

A Theology of Science

From Science
to
Ethics
to
an Ethical Politics



ROBERT C. TRUNDLE

FOREWORD BY PETER A. REDPATH

*A Theology of Science:
From Science to Ethics to an Ethical Politics*

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ON THE TITLE 'A THEOLOGY OF SCIENCE'

An intellectual fertility of traditional theology, due to its not supposing that reality must conform to various norms of reason, advances creativity in all domains of thought. So with the hope that my thought is duly resourceful in this regard, the theology is credited by my book being called 'a theology of science'. Thus although detailed discussions of science may seem to stray from the theology, they are the foundation for showing how theology is related logically to scientific truth and how this truth implies a true ethics and an ethical politics.

A QUESTION POSED BY THIS BOOK

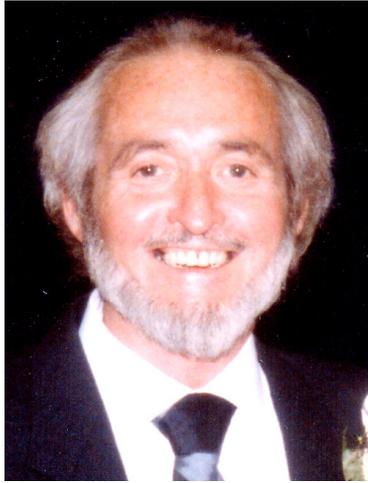
If natural science is the best candidate for knowledge and claims to this knowledge are indefensible theoretically, how can it be defended elsewhere? As practical reason was Kant's refuge after his theoretical *Critique*, today's mania with the practicality of applied philosophy belies an intellectual disingenuousness: a naked failure of modern theories of truth. A lack of objective truth has been exploited by anti-realists to both validate ideological agenda and marginalize traditional theology — the theology being a perennial nemesis of sophisticated visions that have caused episodic disorders in history. Historically, the theology has survived continuously by reflecting profound truths about human nature as, by analogy, Nature is said to be reflected primordially by the Laws of Thermodynamics due to their continued applicability in spite of the dramatic upheavals of scientific revolutions.

BOOK AT A GLANCE



This book reveals a remarkable oddity about the mainstream philosophy of science. While rejecting a noxious relativism, it is unable to ascribe ‘truth’ to scientific theories that also are divorced conceptually from ethics and politics. There is much at stake since these dilemmas have led to a politicized truth whereby ‘truth’ in these areas is often decided ideologically. But the ideology and splintered areas collide head-on with our awareness of ourselves and the world. By relating a world of which we are phenomenologically conscious to a commonsense reasoning, a novel case is made for objective scientific truth, a true causal principle, and the principle’s implication of a First Cause. This Cause, as a Creator of Nature, begets moral norms intrinsic to scientific descriptions of our psycho-biological nature since our nature was created as it ought to be; affording a naturalistic ethics that can be as true as the science that informs it. Medicine and its allied sciences are used to illustrate this moral import in terms of a revitalized support of the traditional family — a perennial norm expressed by the dictum “As the family goes, so goes the state.” Thus a state’s support of the family exemplifies how *normative political claims* can be as true as a scientific ethics that informs *them*. The logical link of ethics to science and politics marks the reasoning implicit in a natural theology common to the major monotheistic religions. And so despite the faults of all organizations, this book suggests one reason why those religions flourished over the ages. Outlasting the Roman Empire and modern ideologies that boasted vainly of reigning to the end of history, the religions address a personal spirituality and fulfill human nature. They render coherent an experienced world where truth coincides in science, ethics, politics, and religion.

For my
former teacher:
The late Professor
Emeritus James P. Kimble
University of Colorado at Boulder



In Memoriam
October 23, 1934 – September 1, 2003

Having grown up humbly in Mt. Olive and Yazoo City in Mississippi, Jim taught himself to read by studying comic strips. After earning a Ph.D. in Philosophy at the University of Texas, Austin, he joined UC Boulder where he was awarded early promotion to full professor. His interests spanned from Wittgenstein and modal logic to the foundations of mathematics and the philosophy of psychiatry and culture. But his reputation for brilliance bore on a visceral fear of testing his patience with academic prattle. He came to believe that something had gone terribly wrong as a “consequence of the western project of rational and scientific explanation in which he worked for so many years, and that he loved so well. He began to think a humane way of life was not possible if a certain set of problems or cultural defects pursuant to that tradition were not overcome.” His effort to overcome the defects was poignantly illustrated when, after a typical rationalistic lecture on ethics at a colloquium, Jim asked the speaker in his stilted Southern drawl: “I was wondering what all these *moral stick figures* have to do with any ethical or moral issue?” ~ Warm memories of the author, Jim’s family and friends, and a recollection of Professor Emeritus Forrest Williams.

