Empiricism

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Empiricism is the theory according to which experience is the only source of warrant for our claims about the world. Having assigned experience this exclusive role in justification, empiricists then have a range of views concerning the character of experience, the semantics of our claims about unobservable entities, the nature of empirical confirmation, and the possibility of non-empirical warrant for some further class of claims, such as those accepted on the basis of linguistic or logical rules. Given the definitive principle of their position, empiricists can allow that we have knowledge independent of experience only where what is known is not some objective fact about the world, but something about our way of conceptualizing or describing things. Some empiricists say we have knowledge of verbal equivalences or trivialities; some argue that any non-empirical tenets are not even properly called knowledge, but should be seen as notions accepted on pragmatic rather than properly epistemic grounds. What no empiricist will allow is substantive a priori knowledge: according to empiricism we have no rational insight into real necessities or the inner structure of nature, but must rely on the deliverances of our senses for all of our information about external reality. Some versions of empiricism argue against the very notion of real necessities or metaphysical structure behind the phenomena; other versions take a more agnostic approach, arguing only that if there is a metaphysical structure behind the phenomena it is out of our epistemic reach.

1. Early Modern Background

First published in 1689, John Locke's *Essay Concerning Human Understanding* sets out a version of empiricism whose basic framework remains an inspiration to contemporary advocates of the position. Expressing admiration for the accomplishments of Newton and Boyle, Locke aims to show a similar respect for observation and theoretical simplicity in his investigation of the powers of the human mind. In contrast to the rationalist project of searching for the essence of the mind or the metaphysical principles behind the way it ought to work, Locke promises to pursue the 'Historical, plain Method' (Locke, 44) of describing the type of process that would result in the ordinary formation of human knowledge. Locke contends that in this sequence of events we begin with a blank slate, a mind empty of ideas. The contrary postulation of innate ideas or principles is incompatible with our observations of children and the dull-witted, Locke maintains, and in any event superfluous: human cognition can be explained without helping ourselves to the rationalist notion that some truths are built into the mind from the start. The positive task of providing such an explanation becomes the main project of Locke's *Essay*.

Locke maintains that all thought can be analysed into ideas whose ultimate origin is in experience, broadly conceived to include both sensation (the passive reception of ideas from external objects through the senses) and reflection (the passive reception of ideas from the mind's introspective access to its own workings). Experience provides simple ideas (like the idea of blue, or sweet, or pain); the mind then manipulates and conjoins these simple ideas to form complex ideas (like the ideas of particular individual objects, modes and relations). Because the mind is able to combine its ideas our acquisition of knowledge is not restricted to the passive ingestion of ideas in experience; in fact our highest grade of certainty comes from assessing the internal structure of, and the relations among, complex ideas we ourselves have

constructed. A lower degree of certainty accrues to our knowledge of the external world, made possible in part by our noting that certain ideas reliably come to us in clusters, which we presume to indicate the presence of substances outside of us, and also by our consciousness of our passivity in receiving ideas of sensation. While it may be the case that certain perceivable qualities necessarily coexist in certain substances (e.g. ductility and weight in gold) in virtue of the microscopic constitution of that substance, our powers of perception are such that we are unable to have the same kind of direct knowledge of this necessary coexistence as we have of the perceivable qualities themselves.

In Locke's theory ideas received from experience are the only ingredients of our thought, but many entities other than ideas get postulated during the course of the theory: the external objects causing our ideas, powers inherent in those objects and causal relations among them, and the mind itself. Advanced some 50 years later, David Hume's version of empiricism exposes some of the difficulties with attempting to maintain this kind of mixed ontology within the empiricist framework. Hume is more careful than Locke to extract evidence for his theory of human cognition only from the perceivable phenomena, and to refrain from positing the kind of physical and metaphysical entities access to which would be unaccountable from an empiricist perspective. In the first wave of reaction to Locke, George Berkeley had already shown that even the apparently straightforward claim that our ideas of sensation are caused by external objects could prove difficult for an empiricist to defend: if we are directly conscious only of our ideas, with what right could we claim that these ideas resemble, and have their origin in, things of an entirely different kind which are not themselves present to the mind? Berkeley argues for a phenomenalist understanding of objects: the objects of which we are conscious are not independent matter but in fact collections of perceptions. Hume agrees with Berkeley that given

