STEFAN HELMREICH, *SOUNDING THE LIMITS OF LIFE: ESSAYS IN THE ANTHROPOLOGY OF BIOLOGY AND BEYOND* (PRINCETON: PRINCETON UNIVERSITY PRESS, 2016) ISBN 978-0-691-16481-6 (PB) £21.95 [MATTHEW WRAITH]

Whatever else H. G. Wells became in his long career, he never stopped being a biologist. The first book that he ever published was a textbook, (later dismissed as 'pure hackwork'). At the other end of his career, in 1931, long after he had thoroughly established himself, not just as a novelist, but as a political visionary, he returned to the task of biological pedagogy with his colossal summation of the state of biological knowledge, *The Science of Life*, aided by his son G. P. Wells and the biologist Julian Huxley.[1] In fact, Wells was no less a political visionary for having returned to biology: it had always been at the centre of his political project to set human affairs on sound scientific first principles. And *The Science of Life* is ultimately just as much a part of this project as any of his more pamphleteering works. The last chapter is entitled 'The Present Phase of Human Association', where he speculates upon 'The Passing of Traditionalism', 'The Supersession of War', 'The Change of the Nature of Education', 'The Breeding of Mankind', and finally 'The Possibility of One Collective Human Mind and Will'.[2] This was the culmination of all the previous pages' enquiries into molluscs and toadstools.[3]

However, before venturing on this journey through life's evolution and eventual destination, there was the small matter of what life is in the first place. The definition of life is the bedrock on which all the subsequent social theory rested. Answering this question turns out to be more than the usual throat-clearing academic pabulum one usually finds with an initial definition of terms. Defining life has always been vexed by threshold test cases. Having rather long-windedly arrived at a provisional checklist – life is something that moves, grows, metabolises and reproduces – he begins to speculate, in typically Wellsian fashion, about the possibility of extra-terrestrial life and what the discovery might do to this definition. Life on other planets would

[1] H. G. Wells, G. P. Wells and Julian Huxley, *The Science of Life* (New York: The Literary Guild, 1931).

[2] Ibid., 1454-73.

[3] Peter Kemp has noted 'Wells's eagerness to see not merely human beings but also human institutions in biological terms (*H. G. Wells and The Culminating Ape: Biological Imperatives and Imaginative Obsessions* (London: Macmillan, 1982), 176.).

be so far removed from life on earth, that perhaps an auxiliary definition might be invoked to mop up problematic cases. 'If we called terrestrial life Alpha life, we might call the parallel life on Mars Beta life, an analogous thing and not the same thing.'[4] 'Life' turns out to be an endlessly plastic category, swelling and splitting in something like the way a cell reproduces.

Since Wells and Huxley wrote about life, we have had need to tinker with its central definition repeatedly. Scientists have found evidence of life under miles of Arctic ice, at the deepest point in the ocean, in hydrothermal vents on the ocean floor, and on asteroids from other planets – each discovery forcing a new conception of the subject's essential subject matter. Studying an asteroid that landed in the Antarctic, practitioners of the always inconclusive scientific guessing-game known as *astrobiology* discovered microscopic elliptical marks within the rock that they believed might point to the existence of life. When it was pointed out that these marks were two orders of magnitude smaller than the smallest microbe, astrobiologists argued that, if perhaps not the marks of microbes-as-we-know-them, they could be signs of a previously undiscovered type of ultra-small life we might call a *nanobe*. Much like Wells's 'Beta-life', the nanobe is 'a reframing that recognizes a limit but then leaps over it by forming a new category' (14).

Stefan Helmreich, the anthropologist at MIT who I have just quoted, has spent two decades delving into the limits of life, the points at which our intuitive notion of what life is starts to splutter and give out. He finds this dissolution of life-as-we-know-it in astrobiological speculation, in the silicon virtual life forms we have constructed on our computer databases, and in the barely perceptible reaches of the ocean. His book *Alien Ocean: Anthropological Voyages in Microbial Seas* was published in 2009. The book was the outcome of a long collaborative project with the Monterey Bay Aquarium Research Institute. Helmreich travelled with them on their maritime investigations, looking into the increasingly weird microscopic world revealed to us by marine biology, the fluctuating genetic networks at play in the ocean, and the scientific, social and cultural networks established to record and imagine their workings. Now he has published a set of further essays taking essentially the same point of departure, *Sounding the Limits of Life: Essays in the Anthropology of Biology and Beyond*.

Before these works can begin to make their case, an initial, rather large, methodological incredulity has to be overcome: why should an anthropologist, of all people, interest himself in these matters? What is an

[4] Wells et. al., *The Science of Life*, 12.

anthropologist doing exploring precisely those parts of the planet where there does not seem to be much *anthropos* about? What insights can one possibly gain about humanity by looking at those branches of the tree of life most distant to it? Helmreich's work offers a range of interrelated answers to these questions.

