How Mathematical Concepts Get Their Bodies

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Abstract

When the traditional distinction between a mathematical concept and a mathematical intuition is tested against examples taken from the real history of mathematics one can observe the following interesting phenomena. First, there are multiple examples where concepts and intuitions don't well fit together; some of these examples can be described as "poorly conceptualised intuitions" while some other can be described as "poorly intuited concepts". Second, the historical development of mathematics involves two kinds of corresponding processes: poorly conceptualised intuitions are further conceptualised while poorly intuited concepts are further intuited. In this paper I study this latter process in mathematics of 20th century and, more specifically, show the roles of Set theory and Category theory in this process. I use this material for defending the following claims: (1) mathematical intuitions are a subject to historical development just like mathematical concepts; (2) mathematical intuitions continue to play its traditional role in today's mathematics and will plausibly do so in the foreseeable future. This second claim implies that the popular view according to which modern mathematical concepts unlike their more traditional predecessors cannot be directly intuited is not justified.

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