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the empiricist premise that we are only aware of our perceptions, the postulation of independent matter is unjustifiable, but Hume also notes that we have a tendency to conceive of objects as having an independence and continuity that we do not ascribe to our perceptions. From the perspective of a consistent empiricist this tendency of ours can only be seen as a blind instinct to fabricate: experience never delivers anything other than our fleeting perceptions, so our sense of permanence is nothing more than an illusion, an illusion Hume explains by pointing to the near resemblance of our successive perceptions, and the ease with which we can confuse resembling particulars for the same thing.

Causation receives a similar treatment: where Locke had helped himself to a realist understanding of causation, Hume points out that we do not perceive causation itself, and cannot construe it as a pure relation of ideas. That no purely conceptual connection links a cause to an effect can be seen by reflecting on our ability to imagine a change in the course of nature. Like the stability of external objects, objective necessary connections among objects are an illusion, generated in this case by our consciousness of our instinctive (as opposed to rational) habit of expecting past patterns to continue. Where we have seen many events of type A followed by events of type B we develop a mental custom of associating these ideas, and with this custom in place, the sight of type A compels the mind to think of B: our subjective sense of being pushed in this way gives rise to the idea of necessary connection, which we then mistakenly project onto nature and imagine as an objective relation among events.

If Hume's analysis is aimed at showing that such fundamental components of our commonsense world view as enduring external objects and causation are illusory, he does not suggest that this philosophical result will overthrow our world view; indeed, he argues that observation of the natural tendencies of the human mind shows that we will naturally continue in

our instinctive patterns of thinking in terms of objective things and causes however unjustified these instincts may seem from a philosophical standpoint. It is a difficult interpretive question to what extent this sceptical outcome should be read as a philosophical condemnation of our ordinary claims to knowledge, or as a demonstration of the shortcomings of either philosophical analysis in general or empiricism in particular.

One influential response to Hume was to see his scepticism as pointing to the inadequacy of the empiricist starting point. Immanuel Kant argued that our thought about matters such as causation could not be understood without the postulation of something more than mere sensory perceptions as available to the mind; he maintained that we can make sense of empirical knowledge only if we see sensory perceptions as entering a mind already possessed of a priori knowledge of the underlying causal structure of nature and the form of time and space, which Kant took to conform to Euclidean geometry. With the development of quantum mechanics and the theory of relativity in the early twentieth century, the Kantian response to empiricism was no longer supportable in its original form.

2. Early Twentieth Century background

Until the twentieth century, geometry, or the study of the pure structure of space, had typically been seen as the paradigmatic example of an a priori discipline, and as an obstacle for empiricist accounts of knowledge. Einstein's use of non-Euclidean geometry in the theory of relativity made it hard to resist the conclusion that if geometry is a priori at all, it has this status only when considered as an uninterpreted deductive enterprise: the study of the structure of space itself could now be taken as either an empirical matter, or a matter of the postulation of conventions rather than the discovery of objective facts. The re-examination of the status of questions once

considered intuitive or rational was a significant source of inspiration for logical positivism, originating in Germany and Austria in the 1920s. Positivism drew inspiration from the development of Frege and Russell's symbolic logic and the new clarity it brought to the problem of the foundations of mathematics; at the same time, the legacy of Ernst Mach's eliminative empiricism was also a powerful if short-lived force behind the movement.

The relation between positivism and empiricism is a complex matter. It is clear that the positivists thought that all substantive questions about the world were to be answered by empirical science, but less clear that their conception of empirical science was straightforwardly empiricist. Some examination of the details of positivism is in order here.

