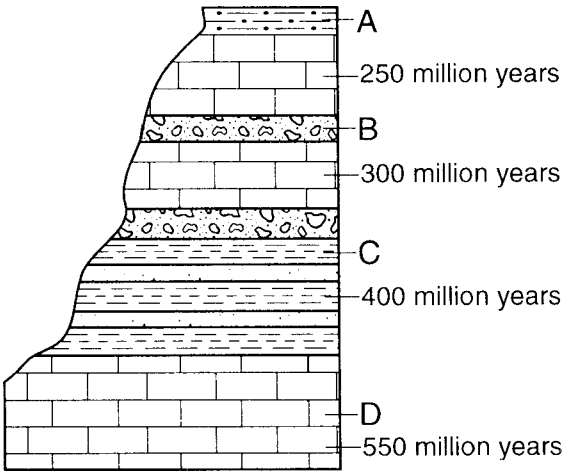
Earth History Exam

Name: _____ **Date:** _____

1. Base your answer(s) to the following question(s) on the *Earth Science Reference Tables* and your knowledge of Earth science.

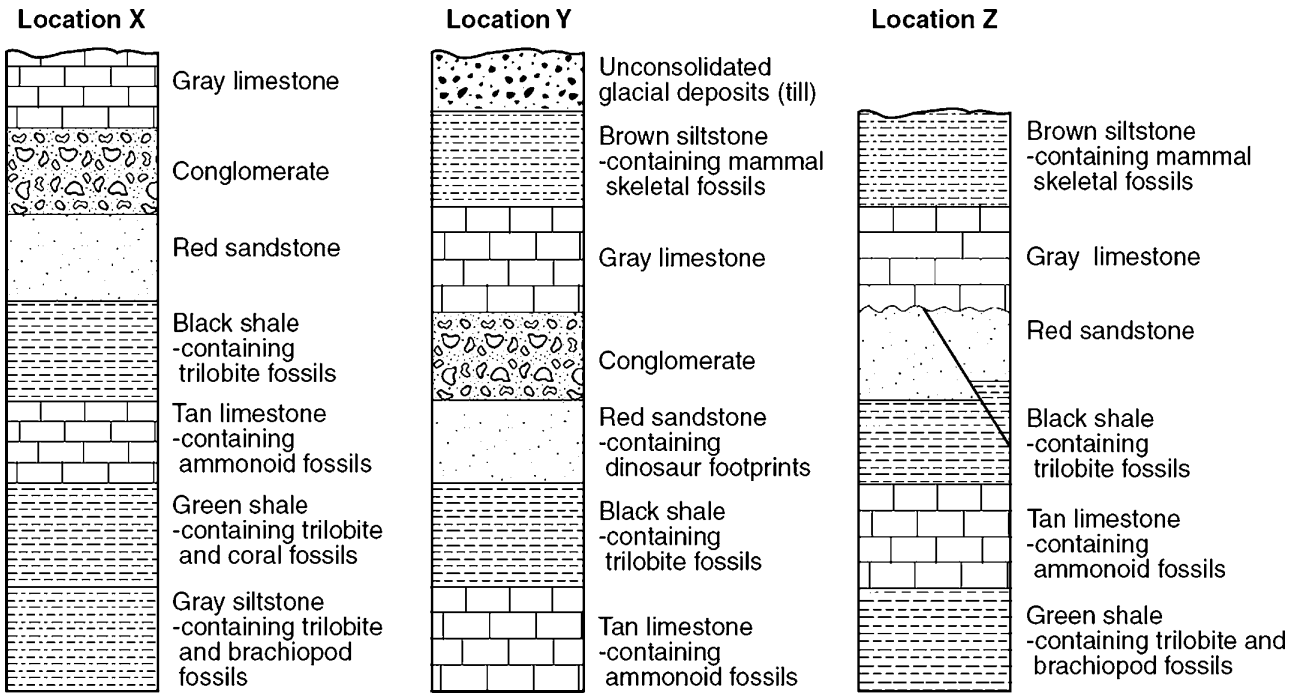
   The accompanying cross section shows undisturbed sedimentary bedrock. The ages of various layers are indicated, and reference points within the rocks are labeled *A* through *D*.