Firstly, alien life forms will always remain profoundly relevant to the study of humans precisely by virtue of their alien status, their alterity. Before any properly scientific taxonomic classification of life is ever drawn up, there is that older and more primitive, more visceral classification of life into the self-same and the Other. Ocean life has become one such defining mark of difference. Yet at the same time, microbial life is also life at its most elementary and atomic, and thus the search for it becomes a search for the starting point, the originary moment to which we are ultimately tied by untraceably tortuous paths of heredity. These points, taken together, provide the duality and enigma of marine biologists' subject matter: both intimate and exotic, origin and other, foundational to our own nature and impossibly foreign to it. Helmreich suggests in his earlier work that

> the marine microbe [...] stands today for the strangeness of the sea. Neither fully self nor other, the marine microbe is an alien whose purposes we do not know – a stranger who may be friend or foe, who may offer the unexpected communion of kinship, or the irreversible rescripting of life as we know it.[5]

Secondly, and less sentimentally, marine biology offers itself to anthropological investigation through presenting its own processes and practices as objects of study in and of themselves. In an obvious, but by no means trivial sense, there are always humans present in the scientific investigation of the oceans, namely the scientists themselves. Helmreich's work follows in the train of the seminal but deeply contested work of Bruno Latour and Steve Woolgar, whose book *Laboratory Life* became one of the founding works of Science and Technology Studies (STS).[6] Woolgar and Latour spent a long time studying scientists at the Salk Institute in San Diego. The report that they wrote up described the workings of the Institute in the language of anthropologists observing a foreign and unfamiliar tribe. Its daily scientific activities – labelling and inscription, conversations at the

[5] Stefan Helmreich, *Alien Ocean: Anthropological Voyages in Microbial Seas* (Berkley and Los Angeles: University of California Press, 2009).

[6] Bruno Latour, and Steve Woolgar, *Laboratory Life: The Construction of Scientific Facts* (Beverly Hills: Sage, 1979).

chalkboard, to name a few – were presented as the rites and rituals that bound this collective together while all acknowledgement of the content of the scientific matter under discussion was rigorously bracketed. The question of what had ultimately been achieved by the adoption of this deliberately estranged perspective other than an ironic distance and absurdity is still up for debate.

Helmreich, aboard the ship with the Monterey Bay Institute, does not quite follow Woolgar and Latour in their faux naivety; he is demonstrably well-versed in the science of his subject matter and he meets the scientists eye-to-eye as a companion rather than as a distant observer. But it is still as much the collective act of observation as the thing observed that he is interested in. The result is a hybrid work: a summary of the current scientific state-of-play in microbiology and a further examination of the practices and processes by which it is arrived. In a way, there is a certain continuity between the two: the streams of genetic information being transferred through the imperceptible networks of the oceans into the scientific networks of registration, interpretation and communication. The result is a detailed study of life at its limits and a detailed study of the life that studies it.

Thirdly, the act of interpreting nature is not merely the job of a group of professional specialists; it is something distributed throughout society at large. Helmreich, particularly in the more recent work, *Sounding the Limits of Life*, expands his field of reference beyond the strictly scientific onto the social, the cultural and the political. He attends to the complex interaction between biology and culture that goes on when we divide up the oceans into territorial jurisdictions, for example, or attempt to order and present oceanographic knowledge on a searchable database like Google Ocean, or even when we hold a seashell to our ears to hear the sea. Helmreich offers an abundance of not only the social and cultural practices by which we attempt to encounter, organise and understand the ocean, but also, reciprocally, the ways in which we use the oceans and their life forms to understand culture. In one instance, he cites anthropologist Franz Boas's use of coral reef as a metaphoric illustration of the way that a living and transient cultural actor makes a deposit to the petrified enduring traditions that will survive him (51).

We continually look to the biological sciences to find a grounding and legitimation for our own social organisation and cultural practices. To use Helmreich's language, 'forms of life', i.e. repeatable human practices, can be made to rest on 'life forms', i.e. organisms or ecological networks. Wells's final speculations on humankind in *The Science of Life* are one case in point. But the most fundamental, if also the most contestable, claim made

by this work, and the fourth and final line of approach from microbiology to anthropology, is that the grounding certainty that biology once offered to the human sciences is beginning to give way. In hunting down the most basic core constituents of life, in transferring their genetic information into other media, in simulating microbiology's processes in silicon that then takes on a life of its own, we have already initiated the process of transforming life into something else. Life has always already been manipulated by the hand that would discover it. The limits of life that Helmreich refers to do not simply mark the boundary between living forms and dead, inorganic matter. They can also mark that boundary, vital to anthropology itself, between nature and culture, the given and the manmade. Nature, rather than acting as the ground bed for culture, has come under its control. As Helmreich states,

> Biological studies in which 'life' is conceptually stretched to a limit resonate with uncertainties about what kinds of sociocultural forms of life biology might now anchor. (4)
> Biology becomes ungrounded. The form of life prepared by belief in these life forms is one in which bioengineering practice can simultaneously lean on 'life' and know that it is constructed. (8)

This is something Wells would be closer to conceding than one might think. His pragmatic philosophy admitted that the subject matter of biology, the system of classification into which organisms were organised, had the marks of human manipulation all over it. Any system of classification must be constructed through a wilful disregard of apparent difference: '*The forceps of our minds are clumsy forceps, and crush the truth in taking hold of it.*'[7]

Alien Ocean, Helmreich's first work on ocean biology gave a succinct and coherent set of arguments, focused around one extended piece of field research. His more recent, much more various and fanciful book is really a series of lines of flight off and away from the central arguments presented there, a fragmentary, essayistic series of 'further reflections on...'. He concludes, quite far from where he started out, with an unusual, but not unwelcome, meditation on the specifically auditory apprehension and comprehension of sea life, and on the parallels between the synthetic manipulation of sound and of life. The tone is often needlessly abstruse, but sometimes exhibits the kind of meandering wayward curiosity that might have appealed to Wells, as it ultimately appealed to this reviewer.

[7] H. G. Wells, *A Modern Utopia* (London: Penguin, 2005), 257. Emphasis in the original.