The positivists conceived of philosophy as a enterprise of clarifying and making explicit the conceptual, linguistic and logical structure of science, rather than as a means of discovering further characteristics of reality at a deeper metaphysical level than the empirical phenomena. The positivists hoped for a clean divide between the material questions about nature that are to be answered by the empirical sciences and the formal questions about science that are to be answered by philosophy. Given this formal approach, it is not surprising that the positivists cast the central problems of epistemology in linguistic terms. Locke's causal picture of sensation saddled him with a metaphysics not easily defended from within empiricism; the positivists aimed to avoid metaphysics altogether and take the question of the relation between experience and theory as a question about the proper form of observation reports and their formal relations to other sentences in the language of science. So Moritz Schlick writes in "The Foundation of Knowledge": "I think it a great improvement in method to try to aim at the basis of knowledge by looking not for the primary *facts* but for the primary *sentences*." (Schlick, 212). These primary or protocol sentences are seen as idealized records of basic experience, cast in a

vocabulary of observational terms and separated sharply from the higher-level theoretical claims whose confirmation they supply. Positivists divided into several factions over the question of the form of these statements. On Schlick's 'foundationalist' side of the debate, a protocol statement aims to capture the content of what Schlick called a 'confirmation' or decisive moment of experience, whose certainty is beyond doubt; other parts of the system of science are ultimately justified by their relations to these confirmations, but the confirmations themselves are justified by the character of experience itself, and not by anything further within the system of science. In opposition to Schlick, Otto Neurath proposed a fallibilist approach to protocol statements: a protocol statement is, like any other statement in the system of science, subject to rejection in light of considerations of overall coherence. Schlick has difficulty explaining the relation between basic confirmations and their linguistic expressions in protocol statements without recourse to metaphysics. Neurath has difficulty explaining how his solution maintains a special role for experience, or how he is maintaining empiricism and not leaving himself open to the charge that science and fantasy could be equally well-grounded just given sufficient internal consistency.

While Rudolf Carnap's original position was closer to Schlick's, he soon moved to adopt what he took to be a neutral stance, declaring that the question of the form of protocol sentences is "not answered by assertions but rather by postulations. … the task consists in investigating the consequences of these various possible postulations and in testing their practical utility." (Carnap 1932, 458) Rather than supposing that something in the nature of reality determines the correct syntactical form and role of observation statements in science, Carnap now maintains that this is not a question of fact with a single correct answer, but a question about which postulation we will find most convenient for our purposes. Applied to philosophical problems more broadly,

this strategy became known as Carnap's Principle of Tolerance: norms of correctness do apply to how clearly we have articulated a syntactical system, and to how well we have shown what consequences follow from it, but not to the deeper choice of one system over another, a choice made on pragmatic rather than epistemic grounds.

The exact extent of Carnap's allegiance to empiricism is subject to debate (see Friedman 1999). Carnap does not start from the position that the justification of empirical science is in doubt until science can be shown to be derived from the contents of experience, nor does he think that the immediately given has a specially certain or unproblematic epistemic status. In *The Logical Structure of the World*, Carnap tries to show how scientific concepts could be reduced to relations among moments of experience, but he claims that he could have taken other basic elements, like space-time points or even physical entities such as sub-atomic particles, as his starting point: his aim is strictly to analyze the internal logical structure of science rather than to justify science by appeal to something better grounded. By his own admission, Carnap's analysis of the internal logical structure of science was incomplete, most crucially in his failure to exhibit the dispensability of the basic relation of recollected similarity. Furthermore, Carnap's own work in the decade after *Logical Structure* did much to undercut the early positivist hopes of understanding science through a pure analysis of language: in 'Testability and Meaning' (1936, 1937) he presented a series of devastating arguments against the separation of scientific vocabulary into strictly observational and theoretical components.

A form of positivism that lies squarely in the empiricist tradition is presented in A. J. Ayer's *Language, Truth and Logic.* Ayer insists on a phenomenalist account of external objects and a verificationist theory of meaning. According to Ayer only two kinds of statements have literal significance and the possibility of truth or falsity: synthetic statements, identified as those

statements that can be rendered more or less probable by some specifiable course of experience, and analytic statements, whose acceptability is wholly determined by our syntactic rules for the symbols they contain. All other statements, and in particular the statements of traditional metaphysics, are not even false but meaningless. Philosophy itself is seen as falling on the analytic side of the line: epistemology is concerned with the rules governing our use of symbols, and aims to identify the formal relations between the various strings of symbols that constitute observational and theoretical statements in the language of science.

