

Chapter 6: Selection, the Impersonal Engineer

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Summary

In Chapter 6, the focus shifts from carefully crafted designs to the role of chance and selection in shaping new vehicles. The narrative introduces a process that relies on randomness to create innovation, showing how mistakes and variations can produce systems more intelligent and capable than those designed intentionally. By mimicking the principles of Darwinian evolution, the chapter reveals how complexity and sophistication can arise from simple mechanisms combined with error and selection.

The experiment begins with a table populated by various vehicles, each navigating an environment filled with light, sound, smell, and physical landmarks like cliffs marking the table's edge. Vehicles that successfully adapt to these conditions continue to operate on the table, while those that fail, such as falling off the edge, are excluded from future reproduction. The creation process involves copying vehicles directly from the table, using materials like wheels, motors, sensors, and wires. However, the experimenters deliberately avoid analyzing the wiring or testing the behavior of the vehicles they reproduce. Instead, they follow the patterns of the originals, copying designs as accurately as possible.

Mistakes inevitably occur during copying. Some errors result in failures, with vehicles falling off the table as soon as they are placed. However, other mistakes lead to unexpected improvements, introducing novel patterns of wiring or combining mechanisms from different vehicles. These "lucky accidents" create vehicles that perform better than their predecessors, surviving longer and being reproduced more frequently. Over time, these variations accumulate, driving the evolution of increasingly intelligent designs.

The chapter highlights the power of this process, likening it to natural selection. Vehicles with advantageous traits remain on the table, ensuring they serve as models for the next generation. As these designs proliferate, the most successful innovations spread widely, demonstrating how random errors can become the seeds of significant improvement.

This process produces vehicles so complex that their wiring and behavior defy analysis. Without deliberate engineering, the resulting systems appear as though guided by an invisible, supernatural force. However, the chapter emphasizes that this complexity arises entirely from simple rules of reproduction, error, and selection.

Chapter 6 demonstrates how randomness and selection can create intelligent systems that exceed human design capabilities. By embracing chance, the process mirrors Darwinian evolution, generating vehicles with remarkable adaptability and complexity. This exploration challenges the assumption that intelligence must stem from careful planning, proving instead that error and selection can be powerful forces for innovation.