Biological transmutations

Over the past two centuries a large number of experiments with animals, seeds and bacteria have demonstrated that biology is not only a chemical process, but also a nuclear one. It has been demonstrated that some minerals transmute into other minerals. With the development of low-energy nuclear reactions (cold fusion), this topic is back in the scientific agenda. Very few scientists work in this field, but its importance is such that its further development is crucial.

by Jean-Paul Biberian © 2015–2021

Introduction

At the end of the 18th century Antoine Lavoisier demonstrated that chemical elements cannot be created nor destroyed. He performed a number of chemical experiments showing that various elements can combine with each other, but without any change in their elemental compositions. This was the credo of science until the discovery of radioactivity at the end of the 19th century and later artificial radioactivity. However, for everyone now, it is out of the question that nuclear reactions can occur outside the nuclear world of radioactivity and high-energy physics. The announcement by Stanley Pons and Martin Fleischmann[1] in 1989 that it was possible to produce nuclear reactions at ambient temperature by electrochemistry reopened the door of biological transmutations. The work of several pioneers[2–7] has been totally ignored by the scientific community as their observations were against the known laws of physics. Fortunately, Vysotskii and Kornilova[8], have now shown with modern spectroscopic techniques transmutation with bacteria.

I myself have been convinced of the reality of the phenomenon thanks to experiments showing that transmutations occur in seeds and bacteria.

Research During the 19th Century

• Vauquelin

In 1799, the French chemist Louis Vauquelin[2] (1763–1829) became intrigued by the quantity of lime which hens excrete every day. He isolated a hen, fed it a pound of oats, and analysed the eggs and faeces for lime (CaO). He found that five times more calcium was excreted than was consumed. He observed not only an increase in calcium, but also a subsequent decrease in silicon. He is certainly the first scientist to have demonstrated the biological transmutation of silicon into calcium.

Vauquelin concluded that a loss of only 1.274 g of silica cannot account for an increase of 14.118 g of limestone. He reported that lime had been formed but could not figure out how it happened. Furthermore, he encouraged other scientists to replicate his experiment.

• Von Herzeele

Albrecht von Herzeele studied medicine from 1841 to 1842 at the University of Geneva and from 1843 to 1846 at the Humboldt University in Berlin. In 1873 he published *About the Origin of Inorganic Substances*. From him comes the sentence: "It is not the soil that produces the plant, but the plant that creates the soil."

In 1876 he published the first of a series of books in which he showed that plants continuously create material elements. From 1875 to 1883, in Berlin, he conducted 500 analyses with different types of seeds—clover, crimson, vetch, rapeseed, barley, watercress, bean, white beans, kidney beans, turnips, rye, peas lupine, coltsfoot and angelica.

A typical experiment was the determination of the variation of calcium, potassium and phosphorus in *Vicia sativa* during germination with or without the addition of mineral salts in distilled water. He even showed that the addition of various calcium salts to the medium increased the formation of potassium.

The addition of K_2CO_3 (potassium carbonate) increased the formation of calcium. Von Herzeele concluded that "Plants are capable of effecting the transmutation of elements".

His publications outraged the scientific community of the time so much so that they were removed from libraries.

His writings were lost for more than 50 years until about 1930, when a collection was found by accident in Berlin by Rudolf Hauschka, who subsequently republished von Herzeele's books.

Research in the 20th Century

• Baranger

Pierre Baranger[4] (1900–1970), a French scientist, was professor of organic chemistry at the famous Ecole Polytechnique, and head of the Laboratory of Chemical Biology. He became intrigued by von Herzeele's experiments but thought that the number of trials had been too limited and the precautions against error were insufficient. Baranger decided to repeat the experiments with all possible precautions and a very large number of cases, which would allow a statistical study. His research project from 1950 to 1970 involved thousands of analyses. Baranger verified the content of phosphorus, potassium, calcium and iron of vetch seeds before and after germination in twice-distilled water to which pure calcium chloride was/was not added. Hundreds of samples of 7–10 g each were selected, weighed to 1/100th mg, graded and then germinated in a controlled environment[4].

