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Evolution: The Computer Systems Engineer Designing Minds

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Abstract:

What we have learnt in the last six or seven decades about virtual machinery, as a result of a great deal of science and technology, enables us to offer Darwin a new defence against critics who argued that only physical form, not mental capabilities and consciousness could be products of evolution by natural selection. The defence compares the mental phenomena mentioned by Darwin's opponents with contents of virtual machinery in computing systems. Objects, states, events, and processes in virtual machinery which we have only recently learnt how to design and build, and could not even have been thought about in Darwin's time, can interact with the physical machinery in which they are implemented, without being identical with their physical implementation, nor mere aggregates of physical structures and processes. The existence of various kinds of virtual machinery (including both "platform" virtual machines that can host other virtual machines, e.g. operating systems, and "application" virtual machines, e.g. spelling checkers, and computer games) depends on complex webs of causal connections involving hardware and software structures, events and processes, where the specification of such causal webs requires concepts that cannot be defined in terms of concepts of the physical sciences. That indefinability, plus the possibility of various kinds of self-monitoring within virtual machinery, seems to explain some of the allegedly mysterious and irreducible features of consciousness that motivated Darwin's critics and also more recent philosophers criticising AI. There are consequences for philosophy, psychology, neuroscience and robotics.

Keywords: Architecture, Causation, Cognition, Consciousness, Control, Darwin, Designer Stance, Evolution, Explanatory Gap, Mind, Self-monitoring, Universal Turing machine, Virtual Machinery.