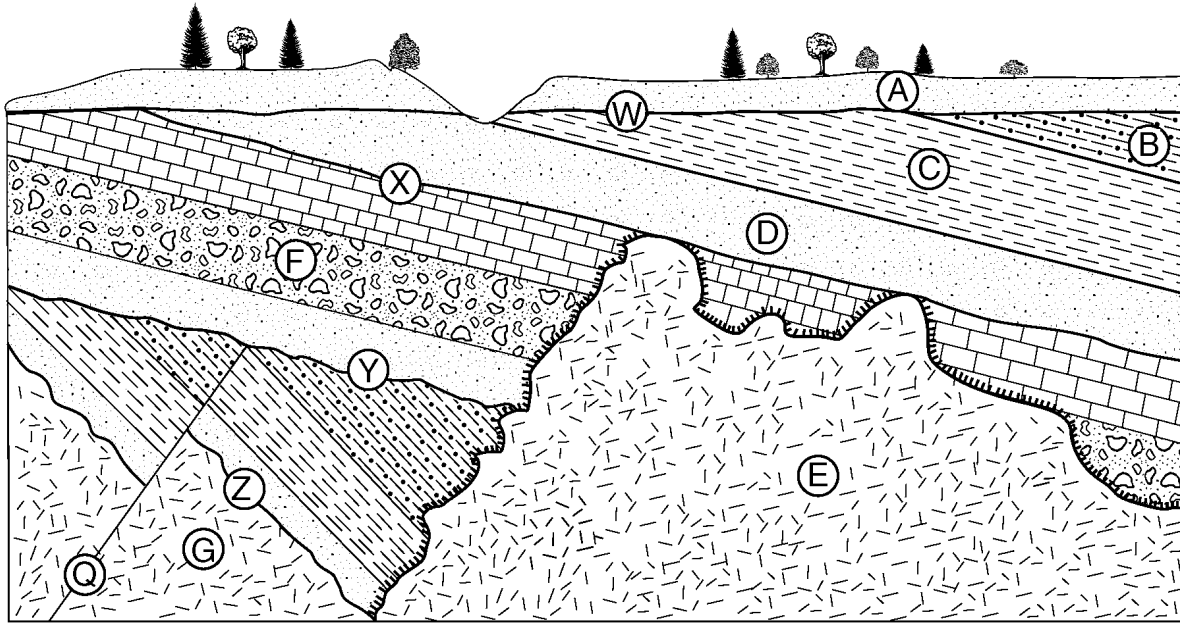
Which rock layer is the youngest?

- A) sandstone in outcrop 1 B) breccia in outcrop 2
C) **conglomerate in outcrop 3** D) sandstone in outcrop 4
-

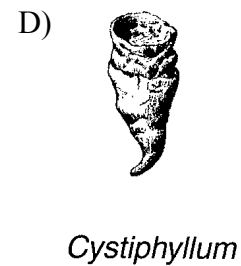
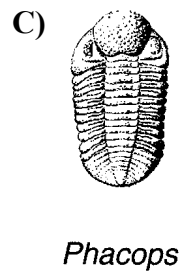
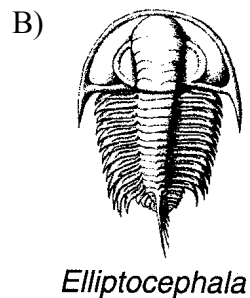
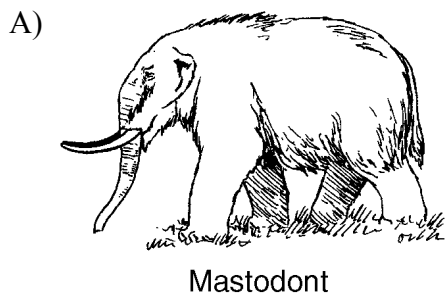
28. Which bedrock feature is most useful in correlating sedimentary bedrock in one area with sedimentary bedrock in another area?

- A) **index fossils** B) cementing agent
C) texture D) color
-

29. Base your answer to the following question 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.



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



30. Which characteristics of a fossil would make it useful as an index fossil in determining the relative age of widely separated rock layers?

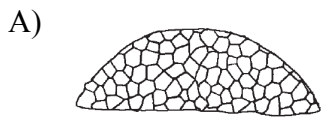
- A) a wide time range and a narrow geographic range
- B) a wide time range and a wide geographic range
- C) **a narrow time range and a wide geographic range**
- D) a narrow time range and a narrow geographic range

31. The index fossil shown below has been found in New York State sedimentary bedrock.



Phacops

Which other index fossil could also be found in New York State bedrock of the same age?



Lichenaria



Elliptocephala

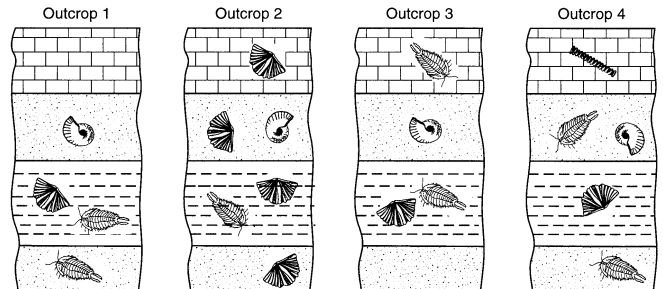


Manticoceras



Eospirifer

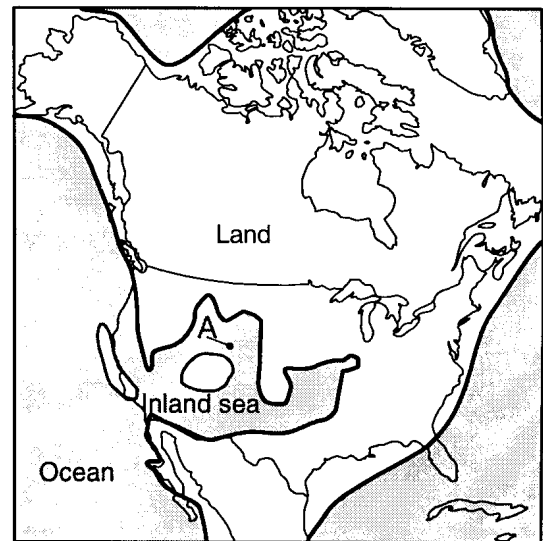
32. The diagrams below represent the rock layers and fossils found at four widely separated rock outcrops.



Which fossil appears to be the best index fossil?

- A) B) C) D)
33. Which characteristic is most useful in correlating Devonian-age sedimentary bedrock on the East Coast with Devonian-age sedimentary bedrock in other parts of the world?

- A) color
 - B) **index fossils**
 - C) rock types
 - D) particle size
34. The shaded portion of the map below of North America shows areas believed to have been below sea level during the Pennsylvanian Period. Point A is a location in the inland sea.







Present-day evidence of the existence of the inland sea during the Pennsylvanian Period is best provided by

- A) **marine fossils at point A**
- B) seawater at point A
- C) metamorphic rock at point A
- D) terrestrial rock at point A






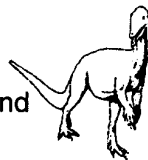


35. Shark and coral fossils are found in the rock record of certain land areas. What does the presence of these fossils indicate about those areas?

- A) They have undergone glacial deposition.
- B) They were once covered by thick vegetation.
- C) They have undergone intense metamorphism.
- D) They were once covered by shallow seas.**

36. Which index fossil may be found in the surface bedrock near Ithaca, New York?

- | | |
|--|---|
| A) 
Elliptocephala | B) 
Coelophysis |
| C) 
Bothriolepis | D) 
Maclurites |

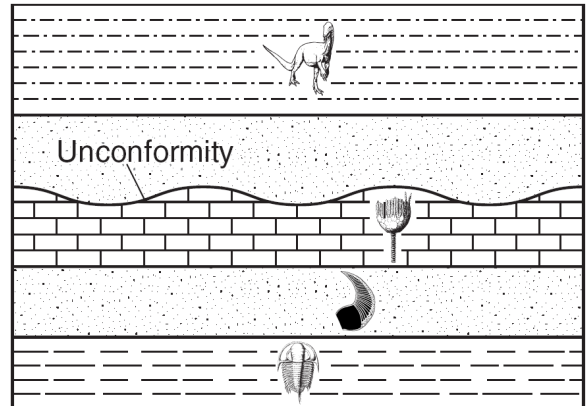
37. Which pair of index fossils can be found in Ordovician bedrock?