   The remains of an early dinosaur could be found at reference point

   A. *A* B. *B* C. *C* D. *D*

2. Base your answer(s) to the following question(s) on the cross sections below, which show widely separated outcrops at locations *X*, *Y*, and *Z*.



Which rock layer is oldest?

A. gray siltstone B. green shale C. tan limestone D. brown siltstone

3. 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

4. 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

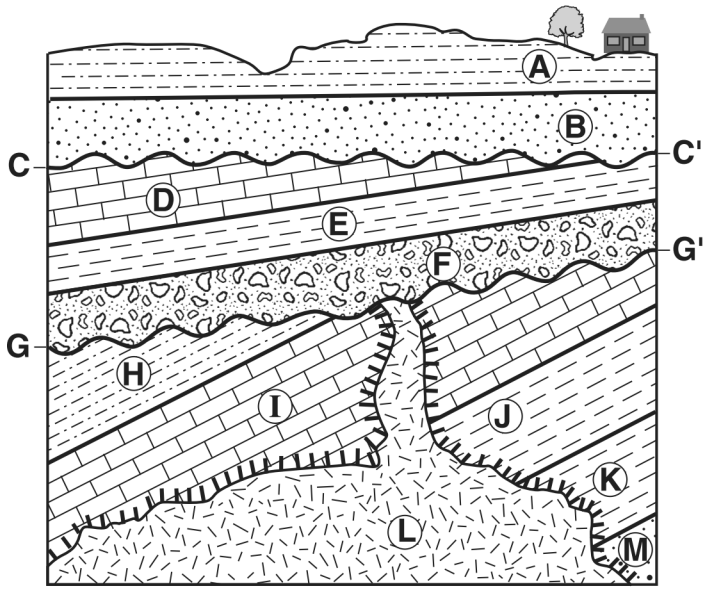
5. The fossils in the rock formations at location *X* indicate that this area was often covered by

A. tropical rain forests B. glacial ice C. desert sand D. seawater

6. Which rock layer was formed by the compaction and cementation of particles that were all less than 0.0004 centimeter in diameter?