Baranger found an increase of 4.2 per cent in calcium and 8.3 per cent in iron, and subsequently a decrease in phosphorus by 1.9 per cent, and of potassium by 1.1 per cent. Interestingly, the addition of $MnCl_2$ (manganese chloride) increased the amount of iron produced. None of the specialists who examined Baranger's work were able to find any experimental errors. Baranger concluded:

> "These results, obtained by taking all possible precautions, confirm the general conclusions proposed by von Herzeele and lead one to think that under certain conditions the plants are capable of forming elements, which did not exist before in the external environment".

In May 1959, he submitted an article to the French Academy of Sciences for publication, but it was not accepted. Later in 1972, his family tried another submission without success. He had difficulties in publishing his findings, and died without being able to do so. Later, in 1977, his family asked Jean-Marie Gatheron, a close friend of Baranger to publish Baranger's work. In 1976, his family submitted Baranger's final report to the Academic Commission of the French Academy of Agriculture. It was decided that the work would be presented to the full assembly in a secret meeting. The proposal of publication in a public meeting was rejected without any reason.

Baranger failed to provide relevant theory to explain his findings.

• Kervran

C. Louis Kervran (1901–1983) is certainly the most well-known scientist having worked in the field of biological transmutations. He had a broad knowledge of plants, geology and also of nuclear science. His findings have been published in French in ten books, some of which have been translated into English[5]. He was also nominated for the Nobel Prize.

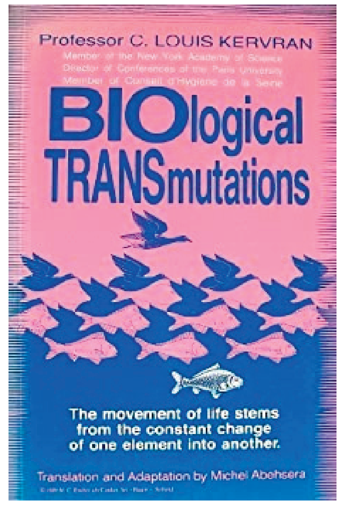
From 1935 Kervran collected facts and performed experiments which showed that transmutations of chemical elements do indeed occur in living organisms. It started when he investigated fatal accidents from carbon monoxide poisoning when none was detectable in the air. Next, he analysed why Sahara oilfield workers excreted a daily average of 320 mg more calcium than they ingested without decalcification occurring.

Kervran pointed out that the ground in Brittany contained no calcium; however, every day a hen would lay a perfectly normal egg, with a perfectly normal shell containing calcium. The hens eagerly pecked mica from the soil, and mica contains potassium. It appears that the hens may transmute some of the potassium into calcium.

From 1960 to 1980, Kervran reported the astounding results of his research showing that living plants were able to accomplish limited transmutation of elements. Then Kervran was the Conferences Director of the University of Paris, and his first paper was published in *La Revue Générale Des Sciences*, July 1960.

Kervran found that in nuclido-biological reactions, oxygen is always in the form of O, never O_2; reactions with nitrogen occur only with N_2, insofar as is known. The following reactions have been proposed:

$Na^{23} + H^1 \rightarrow Mg^{24}$
$Na^{23} + O^{16} \rightarrow K^{39}$
$Na^{23} - O^{16} \rightarrow Li^7$
$Na^{23} \rightarrow Li^7 + O^{16}$
$K^{39} + H^1 \rightarrow Ca^{40}$
$Mg^{24} + Li^7 \rightarrow P^{31}$
$Mg^{24} + O^{16} \rightarrow Ca^{40}$
$F^{19} + O^{16} \rightarrow Cl^{35}$
$C^{12} + Li^7 \rightarrow F^{19}$
$Cl^{35} \rightarrow C^{12} + Na^{23}$
$Fe^{56} - H^1 \rightarrow Mn^{55}$
$2\,O^{16} - H^1 \rightarrow P^{31}$
$O^{16} + O^{16} \rightarrow S^{32}$
$2\,N^{14} \rightarrow C^{12} + O^{16}$
$N^{14} + Mg^{12} \rightarrow K^{19}$
$Si^{28} + C^{12} \rightarrow Ca^{40}$
$Si^{28} + C^{12} \rightarrow Ca^{40}$
$P^{31} + H^1 \rightarrow S^{32}$



In 1980, Kervran performed an experiment with oat seeds analysed using mass spectroscopy. He and his team looked at phosphorus and calcium variations. They observed that the calcium increased with germination, whereas phosphorus decreased. There are certainly other elements that played a role, but they were not analysed in this experiment.