- A)  and 
- B)  and 
- C)  and 
- D)  and 

38. Thin layers of volcanic ash act as excellent time markers in the correlation of bedrock because volcanic ash

- A) is easily eroded and lasts only a short time on Earth's surface
- B) stays in the atmosphere for millions of years
- C) is deposited over millions of years
- D) falls to Earth over a large area in a short period of time**

39. The geologic cross section below shows an unconformity in New York State bedrock layers that have not been overturned. Index fossils found throughout some rock layers are shown.

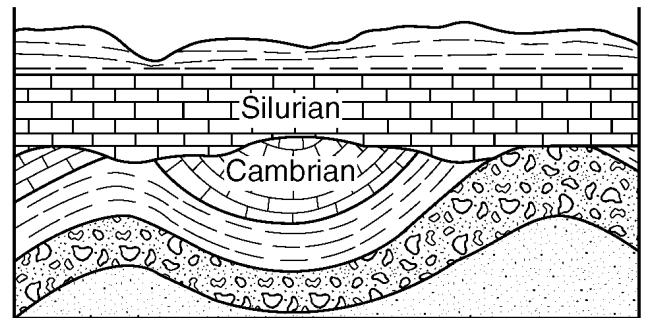


(Not drawn to scale)

Which New York State index fossil may have been present in a rock layer that is missing due to the unconformity?

- | | |
|---|--|
| A) 
Coelophysis | B) 
Bothriolepis |
| C) 
Lichenaria | D) 
Maclurites |

40. The geologic cross section below shows the geologic age of two rock layers separated by an unconformity.



The unconformity at the bottom of the Silurian rock layer indicates a gap in the geologic time record. What is the *minimum* time, in millions of years, shown by the gap?

- A) 13 **B) 47** C) 101 D) 126

41. Which group of organisms is inferred to have existed for the *least* amount of time in geologic history?

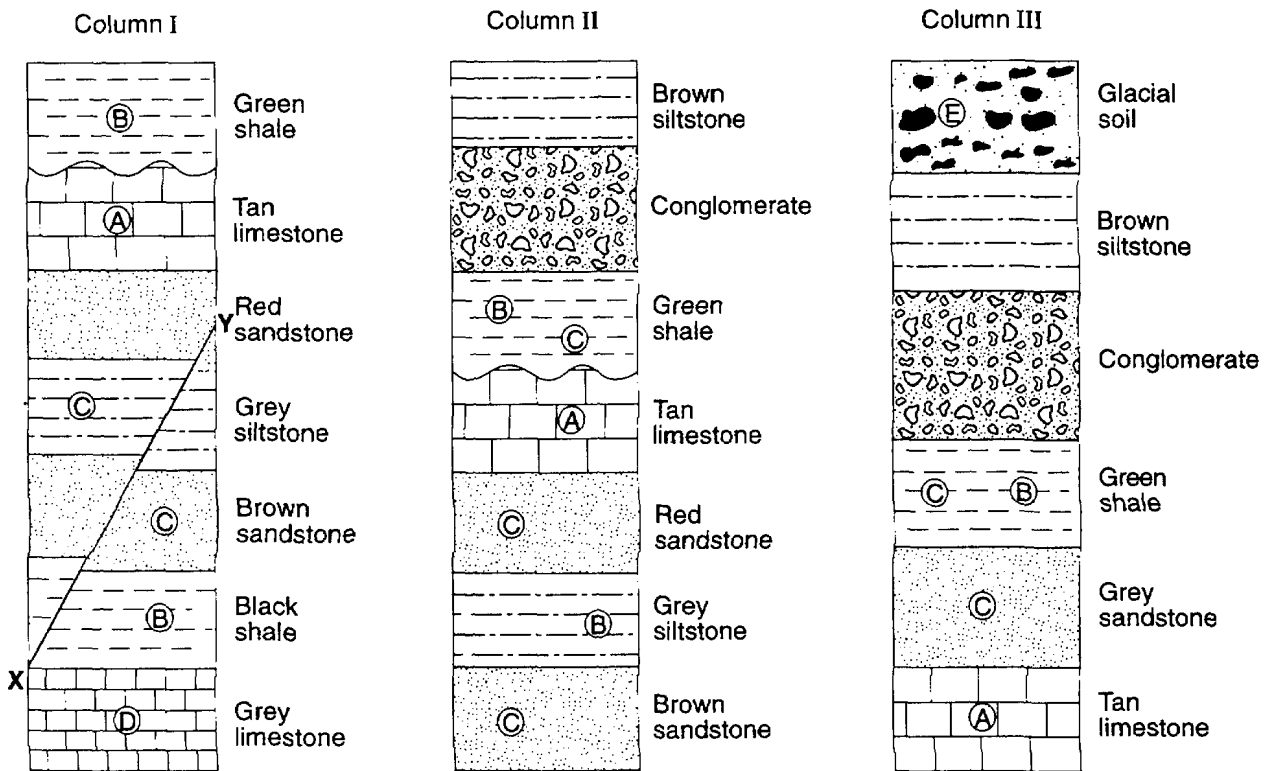
- | | |
|----------------|--------------------------|
| A) trilobites | B) dinosaurs |
| C) eurypterids | D) placoderm fish |

42. The best indicator of an area's ancient environmental conditions and climates would be the

- A) type and distribution of fossils
- B) present plant and animal life
- C) banding patterns of metamorphosed rocks
- D) amount of carbon-14 found in sedimentary layers

43. 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.

Rock Outcrops

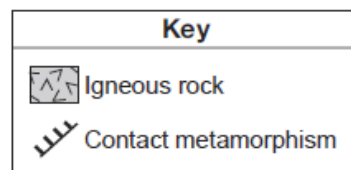
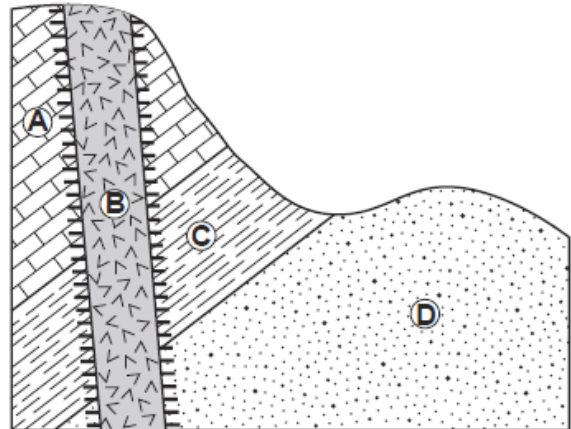


The wavy line located between the green shale and the tan limestone layers in columns I and II most likely represents

- A) contact metamorphism
- B) a volcanic ash layer
- C) a buried erosional surface
- D) an igneous intrusion

44. Organisms that later became good index fossils lived over a
- A) wide geographic area and existed for a long geologic time
 - B) wide geographic area and existed for a short geologic time**
 - C) limited geographic area and existed for a long geologic time
 - D) limited geographic area and existed for a short geologic time
45. In order for an organism to be used as an index fossil, the organism must have been geographically widespread and must have
- A) lived on land
 - B) lived in shallow water
 - C) been preserved by volcanic ash
 - D) existed for a geologically short time**
46. Sedimentary rock units several hundred kilometers apart could best be correlated by comparing the
- A) color and thickness of each rock unit
 - B) fossils found in each rock unit**
 - C) types of soil located above each rock unit
 - D) degree of weathering and erosion of each rock unit

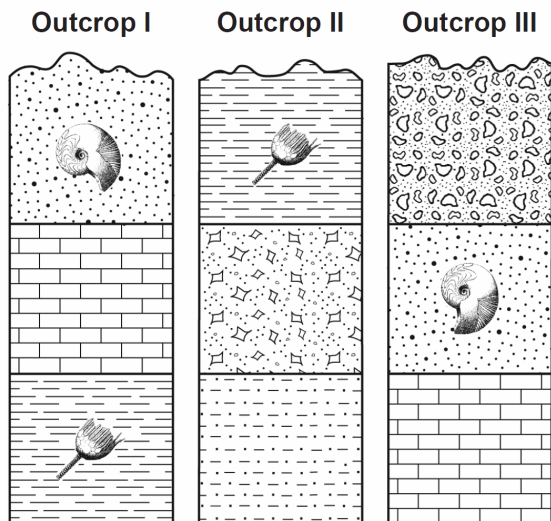
47. The bedrock cross section below contains rock formations *A*, *B*, *C*, and *D*. The rock formations have *not* been overturned.



