Transmutation – Reality or Macrobiotic Fairy Tale?

A recent Quantum Rabbit experiment provides evidence that contamination, not transmutation played a major role in it, and seriously calls in question all the experiments that have been performed at the Quantum Rabbit Laboratory so far. Standard Physics tells us that low energy nuclear transmutation as it has been suggested in the context of macrobiotics is not possible. If the experiments at Quantum Rabbit had found any convincing evidence of it, it could thus have challenged the conventional scientific understanding. It appears that at least so far that goal has not been achieved.

> This online version of the article has several additional comments added for the interested reader. They will be in red and will be somewhat indented. To get a more basic description these additional comments can be skipped.

In his article "Corking the Nuclear Genie" in Macrobiotics Today, Vol. 55 No. 1 Edward Esko enthusiastically presented the idea of using low energy nuclear transmutation, "Cool Fusion" as he calls it, to help eliminate nuclear waste. If this could work, it would in fact be a marvelous solution to the problem. However, there is one important prerequisite: The phenomenon of low energy transmutation must actually exist. To show that it does, it must be possible to reliably reproduce the envisioned reactions, and alternative explanations for the experimental results must be ruled out.

"Low energy" in this context means that the reactions can take place without involving energies of magnitudes usually associated with nuclear explosions. Two experiments by George Ohsawa are commonly cited in macrobiotic literature as "proof" of transmutation, but it turns that both of these experiments fall short in one way or another. In one of the experiments George Ohsawa claimed to have transmuted sodium and oxygen into potassium in a test tube, the second one purported to have transmuted carbon and oxygen into iron. Unfortunately, the first experiment was never reproduced by others, despite numerous attempts to do so. In the second experiment, carbon was exposed to electricity, and after that it exhibited magnetic behavior. This can be reproduced fairly easily, and has been done so very impressively in the Quantum Rabbit Laboratory by Edward Esko, Alex Jack and Woody Johnson, and by many others. The conclusion drawn by Ohsawa and Kushi was that iron had been produced, as evidenced by the magnetism. However, it has since been discovered that magnetic forms of carbon exist, and these may have been created in the experiment. The observed magnetism alone is therefore no proof at all that any iron had been produced.

> Another important name to mention in this context is Louis Kervran. He was a French researcher living from 1901 to 1983 who was trying to prove the possibility of Biological Transmutations, suggesting that transmutation of chemical elements can occur within living organisms. George Ohsawa was very excited when he learned about Kervran's work, and went so far as to say that the Western theory of the atom is dead. However, Kervran's experimental methods have been criticized (even by supporters of the idea of Biological Transmutation, see for example

http://www.davidc.f9.co.uk/stichting/holleman/s4.htm#4.3), and attempts to reproduce his findings have produced mixed results. Again, the question that has to be asked is if his findings can have alternative explanations that do not involve low energy transmutations. As these experiments stand they cannot be considered proof of biological transmutations, much more careful analysis would be necessary.

The evidence obtained in the classic macrobiotic transmutation experiments is therefore inconclusive at best. The Quantum Rabbit Laboratory that Edward Esko is working with has made it a goal to demonstrate that nuclear transmutations at low energies can occur, by performing experiments in a much more rigorous manner. What have they achieved in all the years of their experiments? They have conducted a variety of experiments with different setups, involving different chemical elements, but the basic idea is the same for all of them. They start out with certified pure materials, apply heat and electricity to them, and send them to outside laboratories for testing afterwards. Predictions had been made what chemical elements might be created by transmutation in each of these experiments, and the laboratory analysis was looking for traces of these elements. Tests were also performed to make sure these elements could not be detected before the experiments, which does not entirely rule out their presence though. Numerous times the expected chemical elements were detected afterwards, which would seem to speak in favor of the transmutation hypothesis. However, before this can be accepted as evidence of transmutation, other explanations must be ruled out. First and foremost there is the possibility of contamination. In these experiments contamination would mean that the new materials detected were not created by transmutation, but were present in the test samples, or they were present in the environment and came in contact with the test samples. This could have occurred by handling the test materials before, during or after the experiment, or when packaging and sending them to other laboratories to test for the expected trace elements. Edward Esko admits to the possibility of contamination and mentions it in the book “Cool Fusion” (Cool Fusion, Edward Esko and Alex Jack, Amber Waves, 2012). He correctly points out that the Quantum Rabbit experiments should be repeated by better equipped research laboratories that may be better able to avoid contamination.