A. red sandstone B. green shale C. brown siltstone D. conglomerate

7. Base your answer(s) to the following question(s) 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

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

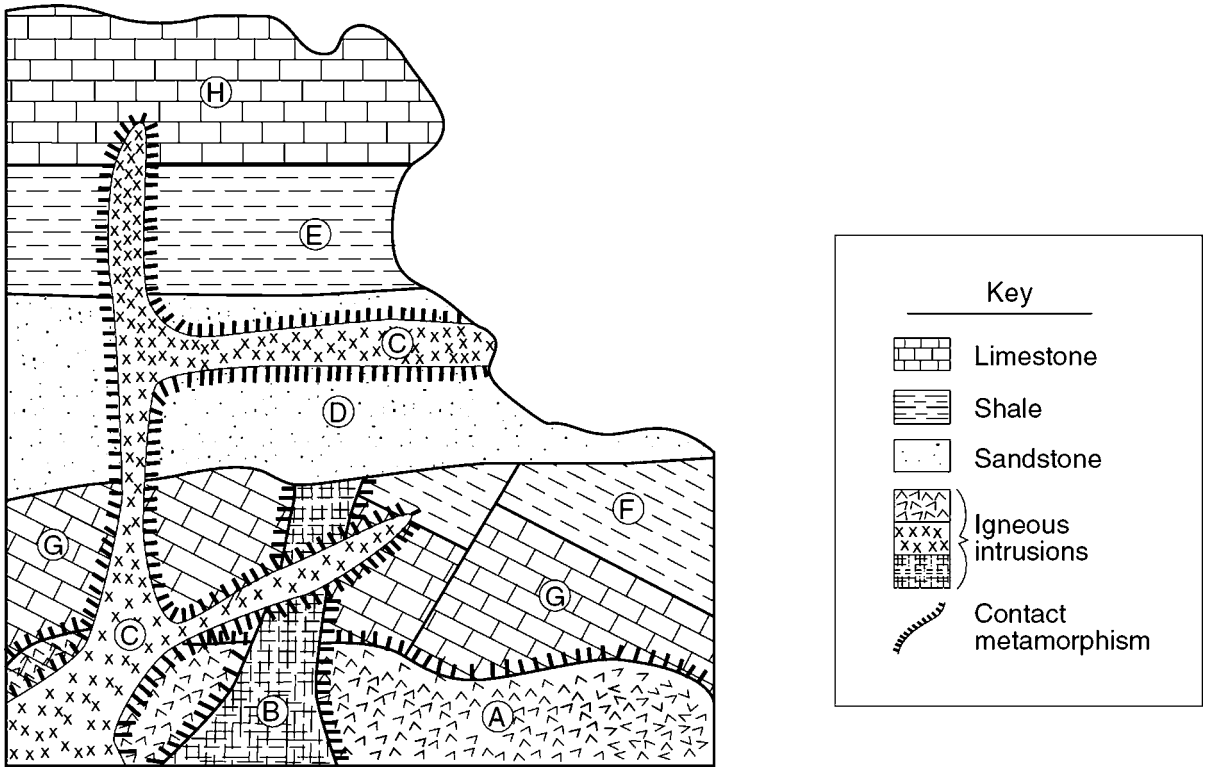
A. Conglomerate does not metamorphose.

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*.

8. Base your answer(s) to the following question(s) 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?

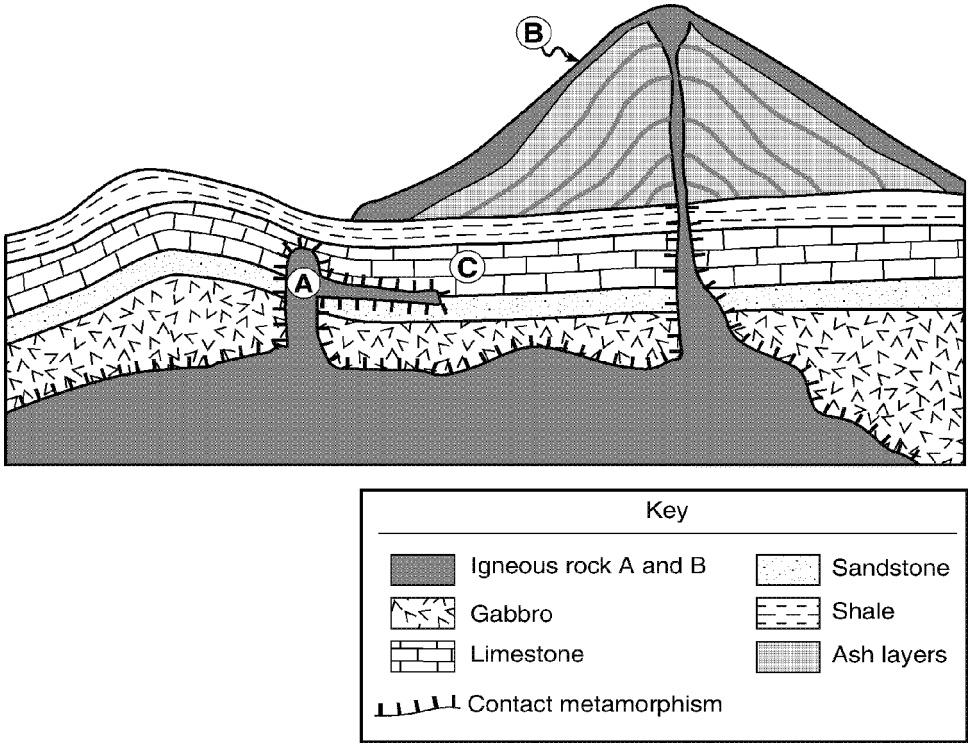
A. Intrusion *A* is younger than intrusion *C*.

