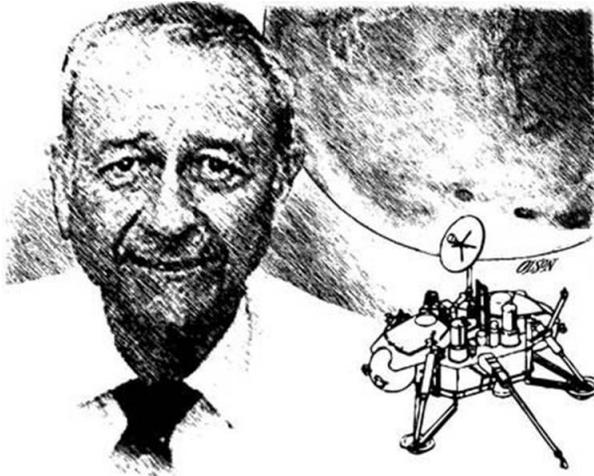


Gilbert Levin, advocate of the existence of Martian life, to visit Kiruna

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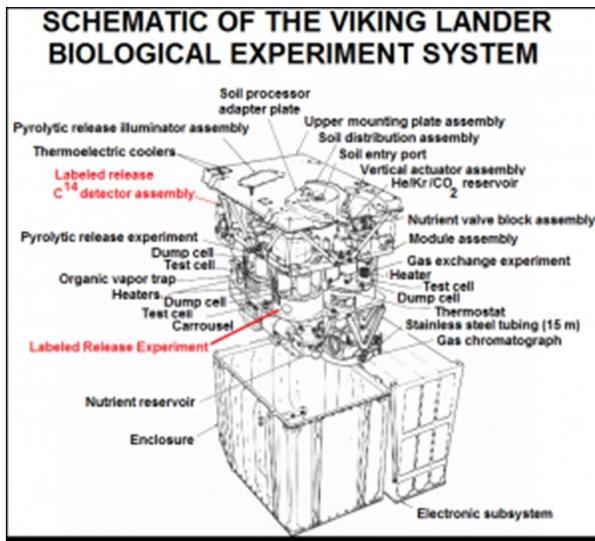
Dr. Gilbert V. Levin, designer of the famous ‘Labeled Release Experiment’ (LR) performed on Mars by the Viking Landers in 1976, is visiting the Luleå Tekniska Universitet’s Rymdcampus at Kiruna between June 6th and 10th, and on June 8th he will give a lecture in the frame of the North Pole Seminars, organized by the Atmospheric Science Group. He will talk about the controversial results of this experiment that got positive evidence for microbial life in soil samples tested at both Viking landing sites. However, some other Viking results, such as the lack of organics in the chemical analysis, led NASA to discard the possibility of extant life and to attribute the experiment’s outcome to some chemical in the soil or to photochemical reactions. Dr. Levin has kept on supporting the validity of the experiment since then, sustaining a continuous controversy on which the studies to be carried out by ExoMars missions could cast a new light. Dr. Levin has been recently appointed as Co-I of the HABIT instrument.



Dr. Levin was educated as a civil and sanitary engineer, and, early in his career as a public health officer, he invented methods to detect and identify microbial life to safeguard the public. He was awarded several contracts by NASA to apply his expertise to the detection of extraterrestrial life in different missions, among which Viking stands out. He designed the so-called 'Labeled Release Experiment' performed by the two landers of the Mission. The LR consisted basically of the inoculation of a sample of Martian soil with a solution of nutrients "tagged" by means of ^{14}C , a radioactive heavy isotope of Carbon, whose subsequent release as a component of by-product gases was continuously monitored in order to determine whether one or more of the nutrients had been "metabolized". Any positive response would be followed up with a control run that tested a duplicate sample after heating it to a temperature to kill microorganisms, but not so high as to destroy chemical oxidants that might have caused the response. A negative control confirmed that the positive response had been from living organisms.

The first feedings of soil samples at each Viking landing site, a few hundred kilometers apart, were strongly positive, comparable to responses achieved by the LR on some Earth soils. All four-test samples gave similar positive results, and the five control runs all supported biological activity as the underlying cause. However, when the samples showing positive responses were fed additional nutrient, no further gas evolved. On Earth, such second feedings almost always produce a new outpouring

of gas so, even though the LR had tested one Antarctic sample that behaved like the Martian samples, this threw grave doubt on the biological explanation. Weighing even more heavily against biology was the failure of the Viking's instrument mounted to identify organic compounds in detecting any. This, obviously, is not compatible with the existence of life. Furthermore, at that time, it was believed there was no liquid water on Mars, an essential requirement for known life, so the conclusions from the results were taken with prudence and NASA did not accept them as proof of the existence of Martian life. In addition, some other clues supporting a photochemical origin of the reactions were put forth. It was claimed that the release of ^{14}C from the nutrients was caused by their ultra violet light-induced reaction with perchlorate found in the Martian soil. These salts could have easily reacted with the nutrients producing the first release of the radioactive carbon in the resultant by-products, a process that would not have repeated after their consumption. However, Levin points out that perchlorates or their ultra violet products would have survived the heating of the control samples.



Although some converts have been made, the vast majority of the scientific community does not accept the LR results as proof of the presence of life. Nevertheless, Dr. Levin continues advocating the idea that, indeed, Martian life has been detected, as he keeps on doing nowadays with the support of a number of colleagues citing new supportive findings reported by the latest

missions.

Since Viking, doubt has been cast on the ability of the Viking lander's organic analysis instrument to detect tiny amounts of organics and, finally, Curiosity's rover has detected organics and fixed nitrogen in the ground, together with the presence of liquid water persisting daily. These discoveries have revived the question of whether there is life on Mars or not, and in fact, the ExoMars programme has been designed to detect information that could bear upon this major scientific issue. Right now it is not possible to deny the presence of life on Mars nor to assert there is. Dr. Levin, who has been for decades in the very centre of the debate, will talk about all these matters and some others, sharing his genuine and authoritative insights.