A slightly different mechanism that can occur is that of concentration. Some chemical elements could have been present in the material in such a low concentration that they could not be detected, but they might accumulate in particular areas of the test materials during the experiments to the extent that they can now be detected. This is very similar to contamination in that the detected materials were not created by transmutation but were present before that. Much of what is said below about contamination applies to this also, in particular that the mix isotopes of these elements would be very similar to the mix found in nature, which is not the expected result in the case of transmutation.

A recent experiment at Quantum Rabbit was testing the hypothesis that barium can be formed from iodine and lithium by transmutation. Different from the Quantum Rabbit experiments of previous years, this experiment included additional tests that help to distinguish between transmutation products and contamination. The idea is very simple. There are different types of barium that have slightly different weights. Such variants of chemical elements are called isotopes. The reaction of transmuting iodine and lithium into barium as suggested by Edward Esko states that only one specific type of barium is created in the reaction, referred to as ^{134}Ba. The 134 indicates the atomic weight of it, which is slightly less than that of most other barium isotopes. On the other hand, existing barium found anywhere on earth consists of a specific mix of isotopes, mostly containing the somewhat heavier ^{138}Ba , along with some other types. Only the small proportion of 2.417% of it is ^{134}Ba.

> In detail, naturally occurring barium is a mix of quite a number of different isotopes. In naturally occurring barium the most common isotope is ^{138}Ba with an abundance of 71.7%. This is followed by ^{137}Ba with 11.23%, ^{136}Ba with 7.854% and ^{135}Ba with 6.592%. Only 2.417% of barium found on earth consists of ^{134}Ba.

The extra tests performed in the recent experiment measured the proportions of the different barium types found after the experiment. If it had been found that almost all of the barium detected was ^{134}Ba as predicted by the suggested reaction, it would have lent good support to the transmutation hypothesis. Alas, it turned out that most of it was ^{138}Ba, according to the results compiled by Edward Esko in an article submitted to the magazine Infinite Energy that he kindly shared with me (Appearance of Barium in Lithium-Iodine Plasma, Infinite Energy Issue 111, September/October 2012). Finding ^{138}Ba is exactly what we would expect if the barium originated from contamination, as ^{138}Ba is the dominant type of barium present in the environment. On the other hand, according to the Cool Fusion model ^{138}Ba will not be created by transmutation of iodine and lithium, since the combined atomic weights of iodine at 127 and lithium at up to 7 are not sufficient to produce ^{138}Ba with an atomic weight of 138.

The Quantum Rabbit experiment thus strongly indicates that contamination at the very least played a major role. It is still possible that some of the barium found was created by transmutation. In that case we would expect to see at least some increase of ^{134}Ba relative to ^{138}Ba. Three test runs of the experiment were performed. For test 3 a fairly large proportion of 463 ppm (parts per million) of barium was found in the materials tested after the experiment, but next to no increase of ^{134}Ba.

> 70.2% of ^{138}Ba was detected after the experiment as compared to 71.7% for ordinary barium, and 2.42% ^{134}Ba compared to 2.417%. Thus there was next to no increase seen in ^{134}Ba as one would expect if the barium was created by transmutation.

According to Edward Esko's article in Macrobiotics Today the barium appeared "as predicted", but the fact that it was mostly ^{138}Ba is quite contrary to the prediction that ^{134}Ba would be created by transmutation.

In test 1 and 2 only 3.5 ppm and 1.8 ppm of barium were found afterwards, and again most of that consisted of ^{138}Ba. This suggests that most of the barium found was from contamination in these test runs also. Besides ^{138}Ba, such contamination would contain some ^{134}Ba as well. We can easily estimate how much that would be, based on the fact that the ratio of ^{134}Ba to ^{138}Ba in naturally occurring barium is about 1:30. One 30th of the amount of ^{138}Ba detected comes out to 0.085 ppm for test1, 0.043 ppm for test2 and 11.19 ppm for test 3. If additional ^{134}Ba was produced by transmutation we would expect to see an increase over these values. Minute increases were in fact seen in the test runs. The increase in ^{134}Ba was 0.011 ppm in test 1, 0.029 ppm in test 2 and 0.014 ppm for test 3.