Ayer's version of empiricism was one of the first targets of a wave of arguments that led to the abandonment of positivism by mid-century. Phenomenalism was attacked as incoherent (see Chisholm 1948); Nelson Goodman refuted the notion that the relation of confirmation could be given a purely syntactical definition (1954/1979); Wilfred Sellars argued that empiricism's view of what is given in experience made experience an inadequate basis for knowledge of the world (1956), and Quine argued that the positivists had no acceptable way of drawing their distinction between analytic and synthetic statements. (Quine 1953) Quine's criticism proved particularly decisive in the subsequent development of empiricism.

3. Empiricism after positivism

Quine's "Two Dogmas of Empiricism" attacked both the positivist notion of a sharp distinction between analytic and synthetic sentences, and the doctrine of reductionism, according to which each synthetic sentence is associated with a fixed set of actual or possible experiences tending to confirm or discredit that sentence. On the first front, Quine argues that various positivist efforts to identify the distinctive features of analytic sentences have either been inadequate to distinguish the set of sentences the positivists needed to take as analytic, or have slipped into an

empty circularity, in which, for example, analyticity is understood with the help of the notion of cognitive synonymy, and cognitive synonymy is either left unexplained or itself defined in terms of what is analytically true. On the question of reductionism, Quine finds a lesson in Carnap's failure to reduce individual statements about the physical world to statements about immediate experience, and recalls Duhem's claim that we are always free to maintain a theory in the face of apparently contrary evidence by amending an auxiliary hypothesis. According to the slogan that has become known as the Quine-Duhem thesis, 'our statements about the external world face the tribunal of sense experience not individually but only as a corporate body.' (Quine 1953, 41)

Quine intended this essay strictly as attack on the positivist version of empiricism, and not on empiricism itself. In the final section, "Empiricism without the dogmas," experience is clearly identified as the only source of information for our theories about the world, but the relation between experience and theory is not as the positivists had thought. Our beliefs about everything from general physical laws to mundane claims about particular objects form a single system, the parts of which are amended in response to recalcitrant experience, and kept in line with each other in accordance with rules of logic which are themselves part of the web. Nothing is immune to revision, and everything is revised on the same basis of accommodating experience, so there is no difference in principle between changing a logical law to simplify quantum mechanics and changing from a geocentric to a heliocentric cosmology, or revising any other empirical claim. In place of the formal positivist approach to confirmation, Quine introduces a relation of 'germaneness' in his account of the relation between sensory evidence and the theory it supports. A body of sensory experience is more germane to one claim than to others when this experience will leave us more likely in practice to revise this particular claim. Rather than engaging in the study of how an ideal scientific language would be formulated, or

how we ought to reform our thinking, the epistemologist is directed to engage in an empirical

study of the relationship between the actual input of sensory stimulation and the output of

theoretical utterances: following through with this program would require epistemology

ultimately to become a chapter of psychology.

Quine insisted throughout his career that this naturalist position counted as a form of

empiricism, but this classification is controversial. Indeed, Donald Davidson argues that a natural

extension of Quine's argument will do away with the contrast between form and content, and

leaving us with nothing recognizable as empiricism. (1973-4). Also, while Quine contends that

there is a normative element in his position, insofar as his position leaves room for people to be

criticized for having beliefs that accommodate their sensory experience poorly, it is clear that

Quine's naturalism does not have the same normative ambition of traditional empiricism.

Traditional empiricism was concerned with the question of what we ought to believe, or how our

common ways of thinking might be reformed to respect the limits of warrant; Quine's naturalism

aims to take our cognition as a given object of empirical inquiry, and does away with the

traditional conception of warrant. (See Hookway 1994.) For Quine, the question is always about

what sentences we *do* revise in practice, and not about what sentences we *would be right* to

revise, whether we actually do so or not. Whether Quine is an empiricist will depend in part on

how one wants to use the term. If one emphasizes Quine's advocacy of empirical methods for the

study of knowledge itself, then it may seem appropriate to classify his epistemological

naturalism as a development continuous with the main thrust of empiricism; indeed, Quine is

sometimes faulted for not having gone far enough in using the empirical data he recommends as

useful in epistemology. On the other hand, if one sees epistemology as an enterprise that is

aimed at figuring out what justifies our beliefs, then it is hard not to see Quine's naturalism as constituting a change of topic rather than a development of earlier empiricism.

