THE LOGIC OF INFORMAL PROOFS

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In this presentation, I will claim that:

(1) progress in the philosophy of mathematical practice requires a general positive account of informal proof (since almost all mathematical proofs are informal in the strictest sense, even if they are highly formalised);
(2) informal proofs are arguments that depend on their matter as well as their logical form (in other words, 'informal' is a poor English translation for *inhaltliche*);
(3) articulating the dependency of informal inferences on their content requires a reconception of logic as the general study of inferential actions (in informal proofs, content, or representations thereof, plays a role in inference as the object of such actions;
(4) it is a decisive advantage of this conception of logic that it accommodates the many mathematical proofs that include actions on objects other than propositions;
(5) further, it explains the fact that mathematics is (aside from some elementary mental arithmetic and simple spatial arguments) essentially inscribed.

This conception of logic facilitates an intimate connection between logical questions about rigour and the study of mathematical cultures and practices (since the logical constraints on inferential actions are enacted as cultural norms).

Such a picture would be helpful, because at the moment, in the philosophy of mathematical practice, we have on the one hand a stock complaint about formal logic as an explanatory model of mathematical proof, and on the other an increasingly rich literature of studies of specific mathematical practices. The model I present can draw on the latter to supply the deficiency identified by the former.