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Foreword

Robert C. Trundle's *A Theology of Science* is a brilliant, controversial, and courageous defense of objective truth and scientific realism made by one of the sharpest young philosophers of our time. Like Socrates before him, Trundle takes seriously the Delphic oracle's prescription that philosophy is a Herculean labor in which legitimate philosophers have a duty to confront the sophists of their age and unmask their sophistry for what it is.

Trundle realizes that Americans live in a precarious age. Since the 1960s we have witnessed skyrocketing increases in divorce, teen suicide, violent crime and societal ignorance. He knows that no society can long last when it destroys the first principles of its social, medical and political health. As a patriotic American and a real philosopher, he takes seriously his moral obligation to both identify politico-psychosocial pathologies as precisely as he can and effectively combat them. *A Theology of Science* is his diagnosis of, and prescription for, the ills of our age. His judgments are just the right ones, given just in the nick of time.

Our age abounds with sophists and ideologues. They occupy the administrations and departments of philosophy, theology, social science and literature of our most prestigious universities — and most others too. They are the chief cause of our social and political ills. Trundle knows this. And he knows that they have grown in numbers over the past several centuries because of the exaggerated prestige given to physical science by the Academy in the West. By modeling all the sciences on physical science, the West has given academics a choice: Either be marginalized or ape the methodology of physical science. Indeed, given the prestige of this science,

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Trundle notes that if truth cannot be defended there, how can truth be defended elsewhere? Many people think that we in the West are losing our culture because we have lost our religious faith. Trundle more accurately recognizes that our main problem is that we have lost our minds, not our faith.

The proximate cause of our growing psychosocial pathologies is traced to a rising influence on the philosophy of science of David Hume and Immanuel Kant. In their embracement of classical elements of sophism, Trundle shows that they are the intellectual descendants of Protagoras, not of Socrates! In particular, he exposes how Kant had a catastrophically negative impact on influential philosophers of science, especially Paul Feyerabend, Thomas Kuhn, and Sir Karl Popper. His critique of Popper, who feigns to be a realist, is particularly devastating.

Trundle overcomes their institutionalized denials of truth by appealing to our everyday experience. This experience reveals that we are always “directly conscious of things other than consciousness and indirectly aware of this consciousness.” Hence we are aware of our consciousness not being either the things of which we are conscious or thoughts we may have about them. In terms of this phenomenological realism, a consciousness without concepts is infused into our conceptual consciousness of reality. Having its development in St. Augustine and Jean-Paul Sartre, the realism is augmented by analyses in the tradition of Wittgenstein.

Using this novel epistemological approach, Trundle shows how a primal opposition of objects about which we think *to* ourselves as self-conscious subjects is part of the epistemic ground of our observational experience. And this experience is used to measure truth, from science to theology to ethics and to politics. The human subject cannot be reduced to an *idea* precisely because we are conscious *of* our ideas and that about which we think. And we are implicitly aware of their not being our consciousness. We know this immediately and incontrovertibly in a manner that is not exhaustively conceptual whenever we know anything.

By in effect reducing all knowledge to ideas with no knowable relation to reality, Kant and Hume are shown to have undermined the observational ground by which we are able to test scientific

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theories. Accordingly, their thinking can never provide us with a commonsensical philosophy of science that allows for a cumulative growth of scientific truth.

Trundle stresses that truth in physical science presupposes a causal principle. But due to Hume and Kant, Enlightenment intellectuals dismissed this principle as a truth-less metaphysics, excluding a coherent physics. To get beyond the skepticism as well as the psychosocial, medical and political pathologies that their thinking has produced, we must recall that the first principles of science are rooted in truths expressed by ordinary language and in a meta-conceptual consciousness. The latter discerns a continuity of phenomena that is understood conceptually in terms of causality. Strikingly, he shows not only that the phenomena are grasped truly by science but also that science is *related logically* to a theology that affords truth in both ethics and politics.

