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SCIENTIFIC REALISM AND THE PESSIMISTIC META-MODUS
TOLLENS

1. INTRODUCTION

Broadly speaking, the contemporary scientific realist is concerned to justify belief in what we might call *theoretical truth*, which includes truth based on ampliative inference and truth about unobservables.¹ Many, if not most, contemporary realists say scientific realism should be treated as ‘an overarching scientific hypothesis’ (Putnam 1978, p. 18). In its most basic form, the realist hypothesis states that theories enjoying general predictive success are true. This hypothesis becomes a hypothesis to be tested. To justify our belief in the realist hypothesis, realists commonly put forward an argument known as the ‘no-miracles argument’. With respect to the basic hypothesis this argument can be stated as follows: it would be a miracle were our theories as successful as they are, were they not true; the only possible explanation for the general predictive success of our scientific theories is that they are true.²

In light of historical concerns, realists have modified the basic position, changing their focus from general predictive success to novel success, from truth to approximate truth, etc. In this paper, I will challenge a number of variations on this explanationist argument and the hypothesis it is meant to justify. I will clarify that the threatening historical argument is not a ‘meta-induction’ from which we infer the falsity of contemporary theories; rather, it is a valid deduction that bears on the justification of our beliefs. After articulating the implications this argument has for realism, I will show that this argument poses a serious threat even when success is understood as novel success. I will also challenge the claim that the approximate truth of a theory can explain its success and will offer an alternative non-realist explanation. My approach will be to work my way from the naive formulat-

-ion of realism toward more sophisticated versions in light of these non-realist objections.

2. LAUDAN'S CONFUTATION

With the basic realist position spelled out above, we can turn to an important historical argument against realism. Larry Laudan, in his 'Confutation of Convergent Realism', provides a frequently cited list of theories and existential postulates that were successful but which are, according to contemporary theories, false (1981, pp. 121-122):

- the crystalline spheres of ancient and medieval astronomy;
- the humoral theory of medicine;
- the effluvial theory of static electricity;
- 'catastrophist' geology, with its commitment to a universal (Noachian) deluge;
- the phlogiston theory of chemistry;
- the caloric theory of heat;
- the vibratory theory of heat;
- the vital force theories of physiology;
- the electromagnetic aether;
- the optical aether;
- the theory of circular inertia;
- theories of spontaneous generation.

Realists have been responding to Laudan's 'Confutation' for two decades now. One question that has become salient: what sort of inference is being drawn from this list? Many realists (I dare say nearly all) assert that the article containing this list provides an exemplary articulation of 'the pessimistic meta-induction'. In regard to Laudan's 'classic paper "A Confutation of Convergent Realism"', Jarret Leplin tells us Laudan 'argues *inductively* that our current picture is *unlikely*, in retrospect, to have achieved referential success or approximate truth from the vantage point of future science, and that realism, accordingly, has no application' (1997, p. 137) [my italics]. Herman De Regt interprets Laudan's argument in a similar way, 'if so many successful theories turn out to be ontologically false we may *induce* the conclusion that current successful theories will *turn out to be* ontologically false as well' (1994, p. 11) [my italics]. 'Laudan's "historical gambit"', says Stathis Psillos, '*concludes, inductively*, that *any* arbitrarily successful scientific theory T_{n+1} is *likely to be false* (or at any rate, *more likely to be false* than true)' (1999, p. 105) [my italics]. Each of these philosophers is taking Laudan's Confutation paper as an articulation

of the pessimistic *meta-induction* toward the conclusion that *our present theories are probably false*.

However, I wish to suggest that this very common reading constitutes a significant misinterpretation of Laudan's argument. First, and briefly, contra the quotes above, Laudan's list is not presented as evidence that our contemporary theories are probably false (or even that it is *unlikely* that we have reached the truth). He is concerned with the justification of our beliefs, not drawing conclusions regarding the truth value of our contemporary theories.³ A second and more important point: against each of the quotes above, I submit that Laudan is not arguing inductively at all.⁴ Before outlining the proper understanding of his argument, we can note that construing Laudan's argument as an induction gives the impression that his inference is insufficiently supported. In specific reference to Laudan's 'Confutation', Psillos writes, 'This kind of argument can be challenged by observing that the inductive basis is not big and representative enough to warrant the pessimistic conclusion' (1999, p. 105).⁵ Additionally, we can note that the intuition that drives us to consider many inductions credible may well not ground an induction of this sort. While we may arguably be justified in assuming, for instance, that there is a natural uniformity in respect to some *physical* entities and their properties, such a uniformity need by no means carry over into the realm of scientific theories. We have been given no reason to think there would be a uniformity of overall falsity here.⁶

However, I contend that Laudan is making no induction and that such criticisms are therefore misdirected. His list of historical theories that were successful but false is presented (and ought to be presented) as phenomena which serve to falsify the epistemic realist's hypothesis (and to challenge the explanationist argument that grounds that hypothesis). Any argument of this form is quite properly distinguished from a deductively invalid induction. It concludes with no universal claim, nor even a prediction. No inference is drawn about the future, or even the present. The list serves instead as fuel for the second premise of a logically valid *modus tollens* argument.⁷ Again, in its most basic form, the hypothesis the realist says we can be justified in believing states that theories enjoying general predictive success are true. The *modus tollens* argument against that hypothesis reads as follows:

Premise 1: If the realist hypothesis is correct (A), then each successful theory will be true (B)

Premise 2: We have a list of successful theories that are not true (Not B)

Conclusion: Therefore, the realist hypothesis is false (Not A)

And, given the argument, we are not justified in believing the hypothesis, etc. (Further specific implications will be spelled out below.)