In test 1 the detected ^{134}Ba amounted to 2.73% = 0.09555 ppm which is about 0.011 ppm higher than the 0.085 ppm from the above argument, a slight increase over the natural value of 2.417%. Test 2 had a more pronounced increase measuring 4.04% = 0.07272 ppm, about 0.032 ppm higher than the expected 0.043 ppm. Thus, while the isotopic composition seems more interesting for these two experiments, the total amount of material detected is substantially less, and that makes the results much more prone to measurement errors. The other fact is that Ba_{138}, which is not expected to be produced by the reaction $I_{127} + Li_7 \rightarrow Ba_{134}$, still made up a large majority of all the barium detected. In test 1 it was 70.2%, which is still very close to the natural value of 71.7%, and 66.3% for test 2, which is not too far off, either. The obvious conclusion is that contamination played a large role in those tests also.

When looking for evidence of transmutation it is these tiny increases that have to be considered. Thus, while the results of the tests may look impressive at first, with as much as 463 ppm of barium found in one of the test runs, the picture is quite different when a realistic assessment of the role of contamination is made.

Unfortunately, the measured increases of ^{134}Ba that could be conceived as a hint of transmutation are so small that we have to question how accurate the measurements of such tiny amounts are. Maybe the measurements gave inaccurate values that were too high and there was no real increase in ^{134}Ba at all.

This is corroborated by the following consideration. The ratio of ^{138}Ba to ^{137}Ba would not be expected to change if only ^{134}Ba was created by transmutation reactions. We would therefore expect it to be at its natural value of 71.7% / 11.23% ≈ 6.38. Yet, there was some fluctuation of this value, being 6.44 for test 1, 6.08 for test 2, and 5.95 for test 3. If such fluctuations can occur for ^{137}Ba and ^{138}Ba that are not related to transmutation, we should be careful not to read too much into the measured increase of ^{134}Ba.

It may be worthwhile following up on that in future experiments, ideally in a setting where contamination can be greatly reduced, to avoid having to look for a needle of transmutation in a haystack of contamination.

In the article submitted to the magazine Infinite Energy Edward Esko suggested that nuclear reactions between ^{127}I and the less prevalent isotope ^{6}Li could have formed ^{132}Ba while releasing a neutron in each reaction, allowing ^{134}Ba nuclei to absorb some of those neutrons and form heavier isotopes of barium. Unfortunately that explanation does not work. There would have to be at least one isotope of ^{132}Ba for each isotope of barium heavier than 134, but that was not observed. The tested samples showed only a tiny amount of ^{132}Ba, close to 4% in test 2 which had the highest showing. This is not enough to explain that about 92% of the detected barium was made up of isotopes heavier than ^{134}Ba.

Simply put, between ^{127}I, ^{7}Li and ^{6}Li there are simply not enough neutrons available from the original nuclei to form a majority of isotopes heavier than ^{134}Ba.

The fact remains that the observed abundances of isotopes were close to the natural occurrences, thus barium from contamination offers a natural explanation for what was observed.

The recent experiment calls into question the past experiments at Quantum Rabbit where no tests had been performed to distinguish between transmutation and contamination. Predictions had been made that certain elements could be produced through transmutation, and when these elements where detected after the experiment it was interpreted as possible evidence of transmutation. Some of the amounts of material found were impressively high, but as the iodine-lithium-barium experiment shows this is no reliable indicator of transmutation if contamination cannot be ruled out. And if contamination was found to be a major factor in one experiment, as in the recent one, this may well have been the case in many if not in all of the previous Quantum Rabbit experiments.