Which sequence represents the relative ages of these rock formations, from oldest to youngest?

- A) $B \rightarrow A \rightarrow C \rightarrow D$
- B) $B \rightarrow D \rightarrow C \rightarrow A$
- C) $D \rightarrow C \rightarrow A \rightarrow B$**
- D) $D \rightarrow B \rightarrow A \rightarrow C$

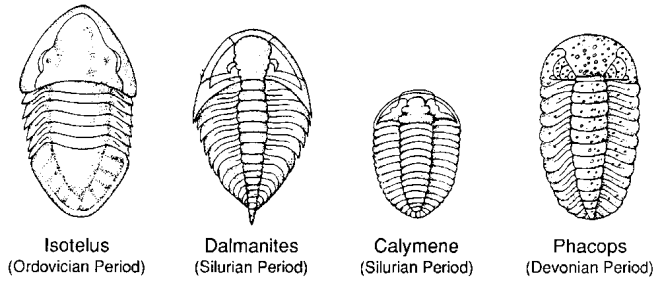
48. The cross sections below represent three outcrops, labeled I, II, and III, containing some New York State index fossils. The rock layers have *not* been overturned.



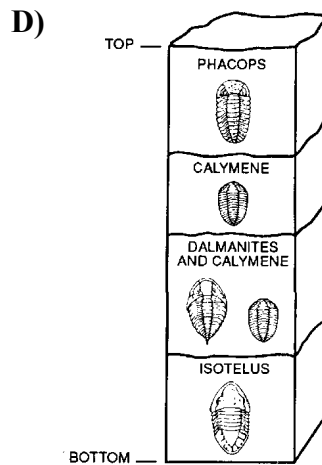
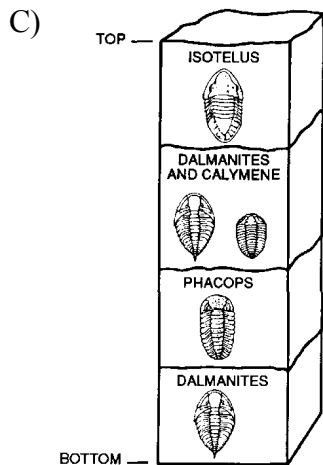
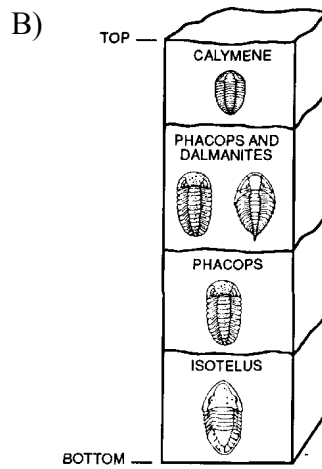
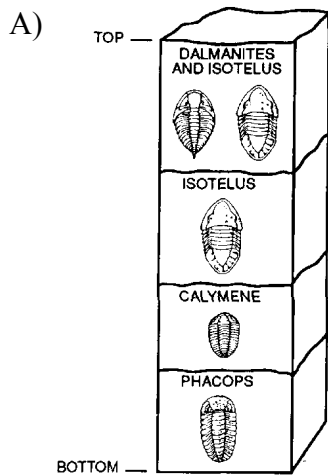
When the rock layers in the three outcrops are correlated, the oldest layer is the

- A) shale layer in outcrop I
- B) siltstone layer in outcrop II
- C) limestone layer in outcrop III
- D) conglomerate layer in outcrop III

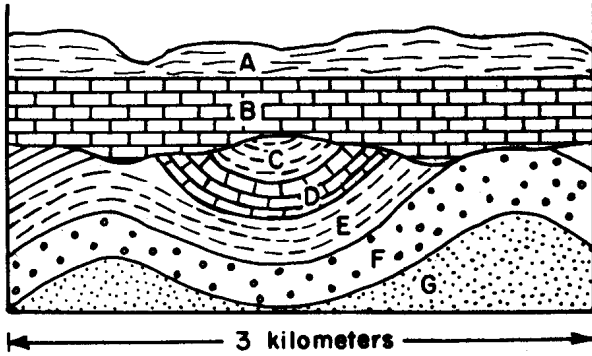
49. Base your answer to the following question on the diagrams of fossil trilobites shown below. The geologic period in which each trilobite form existed is given.



The diagrams below show different geologic cross sections of rock layers in the Earth's crust. Which cross section best shows the relative location of these four types of trilobites if overturning of the rock layers has not occurred?



50. The diagram below shows a geologic cross section of a region where no faulting has occurred.



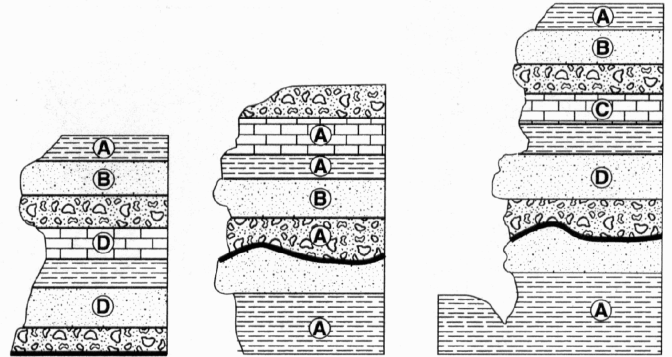
Which statement about the geologic history of the area is best supported by the evidence in the diagram?

- A) The rocks at *A* formed before those at *B*.
 B) The rocks at *D* folded after the deposition of rock layer *B*.
 C) **A long period of erosion took place before the deposition of rock layer *B*.**
 D) The major agent of erosion acting on the present surface is ice.
51. The index fossils shown below are the remains of organisms that lived during which geologic era?



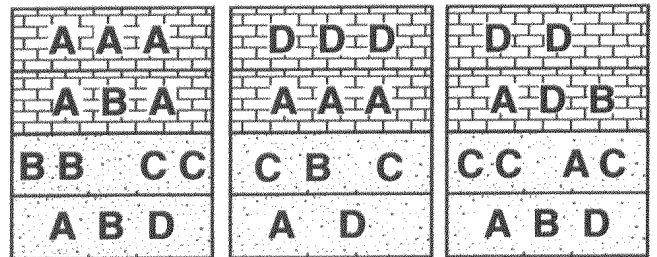
- A) Precambrian B) **Paleozoic**
 C) Cenozoic D) Mesozoic

52. The cross sections below represent three widely separated outcrops of exposed bedrock. Letters *A*, *B*, *C* and *D* represent fossils found in the rock layers.



Which fossil appears to have the best characteristics of an index fossil?

