

*Making Sense of Life*

Evelyn Fox Keller

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From the nineteenth century to the twenty-first, the meaning of life changed enormously, and with it the field of biology changed too. It can be said, though not everyone would agree, that biology got going as a subject when it distinguished life, not from death, but from inorganic processes. Around 1910, a Frenchman, Stéphane Leduc tried to close the conceptual gap between the living and the non-living with demonstrations of life-like chemical forms. By selecting his colloids and solutions carefully, adjusting concentrations at appropriate stages, he was able to create rather nice “osmotic productions,” which look much like fungus: mushrooms and flowering bodies. Like real life, these artificially-created forms grew and sort-of reproduced. Some people got excited; others did not know whether to laugh or cry.

Today, Leduc’s ideas seem naïve, and indeed they never provided an explanation about life that people could work with. The story of life had to wait for genes, and that undermined Leduc’s gene-free approach, along with several others.

The creation of life, or perhaps rather the creation of life-like forms, has ever since received a mixed reception. Today, it is trendy not to rely on chemical osmosis so much as computation. Artificial life has set itself the goal of studying how life emerges from appropriate organising principles, regardless of the medium it lives in. It does not have to be carbon-based, but if it is in a computer, so be it.

*Making Sense of Life* is Evelyn Fox Keller’s meditation on these issues. Some biologists would rather observe than build, and those that build have to use their words carefully. Artificial life does not really need nutrition or metabolism in the same way real life does. Such words as nutrition and competition are metaphors, and can inspire scientists to see more than is really there, or perhaps less. Why do species compete rather than collaborate? And when those metaphors are laden, as they are, with the burdens of culture and stereotypes about what scientists do, there is scope for even more debate. Mother Nature hides secrets from us, especially in embryology, and the quest to explore takes on masculine and elitist overtones.

*Making Sense of Life* is divided into three clear parts, corresponding to historical periods. First, we have making sense of life without genes, which opens with Leduc and fizzles out with the untimely birth, as Keller puts it, of mathematical biology. Then in the second part, the story develops with genes plus cybernetics. The third part splits in two. It starts with a review of the impact of microscopy and visualisation on biology: as it were, emphasising that seeing is believing. This celebration of technology is then followed with a discussion of computational models, ultimately artificial life, where computers are the technology rather than the various sorts of microscope.

Unfortunately the parts of the book are disconnected: there is no real narrative building one part on the other, apart from the implicit historical sequence, and there is no relation to the theme, rarely even to the title of the book. So, for instance, when we are asked whether “simulated

organisms of cyberspace” meet the criteria of being alive, this question, though explicitly posed and apparently worrying philosophers and the rest of us, is dismissed as not germane to the concerns of the book. As narratives go, then, it lacks a viewpoint and a point of view, other than that no simple point of view can be had.

Biologists are of necessity more closely wrapped up with their subject than the rest of us. What to a physical scientist might be a mathematical explanation can, we are told, become unthinkable and downright insulting if it seems to over-simplify life. Questions are “troubling.” This book *Making Sense of Life* spends more time worrying about how we make sense of each other’s science and use of metaphors than of the meaning of life itself. It worries about so-called lexical gaps, uses rhetorical questions and worries about words, in one case discussing the significance of introducing a new term for the modifier of a noun. Is “model” a noun or a verb, and is its object unparseable but composite? I know what the words mean, but they aren’t making sense to me here.

The three parts of the book are followed with a concluding chapter, which now admits that the central concern of the book was with the multiplicity of styles in scientific explanation. Indeed the narratives in the three parts have their own different styles. The first was practically popular science; the middle rather uncertain and pedantic, and the last third a largely routine review of the impact of certain technologies in biology. In contrast to the popular start, only specialists will survive the middle. And the final third of the book hasn’t a clear audience: it is neither popular nor specialist. The popular reader will not be edified; the developmental biologist will know it already; and the philosopher, particularly one aware of artificial life, will be frustrated with a shallow survey with no new insights making sense of life.

Ultimately *The Meaning of Life* will be interesting to people who work in multidisciplinary fields, where hard and soft ideas confront each other, where people play with words, but those interested in making sense of life beyond these concerns will need to look elsewhere.

*Reviewed by Harold Thimbleby.*