B. Intrusion *C* is younger than intrusion *B*.

C. Intrusion *B* is older than intrusion *A*.

D. Intrusion *C* is older than layer *E*.

9. Base your answer(s) to the following question(s) on the geologic cross section. 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*.

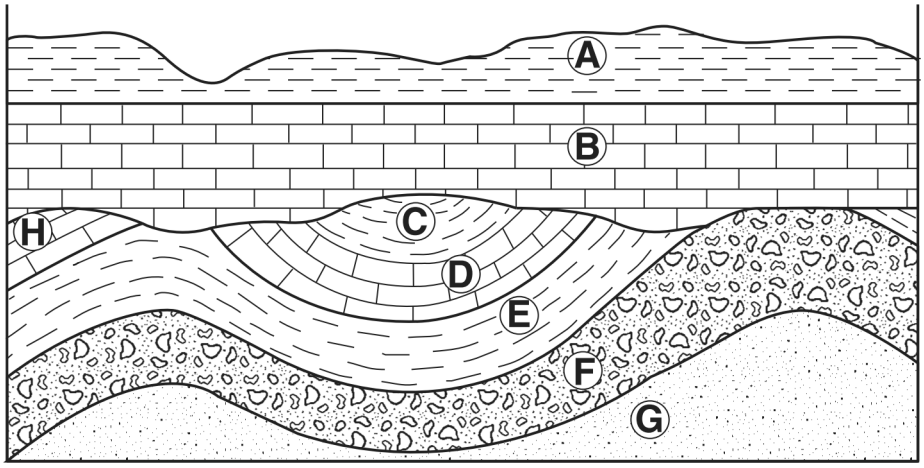
C. *A* is older than *C*, because *A* has older index fossils.