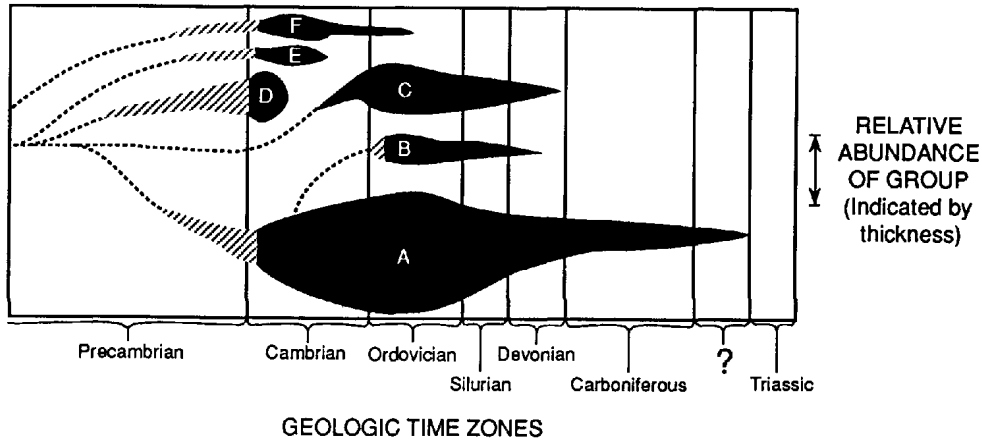
- A) *A* B) ***B*** C) *C* D) *D*
53. The three cross sections of sedimentary bedrock shown below represent widely separated surface exposures of layers that contain fossils. Letters *A*, *B*, *C*, and *D* represent four different marine fossils found in these rock layers.



Which letter best represents an index fossil?

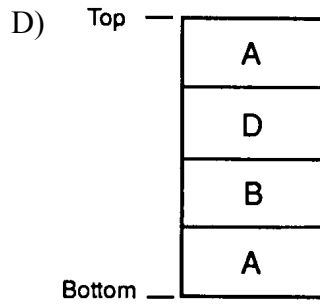
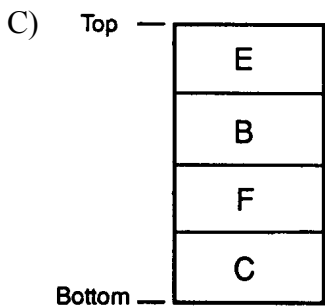
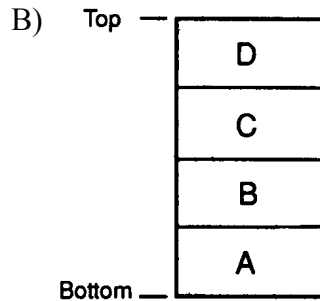
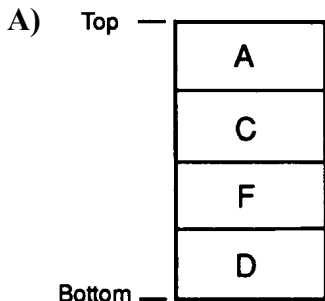
- A) *A* B) *B* C) *C* D) *D*

Base your answers to questions 54 and 55 on the graph below which shows the development, growth in population, and extinction of the six major groups of trilobites, labeled A through F.

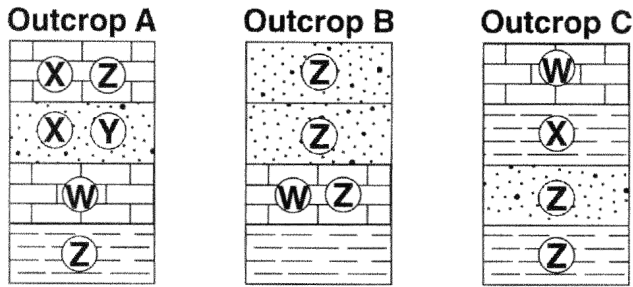


- KEY TO SYMBOLS:
- Population based on fossil record
 - Population presumed: fossil evidence rare
 - Assumed evolutionary relationship

54. The fossil evidence that forms the basis for this graph was most likely found in
- lava flows of ancient volcanoes
 - sedimentary rock that formed from ocean sediment**
 - granite rock that formed from former sedimentary rocks
 - metamorphic rock that formed from volcanic rocks
55. The diagrams below represent rock outcrops in which the rock layers have not been overturned. Which rock outcrop shows a possible sequence of the trilobite fossils?



56. The cross sections below represent three widely separated bedrock outcrops labeled *A*, *B*, and *C*. Letters *W*, *X*, *Y*, and *Z* represent fossils found in the rock layers.



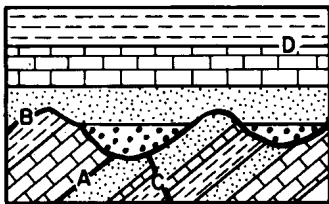
Which fossil could best be used as an index fossil?

- A) *W* B) *X* C) *Y* D) *Z*

57. An unconformity between two sedimentary layers is most likely produced by

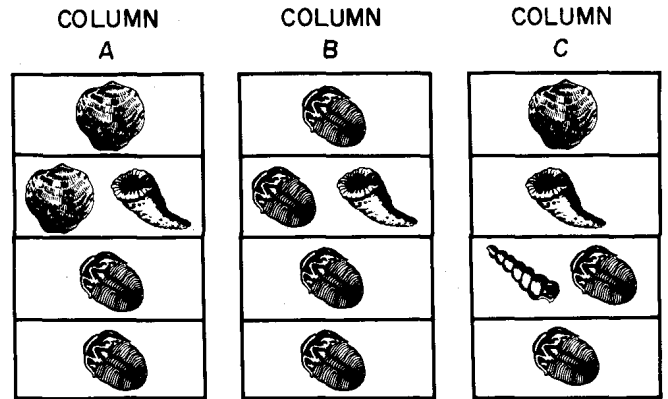
- A) the deposition of gravel followed by the deposition of sand and silt
 B) continuous sedimentation in a deep basin over a long period
 C) **uplift followed by extensive erosion, submergence, and deposition**
 D) a period of extrusive vulcanism followed by another period of extrusive vulcanism

58. The diagram below represents a cross section of rock layers. Along which line is a former interface between erosion and deposition most likely to be found?



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

59. The geologic columns *A*, *B*, and *C* in the diagrams below represent widely spaced outcrops of sedimentary rocks. Symbols are used to indicate fossils found within each rock layer. Each rock layer represents the fossil record of a different geologic time period.



According to the diagrams for all three columns, which would be the best index fossil?

- A) B) C) D)