The version of empiricism that constitutes the most influential contribution to traditional epistemology since the collapse of positivism has been put forward by Bas van Fraassen, in support of the view of science he calls 'constructive empiricism'. According to van Fraassen, the positivists were mistaken in assuming that once the empiricist takes experience as our sole source of warrant he is required to reduce everything to experience, or to reinterpret statements about unobservable entities as abbreviations for more complex statements about observable phenomena. Empiricism does set limits on what we can see ourselves as rationally obliged to believe, but by invoking a distinction between acceptance and belief, van Fraassen is able to defend an empiricist approach to science without requiring a positivist reformulation of the language of theories. When we accept a theory, and commit ourselves to a certain research program, we have to believe what the theory says about observables – that is, we have to believe that the theory is empirically adequate – but we do not have to believe the whole theory, including what it says about unobservables. Allowing this agnosticism about the unobservable makes accepting less committal than believing, but van Fraassen argues that science can be understood without the stronger realist stance; nothing that matters is lost by seeing science as aiming just at empirical adequacy, rather than full-blown truth. Equally, nothing is gained by the stronger realist position if van Fraassen is right, other than the need to contend with, and explain our epistemic access to, various items of metaphysical baggage like causes and laws, realistically construed.

Van Fraassen allows that theories may have virtues which go beyond empirical adequacy – perhaps simplicity or explanatory power—but such informative virtues do not make the theory

more likely to be true. Indeed, the more informative a theory is the more risk it runs of being false; if we choose informative theories over their less committal counterparts it can only be for pragmatic reasons, and not because we find these theories more likely to be true. In van Fraassen's empiricism, the scientist need never accept ampliative rules of inference (like inference to the best explanation/IBE) as forcing him to go beyond the limits of observation: if positing the real existence of electrons would explain some observable phenomenon, this is not in itself a reason to take the step of believing that the unobservable electrons exist. Respecting the limits of his warrant, the scientist may rationally stick to the more modest position that all observable phenomena are *as they would be if* the electron theory were true.

Van Fraassen shares with the positivists a sense of the epistemic significance of the line between what is observable and what is not, but instead of aiming to find a syntactical way of drawing the line, say by developing a purely observational vocabulary, he argues that the problem can be naturalized: scientific theories themselves can show us how the realm of the observable is delimited. According to constructive empiricism, a scientific theory shows us a picture of how the world could be, giving us a set of models corresponding to various initial conditions. The theory itself can then specify parts of these models (the 'empirical substructures') as potentially representing observable phenomena. A theory is empirically adequate if it has a model in which the observable phenomena can be embedded.

Van Fraassen himself notes that while belief in a theory's empirical adequacy is weaker and therefore safer than belief in its truth, it is not without risk: in claiming that a theory is empirically adequate I am still going out on a limb and committing ourselves to the truth of claims about states of affairs that are not observed by me, or have not yet been observed, or will never actually be observed, and so on. If my motivation were just to maintain the weakest

possible beliefs compatible with our evidence, I should shrink in the direction of a solipsism of the present moment rather than adopting the scientific rationality of constructive empiricism. So van Fraassen's position does not enable us to be maximally certain of our beliefs. He has argued that his aim is rather to develop a characterization of the aim of science, or the standards for what counts as success or failure in that enterprise; if scientists do not restrict admissible evidence to, say, 'what-is-observed-by-me-alone', then no adequate account of science can give supreme epistemic significance to that special class of evidence.