I enjoyed reading Professor Trundle's work because I think he has one of the brightest minds around in the philosophy of science, plus extensive familiarity with widely different philosophical areas. He is one of the few "professional" philosophers from whom I can honestly say I learn anything. In the best intellectual tradition of the West, with recognition of the East as well, he calls upon rich philosophical traditions to do cutting-edge work on crucially serious matters. His book is a prime example of what I mean. It is not for the faint-hearted. It pulls no punches. Trundle is not Dale Carnegie. Many academics will not like it since it accurately exposes them as charlatans in ways that are difficult, if not impossible, to refute. In virtue of what he has done, however, all serious academics as well as the general public owe him a debt of gratitude. I hope they will repay this debt to him by buying his book, reading it, and recommending it to others.

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Author's Preface

“Historically, anti-realism seems to have emerged from the ‘Copernican revolution’ due to Kant: All that we are able to know must fit into the categories of the terms we use to think about them, and so cannot be known as they are in themselves... Consequently, truth is a sort of (idealized) rational acceptability... but not a correspondence with ‘states of affairs’ independent of the mind or speech.”

— Topic of an International Conference on Realism and Anti-Realism at the l'Université de Nancy 2, Summer 2006

A *Theology of Science* holds that science, in being related logically to natural theology, permits inferences to moral and political truth. Though this truth supposes controversially that ‘truth’ is ascribable to scientific theories, denials that the theories can be true are overcome by a commonsense reasoning. And although this reasoning relies on concepts about a reality that is not itself a conceptual construction, the various constructs of science are rooted ultimately in a concept-free consciousness of reality. In accord with phenomenological insights initiated by St. Augustine, a reality-in-itself is revealed without either imposing reason on reality or demanding that reality be rational.

Rationalistic theories of ‘truth’ have a troubled history. Long before Kant there was a dictum that ‘man is the measure of what *is*,’ by the Greek Sophist Protagoras, that became a paradigm challenge to objective truth. Controversy ensued over whether ‘truth’ is relative to different persons, wherein the nature of the world depends on inconsistent interpretations, or whether ‘truth’ depends on the real physical, biological and psychological worlds. Today, those who avow that these worlds can be reflected truly by science are called scientific realists. The realism is strong if ‘truth’ is ascribed to theories and weak if theoretical entities alone are said

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to be real. But reality, in any case, is related to either theories or theoretical entities with the understanding that they roughly mirror, represent, or correspond to reality.

§

Sir Karl Popper and his intellectual progeny avow a realism of concept-dependent observation. But this observation belies an anti-realism that rivals Kant's critique of a causal principle. Its metaphysical status excludes inferring a scientific theory's truth from a truth of the theory's predictions.

§

The correspondence was defended by a *reductio ad absurdum*, whereby relativism is illogical, and by analyses in which observation plays a vital role in yielding scientific knowledge. Herein, this knowledge is defended with a caveat that the analyses and *reductio* fail to establish realism for two reasons. First, theories of reality are not reality. Thus although reality is not a conceptual construction, there are question-begging appeals to the constructions to depict reality. Second, a theory's truth is not implied by truly predicted observations since, on the received view, it is logically possible for the observations to be true when the theory is false.

Indeed, the prevailing view is that observational concepts are theory-laden, worsening a separation of concepts from reality. And a touchstone with reality is aggravated further if the meanings of observation terms are relative to different theories, paradigms, or linguistic conventions. While paradigms were proposed by Thomas Kuhn, the conventions bring to mind an anti-realism of Stephen Toulmin. But although he was inspired by Wittgenstein, the latter did not dismiss the words 'I know that...' as nonsense when they prefaced replies to observational doubts. Doubts about an instrument reading may properly evoke, 'I know the pointer read five!'

