

FOSSIL

Anyone who has handled a fossilized bone knows that it is usually not exactly like its modern **counterpart**, the most obvious difference being that it is often much heavier. Fossils often have the quality of stone rather than of organic materials; and this has led to the use of the term "petrification" (to bring about rock). The implication is that bone, and other tissues, have somehow been turned into stone, and this is certainly the explanation given in some texts. But it is wrong interpretation; fossils are frequently so dense because the **pores** and other spaces in the bone have become filled with minerals taken up from the surrounding sediments. Some fossil bones have all the interstitial spaces filled with foreign minerals, including the marrow cavity, if there is one, while others have taken up but little from their surroundings. Probably all of the minerals deposited within the bone have been recrystallized from solution by the action of water percolating thru them. The degree of mineralization appears to be determined by the nature of the environment in which the bone was deposited and not by the antiquity of the bone. For example, the black fossil bones that are so common in many parts of Florida are heavily mineralized, but they are only about 20,000 years old, whereas many of the dinosaur bones from western Canada, which are about 75 million years old, are only partially filled in. Under optimum conditions the process of mineralization probably takes thousands rather than millions of years, perhaps considerably less.

The amount of change that has occurred in fossil bone, even in bone as old as that of dinosaurs, is often remarkably small. We are therefore usually able to see the microscopic structures of the bone, including such fine details as the lacunae where the living bone cells once resided. The natural bone mineral, the hydroxyapatite, is virtually unaltered too - **it** has the same crystal structure as that of modern bone. Although nothing remains of the original collagen, some of its component amino acids are usually still **detectable**, together with amino acids of the non-collagen proteins of bone.

Question 31 The word "**counterpart**" in the passage is closest in meaning to _____.

- A. species
- B. version
- C. change
- D. material

Question 32 The word "**pores**" in the passage is closest in meaning to _____.

- A. joints
- B. tissues
- C. lines
- D. holes

Question 33 Why is fossilized bone heavier than ordinary bone?

- A. Bone tissue solidifies with age.
- B. The marrow cavity gradually fills with water
- C. The organic materials turn to stone
- D. Spaces within the bone fill with minerals.

Question 34 What can be inferred about a fossil with a high degree of mineralization?

- A. It was exposed to large amounts of mineral-laden water throughout time.
- B. Mineralization was complete within one year of the animal's death.
- C. Many colorful crystals can be found in such a fossil.

D. It was discovered in western Canada.

Question 35 Which of the following factors is most important in determining the extent of mineralization in fossil bones?

- A. The age of fossil
- B. Environmental conditions
- C. The location of the bone in the animal's body.
- D. The type of animal the bone came from

Question 36 Why does the author compare fossils found in western Canada to those found in Florida?

- A. To prove that a fossil's age cannot be determined by the amount of mineralization.
- B. To discuss the large quantity of fossils found in both places
- C. To suggest that fossils found in both places were the same age.
- D. To explain why scientists are especially interested in Canadian fossils

Question 37 The word "it" in the passage refers to _____.

- A. hydroxyapatite
- B. microscopic structure
- C. crystal structure
- D. modern bone

Question 38 The word "detectable" in the passage is closest in meaning to _____.

- A. sizable
- B. active
- C. moist
- D. apparent

Question 39 Which of the following does NOT survive in fossils?

- A. Non-collagen proteins
- B. Hydroxyapatite
- C. Collagen
- D. Amino acid

Question 40 What does the passage mainly discuss?

- A. The location of fossils in North America
- B. The composition of fossils
- C. Determining the size and weight of fossils
- D. Procedures for analyzing fossils