In 1971, the laboratory of the French Society of Agriculture sprouted rye seeds under controlled conditions. Their results were in good agreement with Kervran's previous findings.

Kervran was very active in promoting his work through books, conferences and mass media. However, the Academy of Agriculture strongly opposed his efforts.

• Goldfein

In 1978, an officially funded effort from the US Army Mobility Equipment Research and Development Command, Fort Belvoir, Virginia positively confirmed that mechanisms for elemental transmutations could occur in biological systems. The work was performed under the direction of Emil J. York, Chief of the Material Technology Laboratory. Solomon Goldfein was the principal investigator for the effort. Robert C. McMillan, Chief of the Radiation Research Group of the laboratory, provided guidance on matters of physics and nuclear physics. The abstract of the final report reads as follows:

> "The purpose of the study was to determine whether recent disclosures of elemental transmutations occurring in biological entities have revealed new possible sources of energy. The works of Kervran, Komaki and others were surveyed, and it was concluded that, granted the existence of such transmutations (Na to Mg, K to Ca and Mn to Fe), a net surplus of energy was also produced. The proposed mechanism was described in which Mg adenosine triphosphate, located in the mitochondrion of the cell, played a double role as an energy producer. In addition to the widely accepted biochemical role of Mg-ATP in which it produces energy as it disintegrates part by part, Mg-ATP can also be considered to be a cyclotron on a molecular scale. The Mg-ATP when placed in layers one atop the other has all the attributes of a cyclotron in

accordance with the requirements set forth by E.O. Lawrence, inventor of the cyclotron."

"It was concluded that elemental transmutations were indeed occurring in life organisms [sic] and were probably accompanied by a net energy gain."

Goldfein postulated a conformational structure of a stack of Mg-ATP molecules forming a helical chain. The Mg-ATP chelate produces oscillating electrical currents, which act as a micromini-cyclotron that accelerates hydrogen ions to relativistic speeds with sufficient potential to transmute an element to the next higher number. It was concluded that the elemental transmutations occurring in living organisms are accompanied by losses in mass representing conversion to thermal energy and that such energy probably is a net gain when compared to the amount required to effect the transmutation.

Sourdough *Saccharomyces cerevisiae*
(Photo: Olivier Colas)

• Zündel

J.E. Zündel[9] was a Swiss scientist, head of a paper company, and a chemical engineer at the Polytechnic School of Zurich (ETH Zurich) in Switzerland. Following Kervran's observations, from 1970 he studied germinating seeds and observed a 54–61 per cent increase in calcium. In another experiment, he grew 150 oat seeds (flämingkrone) in a controlled environment for six weeks. Then 1,243 sprouts were analysed by atomic absorption spectroscopy for magnesium and calcium. Potassium was found to decrease by 0.033 per cent, calcium increased by 0.032 per cent and magnesium decreased by 0.007 per cent. The variation of magnesium was not significant, but the decrease in potassium balanced the increase in calcium. In 1972 with oat seeds, he observed an increase of calcium by 118 per cent, a decrease of magnesium by 23 per cent and potassium by 29 per cent.

Studies at Present

Vladimir Vysotskii[8] is a scientist from Ukraine. He started working on biological transmutations in the 1990s. He is well known for using modern analytical techniques. In particular, he used Mössbauer spectroscopy, very sensitive to Fe-57 to measure its production. In natural iron, Fe-57 represents only 2.2 per cent of the total iron content. The main isotope of iron is Fe-56, which represents 91.7 per cent. Measuring Fe-57 is also easy by mass spectroscopy, since there is no possible interference with another element. The experiments conducted by Vysotskii and his group[4] were performed with bacteria capable of developing in heavy water. They chose *Bacillus subtilis*, *Escherichia coli*, *Deinococcus radiodurans*, as well as a yeast culture *Saccharomyces cerevisiae*. When manganese was introduced with $MnSO_4$, a clear spectrum was measured, indicating that manganese had been transmuted into iron. The authors analysed the material by time-of-flight mass spectroscopy showing that the mass 57 peak was as large as that of mass 56. This is another confirmation of the production of Fe-57. Vysotskii and co-workers have also looked at another reaction:

Na-23 + P-31 → Fe-54

In natural iron, Fe-54 represents only 5.8 per cent of the total iron content. The bacteria developed in a medium without iron, and after development they measured Fe-54 as large as Fe-56.