60. Three extinct organisms are shown in the diagrams below.



Cystiphyllum, a solitary coral



Baragwanathia, a lycopod — an early land plant

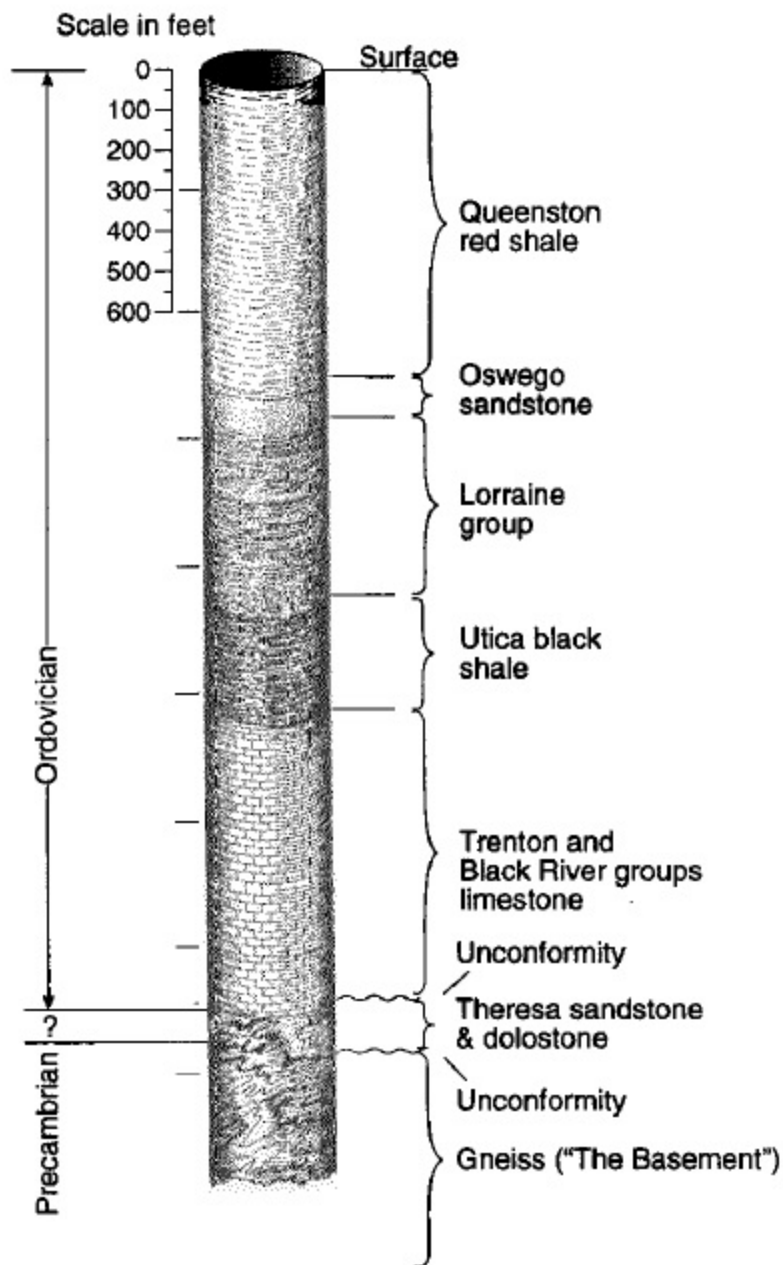


Palaeophonus, a scorpion — one of the first land animals

Which other life-form reached its peak development during the same period in geologic history that these three life-forms first appeared on Earth?

- A) dinosaurs B) stromatolites
 C) mastodonts D) **eurypterids**

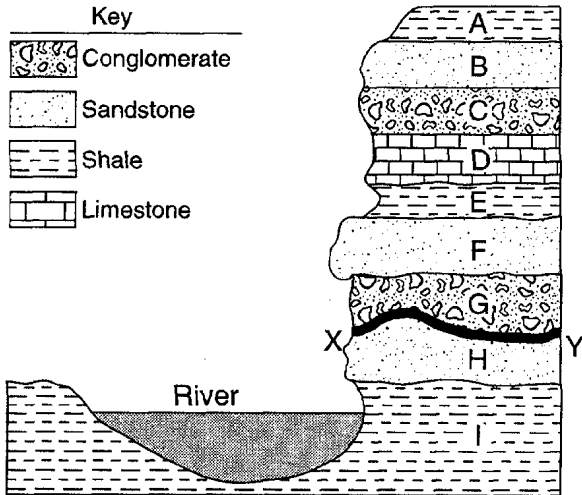
61. Base your answer to the following question on the Earth Science Reference Tables, the core section below, and your knowledge of Earth Science. The core section shows the subsurface bedrock geology for a location north of Buffalo, New York.



What do the unconformities shown near the base of the drill core indicate?

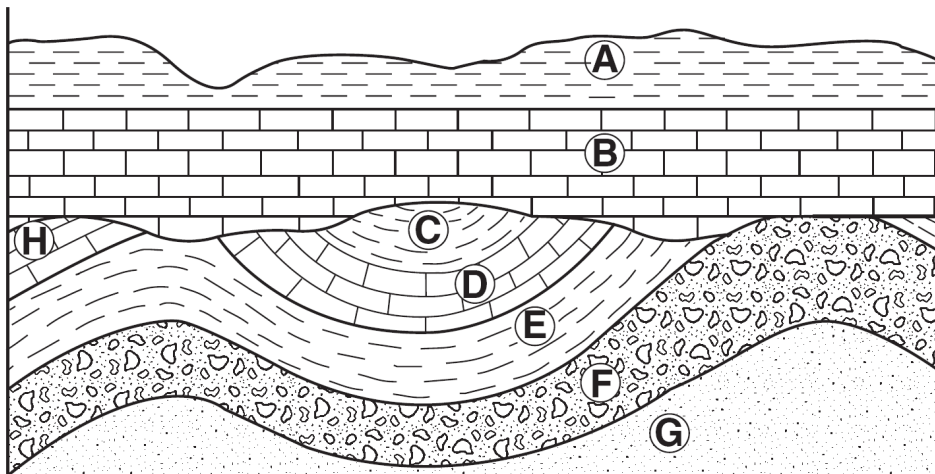
- A) The continental plates were separated for a long period of time.
- B) Part of the geologic rock record has been destroyed.**
- C) This area was covered by a warm, shallow sea.
- D) Extinction of many kinds of living things was widespread.

62. Base your answer to the following question on the diagram below, which is a geologic cross section of an area where a river has exposed a 300-meter cliff of sedimentary rock layers. The rock layers are labeled *A* through *I*. Line *XY* represents a gap in the geologic record (an unconformity).



A long period of erosion most likely occurred between the deposition of which layers?

- A) *C* and *D* B) *D* and *E*
 C) *F* and *G* D) ***G* and *H***
63. 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.



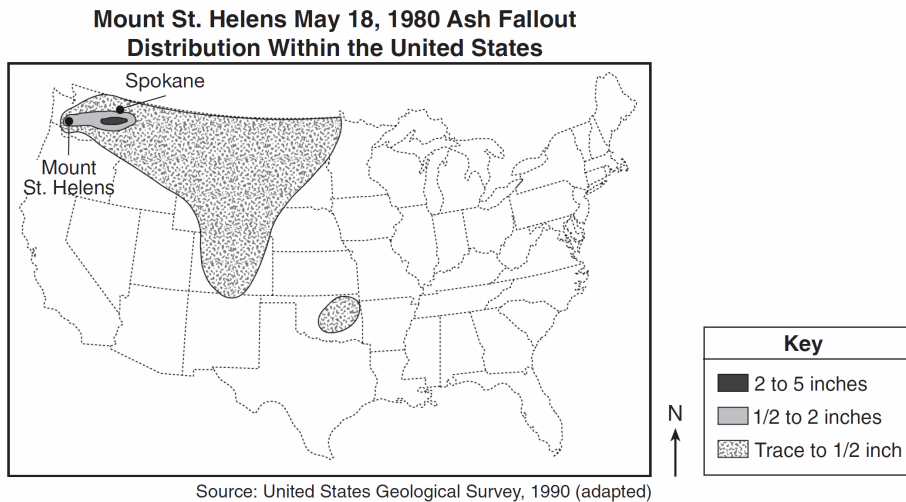
Which sequence of events most likely caused the unconformity shown at the bottom of rock layer *B*?

- A) **folding** → **uplift** → **erosion** → **deposition**
 B) intrusion → erosion → folding → uplift
 C) erosion → folding → deposition → intrusion
 D) deposition → uplift → erosion → folding

64. Based on fossil evidence, most scientists infer that

- A) life has not changed significantly throughout Earth's history
- B) life has evolved from complex to simple forms
- C) many organisms that lived on Earth have become extinct**
- D) mammals developed early in the Precambrian time period

65. The map below shows the distribution of ash across the United States as a result of the May 18, 1980 volcanic eruption of Mount St. Helens.



Volcanic ash deposits such as these are usually excellent geologic time markers because they

- A) occur at regular time intervals
- B) spread over a large area in a short amount of time**
- C) represent a time gap in the rock record
- D) contain index fossils from different time periods

66. The presence of which index fossil in the surface bedrock most likely indicates that a forest environment once existed in the region?

- A) *Aneurophyton*
- B) *Cystiphyllum*
- C) *Centroceras*
- D) *Bothriolepis*

67. Two layers of sandstone exist along opposite coasts of the United States. Which characteristic of the layers would give the best evidence that they were deposited about the same time?

