



PASSAGE VI

Earth's original atmosphere probably consisted mainly of a mixture of the gases ammonia (NH_3), methane (CH_4), hydrogen (H_2), and water vapor (H_2O). Today, Earth's atmosphere consists primarily of the gases nitrogen (N_2), oxygen (O_2), carbon dioxide (CO_2), and water vapor (H_2O). Earth is much cooler than when the original atmosphere was present. Our planet has been bombarded by a steady stream of heat, ultraviolet rays, gamma rays, and cosmic rays. Sometime during Earth's development, organic compounds—the chemicals of life—developed.

Hypothesis 1

Life was formed in Earth's early atmosphere. As a result of pressure and heat, igneous and sedimentary rocks were changed into harder and denser metamorphic rocks. Specks of metamorphic rock were weathered away and swept into the atmosphere by wind. While there, these compounds combined with other bits of rock and mixed with other gases. The result of this weathering and interaction in the atmosphere along with lightning strikes led to the development of the first life-forms.

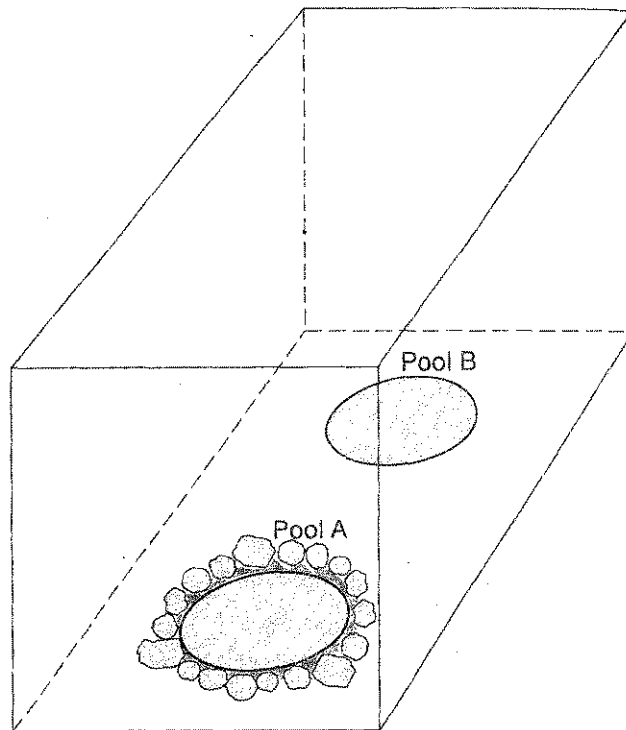
Hypothesis 2

Life was formed in Earth's ancient seas. Rain fell on the land, dissolved minerals from the rocks, and carried the minerals to the seas. Lightning from storms and energy from the sun caused the gas molecules of the original atmosphere to form compounds such as amino acids. These compounds rained into the seas to form an organic "soup" in which developed the organic compounds that led to the development of the first life-forms.

29. For Hypothesis 1 to be true:

- A. the results of the interactions among the rocks and other bits of matter in the atmosphere must produce inorganic compounds.
- B. the results of the interactions among the rocks and bits of other matter in the atmosphere must produce organic compounds.
- C. the gas molecules in the original atmosphere must be organic.
- D. the gas molecules in the original atmosphere must be inorganic.

30. Scientists conducted an experiment to assess Hypothesis 2. The scientists replicated Earth's original atmosphere in a large sealed glass enclosure. At one end of the tank, a pool of water (A) was surrounded by rock formations. At the other end of the tank, a pool of water (B) stood alone. The entire enclosure was subjected to continuous rain and to electronic strobes replicating lightning. Which of the following results lends support to Hypothesis 2?



- F. Inorganic compounds form in water pool A.
 - G. Inorganic compounds form in water pool B.
 - H. An organic "soup" forms in water pool A.
 - J. An organic "soup" forms in water pool B.
31. The change in Earth's atmosphere from ammonia-methane-hydrogen to nitrogen-oxygen-carbon dioxide suggests that:
- A. the early photosynthetic organisms had an enormous impact on the chemical makeup of the atmosphere.
 - B. ammonia and methane combined to form nitrogen while Earth was being drenched with rain.
 - C. respiration of mammals during the time of the early atmosphere added nitrogen, oxygen, and carbon dioxide to the atmosphere.
 - D. carbon dioxide from burning fossil fuels during the time of the early atmosphere was added to the atmosphere.

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32. Scientists conducted another experiment that replicated Earth's original atmosphere in a large sealed glass enclosure. A large shallow pool at the bottom of the enclosure represented Earth's ancient seas. The "sea" contained amino acids and DNA. At the conclusion of the experiment, scientists found that additional organic material, a first step in the development of life, had been formed in the pool. Which of the following conclusions is NOT supported by this experiment?
- I. Hypothesis 1 is supported because the ingredients for life formed in the sea.
 - II. Hypothesis 2 is supported because the ingredients for life formed in the sea.
 - III. Amino acids are required for life to form.
- F. I
 - G. I and III
 - H. II and III
 - J. III
33. Which of the following would most clearly SUPPORT Hypothesis 1?
- A. Amino acids react to form the ingredients for life in conditions replicating Earth's early atmosphere.
 - B. Nitrogen content of the early atmosphere declined rapidly.
 - C. Lightning storms were common in Earth's early atmosphere.
 - D. Igneous rocks were common during early stages of Earth's development.
34. The two hypotheses share the common assumption that:
- F. Earth's atmosphere changed dramatically from its original composition.
 - G. minerals from rocks were carried to the seas.
 - H. the atmosphere and the seas were places in which life originally formed on Earth.
 - J. organic material was not originally present in Earth's early atmosphere.
35. Which of the following would REFUTE Hypothesis 1?
- I. Inorganic material combined with gases cannot form organic material.
 - II. Earth's early atmosphere had no wind.
 - III. Lightning was not present in the atmosphere.
- A. I, II, and III
 - B. I and III
 - C. II and III
 - D. III