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2001a:00003 [00A30](#) ([00A35](#) [00A71](#) [03A05](#))

[Franklin, J.](#) [Franklin, James William] ([5-NSW-SM](#))

The formal sciences discover the philosophers' stone.

Stud. Hist. Philos. Sci. **25** (1994), *no. 4*, 513–533.

References: 0

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Among the aims of the author in this wide-ranging article is to draw attention to the numerous formal sciences which so far have received little scrutiny, if at all, on the part of philosophers of mathematics and of science in general. By the formal sciences the author understands such mathematical disciplines as operations research, control theory, signal processing, cluster analysis, game theory, and so on. First, the author presents a long list of such formal sciences with a detailed discussion of their subject matter and with extensive references to the pertinent literature. Turning to the nature of the formal sciences, the author states that “the formal sciences, though they arose in most cases out of engineering requirements, are sciences and can be pursued without reference to applications”. It is argued, through a wealth of examples, that in a great number of cases the formal sciences permit the attainment of provable certainty about actual parts of the world. As Franklin puts it, “knowledge in the formal sciences, with its proofs about network flows, proofs of computer program correctness, and the like, gives every appearance of having achieved the philosophers' stone; a method of transmuting opinion about the base and contingent beings of this world into the necessary knowledge of pure reason.”

Franklin clearly distinguishes between certainty and necessity: “. . . what the mathematician in offering is not, in the first instance, absolute certainty in principle, but necessity. This is how his assertion differs from one made by a physicist. A proof offers a necessary connection between premises and conclusion. One may extract practical certainty from this . . . but this is a separate step.” Though Franklin explicitly states that there is a gap between necessity and certainty as one passes from mathematical reasoning to applications, the main thrust of the article consists in arguing that the gap is considerably smaller than generally claimed. Indeed, Franklin argues that in a large number of cases the gap is quasi nil. And he writes: “The greatest philosophical interest

in the formal sciences is surely the promise they hold of necessary, provable knowledge which is at the same time about the real world, not just some Platonic or abstract idealisation of it.”

{See also the following three reviews [[MR 2001a:00004](#); [MR 2001a:00005](#); [MR 2001a:00006](#)].}

Reviewed by [Yehuda Rav](#)



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