
Crafting Interchangeability: A Generative Structure for the Industrial Revolution and for Evolution

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Abstract

Developing Scaffolds in Evolution, Cognition, and Culture (Griesemer, Caporael, Wimsatt)
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One of the most important ways of generating deep entrenchment very quickly is to fashion an array of standardized parts which then, like alphabets, words, tinkertoys or electronic components can be used in systematically articulated combinations to produce a large variety of diverse artifacts, adaptations, or adapted systems. This pattern has played important roles in biology, in cognition, in language and in culture. I will draw on the history of technology to consider the difficult process of crafting interchangeable parts for muskets, and the processes to make them in between 1812 and 1841. Out of these processes emerged-scaffolding and scaffolded by-a number of social and technological generating other industries and trained workers who spread these changes and catalyzed the industrial revolution in the United States between then and the Second World War.

Analysis of this process and what it required reveals deep similarities and differences between these and correlative processes in biology and cognition. I will explore some of these and their implications for accounts of developmental and evolutionary processes in the three areas. It also complements the contrast between reproducers and replicators in suggesting that the search for replicators misreads the character of the causal processes and the relevant boundaries of the systems involved. This approach is also consistent with extended and distributed cognition, and with the generation and utilization of naturally forming reference groups or core configurations.

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