



UNLOCKING  
CONSCIOUSNESS



## **BRIAN MIND FORUM**

### **Appendix 007**

#### **Examples of Software in biological systems.**

Over the last half century we have learned a lot about the physical structure of Deoxyribo Nucleic Acid (DNA), its derivative RNA, and the enzymes and proteins they construct.

However, it is clear we are missing a piece of the jig-saw. All the processes along the chain appear to be influenced by electrochemical patterns that control the construction of stem cells which then morph into individual cells that execute specific functions. Where do these patterns come from, how do they influence the genome, not just to create the original cells with which we are born, but from an identical set in each cell nevertheless reproduce individual specific replacement cells throughout our lives? In particular, polymerase is an exact example of a Turing universal machine. Polymerase is a protein that travels along a gene transcribing the DNA by inputting one base at a time changing its state according to the chemical information algorithm and transcribing the result, and so in the process generating a perfect replica.

We marvel at the behaviour of flocks of birds and shoals of fish as large numbers fly or swim together, changing direction and formation in perfect symmetry. Much work is being done to understand how a hive of bees reconnoitres and moves to a new hive, selects a Queen, forages for honey and describes to other where nectar can be found. Very clearly the abilities of the swarm far exceed the sum of the skills of all the individual bees. People have speculated that this is some form of group intelligence. It seems likely this is built on some expression of software, which provides the process of coordinating the individual bees to behave as one cohesive cooperative hive.

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