

# Jaynes on the Role and Value of Philosophy in Science, with a Comparison to Maxwell

Jaynes (1967, pp. 91–92):

[T]he injection of philosophical considerations into science has usually proved fruitless, in the sense that it does not, of itself, lead to any advances in the science. But there is one extremely important exception to this. . . . At the stage in development of a theory where we already have a formalism successful in one domain, and we are trying to extend it to a wider one, some kind of philosophy about what the formalism “means” is absolutely essential to provide us with a sense of direction. And it need not even be a “true” philosophy—whatever that may mean—for its real justification will not lie in whether it is “true”, but in whether it does point the way to a successful extension of the theory.

In the construction of theories, a philosophy plays somewhat the same role as scaffolding does in the construction of buildings; you need it desperately at a certain phase of the operation, but when the construction is completed you can remove it if you wish; and the structure will still stand of its own accord. This analogy is imperfect, however, because in the case of theories, the scaffolding is rarely ugly, and many will wish to retain it as an integral part of the final structure. At the opposite extreme to this conservative attitude stands the radical positivist, who in his zeal to remove every trace of the scaffolding, also tears down part of the building. Almost always, the wisest course will lie somewhere between these extremes.

And Jaynes (1967, p. 100):

Once a philosophy has led to a definite, unambiguous mathematical formalism by which practical calculations may be carried out, then the issue is no longer one of philosophy; but of fact. The formalism either will or will not prove adequate in practice; and it will be judged, quite properly, not by the philosophy which led to it, but by the results which it gives. If you do not like my philosophy, but you find that the formalism, nevertheless, does give useful results, then I am quite sure that you will be able to invent some *other* philosophy by which the formalism can be justified! And, perhaps, that other philosophy will lead to still further generalizations and extensions, to which my own philosophy makes me blind. That is, after all, just the process by which all progress in theoretical physics has been made.

Compare Maxwell’s remarks on the standing and value of philosophical questions in science.

Maxwell (1870):

[W]e are met as cultivators of mathematics and physics. In our daily work we are led up to questions the same in kind with those of metaphysics; and we approach them, not trusting to the native penetrating power of our own minds, but trained by a long-continued adjustment of our modes of thought to the facts of external nature.

Maxwell (1875):

[W]e must bear in mind that the scientific or science-producing value of the efforts made to answer these old standing questions is not to be measured by the prospect they afford us of ultimately obtaining a solution, but by their effect in stimulating men to a thorough investigation of nature. To propose a scientific question presupposes scientific knowledge, and the questions which exercise men's minds in the present state of science may very likely be such that a little more knowledge would shew us that no answer is possible. The scientific value of the question, How do bodies act on one another at a distance? is to be found in the stimulus it has given to investigations into the properties of the intervening medium.

## References

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