D. *A* is older than *C*, because the intrusion of *A* cuts across rock layer *C*.

10. Rock *B* is most likely which type of igneous rock?

A. granite B. peridotite C. pegmatite D. basalt

11. Base your answer(s) to the following question(s) 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

12. The folding of rock layers *G* through *C* was most likely caused by

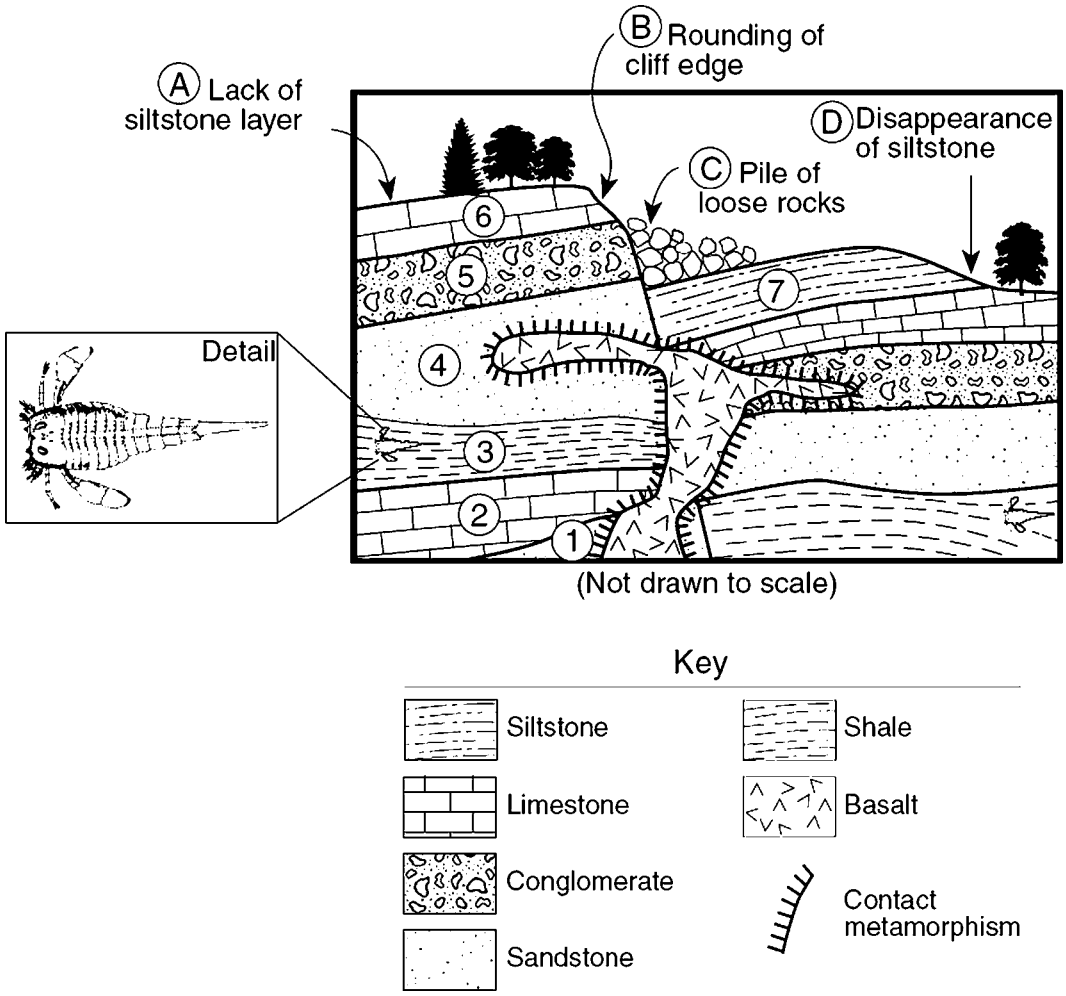
A. erosion of overlying sediments

B. contact metamorphism

C. the collision of lithospheric plates

D. the extrusion of igneous rock

13. Base your answer(s) to the following question(s) 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?

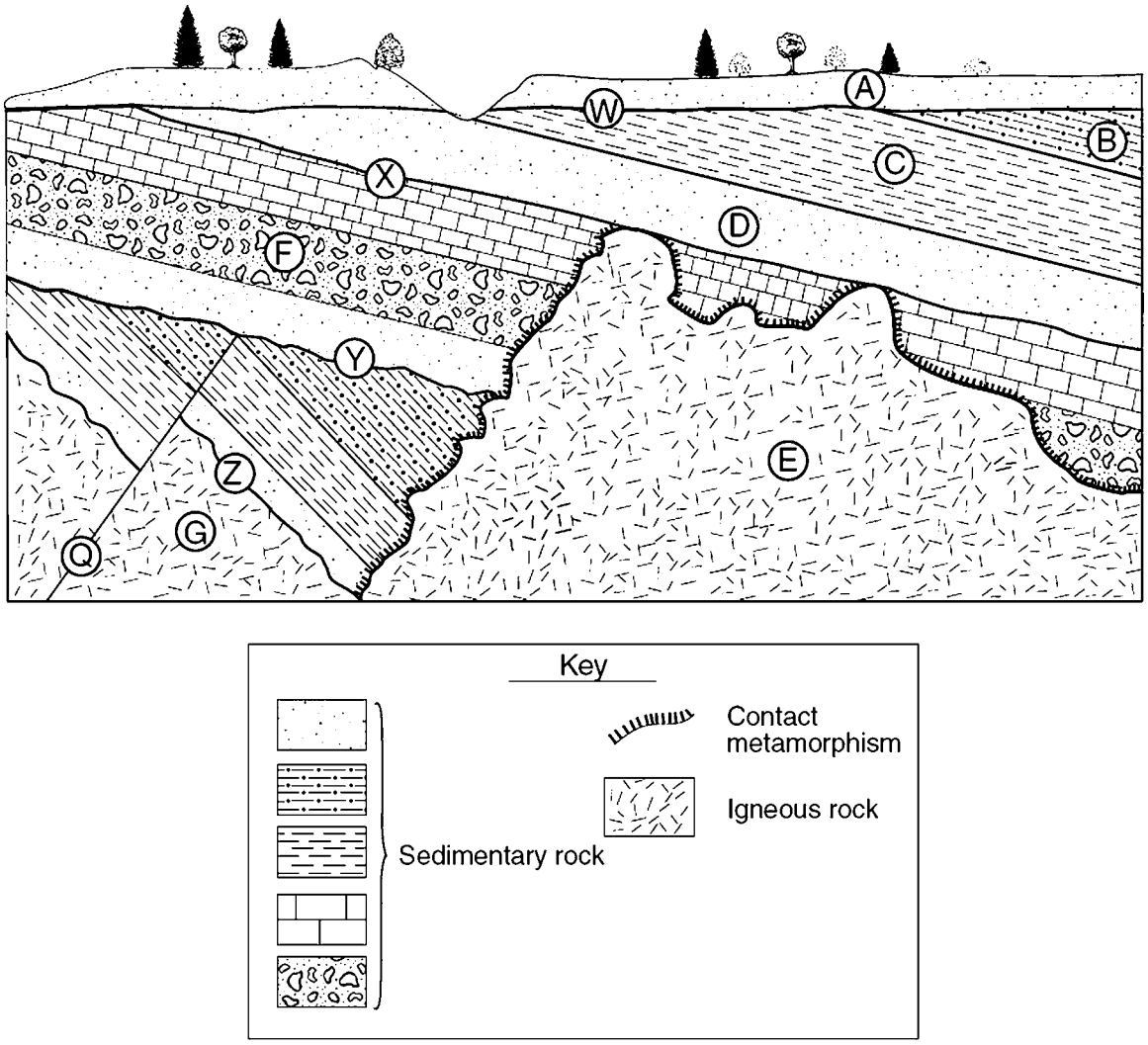
A. deposition of layers from 1 to 7 → intrusion of basalt → faulting

