

The Unity of Science

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The idea that science is unified dominates our world view. There's hardly a better example of this old dream than the picture presented in a paper called "The Unity of Science as a Working Hypothesis" by Hilary Putnam and Paul Oppenheim from the 50s. The picture was admirably simple: our scientific efforts can all be represented by six levels of reality. The fundamental level would then be the elementary particles, the building blocks of reality that everything else is thought to consist of, things like quarks and electrons. The hope was that by finding bridge laws between the different levels we could ultimately reduce everything to particle physics – to explain all the higher-level phenomena and perhaps even to replace the vocabulary of the higher-level sciences with the vocabulary of fundamental physics.

This picture was of course overly ambitious, it needs to go. But the idea that our scientific endeavours are somehow unified should not be abandoned so quickly. After all, it would be strange to think that the higher-level sciences are entirely independent of the lower-level sciences. The question is: what exactly are the inter-level relationships between the sciences? In this talk I will give a brief historical overview of this debate and will then present a case study.