Retorts that the reading relies on concepts, that beg for a distinction from reality, arose not only in Greek Sophism but in a revitalized Sophism of modern philosophy. This includes Hume's *critical account* of legitimate ideas that, not being metaphysical,

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refer to internal sensations and not to external reality. Later, Kant mediated between this anti-realist skepticism and a dogmatic rationalism. The latter uncritically assumed that pristine *knowledge* is inferable from innate ideas. So a *critical account of knowledge* was proposed in which the mind imposed categorial interpretations on reality. But reality was not described, rather our mind. Thus his 'idea' about our mind further eviscerated an observational realism and, following Hume, was itself metaphysical.

§

Scientific predictions involve a consciousness of reality, without concepts, and an indirect awareness of that consciousness whereby the predictions are implicitly known to be true. And true predictions, made systematically by theories, incur an impossibility that the theories are not true in terms of a commonsense mode of reasoning.

§

Is it metaphysical gibberish to say that true observations permit our entering doorways? Is 'doorway' a mere idea that masks reality? Update the question with Sir Karl Popper's *The Logic of Scientific Discovery*. Since the discovery depends on observation statements to falsify theories and other theories in question underlie concepts in the statements, how can the statements test if theories falsely depict reality? The implied anti-realism rivals Kant's relegation of the causal principle to a metaphysical judgment. The judgment's imposition on an experienced reality excludes reality from playing any role in knowing its truth. And this precluded truth bars knowing that predicted states of physical systems are related causally to prior states described by theories. And thus the notion of testing theories by predictions is vacuous. Precisely, the vacuity is echoed by Popper when he likens theories to piles that are lowered on a swamp (reality) that is never reached!

But the patent success of mudane observation reveals that there is a reality, that *is* as it *is* despite our thought, of which we are conscious. Empiricist accounts of perception must be replaced by

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reference to our observational consciousness. We can be conscious without concepts such as when we are bored and see something without noticing it *as* a given thing. And our nonconceptual consciousness is infused into the act of being conceptually conscious of it. Also, there is an indirect awareness of both modes of consciousness (a self-consciousness) whereby to be directly conscious of anything is to be indirectly aware *of* that consciousness. These points, raised by St. Augustine and developed by Jean-Paul Sartre (despite his atheism), are not a matter of abstract philosophizing. They are based on a phenomenological appeal to an integrity of our concrete experience.

§

Empiricist notions of 'truth,' assumed uncritically for rejecting a First Cause, preclude ascriptions of 'truth' to scientific theories. And the ability to show that the theories are true proceeds *pari passu* with being able to prove that there exists this Cause as Nature's God.

§

This experience bears profoundly on science. Scientific predictions involve a direct consciousness of phenomena and an indirect awareness *of* that consciousness whereby concepts are implicitly known to be veritable. And although true predictions do not imply true theories in a typical truth-functional logic, since it is logically possible for theories to be false when their predictions are true, systematically true predictions beget an epistemic impossibility that theories are entirely false in a commonsense modal logic. That is, it is epistemologically (epistemically) impossible, even if logically possible, that theories are not approximately true when they make systematically true predictions of phenomena. For unless the phenomena were reflected truly by the theories, how could the theories systematically predict the phenomena?

Intriguingly, the eminent philosopher Nancy Cartwright once suggested, using a strong modal word, that phenomena *must* have an existential connection to a reality of theoretical entities to explain how the entities can be employed by theories to make

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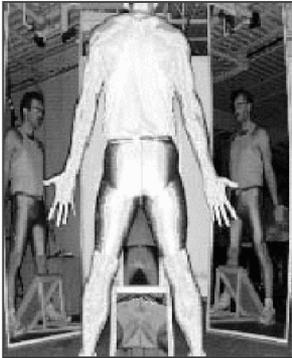
systematically successful predictions. And since a predictive power of scientific theories makes them a paradigm knowledge-yielding enterprise, an inability to explain how the enterprise describes what reality is really like, at least nominally, is overcome with an astonishing import for ethics and politics.

Politics may be able to incorporate an ethics that is *as* objectively true *as* the sciences that inform it. For scientific truth would presuppose a true causal principle that strictly implies a First Cause or Creator of human nature and Nature. Given that they were created as they ought to be, scientific descriptions of our psychological nature would describe a nature that *is* as it *ought* to be. Thus there could be sound inferences to how our nature ought to be fulfilled without a Naturalistic Fallacy in which what ought to be the case is not inferable from what is the case.

