Introduction to What is Life? – *Tim Bollands*

The topic for this year's Members' Weekend is one of the oldest problems in philosophy - the question: ***What is Life?*** We can interpret the question in several ways:

- What do we mean when we use the word "Life"?
- What is it that makes living things alive?
- What is the correct definition for the natural phenomenon we call Life?
- What is the distinction between living things and non-living things?

Science has been very successful at describing living things and living processes. And yet, for some reason, they remain unable to say what Life actually is. A recent study - Popa (2004) - found over 100 definitions of Life, developed by scientists, none of which had gained overall acceptance as providing a clear, unambiguous distinction between Life and non-Life.

So, what do you think? How might we distinguish living things from non-living things? On what basis do we decide whether something is alive or not alive? Is a virus a living thing? Could a robot be alive? What about computer viruses? How will we recognise Life if we find it on other planets? Without a clear definition of "Life", none of these questions is easily answered.

Perhaps we can we define Life as:

- The possession of a soul or spirit ?
- The animation of the body by a life-force, elan vital, or other vital substance ?

Such definitions are not well supported by science, however. So, perhaps instead, Life is:

- A physical machine which grows, eats, moves, responds, excretes, reproduces, etc.
- A chemical system with nutrition, respiration, homeostasis, metabolism, reproduction, etc.
- A biochemical machine that is Carbon-based, Cell-based, has DNA and ribosomes, etc.

Each of these list-based definitions has its problems, due to the fact many of the things we think of as living don't meet some of the criteria, while some things we think of as non-living do. There is also the 'Problem of the Criterion', as epistemologists find when seeking to define "knowledge". What we really need is a definition which captures the essence of what life really is.

In the 1970s, NASA's developed a definition to support the search for life on other planets:

- "A self-sustaining system capable of Darwinian evolution"

But if they found aliens that were not capable of evolution, would they consider them not living? And what counts as a "self-sustaining system"? John Conway's 'Game of Life' considered self-sustaining patterns of dots on a computer screen, emerging from simple sets of rules, competing for resources and thus evolving in a Darwinian sort of way (Gardner, 1970). But are simple patterns of dots, or even complex computer viruses, really examples of Life?

Over the course of the weekend, our eight speakers will address the question *What is Life?* from a range of different perspectives, offering their own personal response to the question. This will be followed on Sunday afternoon by a Panel Discussion, where you can put your questions to each speaker, and maybe tell us what you think Life really is.

References:

Popa, R. (2004), *Between Necessity and Probability: Searching for the Definition and Origin of Life*. Springer, p. 197-205.

Gardner, Martin (1970), *"Mathematical Games - The Fantastic Combinations of John Conway's New Solitaire Game 'Life'"* , Scientific American.