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

14. Base your answer(s) to the following question(s) 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.



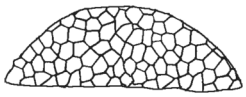
Which rock most likely formed in the zone of contact between rock *E* and rock *F*?

A. obsidian B. slate C. metaconglomerate D. sandstone

15. 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?

A. 

Lichenaria

B. 

Elliptocephala

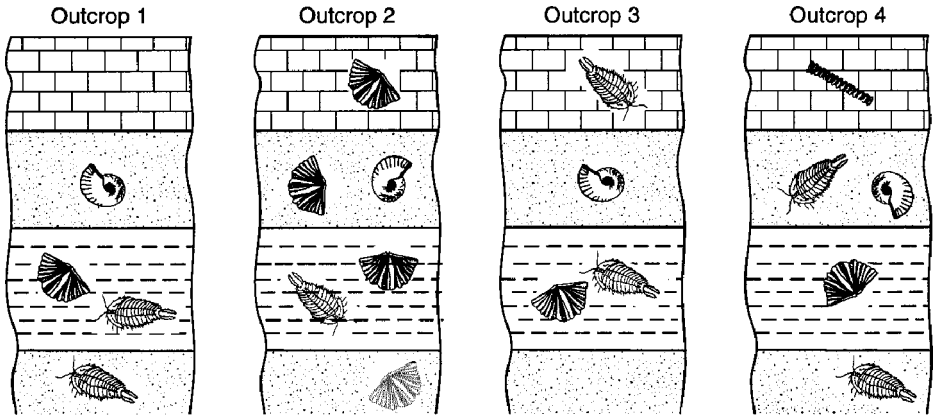
C. 

Manticoceras

D. 

Eospirifer

16. 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. 