In similar experiments they observed the following reaction:

Cs-133 + H-1 → Ba-134

To reduce radioactivity, they conducted experiments with synthetic microbiological cultures, which were up to 20 times more effective than standard microbiological cultures. It was shown that Ba^{140}, which is radioactive with a half-life of 12 days, transformed into Sm^{152}, which is stable with the possible following reaction

Ba-140 + C-12 → Sm-152

Interestingly, Cs-137, which is radioactive with a half-life time of 30 years, transmutes within 310 days into stable Ba-138:

Cs-137 + H-1 → Ba-138a

This work is certainly the best proof of biological transmutations.

Conclusion

There is no theory capable of explaining biological transmutations, but most likely low-energy nuclear reactions (LENR) will help better understand these new types of nuclear reactions in solids, be it in a crystalline form like in LENR or in living organisms like in biology.

The consequences of this body of research are of vital importance to the fields of science, agriculture, health and medicine; biological transmutations must be studied in depth. A full historical review is available in Biberian, "Biological transmutations: historical perspective"[10].

About the Author:
A physics professor at the University of Aix-Marseille, Jean-Paul Biberian has authored more than 80 research papers in the field of surface science and low-energy nuclear reactions (LENR). He is the editor-in-chief of the peer-reviewed journal devoted to LENR, the *Journal of Condensed Matter Nuclear Science*. Dr Biberian received the Preparata medal in 2016. This article was extracted with permission from Professor Biberian's published articles, "Biological Transmutations" from Current Science, Vol. 108, No. 4; 25 February 2015; and "Biological Transmutations: Historical Perspective" from J. Condensed Matter Nucl. Sci. 7 (2012) 11-25 and includes information from the website https://tinyurl.com/ybn867sy. Biberian can be contacted via his websites, http://cryofusion.org and www.jeanpaulbiberian.net.

Endnotes

1. Fleischmann, M., Pons, S. and Hawkins, M., Electrochemically induced fusion of deuterium. J. Electroanal. Chem., 1989, 261, 301–309.
2. Vauquelin, L.N., Expériences sur les excréments des poules, comparés à la nourriture qu'elles prennent, et Réflexions sur la formation de la coquille d'œuf. Ann. Chim., 1799, 29, 3–26.
3. Von Herzeele, A., Uber die Entstehung der anorganischen Stoffe (About the Origin of Inorganic Substances), 1873; Entstehung der unorganischen Stoffe (Berlin, 1876); Die vegetabilische Entstehung des Phosphors und des Schwefels (Berlin, 1880); Die vegetabilische Entstehung des Kalkes und der Magnesia (Berlin, 1881).
4. Baranger, P. and Gatheron, J.M., Les Plantes opérent-elles des transmutations? Les travaux de Pierre Baranger (ed. Baranger, M.), 1980.
5. Kervran, C.L., Biological Transmutations (revised and edited by Rosenauer, H. and Rosenauer, E., Crosby Lockwood, London 1972, reprinted by Beekman, New York, 1980, 1998).
6. Goldfein, S., Report 2247, Energy development from elemental transmutations in biological systems, US Army Mobility Equipment Research and Development Command, May 1978. DDC No. AD AO56906.
7. http://www.holleman.ch/holleman.html
8. Vysotskii, V.I. and Kornilova, A.A., Nuclear Transmutation of Stable and Radioactive Isotopes in Biological Systems, Pentagon Press, 2010.
9. Zündel, J.E., Transmutation of the elements in oats. In The Planetary Association for Clean Energy Newsletter, Volumes 2 and 3, July/August 1980
10. Biberian, J.P., Biological transmutations: historical perspective. J. Condens. Matter Nucl. Sci., 2012, 7, 11–25.