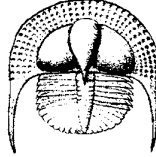
- A) fossil remains**
- B) chemical composition
- C) distance below the surface
- D) particle size

68. Which index fossil has been found in Ordovician-age bedrock?

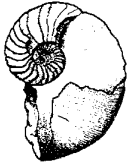
A)



B)



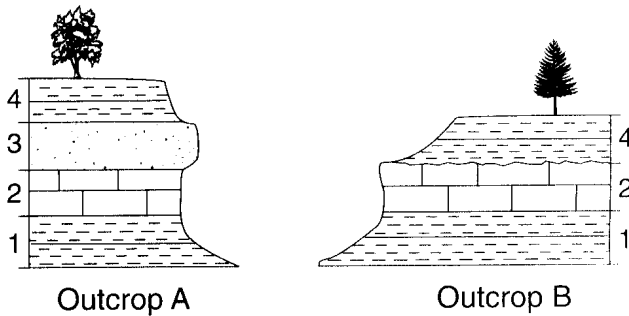
C)



D)



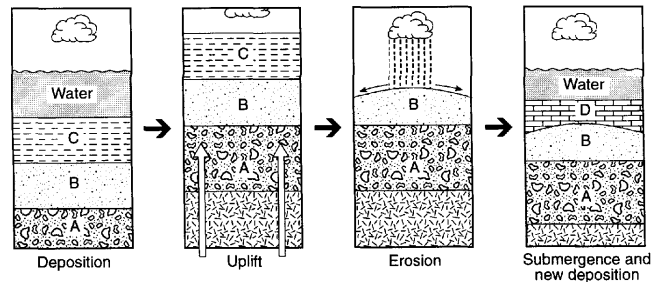
69. Bedrock outcrops *A* and *B* are located at two different locations along the Mississippi River. Rock layers 1, 2, and 4 are the same in both outcrops.



Which statement best explains why rock layer 3 is missing from outcrop *B*?

- A) A fault exists between outcrops *A* and *B*.
- B) Erosion created an unconformity between rock layers 2 and 4 in outcrop *B*.**
- C) A volcanic eruption destroyed rock layer 3 in outcrop *B*.
- D) Metamorphism of outcrop *A* created rock layer 3.

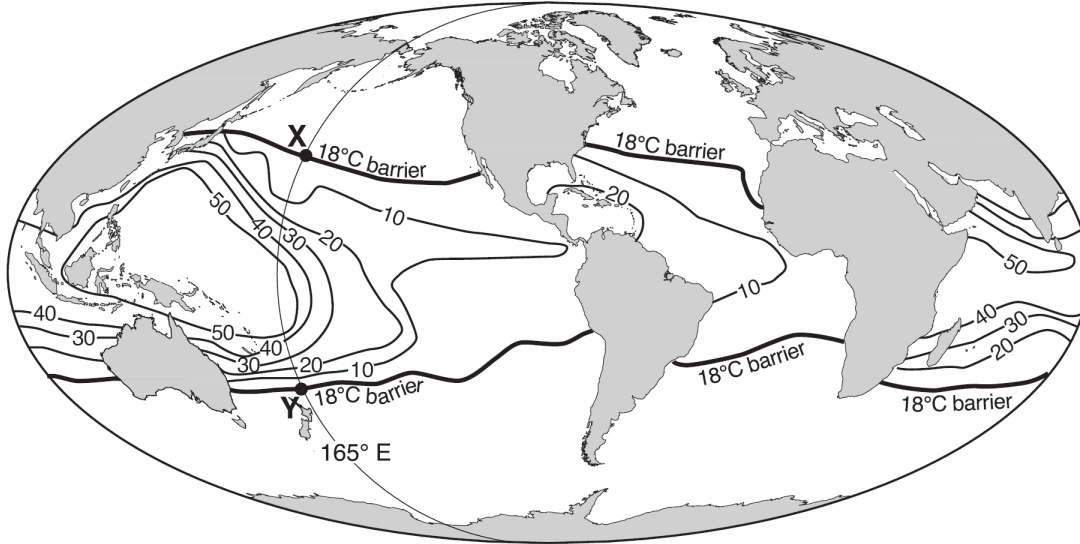
70. The diagrams below show the sequence of events that formed sedimentary rock layers *A*, *B*, *C*, and *D*.







This sequence of events best illustrates the

- A) formation of a buried erosional surface (unconformity)**
- B) movement of rock layers along a fault between layers *B* and *D*
- C) overturning of rock layers
- D) metamorphism of sandstone (layer *B*) into quartzite

71. Base your answer to the following question on the map below, which shows coral reef distribution and diversity (number of different coral types) around the world. Isolines on the map represent the number of different types of coral. Coral reefs are found mostly in shallow tropical waters and do not grow when ocean temperatures fall below 18°C. The 18°C barrier represents the outer boundaries within which coral reefs normally grow. Points X and Y are locations on the map.



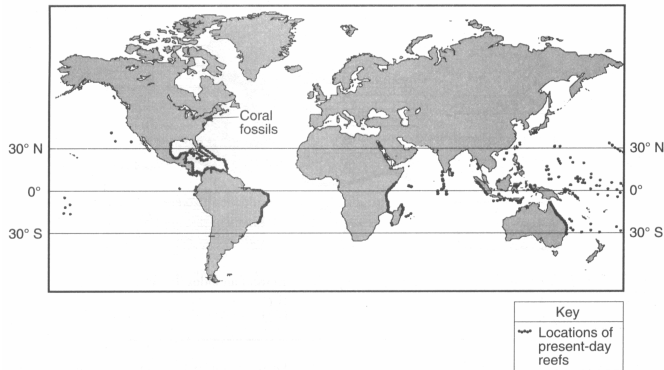
Which index fossil is an ancestor of the organisms whose distribution is shown on the map?

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

72. What is the best interpretation of the two statements below?

- Corals are marine animals that live in warm ocean water.
 - Fossil corals are found in surface bedrock in areas of New York State.
- A) Corals once lived on land.
- B) Corals have migrated northward.
- C) Parts of New York State are now covered by warm ocean water.
- D) Parts of New York State were once covered by warm ocean water.**

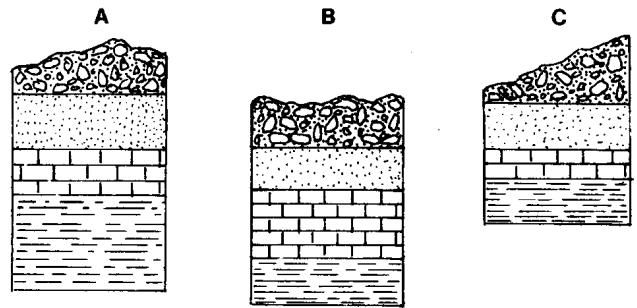
73. On the map below, the darkened areas represent locations where living corals currently exist. The arrow location where coral fossils have been found in Devonian-age bedrock in New York State.



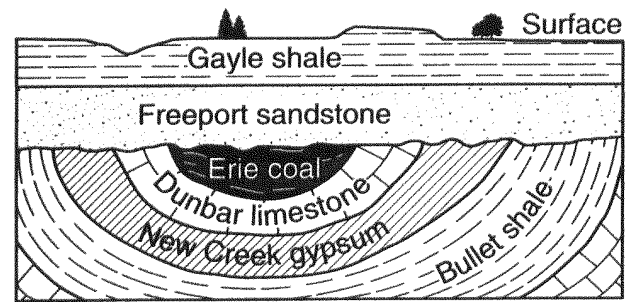
Devonian-age coral fossils found in some New York State bedrock are *not* located in the same general region that present-day corals are living because during the Devonian Period

- A) corals migrated to New York State
 B) corals lived everywhere on Earth
 C) **New York State was closer to the equator**
 D) New York State had a colder climate
74. Which statement best supports the inference that most of Earth's present-day land surfaces have, at one time, been covered by water?
- A) Volcanic eruptions contain large amounts of water vapor.
 B) Coral reefs formed, in the past, along the edges of many continents.
 C) Seafloor spreading has pulled landmasses apart and pushed them together.
 D) **Sedimentary bedrock of marine origin covers large areas of Earth's continents.**

75. The diagram below represents cross sections of three rock outcrops approximately 100 kilometers apart. What would be the best method of correlating the rock layers of each outcrop?