17. What is the age of most of the surface bedrock found in New York State at a latitude of 45° ?

A. Precambrian Middle Proterozoic

B. Triassic and Jurassic

C. Silurian and Devonian

D. Cambrian and Ordovician

18. What is the geologic age of the surface bedrock of most of the Allegheny Plateau landscape region in New York State?

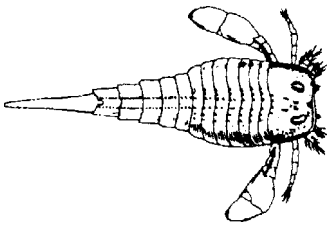
A. Cabrian

B. Devonian

C. Silurian

D. Ordovician

19. Base your answer(s) to the following question(s) on the *Earth Science Reference Tables*, the index fossil diagram below, and your knowledge of Earth science. This index fossil was found in surface bedrock in New York State.



This index fossil is representative of a group of invertebrate animals known as

A. trilobites B. stromatolites C. brachiopods D. eurypeterids

20. During which geologic time period was this particular species alive and most abundant?

A. Cambrian B. Jurassic C. Silurian D. Tertiary

21. Which information could scientists most easily infer about the location where this index fossil was found?

A. environmental conditions that existed when the animal lived

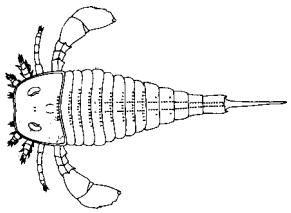
B. change in the seafloor-spreading rates from the time this animal lived to the present

C. length of time necessary to form the igneous rock in which this fossil was found

D. amount of radioactive carbon-14 in Earth's atmosphere when this animal lived

22. Base your answer(s) to the following question(s) on the *Earth Science Reference Tables* and on your knowledge of Earth science.

The accompanying fossil was found in the surface bedrock in New York State.

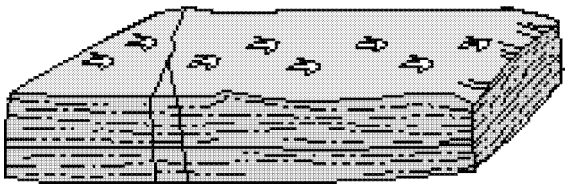


In which landscape region was this fossil most likely found?

A. Adirondack Mountains B. Erie-Ontario Lowlands

C. Hudson Highlands D. Newark Lowlands

23. The diagram below represents a rock sample containing fossilized *Coelophysis* footprints. The sample was found in New York State.



According to current knowledge of New York State fossils, during which geologic time period were these footprints most probably made?

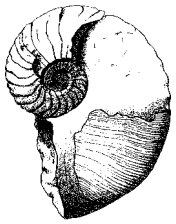
A. Cambrian B. Devonian C. Tertiary D. Triassic

24. Base your answer(s) to the following question(s) on the *Earth Science Reference Tables* and on your knowledge of Earth science.

Trilobite fossil remains are most likely to be found in bedrock of

A. Precambrian age near Mt. Marcy
B. Cretaceous age on Long Island
C. Triassic age northwest of New York City
D. Ordovician age near Plattsburgh

25. The diagram below shows a fossil found in the surface bedrock of New York State.



Centroceras

Which other fossil is most likely to be found in the same age bedrock?

A. *Phacops* B. condor C. *Coelophysis* D. *Tetragraptus*

26. A bone sample contains only $\frac{1}{4}$ of its original radioactive C^{14} content. How old is the bone sample?

A. 1 C^{14} half-life B. 2 C^{14} half-lives C. 9 C^{14} half-lives D. 4 C^{14} half-lives

27. Which radioactive isotope is most useful for determining the age of mastodont bones found in late Pleistocene sediments?

A. uranium-238 B. carbon-14 C. potassium-40 D. rubidium-87

28. A sample of wood found in an ancient tomb contains 25% of its original carbon-14. The age of this wood sample is approximately

A. 2,800 years B. 5,700 years C. 11,400 years D. 17,100 years

29. Base your answer(s) to the following question(s) on the table of index fossils shown below and on your knowledge of Earth science.

