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*Editorial*

# Thoughts in Geobiology

One of the possible ways to make connection between geologists and biologists is through studying subjects related to the newly established trend “Geobiology”.

In the year 1972, Sylvester-Bradley stated that the Earth sciences include not only geology, but the hybrid-sciences geophysics, geochemistry and geobiology, of which the most complex and least rigorous is geobiology.

Kump (2008) simply defined geobiology as the field that has recently energized the life and Earth sciences as geologists and biologists bring new tools to collaborations addressing fundamental problems that transcend the disciplines.

The book edited by Xiao and Kaufman (2007) includes a set of multidisciplinary reviews on the Neoproterozoic fossil record (animals, algae, acritarchs, protists, and trace fossils), evolutionary developmental biology of animals, molecular clock estimates of phylogenetic divergences, and Neoproterozoic chemostratigraphy and sedimentary geology. The editors of this book believe that these topics are of continuing interest to geoscientists and bioscientists who are intrigued by the deep history of the Earth and its inhabitants.

Yildirim et al. (2008) believe that microbial systems in extreme environments and in the deep biosphere may be analogous to potential life on other planetary bodies and hence may be used to investigate the possibilities of extraterrestrial life. I would add that astrobiologists are working on this point through studying materials from Mars.

Through geobiology we search for origins and evolution of life, atmosphere, hydrosphere, lithosphere and biosphere, reasons of mass extinctions, interactions between microbes and minerals, global changes, and other subjects of interest.

The importance of geobiology is that we (geologists) can collaborate with biologists in different aspects related to Earth. One of the astonishing and applicable themes reporting this collaboration is the field of biotechnology. For example, mineralogists together with biotechnologists are using bacteria for extracting specific metals from their ores; this process is called bioleaching. The process depends on oxidation of sulphides into sulphates and metals. As workers in mines know, there are several problems related to the solutions occurring from mining and lead to groundwater pollution; bioleaching may prevent this because of the natural occurrence of bacteria in this process. Nowadays, competition in bioleaching technology is to reduce the pollutants resulting from this procedure.

What is interesting to us is that Fernando Acevedo (2002) noted that bioleaching can significantly contribute to the economic and social development of the developing countries; because several developing countries have significant mineral reserves, as well as the simplicity and low capital cost requirement of this technique.

It is certainly encouraging that there is a well established center for “Earth Systems Science” in South Africa, which provides research and educational environment to seek unified knowledge amongst earth and life sciences, engineering, resource economics and the human sciences; it is AEON (Africa Earth Observatory Network; visit at: http://www.aeon.uct.ac.za/index.php). I hope African countries behave like South Africa in giving some interest to centers devoted for geobiological research.

Another point of interest, in geobiology, is the search for life on the other planets. The idea of communicating with other planets as well as finding life on them is not new; Nikola Tesla believed in interplanetary communication; assumed that within the solar system, there seem to be only two planets--Venus and Mars--capable of sustaining life such as ours: but this does not mean that there might not be on all of them some other forms of life (*Collier's Weekly*, February 19, 1901, pages 4-5).

Using computer modeling, astronomers say that life could be theoretically found on fifty of the one hundred discovered planets (Said Helen Briggs in the BBC News; April 2004; at: http://news.bbc.co.uk/2/hi/science/nature/3588721.stm).

As a result, many geobiologists and astronomers are trying to find way for that communication. They already designed the so-called “Interplanetary Internet”, which is a computer tool to communicate with other planets in the space. One of the famous examples in this field is the “Mars Internet”, which was designed by NASA.

How can we discover life on the other planets? This cannot be answered without using geobiology to search for any features of life there (extraterrestrial life).
Wikipedia (the free encyclopedia) defined the term “extraterrestrial life” as the life that does not originate from Earth. It is notable, however, that all assumptions of presence of life on other planets are still theoretical. On the other hand, there are two main teams speaking on the origin of extraterrestrial life, in case it is fact; the first team assumes the independency of origin; the second team believes in panspermia, which means one origin from which life spread between planets (for more details, see Wikipedia at: http://en.wikipedia.org/wiki/Extraterrestrial_life).
Anyway, whether you accept or reject the idea, it is most important to know what the others search for, how is their way of thinking, how can you benefit from that; this could widen your knowledge and activates the energy inside you to search for new discoveries leading to happiness of human being. I would so much like to say that “all discoveries were dreams until genius men verified them”.

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