The Fallacy was accepted tragically by the heirs of Hume whose denial of *necessary* causal connections excluded both the causal proof of a First Cause and ascriptions of 'truth' to scientific theories that presuppose a true causal principle.* Thus restrictive empiricist ideas of 'truth', held uncritically for rejecting the principle and proof, proceed logically with an inability to ascribe 'truth' to even well established scientific theories. And an ability to show that the theories are true in virtue of a true causal principle, alternatively, proceeds *pari passu* with an ability to prove the Cause. Given this Cause, there would be a God of Nature whereby natural theology would be related logically to science. Further, science would afford inferences to a revitalized naturalistic ethics that could be institutionalized for an ethical politics. Finally, to integrate political, ethical, scientific and theological truths is to render coherent the concept of 'truth' about a reality that is not experienced as being splintered into incomparable domains.

* Did Hume confuse what is physically and logically necessary when he denied 'necessary causal connections'? If one said that there were no biological causes of one's coming into the world, an example suggested by Wittgenstein, might we reply that this is physically impossible? This impossibility brings to mind denials of the Laws of Thermodynamics.

1 Introduction: Challenges to Truth



This image brings to mind both a phenomenology for which phenomena always “overflow” their interpretations and a UTD thesis in terms of which data are underdetermined by theoretical interpretations. The image illustrates the use of laser beams and mirrors, by scientist Dr. Judson Jones and others at the Oak Ridge National Laboratory, to accurately measure the shapes of human body surfaces from a virtually limitless number of perspectives.

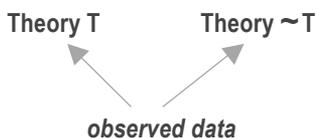
Herein, a strong realism is proposed in which scientific theories increasingly reflect what reality is really like in terms of an historical development of truer theories. In the spirit of physicist and theologian John Polkinghorne, we might say that from a “theological perspective, all forms of realism are divinely underwritten, for God will not mislead us...”¹ Being misled by science would be highly problematic since it is widely regarded as the ideal knowledge-yielding enterprise. So if this enterprise as such is indefensible, there would be a cavalier dismissal of knowledge in ethics and politics. And thus natural theology, from which all of these studies derive their normative significance, is addressed after a support of scientific realism.

Reactions against this realism, largely by some scientists who engage in philosophy and many philosophers of science, have attacked a propriety of ascribing ‘truth’ to either theories or theoretical sentences due to problems that

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are historical and epistemological. Epistemology includes examining accounts of ‘truth’.

Problems of ‘truth’ for realism include observation depending on theories and theories being underdetermined by data. Thus if observation depends for its understanding on theories, how can theoretical truth be evidenced by observation? And if observational data so overflow a theory that another theory can be logically inconsistent but empirically equivalent in explicating or predicting data, how can data count for a truth of theories without violating the Principle of Non-contradiction? In this case, there could be the incoherent truth of theories T and $\sim T$.



Underdetermination-of-Theory-by-Data (UTD) Thesis

Historical criticisms address conceptual revolutions, paradigm shifts, a lack of converging theories, and periods of epistemological anarchy when there were fruitful unconventional theories. Indeed, these theories are said to have both resolved anomalies and shown that there can be predictive success but not increasing historical truth in science. How can scientific theories be true, in any event, when they can be false in the future due to future anomalies and conceptual frameworks to which ‘truth’ is relative?

Having introduced some paramount epistemological and historical dilemmas that seem to undercut realism, from which other less pivotal dilemmas are derived, it would be helpful to expand on these various problems. There is an elaboration on problems in the history of science after ones in epistemology.

Knottly epistemological problems arose when observation reports for evaluating theories seemed to beg circularly for theoretical interpretations. This quandary was not appreciated by the early twentieth-century logical positivists who held that observation terms such as ‘weight’ were rooted in reliable sense experience. The experience would afford predictions that verify or

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falsify theories. Changing theories would beget changing meanings of theoretical terms such as ‘mass’. Yet observation terms such as ‘weight’ would not vary. Newton and Einstein may disagree about theory and agree about observation, and observation is that on which we base true theories. If Einstein’s theory implied observation sentence O and Newton’s not-O, and not-O was false, the former theory would be better in this respect and its truth might be confirmed by further predictions.

