

tpo_7_passage_1

In 1970 geologists Kenneth J. Hsu and William B.F. Ryan were collecting research data while aboard the oceanographic research vessel Glomar Challenger. An objective of this particular cruise was to investigate the floor of the Mediterranean and to resolve questions about its geologic history. One question was related to evidence that the invertebrate fauna (animals without spines) of the Mediterranean had changed abruptly about 6 million years ago. Most of the older organisms were nearly wiped out, although a few hardy species survived. A few managed to migrate into the Atlantic. Somewhat later, the migrants returned, bringing new species with them. Why did the near extinction and migrations occur? Another task for the Glomar Challenger's scientists was to try to determine the origin of the domelike masses buried deep beneath the Mediterranean seafloor. These structures had been detected years earlier by echo-sounding instruments, but they had never been penetrated in the course of drilling. Were they salt domes such as are common along the United States Gulf Coast, and if so, why should there have been so much solid crystalline salt beneath the floor of the Mediterranean? With question such as these clearly before them, the scientists aboard the Glomar Challenger processed to the Mediterranean to search for the answers. On August 23, 1970, they recovered a sample. The sample consisted of pebbles of hardened sediment that had once been soft, deep-sea mud, as well as granules of gypsum and fragments of volcanic rock. Not a single pebble was found that might have indicated that the pebbles came from the nearby continent. In the days following, samples of solid gypsum were repeatedly brought on deck as drilling operations penetrated the seafloor. Furthermore, the gypsum was found to possess peculiarities of composition and structure that suggested it had formed on desert flats. Sediment above and below the gypsum layer contained tiny marine fossils, indicating open-ocean conditions. As they drilled into the central and deepest part of the Mediterranean basin, the scientists took solid, shiny, crystalline salt from the core barrel. Interbedded with the salt were thin layers of what appeared to be windblown silt. The time had come to formulate a hypothesis. The investigators theorized that about 20 million years ago, the Mediterranean was a broad seaway linked to the Atlantic by two narrow straits. Crustal movements closed the straits, and the landlocked Mediterranean began to evaporate. Increasing salinity caused by the evaporation resulted in the extermination of scores of invertebrate species. Only a few organisms especially tolerant of very salty conditions remained. As evaporation continued, the remaining brine (salt water) became so dense that the calcium sulfate of the hard layer was precipitated. In the central deeper part of the basin, the last of the brine evaporated to precipitate more soluble sodium chloride (salt). Later, under the weight of overlying sediments, this salt flowed plastically upward to form salt domes. Before this happened, however, the Mediterranean was a vast desert 3,000 meters deep. Then, about 5.5 million years ago came the deluge. As a result of crustal adjustments and faulting, the Strait of Gibraltar, where the Mediterranean now connects to the Atlantic, opened, and water cascaded spectacularly back into the Mediterranean. Turbulent waters tore into the hardened salt flats, broke them up, and ground them into the pebbles observed in the first sample taken by the Challenger. As the basin was refilled, normal marine organisms returned. Soon layer of oceanic ooze began to accumulate above the old hard layer. The salt and gypsum, the faunal changes, and the unusual gravel provided abundant evidence that the Mediterranean was once a

desert.gypsum: a mineral made of calcium sulfate and water.

question 1

The word "objective" in the passage is closest in meaning to

A achievement

B requirement

C purpose

D feature

question 2

Which of the following is NOT mentioned in paragraph 1 as a change that occurred in the fauna of the Mediterranean?

A Most invertebrate species disappeared during a wave of extinctions.

B A few hardy species wiped out many of the Mediterranean' s invertebrates.

C Some invertebrates migrated to Atlantic Ocean.

D New species of fauna populated the Mediterranean when the old migrants returned.

question 3

What does the author imply by saying "Not a single pebble was found that might have indicated that the pebbles came from the nearby continent" ?

A The most obvious explanation for the origin of the pebbles was not supported by the evidence.

B The geologists did not find as many pebbles as they expected.

C The geologists were looking for a particular kind of pebble.

D The different pebbles could not have come from only one source.

question 4

Which of the following can be inferred from paragraph 3 about the solid gypsum layer?

- A It did not contain any marine fossil.
- B It had formed in open-ocean conditions.
- C It had once been soft, deep-sea mud.
- D It contained sediment from nearby deserts.

question 5

Select the TWO answer choice from paragraph 3 that identify materials discovered in the deepest part of the Mediterranean basin. To receive credit you must select TWO answers.

- A Volcanic rock fragments.
- B Thin silt layers
- C Soft, deep-sea mud
- D Crystalline salt

question 6

What is the main purpose of paragraph 3?

- A To describe the physical evidence collected by Hsu and Ryan
- B To explain why some of the questions posed earlier in the passage could not be answered by the findings of the Glomar Challenger
- C To evaluate techniques used by Hsu and Ryan to explore the sea floor
- D To describe the most difficult problems faced by the Glomar Challenger expedition

question 7

According to paragraph 4, which of the following was responsible for the evaporation of the Mediterranean's waters?

- A The movements of Earth's crust
- B The accumulation of sediment layers
- C Changes in the water level of the Atlantic Ocean
- D Changes in Earth's temperature

question 8

According to paragraph 4, what caused most invertebrate species in the Mediterranean to become extinct?

- A The evaporation of chemicals necessary for their survival
- B Crustal movements that connected the Mediterranean to the saltier Atlantic
- C The migration of new species through the narrow straits
- D Their inability to tolerate the increasing salt content of the Mediterranean

question 9

Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

- A The strait of Gibraltar reopened when the Mediterranean and the Atlantic became connected and the cascades of water from one sea to the other caused crustal adjustments and faulting.
- B The Mediterranean was dramatically refilled by water from the Atlantic when crustal adjustments and faulting opened the Strait of Gibraltar, the place where the two seas are joined.
- C The cascades of water from the Atlantic to the Mediterranean were not as spectacular as the crustal adjustments and faulting that occurred when the Strait of Gibraltar was connected to those seas.
- D As a result of crustal adjustments and faulting and the creation of the Strait of

Gibraltar, the Atlantic and Mediterranean were connected and became a single sea with spectacular cascades of water between them.

question 10

Which of the following can be inferred from paragraph 4 about the salt domes in the Mediterranean?

- A They began as layers of oceanic ooze.
- B They contain large quantities of calcium sulfate.
- C They were destroyed when the basin refilled with water.
- D They formed after the Mediterranean basin refilled with water.