This is not to suggest that van Fraassen sees his constructive empiricism as a sociological summary of the attitudes of working scientists. In particular, van Fraassen is ready to acknowledge that scientists may often believe that their theories are not merely empirically adequate but true, even with respect to unobservables. Because of the way van Fraassen defines rationality, he does not have to classify such thinking as irrational: his conception of rationality is permissive, rather than prescriptive. On this view, the scientist does not need to be rationally compelled to believe something in order for her belief to count as rational; rather, she may believe anything as long as she is not rationally compelled to believe otherwise. Rationality requires us to maintain logical consistency and accept the testimony of our senses, but if we respect such minimal limits it neither requires nor forbids us from making conjectures about what lies beyond our sensory evidence. On this view, then, the main upshot of an empiricist conception of rationality is negative: if warrant comes only from experience, *rationality* can never require us to believe in entities and characteristics of reality to which we lack empirical access.

4. Criticisms of empiricism

The most direct way to attack van Fraassen's empiricist view of science would be to identify a properly epistemic (as opposed to merely pragmatic) reason to believe in the claims that science makes about entities that lie below the threshold of observation. Many critics of van Fraassen have attempted to defend the rationality (as opposed to the mere practical convenience) of abduction or IBE. The best-known move here is Hilary Putnam and Richard Boyd's 'no miracle argument' (NMA), according to which it is only by taking scientific theories to be true or approximately true that the success of science will be anything other than miraculous. It would be a tremendously strange coincidence, they argue, if all observable phenomena were just as though quarks existed and yet in fact they did not exist. This argument would have more force against an eliminative empiricist who would actually forbid belief in the unobservable; against van Fraassen, the realists need to establish not just that belief in quarks is rationally permissible (he already grants this) but that it is rationally required. The main difficulty the NMA faces in establishing that conclusion is that it appears to be an argument with the very same abductive form as is in question. The argument urges that the truth of scientific theories is the best explanation for the phenomenon of their success; but even if that is so, unless one is already convinced that one is entitled to infer that whatever is the best explanation of a phenomenon is for that reason likely to be true, then we have no reason to accept the realist conclusion.

A number of empiricist arguments are intended to suggest that sound arguments in support of IBE are unlikely to be forthcoming. According to the 'pessimistic induction', it is a mistake to infer the truth of a scientific theory from its acceptability as an explanation of the known phenomena, because we have many historical examples of theories that were explanatory successes in their day but have since been shown to be false. From the past course of events, we

have no reason to believe that the theories we now find persuasive as explanations of the phenomena are in fact true descriptions of things seen and unseen. In response to this argument, realists have noted that doubts about whether a current theory is exactly right may not provide a reason to withhold belief in the entities posited by that theory. Many theories which are shown to be false are superseded by theories which continue to use the same basic framework of entities, although there is some question about whether the realist can present a historical argument about the reasons for past predictive successes without presupposing the legitimacy of abduction. (For a detailed historical discussion, see Psillos 2000.) In addition, there is a more abstract and general form of the pessimistic induction available to the empiricist. According to the 'argument from the bad lot', the label 'inference to the best explanation' is misleading, because we have no guarantee to suppose that we are in a position to choose the *best* explanation: our choice is among the explanations we have in fact been able to concoct so far, a range of alternatives that might in fact fail to include the true story. We can at most think of ourselves as choosing the best available story, rationally weighing various rival theories only on the basis of our evidence about observable phenomena.

The 'conjunction objection' to constructive empiricism constitutes a quite independent move. (Boyd 1973, Putnam 1979, Friedman 1983) It may be correct that in terms of vulnerability to recalcitrant evidence, a single theory's truth is never more credible than its empirical adequacy, but by taking our theories to be true we logically have the right to conjoin them, and the conjoined theory (T1&T2) can have richer empirical consequences that can give additional confirmation to its each of its conjuncts T1 and T2 taken separately. In addition, the larger unified theory can give us the kind of integrated explanation of phenomena that science (arguably) must aim at. Meanwhile, accepting that two theories are empirically adequate does

not automatically give us the right to conjoin them (they may, for example, include contradictory statements about unobservables), and even where we can conjoin, the claim that 'T1 is empirically adequate' & 'T2 is empirically adequate' will have fewer observational consequences than (T1&T2). It is open to the empiricist to challenge the realist idea that science aims at such unified explanations rather than unifying, where it does, as a pure consequence of the search for empirical adequacy; it is also possible to challenge the extent to which science does in fact engage in this kind of unification, or whether in fact later theories are used to correct earlier ones, rather than being straightforwardly conjoined with them. (See van Fraassen 1980 ch.4)

Other points in the empiricist program that have attracted critical attention include the issue of modal concepts of possibility and necessity, even as they figure in van Fraassen's own statement of his position (Rosen 1994, Ladyman 2000), and the question of whether empiricism can give an adequate characterization of experience (Nagel 2000).