The fact remains, conventional physics tells us that the type of nuclear reactions that Quantum Rabbit attempts to study should be impossible even at temperatures and matter densities found on the sun, let alone in small laboratories on earth. As I had written in Infinite Energy Issue 92, July/August 2010, "Conventional physics tells us that it requires pressures and temperatures comparable to the interior of the sun to overcome the Coulomb barrier even for the very lightest elements to achieve fusion. But, for fusing heavier elements as suggested by the Quantum Rabbit experiments, only cataclysmic scenarios like supernova explosions will suffice." Trying to reconcile the idea of low energy transmutation with standard physics, in the book "Cool Fusion" Edward Esko counters that the effect of quantum tunneling might offer an explanation of how "the Coulomb barrier can be breached with relatively low inputs of temperature, pressure, and energy and how nuclear transmutation can be achieved under these conditions." But quantum tunneling is exactly what is being taken into account when nuclear fusion is discussed in the context of standard physics. It is true, quantum mechanical tunneling makes it possible to overcome barriers when it should be impossible according to classical mechanics that does not take quantum theory into account. But the higher the barrier, the lower the rate at which such tunneling events will occur. In nuclear physics this is expressed by what is known as the Gamow factor. Interestingly, according to classical mechanics it would be impossible for any nuclear fusion reactions of even the lightest element hydrogen to occur on the sun. It is the tunneling effect that makes these reactions possible at a relatively slow rate, making sure that our sun can keep shining for billions of years. While still very small, the tunneling probability is increased with the available kinetic energy of the colliding atomic nuclei, thanks to the high temperatures on the sun, and the vast amount of matter on the sun makes it possible that enough nuclear reactions are occurring overall to provide the surrounding universe with light and heat. On the other hand, for heavier nuclei the Coulomb barrier resulting from the electric repulsion of the involved nuclei becomes so high that the Gamow factor basically tells us that such fusion reactions are so unlikely to occur that they can be considered impossible even under the conditions on the sun, let alone anywhere on earth.

It is important to understand the significant difference between ordinary chemical reactions and nuclear reactions as they are suggested by biological transmutations or low energy nuclear reactions in general. Atomic nuclei are very small particles that are very far apart from each other in ordinary matter under the conditions found on earth. If we envision the nuclei to be as big as apples, they would be a few miles apart from each other, and an enormous repulsive electric force prohibits them from ever getting close to each other. But they would basically have to touch each other in order for nuclear reactions to set in. For this to work they would have to get much closer to each other, and they would have to move quite rapidly in order to overcome the mutual repulsion whenever a collision happens. It seems absolutely impossible that the necessary densities and energies could at all be achieved by the experiments at Quantum Rabbit, or by the experiments performed by Ohsawa.

Chemical reactions are of a very different nature. They basically consist of rearrangements of nuclei that remain very far apart from each other, with electron clouds between them keeping the molecules together by the attractive electric force between electrons and nuclei. Talking about a reaction of forming barium from iodine and lithium by a reaction Li + I → Ba may look formally very similar to a chemical reaction of forming water from hydrogen and oxygen, $2H_2 + O_2 \rightarrow 2H_2O$, but those are two very different types of reactions.

It all seems to fit together neatly. Physics tells us that low energy transmutation is impossible, and looking at the experiments of Quantum Rabbit including the one described above, we have to conclude that no convincing evidence of it has been found so far. Nonetheless, the very slight apparent increase in ^{134}Ba may be worthwhile following up on. Beyond that, the most promising route for Quantum Rabbit to pursue would be to devise other experiments where the measurement of isotopes can provide more information that helps to distinguish between transmutation and contamination, in the hope that future results will be more suggestive of transmutation.

Where does this leave us? Low energy transmutation is clearly an idea that goes strongly against the common scientific understanding. There are two possibilities: We may be on the brink of a paradigm shift with a radical change in the common scientific understanding, or the idea could just be wrong. In the latter case no convincing evidence in favor of it will ever be found. Adherents to the idea will of course have a hard time giving up on it ever in spite of that, and in spite of all the arguments speaking against the idea. What is at stake in macrobiotics is that the ideas of Ohsawa and Kushi relating to transmutation may have to be considered incorrect. But in the long run macrobiotics must not be limited to upholding each and every idea of the great teachers at all cost. We must be thankful what those teachers have brought us, but our understanding must evolve and go beyond. Transmutation may have been considered an important pillar of macrobiotics several decades ago. While it is not wrong to continue looking for evidence of it, we should be prepared to admit that the idea may not be correct after all. Even if faith and positive thinking can often make a positive difference in our lives, ultimately macrobiotics has to be based on reality, not on wishful thinking.

I would like to thank Edward Esko and Alex Jack for discussing the experiments at Quantum Rabbit with me, and for providing me with their recent results, and I continue to wish them the best for their future research efforts.