

PASSAGE TWO (Questions 9–16)

Paragraph

The Cambrian Explosion

- 1► Many of the major phyla of animals arose during the Cambrian Period, in what is called the Cambrian Explosion. Prior to the Cambrian Period, some scientists believe that the majority of organisms were simple one-celled creatures that in certain instances would organize themselves into colonies. These same scientists propose that an explosion of evolutionary diversification occurred about 580 million years ago, and lasted approximately 70–80 million years. During this period of rapid evolutionary growth, the pre-Cambrian single-celled organisms developed into the multicelled predecessors of

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many of today's organisms. The new, more complicated organisms spread throughout the Earth and formed complex communities.

- 2► One theoretical explanation for the rapid diversification that occurred during the Cambrian Period is known as the theory of polar wander. According to this theory, the rapid diversification occurred because of an unusually rapid reorganization of the Earth's crust during the Cambrian Period. This change in the Earth's top layer initiated evolutionary change inasmuch as change in the environment serves to trigger a concurrent change in evolutionary development.
- 3► Because the Cambrian Period occurred so long ago, it is practically impossible to say with absolute certainty how accurate the claims of scientists who support this theory of the explosion of life are. The primary evidence accumulated in support of the Cambrian Explosion is fossils. Multiple samples of fossils, pre- and post-Cambrian Period, that were preserved in the sediment layers of the Earth have been dug out and examined. Proponents of the Cambrian Explosion use the predominance of single-celled fossils prior to the explosion, and the corresponding rise in multicelled fossils during and after the Cambrian Explosion, to validate their theories on the development of life during this time.
- 4► However, a debate has been fueled over the impact of Cambrian Explosion due to the discovery of fossils dating back over a billion years ago. These fossils show evidence of the complex types of cells that are considered to be the building blocks of all animals, plants, and fungi that exist in our modern era, thus throwing into doubt that all multicelled development originated from the Cambrian Explosion. This and other discoveries have given rise to a different theory of evolutionary development. This competing theory states that the evolution of life occurred in phases that began millions, even billions, of years before the Cambrian Explosion. During these phases, there was a short rapid period of evolutionary growth, followed by long periods of rest during which organisms remained relatively stable, without much evolutionary progress.
- 5► There are obvious problems that arise in determining which theory is more accurate. One of the most apparent concerns is the validity of dating techniques. There is no doubt that methods used to discover the Earth's true age have become increasingly sophisticated with advances in technology. However, the fact that scientists have to project further and further back in time as new investigations of the Earth's layers reveal more clues leaves more room for error. In other words, the older the Earth appears to be, the more gaps appear in definitively pinpointing its age.
- 6► Another issue arises with the use of fossil evidence. Despite fossils being the most reliable source for dating the Earth, especially regarding life forms, their scarcity makes gathering an abundance of evidence for various time periods a challenge. Fossilization is a complex process that the smallest adversity can render incomplete or useless. First, living organisms have to die relatively intact, and quickly be buried in a sediment layer before they decay beyond recognition. Then, the sediment layers require protection from erosion that could eat away at the fossils. These two factors heavily influence the preservation of fossils, and the further back in time scientists investigate, the fewer the fossils that are uncovered.
- 7► Technology has remedied somewhat the difficulty of finding and preserving fossils as it has improved methods of dating the Earth. In fact, it is technological advances that have helped spark the debate involving the Cambrian Explosion theory and other theories of the late twentieth century. The discoveries giving rise to the theory behind the Cambrian Explosion came to light in the mid-1800s, whereas theories regarding the earlier development of multicelled organisms were proposed over a century later with the help of technological improvements in research methods.

9. It can be inferred from paragraph 1 that
- (A) some major phyla developed during periods other than the Cambrian Period
 - (B) many other phyla of animals became extinct during the Cambrian Explosion
 - (C) descriptions of various animal phyla were created during the Cambrian Period
 - (D) the major phyla of animals that came about during the Cambrian Period died out in the Cambrian Explosion
10. It can be inferred from paragraph 2 that one basis for the theory of polar wander is that
- (A) relatively little change in the Earth's crust took place during the Cambrian Period
 - (B) rapid diversification was not possible because of the changes in the Earth's crust
 - (C) the Earth's crust changed more slowly in other periods
 - (D) evolutionary changes are the cause of environmental changes
11. Paragraph 3 suggests that
- (A) most fossils found in sediment are from the Cambrian Period
 - (B) other types of evidence besides fossils have also supported the theory of the explosion of life during the Cambrian Period
 - (C) single-celled fossils were more common during the Cambrian Period
 - (D) scientists supporting the Cambrian Explosion theory are uncertain about the dates of fossil evidence
12. It can be inferred from paragraph 4 that
- (A) the earliest fossils indicate that evolution occurred slowly over long periods of time
 - (B) scientists have conclusively shown that multicelled development occurred after the Cambrian Explosion
 - (C) no fossils exist prior to the Cambrian Explosion
 - (D) multicelled organisms may have evolved in phases
13. Paragraph 5 implies that
- (A) it is easy to come up with the precise age of the Earth
 - (B) technology has not yet succeeded in perfecting methods of dating the Earth
 - (C) current research has not provided new information about the Earth's crust
 - (D) as scientists look further back into the history of the Earth, it becomes easier to predict its age
14. It can be inferred from paragraph 6 that
- (A) finding intact fossils is the main challenge in validating one of the theories
 - (B) fossils are abundant in supply, giving scientists a clear look at the past
 - (C) fossilization is a fragile process that can quickly fall apart
 - (D) most organisms die relatively intact before they fossilize
15. It can be inferred from paragraph 6 that
- (A) scientists are challenged when recreating life forms from a specific time period
 - (B) scientists depend on fossils to help them date the Earth
 - (C) scientists can preserve fossils and protect them from erosion
 - (D) erosion has destroyed most fossil evidence found on the Earth
16. Paragraph 7 suggests that
- (A) technology has made it more difficult to study the Earth's age
 - (B) technology has no effect on scientific research related to the Cambrian Period
 - (C) the Cambrian Explosion was responsible for improvements in technology
 - (D) the technology of the 1800s was not as advanced as later technology