In raising doubts about whether the truth might always lie outside of the range of theories available to us, van Fraassen is sometimes seen as risking a collapse into scepticism. If our warrant is so restricted that we can never have rational grounds to believe in any unobservable entity, no matter how well it would explain what we observe, then it may seem that by similar reasoning we will never be rationally compelled to believe anything as strong as the empirical adequacy of a theory, or even anything at all beyond the present testimony of our senses. Conversely, if van Fraassen wants to support the rationality of believing that certain theories are empirically adequate (true in all they say about the observable, and not just about what is presently observed), or even that objects we perceive continue to exist after we leave the room, then perhaps he is already committed to the admissibility of ampliative rational rules. Against the

idea that continuously existing tables and trees are posited as the best explanation of our given sense data, van Fraassen argues that philosophers have given us ample arguments to show that our awareness of the world cannot be a matter of making inferences from a body of raw sense data. What we perceive are not sense data but the observable parts of an objective world: 'we can and do see the truth about many things: ourselves, trees and animals, clouds and rivers – in the immediacy of experience.' (1989, 178) Experience itself can only be understood 'in the framework of observable phenomena ordinarily recognized'. (1980, 72) This marks a reversal from the earlier empiricist strategy of attempting to show how the framework of observable phenomena could be constructed out of the ideas of experience.

In this version of empiricism, empiricism is insulated from scepticism by setting its focus on the manner in which we update our beliefs, and not on their initial formation. According to van Fraassen, "It is possible to remain an empiricist without sliding into scepticism, exactly by rejecting the sceptics' pious demands for justification where none is to be had." (1989, 178) Once we are committed to the general framework of observable phenomena we will be in a position critically to examine the ways in which we change our beliefs, but there is no useful prospect of a critical examination of our initial commitments. Critics of empiricism can wonder whether this pessimism about the scope of epistemology is justified, and whether van Fraassen is right to characterize of our initial position as involving no commitments other than commitments to observables. It has also been suggested that what is in dispute between empiricism and realism may not be decidable on the basis of considerations acceptable to both sides, and this has generated some scepticism about the legitimacy of this conflict.

5. Scepticism about empiricism

Both the empiricist and the realist are committed to the project of giving a philosophical analysis of the aim of science; Arthur Fine argues that there is something wrong with that project. According to Fine, realists and empiricists are mistaken in supposing that science has a single essence amenable to philosophical examination. There is nothing in scientific practice itself, Fine argues, that requires our possession of a philosophical theory of the point of science, and nothing in the deliverances of scientific enquiry yields an answer to whether empiricism or realism is correct. As an alternative, Fine advocates what he calls the natural ontological attitude, according to which we allow science to 'speak for itself', and refrain from attempting to construct a notion of truth that goes beyond that 'already in use in science.' Of course both realists and empiricists take themselves to be articulating exactly that conception of truth that is already in use in science; Fine's contention is that they do not have any neutral or unprejudiced perspective from which to pass judgment on what science involves.

One of Fine's central criticisms of empiricism is that the empiricist's effort to create a special epistemic status for our claims about observables could only be based on *a priori* commitments that do not square well with the basic orientation of empiricism. Our observations alone do not force upon us any particular epistemic attitude to observation. If Fine is right about that, then the empiricist has some reason to resist the naturalist suggestion that the claims we advance in epistemology are, like the claims of empirical science, themselves warranted only by experience. (See van Fraassen 1995 for an argument along these lines.) Empiricism is then a theory about what claims are warranted within science; the separate question of what claims are warranted within epistemology would lie beyond the scope of empiricism itself.

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