§

Realism is said to involve a profound leap of faith, similar to the faith that animates deep religious convictions. Scientific dialogue will proceed more fruitfully, it is said, when the realists stop pretending to a rational support for their faith that they do not in fact have.

§

But Sir Karl Popper and physicists Thomas Kuhn and Paul Feyerabend suggested that to accept true theories is to naïvely distinguish theory from observation, as if ‘H₂O’ and ‘water’ have clearly distinguished meanings. The logical positivists admitted that ‘electric charge’ was both observational and non-observational since the charge can be felt but its meaning is fully grasped only by a theory. Yet theories were now presupposed by even mundane observation terms. Bringing to mind Plato for whom observables are known only in terms of unobserved universal Forms, the terms of observations now referred to unobserved theoretical entities in a context of possibly inconsistent theories. This theory-dependence resulted in a vicious circularity. Theories would rely on theory-dependent observations and no observation or observational prediction could count for or against a theory’s truth.

Unease about ‘truth’ led to a troubling shift in ideals of rationality. One notable philosopher of science suggests that the rational *aim* of science, to truly depict reality, has been largely usurped by its rational *methods*. A leading methodology is Popper’s “strong realist view of objective truth as a regulative ideal for science on one extreme.”² This extreme, however, brings to mind

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Kant's regulative ideas for reasoning about God that, being metaphysical (*synthetic a priori*), are not known to be empirically true. The other extreme includes Richard Rorty's anti-realist, if not relativistic, substitution of a mere *methodological solidarity* for a *methodological objectivity*.³

In denying the objectivity, Rorty quotes an anti-realist. Realism "involves a profound leap of faith, not at all dissimilar from the faith that animates deep religious convictions."⁴ The "dialogue will proceed more fruitfully... when the realists finally stop pretending to a rational support for their faith."⁵ By contrast, his favored methodological solidarity of assent (consensus) has no ontological commitment of metaphysical discourse since it does not have a structured space. That is, "no relevant designators are agreed... to be canonical" but, instead, "we express our like or dislike, our patience or impatience with, various linguistic practices."⁶

In sum, Rorty's arbitrary practices, for eluding metaphysics, embrace an anti-realism, but no more than Popper's metaphysical ideal of realism whereby theories are likened to piles lowered on an unreachable swamp. The swamp, a metaphor for reality, is always masked by theoretical interpretations with no uninterpreted observations to count against theories.⁷ A classic observation statement about volume, for example, could not count against a either a non-relativistic or relativistic theory. Since one theory would say that 'volume' is fixed as a region of space and the other that it is an effect of compression/expansion, the statement on volume would beg for theoretic interpretations.⁸ Paradoxically, theories to be tested would be untestable, if not incommensurable.

Incommensurability, a euphemism for conflicting worldviews, was popularized by Feyerabend and Kuhn whose ideas were

* Daniel Dennet laments that his old friend Richard Rorty favors "debates about Truth and Reality" which license "a slide into some form of relativism." In the end, "it is all just 'conversations' and there are only political or historical or aesthetic grounds for taking one role or another in an ongoing conversation." See Dennet's "Postmodernism and Truth," *Proceedings of the 20th World Congress of Philosophy* 8 (2000) 93-103.

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exploited by a political counterculture. Influencing a culture war that continues to fuel schisms in theology, it is claimed that the history of science consists of clashing worldviews imposed *a priori* on observation. In short, if observation is entirely conceptual and if concepts beg for interpretations by scientists or cultures — a rationale for some modes of multiculturalism in academia, then there can be no observational evidence for either theories or theory choice.⁹ Choices would be made by persons who amount to truth-conditions for truth, who replace pursuits of truth by quests for political power to dictate what is true.

§

Some philosophers say our rescue from an anti-realism of science might consist in an agnostic attitude, similar to that about religion, being best for theories. This lack of belief one way or the other would be based on an incongruous history of science.