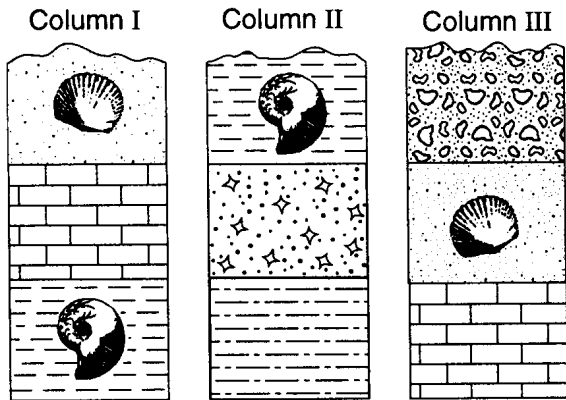
- A) comparing rock types
 B) comparing mineral composition
 C) **comparing index fossils**
 D) comparing thickness of rock layers
76. The diagram below represents a geologic cross section of a portion of Earth's crust.



Folding and erosion occurred after the formation of the

- A) Gayle shale
 B) Freeport sandstone
 C) **Erie coal, but before formation of Freeport sandstone**
 D) Dunbar limestone, but before formation of Erie coal

77. The three geologic columns below represent the rock layers in outcrops located several miles apart. The rock layers have not been overturned. Two different index fossils are shown.



Of the rock layers found in these three outcrops, which layer was probably formed most recently?

- A)  B) 
 C)  D) 

78. Pleistocene deposits of gravel are found lying directly on Precambrian bedrock. The interface between the gravel and the bedrock indicates

- A) a zone of contact metamorphism
 B) an area of volcanic activity that resulted in extruded gravels
 C) a period of continuous deposition
 D) **a major time gap in the geologic record**

79. What characteristics of fossils are most useful in correlating sedimentary rock layers?

- A) limited geographic distribution but found in many rock formations
 B) limited geographic distribution and limited to a particular rock formation
 C) **wide geographic distribution but limited to a particular rock formation**
 D) wide geographic distribution and found in many rock formations

80. Unconformities (buried erosional surfaces) provide evidence that

- A) many life-forms have become extinct
 B) faults are older than the rock in which they are found
 C) **part of the geologic record has been destroyed**
 D) metamorphic rocks have formed from sedimentary rocks

81. Base your answer to the following question on the reading passage and the drawing below and on your knowledge of Earth science.

Fossil With Signs of Feathers Is Cited as Bird-Dinosaur Link

Paleontologists have discovered in China a fossil dinosaur with what are reported to be clear traces of feathers from head to tail, the most persuasive evidence so far, scientists say, that feathers predated the origin of birds and that modern birds are descendants of dinosaurs.

Entombed in fine-grained rock, the unusually well-preserved skeleton resembles that of a duck with a reptilian tail, altogether about three feet in length. Its head and tail are edged with the imprint of downy fibers. The rest of the body, except for bare lower legs, shows distinct traces of tufts and filaments that appear to have been primitive feathers. On the backs of its short forelimbs are patterns of what look like modern bird feathers.

Other dinosaur remains with what appear to be featherlike traces have been unearthed in recent years, but nothing as complete as this specimen, paleontologists said. Etched in the rock like a filigree decoration surrounding the skeleton are imprints of where the down and feathers appear to have been.

The 130-million-year-old fossils were found a year ago by farmers in Liaoning Province in northeastern China. After an analysis by Chinese and American researchers, the fossil animal was identified as a dromaeosaur, a small fast-running dinosaur related to velociraptor. The dinosaurs belonged to a group of two-legged predators known as advanced theropods . . .

excerpted from "Fossil With Signs of Feathers Is Cited as Bird-Dinosaur Link"

John Noble Wilford

New York Times, April 26, 2001

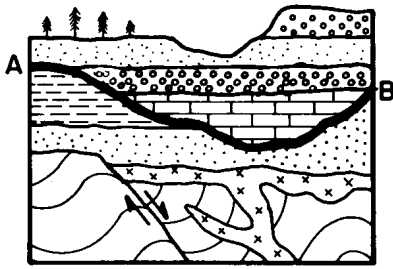
The drawing below shows an artist's view of the dinosaur, based on the fossilized remains.



This feathered dinosaur is not considered an index fossil because it

- A) existed too long ago
 - B) was preserved in ash
 - C) was a land-dwelling animal
 - D) was found in only one area
-

82. What process most directly caused the formation of the feature shown by line *AB* in the geologic cross section below?

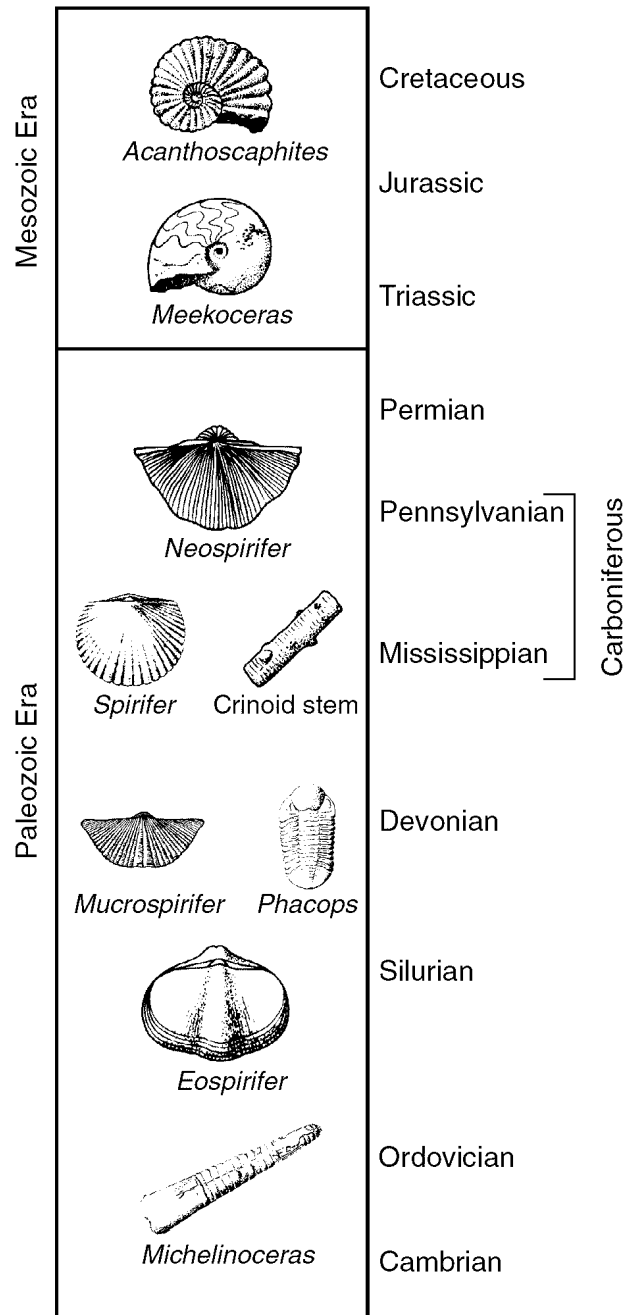


- A) erosion B) faulting
 C) igneous intrusion D) folding

83. A 65.5-million-year-old impact crater in Mexico provides evidence for the cause of the

- A) breakup of Pangaea
 B) evolution of the earliest corals
 C) Alleghenian orogeny
D) extinction of ammonoids

