

Intelligence as Life

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Now, one of the really deep questions that you quickly encounter when you study these kind of systems is: What is the difference between life and intelligence?

David C. Krakauer, 2020 [6]

The notions of intelligence and life have been a topic of discussion since the beginning of humanity. Despite the progress made, to this day both concepts remain very much ill-defined, therefore one may think that it is a mistake to try and define intelligence in terms of life. The point of this essay is to argue otherwise, and by considering one key element that I think life exemplifies, I'll attempt to convince you that life and intelligence share a common structure. Some of the traits of life that can be used to study intelligence include evolutionary transitions, adaptive fitness landscapes, speciation, life/death, and evolutionary novelty. In this essay, I will only consider one of these traits and focus on the idea of intelligence as a tool to generate evolutionary novelty.

Given an evolutionary pressure, a biological system is not only capable of adaptation but it is capable of generating **novel** structures that were not present in the realm of the *actual* inside its ecosystem. As an example, we can take the African orchids and the *Xanthopan morgani* otherwise known as the Morgan's sphinx moth. One of Darwin's original predictions was that a moth with a proboscis long enough to reach the bottom of the spur of the orchid was not on the realm of the *possible* from the ecosystem of the orchid, but in the realm of the *actual*. At first glance, a moth with such long proboscis was unheard of and very unique, especially if one came from a location where no such orchids exist. However, in retrospect after its discovery by Wallace, a deeper look at the ecosystem of the moth and orchid revealed that a moth with such long proboscis was in fact inevitable. This means that everything that was *necessary* for the moth and the ecosystem to generate such long proboscis was in place. This apparent contradiction between inevitability and circumstantial novelty lies at the heart of the layered narrative of evolution and life. Finally, after this novel structure first appeared, it is something that now lies in the realm of the *actual* inside the ecosystem, it is something that now other biological systems (predators, parasites, etc) can take advantage of.

In a similar way, when we call something *intelligent*, it is typically something that is unheard of. For example, we can take the example of Antilochus in the Iliad, he displays intelligence as *mētis* by performing a cunning move in a chariot race. This is a move that the other racers are not familiar with, in other words, a novel move in the realm of the *actual* of his ecosystem of racers and watchers. Moreover, this move comes from something analogous to an evolutionary pressure, that is a consequence of his necessity and pressure to win the race. Similarly, as before, this move from afar, by a frequent watcher of chariot races, looks cunning and novel. However, from the point of view of Antilochus this is just the inevitable consequence of his necessity to win the race, he not only was trying to find a way to win given the constrained conditions of his chariot, but he consulted several people around his circle. In fact, some of these people suggested cunning moves of their own that lie in the realm of the *possible* of his ecosystem of chariot races. In the end, he manages to get everything in place to do what is *necessary* to perform his cunning move and win the race.

Although Antilochus won the race, it is unlikely that his cunning move will work in the future as effectively as in the previous race. In fact, frequent watchers of races may not consider it *intelligent* anymore. This is because although his move is as impressive as before, other racers now know the move and may prepare for it. Therefore the move has been transported from the *possible* to the realm *actual* in the ecosystem of chariot racers.

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