§

This noxious result for ‘truth’ was aided by the previously mentioned prospect that all theories are underdetermined, admitting of logically inconsistent theories that are empirically equivalent. That is, all theories are subject to an Underdetermination-of-Theory-by-Data (UTD) Thesis that seemed to threaten a rationality of realism in terms of a translation process for the inconsistent theories. Theoretical accounts of data by one given theory could become accounts by another, ensuring an equivalence for all possible results.¹⁰ Realists may insist that each theory has a truth-value. But how could they say which value is true? Both theories being true would violate the Principle of Non-contradiction.

Happily, Ian Hacking, Nancy Cartwright and Bas Van Fraassen concur that ‘truth’ is inapplicable to theories. Van Fraassen disputes realism by holding that ‘truth’ implies empirical adequacy but not vice versa, helping to pioneer the view that science aims only for theories that are empirically adequate: To accept a theory is to accept only its sufficiency.¹¹ This stratagem of sufficiency side-steps the problem of empirically equivalent yet discordant theories in a way that avoids realism since evidence is not adduced for the

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truth of theories to guide theory choice. But the choice was grasped in terms of a weak realism by Cartwright and Hacking who said that, while there can be no realism for theories, there can be for theoretical entities.

Experimentalists, for Hacking, accept theoretical entities being real, such as the electron, because they can be used to causally create new phenomena.¹² And Cartwright defends this weak realism against Underdetermination since the latter conflates causal and theoretical explanations.¹³ ‘Truth’ is external to theories but is an existential ingredient in causal explanation. To accept an existing cause is to accept a causal account in terms of a theoretical entity. So in spite of undetermined ‘truth’, can there be a weak realism for a reality of theoretical entities?

May a weak realism become strong since experiments with theoretical entities suppose laws in terms of which the entities are understood? This would imply a truth of the laws. And since laws compose theories, a strong realism might be held whereby Underdetermination falters or rises again as a threat. Is a threat posed by some historians of science? Having an agnostic stance that brings to mind religious belief, they question a reality of theoretic entities often held to be merely idealizations. The agnosticism challenges weak realists such as Cartwright and Allan Franklin.

While Franklin is a physicist who says there are no anti-realists in the laboratory,¹⁴ one historian responds that if a nineteenth-century physicist had referred to an electromagnetic field by saying ‘ether’, then we “should explain to his modern audience what [he] was up to.” Or could we “claim that Newton was referring to light-quanta when he spoke of ‘light-particles’?”¹⁵ That is, there can be no problem of logically inconsistent theories being both true if ‘truth’ is a vacuous concept in virtue of all theories developing historically and being understood only anachronistically.

The apparent anachronism reveals again how history can bear on ‘truth’ in regard to theory and observation. In light of this, some later chapters focus on the issue of observation to show that the Underdetermination Thesis poses no insoluble problem for a strong realism. Indeed, a realism of theology may inspire the insight that there is nothing self-contradictory in saying that reality need not

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abide by the Principle of Non-contradiction! Christ, for example, was held to be both man and not man (God). And despite this paradox relying on faith, the point is that scientific realists should not demand that reality conform to reason. Rather, they should reason from reality as the condition for ‘truth’ to their truth-claims. The claims are secured at the basic level by a phenomenology of consciousness. But before addressing this consciousness, consider some other historical dilemmas since a current trend is to show how the dilemmas undercut the case for there being objectively true observational claims.¹⁶

§

A few anti-realist physicists, whose physics may be modest, are bold philosophically. They have overly influenced a philosophical comprehension of the history of science and may not best see the forest for the trees. The ‘trees’ are historical theories whose patently increasing truth has been incomprehensibly overlooked.

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Thus we turn to Kuhn and Feyerabend whose influence on construing the history of science can scarcely be overstated.¹⁷ Notwithstanding their authority in science, scientists who are philosophically bold do not always best discern the philosophical forest from its trees. The ‘trees’ are historical theories about which we are urged to set aside our rational reconstructions with the intention of learning.¹⁸ But if learning means that there are no objectively true theories because theories or paradigms are used circularly to interpret observations that confirm theories, a position they evidently hold, then one is not surprised by their advice.

The advice involves a denial of objectively true observations. And although denials about truth are epistemological matters, the skepticism at hand is ultimately both grounded in historical considerations and related to a further denial that successive theories are increasingly truer. In the wake of Kuhn’s *The Structure of Scientific Revolutions*, Larry Laudan purports to find theories that were empirically adequate or successful but that are not