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Math Does Not Represent

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On the standard --- almost universally(albeit often only implicitly) accepted --- picture of the relation ofmathematics in a physical theory to the world, mathematical entities represent physical entities, mathematical structures represent physical structures, and so on. The relation of representation is --- again,almost universally, often implicitly --- taken to be one of a designative, depictive or verisimilar character.

I first present nine problems for this standard picture, which I consider damning. I conclude that math does not represent, at least not in any standard sense from formal semantics, philosophical logic or ontology, nor even in any sense based on more informal ideas such as similarity. The essential relation to study to comprehend the nature of physical theories and to understand the structure and character of our knowledge in physics is that between our concepts and the world. Mathematics provides us a wealth of different tools to use in order to bring our concepts and the world into contact (and that itself in a number of different ways), nothing more, nothing less. Some of those tools function in ways that superficially resemble standard ideas of representation, even though they are nothing like it in any important sense; others do not. All of them conduce to knowledge and understanding of the world. I conclude with a few consequences of this view for the epistemology of science and for the numbingly endless debates about realism.

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