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"The Hunt for Life on Mars"

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Goldsmith, D. (1998). The Hunt for Life on Mars. Plume, New York.

Is there a life on Mars ? Are there creatures living on Mars? What about panspermia? These questions and more arise to mind when you start to read this book.

Chapter one leads the reader to think of only three possibilities:

- There are no and there were no life and creatures on Mars and we are reading a story of fantasy.
- There were life and creatures on Mars.
- There are life and creatures on Mars.

The only evidence of life possibility on Mars in this book is the meteorite ALH84001, which was discovered in Allan Hills of Antarctica in the year 1984.

Chapter two describes how the meteorites strike the Earth, and explains the results of the collision between these meteorites and the Earth. One of these severe results is the extinction of dinosaurs since about 65 million years. The author of the book assigned this extinction to the extraterrestrial impact. Conversely, recent studies, including my own research, indicate multiple causes for this extinction (see Elewa 2008 a, b, c, d, e, f, g, h; Elewa and Dakrory 2008a, b; Elewa and Joseph 2009; Elewa 2014; Elewa and Abdelhady 2020). Still, this chapter is interesting in explaining how scientists search for meteorites, and why they focus their research on Antarctica. The most important part of this chapter is that of age dating using radioactive elements. The author stated that $\Delta^{14}C$ has a half-life of 5750 years. Here I would note that scientists found it inaccurate to apply this technique for organic matters of more than 3000 years old. I would also add that there should be definite cautions when applying this technique because any disturbance of the optimum conditions will normally lead to inaccurate results.

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In chapter three the author mentions two significantly controversial ages to the carbonate globules present in the meteorite ALH84001. These conflicting results ensure my previously mentioned note on how the change in the surrounding conditions and the chemical composition affects the results of age dating. Another important point lies in that the idea of discovering meteorites from Mars or any other planet of the solar system is acceptable, however it is possible that the carbonate globules that were found in these meteorites are still of unknown origin. They may be from the Earth!! Severe environmental conditions may lead to assemble these globules with their organic constituents in the meteorites after their falling to the Earth!! Solving this problem may help discovering the truth.

In chapter four the author refers to the five main characteristics of ALH84001, these are:

- ALH84001 is a volcanic rock from Mars with approximate age of 4.5 billion years old.
- Carbonate globules were formed in the fractures of this rock with debatable age.
- The rock contains ovoids.
- It also contains magnetic minerals, which are thought to be products of some kind of primitive bacteria.
- Carbonate globules contain aromatic hydrocarbons.

I'll discuss the problem from the other side. Suggest that these five characteristics indicate presence of ancient life. Then, I would ask whether this life was on Mars or on the Earth!! If the rock is really from Mars, are the carbonate globules also from Mars?

For solving these two questions by modern techniques see the edited book of Elewa (2010 a, b), and his short note on morphometrics and cosmology (2010 c).

Chapter five starts with interesting introduction on genetics, then tried to explain the origin of life on the Earth. However, the author could not introduce strong evidences on the origin of life on our planet.

The author introduced a good comparison, in chapter six, between the characteristics of the Earth and those of the other planets of the solar system. When you read the first half of this chapter you feel that it is impossible to find a planet of the solar system similar to the Earth in its relevancy for living creatures to live on it. All experiments (e.g. labeled-release, gas-exchange, and pyrolitic-release) made to verify life on Mars have promptly failed.

Chapter seven indicates that the aim of future research on the subject is to bring rock samples from Mars. I think until then, the idea of suggesting life on Mars would have more efforts and research.

In the last chapter (chapter eight) the author discusses the distinct controversy in thought between theologians and evolutionists. From this discussion you guess that the author believes in potential life on the other planets as a result of panspermia. This idea could be acceptable under the condition of more evidences.

In conclusion, this book is very interesting and contains a lot of knowledge on cosmology as well as genetics, but it failed to prove a life outside the Earth.

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