ALCHEMISTS IN THE GARDEN

Early this century a young Breton schoolboy who was preparing himself for a scientific career, began to notice a strange fact: about the hens in his father's poultry-yard. As they scratched the soil they consistently seemed to be pecking at specks of mica, a siliceous material dotting the ground. No one could explain to Louis Kervran why the chickens selected the mica, or why each time a bird was killed for the family cooking pot no trace of the mica could be found in its **gizzard,** or why each day the flock produced eggs with calcareous shells though they apparently had not ingested any calcium from land which was entirely lacking in limestone. It took Kervran many years to establish that the chickens were transmuting one element into another.

Reading a novel by Gustave Flaubert called Bouvard et Pecuchet, young Kervran came across a reference to Louis-Nicolas Vauquelin, a celebrated French chemist, who, 'having calculated all the lime in oats fed to a hen, found still more in the shells of its eggs. Therefore, there is a creation of matter. In what way, no one knows.'

It seemed to Kervran that, if the hen had somehow been able to manufacture calcium in its own body, everything he was taught in his chemistry class needed reviewing. Ever since the end of the eighteenth century, when Vauquelin's contemporary Antoine Laurent Lavoisier, known as the 'father of modern chemistry', had laid down the principle that in the universe 'nothing is lost, nothing is created, everything is transformed', it had been believed that elements could be shifted about in different combinations but could not be transmuted one to another; millions of experiments appeared to verify Lavoisier's contention.

The first crack in this seemingly unshatterable wall around the atom came at the start of the twentieth century with the discovery of radioactivity, which showed that some twenty elements could indeed change into something different, apparently no longer obeying the law of the conservation of matter. Radium, for instance, disintegrates into electricity, warmth, light, and various substances such as lead, helium and other elements. With the advent of nuclear physics, man was even able to create certain elements which had been missing on the famous chart drawn by the Russian peasant genius Dmitri Mendeleyev, because they were thought either to have vanished radioactively in former times or to have never existed in a natural state.

Ernest Rutherford, the British physicist who first theorized the existence of the atom's nucleus, showed in 1919 that one could transmute elements by bombarding them with alpha particles - identical to helium atoms less their electrons - a practice which has continued to the present time, with increasingly 'heavier artillery'. Out even these breakthroughs did not shatter Lavoisier's dictum about the eighty or more non-radio-active elements. Chemists still hold that it is impossible to create another element by chemical reaction, and even maintain that all reactions occurring in living matter are solely chemical. In their view chemistry can and must explain life.

As a young graduate engineer and biologist, Kervran remembered Vauquelin's experiment and decided to repeat it. He fed a chicken on oats alone, the calcium content of which he had carefully measured. He then checked the calcium content in both the eggs and faeces issuing from the chicken and found the bird had produced four times as much calcium as it had ingested. When Kervran asked his biochemist colleagues how the extra calcium originated, they replied it had come from the chicken's skeleton. This, Kervran realized, might do in an emergency but *it a* chicken were required to make shells vary long its skeleton would soon be reduced to pulp. In fact, a chicken deprived of calcium lays soft-shelled eggs within four or five days. However, if fed potassium, the chicken's next egg has a hard shell composed of calcium. The chicken is evidently capable of transmuting the element potassium, which is found in high concentrations in oats, into the element calcium. of classical nuclear physics based on powerful interactions, but in the field of hyperweak interactions in which there is no assurance of the operation of the established laws of conservation of energy or even the existence of a mass/energy equivalent.

Physicists, says Kervran, are mistaken in claiming that physical laws are the same for the living as for inanimate matter. Many physicists declare, for instance, that a negative entropy, a force which in biology would build up matter, is an impossibility, since the second principle of thermodynamics of Carnot-Claussius, regarding. the breakdown of energy, states that there is only positive entropy, i.e., that the natural state of matter is chaos and that all things run down and become random, losing heat and not acquiring it.

In contradiction to the physicists, Wilhelm Reich held that the accumulators he built to collect an energy, which he named 'orgone', permanently raised the temperature inside the accumulator tops, thus making nonsense of the second law of thermodynamics. Despite the fact that he demonstrated the phenomenon to Albert Einstein in his house in Princeton, and that Einstein confirmed the phenomenon, though he could not account for it, Reich was considered mad.

Louis-Victor de Broglie, winner of the Nobel Prize for his prediction of the wave properties of the electron, has said: 'It is premature to want to assess vital processes according to the very insufficient physico-chemical concepts of the nineteenth or even the twentieth centuries.'

Extracts taken from Chapter 16; The Secret Life of Plants by P.Tompkins and C.Bird.