The Pessimistic Meta-Inductivist: A Sheep in Wolf's Clothing?

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Under what circumstances, if any, are we warranted to assert that a theory is true or at least approximately true? Scientific realists answer that such assertions are warranted only for those theories that enjoy explanatory and predictive success. A number of challenges to this answer have emerged, chief among them the argument from pessimistic meta-induction. According to this challenge, the history of science supplies ample evidence against realism in the form of successful theories that are now considered false. The main realist reaction to this challenge questions the legitimacy of the pessimistic meta-inductivist inference. Advocates of this approach argue that upon closer scrutiny the historical record can be reconciled with scientific realism. When a successful theory is abandoned, not all of its components are discarded but only those that are inessential or idle for the theory's success. Their abandonment is thus inconsequential for the realist. So long as the essential components survive into the new theory there is no cause for alarm. More precisely, an outdated theory *T* which enjoyed some measure of success must, according to the realist, be: (i) partially true precisely because some of its theoretical claims are responsible for its success and (ii) superseded by a (strictly) more approximately true theory *T** which, of course, preserves *T*'s successful theoretical claims. In this paper I test this requirement of realism against the background of the outdated caloric theory of heat and its successor the kinetic theory.

The fact that the caloric theory was a partially successful theory that was eventually abandoned makes it a prime candidate for the inductive basis of the pessimistic meta-induction. Unsurprisingly, Laudan includes the caloric theory in his list of once successful but ultimately false theories. If the anti-realists are right, it is unlikely that any theoretical parts of the caloric theory survived the thermodynamic revolution and even more unlikely that those parts had a hand in producing the theory's success. If on the contrary the realists are right, not only did certain theoretical parts of the caloric theory survive into our modern conception of heat but these parts are in fact solely responsible for the success the caloric theory enjoyed. Two of the caloric theory's successes will be considered in detail, namely the theory's ability to explain the fact that matter expands by heating and contracts by cooling but also the theory's supposition that a special kind of heat (i.e. latent heat) is involved in changes of state. If these and other such successes turn out to be preserved in subsequent theories, the pessimistic meta-inductivist will be exposed to be nothing more than a sheep in wolf's clothing.