Table of Index Fossils

Eospirifer

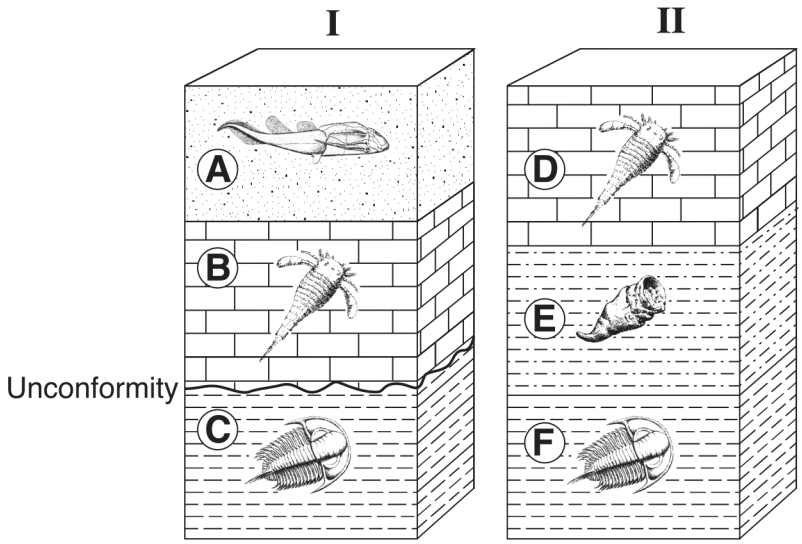
Manticoceras

Phacops

During what geologic time period did the oldest index fossil shown in this table exist?

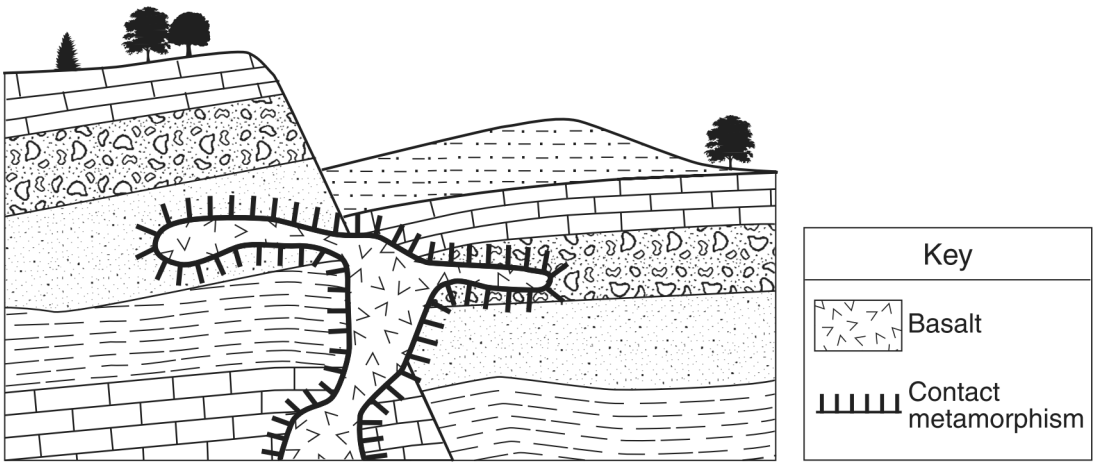
30. State *one* characteristic of a good index fossil.

31. Base your answer(s) to the following question(s) on the diagrams below, which represent two bedrock outcrops, I and II, found several kilometers apart in New York State. Rock layers are lettered *A* through *F*. Drawings represent specific index fossils.



Explain why carbon-14 can *not* be used to find the geologic age of these index fossils.

32. Base your answer(s) to the following question(s) on the geologic cross section below. The rock layers have not been overturned.



(Not drawn to scale)

The index fossil *Dicellograptus* was found in the shale layer. During which geologic time period did this shale layer form?

33. Describe *one* piece of evidence from the cross section that supports the inference that the fault is older than the basalt intrusion.

34. Explain why carbon-14 could *not* be used to determine the age of the *Dicellograptus* fossil.