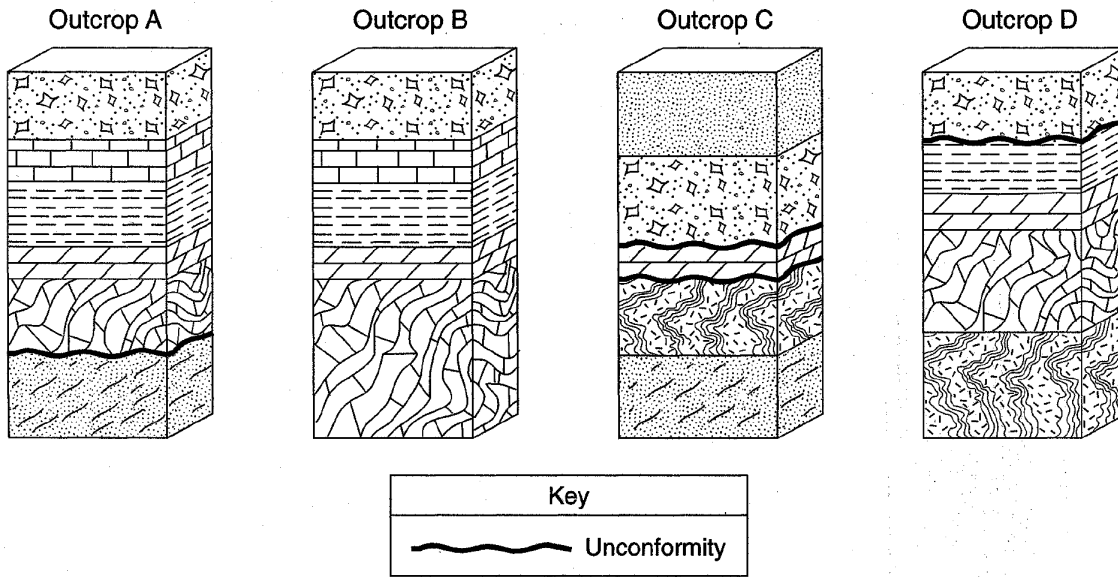
84. Base your answer to the following question on the chart below, which shows the geologic ages of some well-known fossils.



The *Spirifer*, Crinoid stem, and *Neospirifer* fossils might be found in some of the surface bedrock of which New York State landscape region?

- A) **The Allegheny Plateau southeast of Jamestown**
 B) The Catskills near Slide Mountain
 C) The Adirondack Mountains near Mt. Marcy
 D) The Erie-Ontario Lowlands northeast of Niagara Falls

85. Base your answer to the following question on the block diagrams of four rock outcrops, *A*, *B*, *C*, and *D*, located within 15 kilometers of each other. The rock layers have not been overturned.



When the rock layers at outcrops *A*, *B*, *C*, and *D* are correlated, which rock layer would be determined to be the oldest?

- A) quartzite B) marble C) gneiss D) sandstone

86. Base your answer to the following question on the newspaper article shown below.

Fossilized Jellyfish Found in Wisconsin

Fossil hunters have unearthed the largest collection of fossilized jellyfish ever discovered, including the largest fossilized jellyfish ever found.

The remains of soft-bodied animals such as jellyfish are relatively rare because they don't have bones, fossil dealer Dan Damrow, James W. Hagadorn of the California Institute of Technology and Robert H. Dott Jr. of the University of Wisconsin at Madison noted in describing the find in the journal *Geology*.

About a half-billion years ago, during the Cambrian period, the quarry in Mosinee, Wis., where the deposits were found was a small lagoon. The jellyfish apparently died when they were washed up by a freak tide or storm, the researchers said. The jellyfish remains were probably preserved because of a lack of erosion from sea water and wind, and a lack of scavengers, the researchers concluded.

"It is very rare to discover a deposit which contains an entire stranding event of jellyfish," Hagadorn said. "These jellyfish are not just large for the Cambrian, but are the largest jellyfish in the entire fossil record."

Washington Post,

January 2002

Which evidence would lead scientists to suspect that a tide or storm had washed up these jellyfish on a beach?

- A) Primitive life existed on land 500 million years ago.
- B) The rock containing the jellyfish fossils has distorted crystal structure.
- C) Treeroot fossils appear to have been pitted and folded.

D) Large ripple marks were found in the fossil-containing rock layers.

87. 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

88. Earth has sedimentary bedrock of marine origin that is four billion years old. Which inference can be made from this information?

- A) **Earth had oceans four billion years ago.**
- B) Sedimentary rocks formed from magma when Earth cooled four billion years ago.
- C) Most sedimentary rocks are at least four billion years old.
- D) Life existed on Earth four billion years ago.

89. Which is the best method of determining the relative ages of a layer of sandstone in western North Carolina and a layer of sandstone in eastern North Carolina?

- A) Compare the thickness of the two layers.
- B) Compare the colors of the two layers.
- C) Compare the size of sand particles of the two layers.

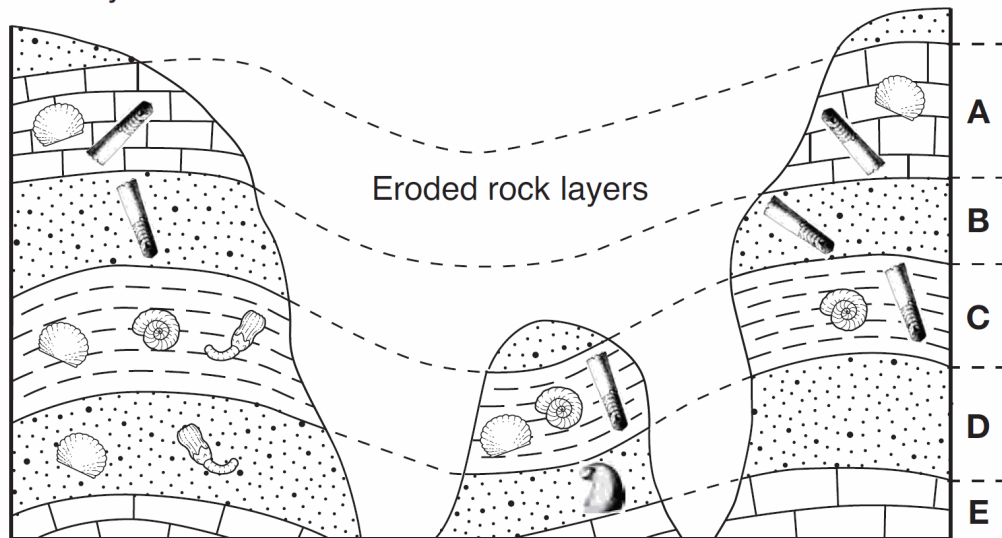
D) Compare the index fossils in the two layers.

90. The rocks 50 kilometers east of Providence, Rhode Island contain many fossils of

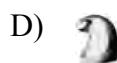
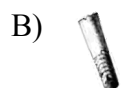
- A) birds
 - B) mammals
 - C) reptiles
 - D) fish**
-

91. The diagram below represents three bedrock outcrops. The layers have *not* been overturned. Letters *A* through *E* identify different rock layers. Fossils found in the rock layers are shown.





Original
rock layers



Which fossil could be classified as an index fossil?



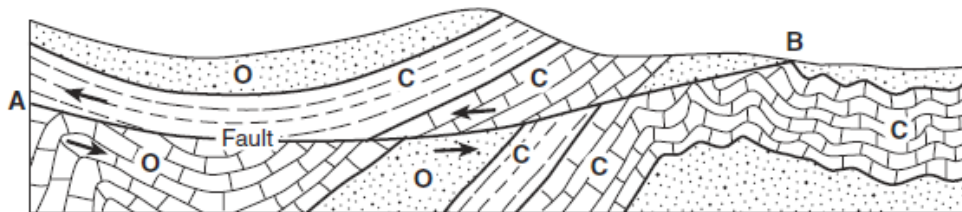
92. The chart below shows index fossils found in rocks of various ages.

BEDROCK AGE	INDEX FOSSIL
MISSISSIPPIAN	 SPIRIFER
DEVONIAN	 MUCROSPIRIFER
SILURIAN	 EOSPIRIFER
ORDOVICIAN	 MICHELINOCERAS

Which fossil could be found in the same rock as fossils of the first corals?

- A) *Spirifer* B) *Mucrospirifer*
 C) *Eospirifer* D) ***Michelinoceras***

93. The cross section below represents surface bedrock where faulting has occurred along line *AB*.



Key to Rock Age
O — Ordovician
C — Cambrian

When could this faulting have occurred?

- A) before the Ordovician rocks were deposited
B) during the Ordovician period
 C) before the Cambrian rocks were deposited
 D) during the Cambrian period