Even viewing the list as occupying the second premise of a *modus tollens*, one may be tempted toward two related contentions against that premise. First, though the non-realist is questioning whether we can justifiably believe that our theories are true, the non-realist appears to be assuming the privilege of *knowing* that these past theories are false. But, given, say, the Duhem-Quine problem, what would license the non-realist's claim to have such knowledge? Second, to say that past theories are false, the non-realist has to assume present day theories are true; this is surely unacceptable given that the non-realist is ultimately trying to show we have no justification for such a belief.⁸ However, in employing the second premise of *the modus tollens*, the non-realist is not *required* to believe any such claims. Since successful present science tells us that much of successful past science is false, successful present science and successful past science cannot both be true. Therefore, we have a subset of theories that are successful yet false.⁹ The only claim being made, in the end, is that there are some successful yet false theories in the set considered, and acknowledging this necessitates no specification of where the falsity resides. For ease of discussion, in what follows, I will nonetheless refer to *past* theories as being 'false', as being 'counterinstances', etc. But the richer understanding of such phrasings should be kept in mind.

3. NAIVE REALISM AND THE IMPLICATIONS OF THE META-MODUS TOLLENS.

Let us determine the effect Laudan's argument has against the naive version of the realist's explanationist argument introduced above. Actually, because our present concern is with naive realism, we do not need to limit ourselves to Laudan's list. Any theories — for instance, the theories of Copernicus, Galileo, Kepler, Newton, Lavoisier, Darwin, Mendel, Wegener, Bohr, etc. — that were successful but are now taken as 'strictly speaking, false' are relevant candidates. That noted, looking at history, we see many such theories. The following, more specific, points make clear the extent to which naive realism is threatened by the list of counterinstances. (I will draw the same implications regarding the more sophisticated realisms discussed below. Doing so, I will direct the reader back to this section. I ask the reader, when returning here, to replace the naive versions of the realist hypothesis and explanationist argument with the hypothesis and argument at issue in the relevant section. The same implications hold).

Take first the explanationist argument the realist employs to justify belief in her hypothesis. For naive realism, the key premise states, 'It would be a miracle were a theory successful but not true'. Given that there have been successful theories that are false, we must either take this key premise of the realist's inference to be absurd and therefore unacceptable, or we must hold the success of these false theories to be miraculous. Since no-one in this debate wants to say the list of concern is a list of miracles, the key premise must be rejected. A similar but separable point: the list constitutes a list of historical theories whose success the realist cannot explain (of the implications I'm drawing, this is one that Laudan himself emphasises). How then can naive realism constitute a good or even adequate explanation of the success of scientific theories in general? Realists say non-realism is to be rejected for the very sin that realism itself is here committing, failing to explain success. Further, since we are rejecting miracles, and since realism cannot explain these successes, some explanation other than the truth of these theories is required to do so. And once that needed explanation is introduced (whatever it may be), the claim that truth is the only explanation for success is rendered futile. Moreover since that explanation would have to be acceptable for explaining the success of those theories on the list, it would also have to be acceptable for explaining the same sort of success of all other theories, including those of contemporary science. Thus it would have greater breadth than the realist's 'truth explanation'. Given that truth could at best only explain the success of some theories, and given that another explanation will be needed to explain the success of others, the truth of our theories would appear to be neither a good explanation nor the only explanation for the success of scientific theories in general. The argument by which the realist seeks to justify her hypothesis is rendered unacceptable.

Continuing, let us directly address the specific hypothesis the naive realist wishes to say we are justified in believing. For naive realism that hypothesis reads, 'successful theories are true'. Testing this correlation, we see first that, without begging the very question being addressed, i.e., without simply asserting the realist hypothesis to hold, we can establish not a single confirming instance of the hypothesis, not a single instance in which both success and theoretical truth obtain. Thus the hypothesis attains no solid inductive support whatsoever. Further, having now interpreted this historical argument as offering a set of counterinstances, in the proper spirit of Laudan's paper, we ask with Martin Carrier, 'What could count as empirical counter-evidence' for the realist hypothesis (1991, p. 25). And we answer: successful theories that are false. Given the high number of such theories, the hypothesis that successful theories are true has an exceptionally high number of falsifications. With the counterinstances in hand, we have a non-universal falsifying hypothesis that contradicts the realist hypothesis:

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