

The Pragmatics of Observation¹

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My eyes are notoriously bad, so I am not sure whether I have ever seen a meteor. Others have seen them, of course, but it is important to me to observe them first hand. I even go to the trouble to hike at night in the desert mountains so that viewing conditions will be ideal. I scan the sky through my thick glasses, but to no avail. My companions have sighted several, the latest just to the left of that peak. And still I am unsure. Did I really see the meteor, or was it just that my eye twitched? I suspect that this question has no unambiguous answer and that understanding why it lacks such an answer will provide important clues about the role of observation in scientific theorizing.

Van Fraassen has recently made some very strong claims for the role of observability:

...theory draws a picture of the world. But science itself designates certain areas in this picture as observable. The scientist, in accepting the theory, is asserting the picture to be accurate in those areas. This is, according to the anti-realist, the only virtue claimed which concerns the relation of the theory to the world alone. Any other virtues to be claimed will concern either the internal structure of the theory (such as logical consistency) or be pragmatic, that is, relate specifically to human concerns. (van Fraassen 1980, p. 57)

The features of merely pragmatic interest would include simplicity, explanatory power, and degree of inductive integration. He goes on to argue that because empirical adequacy is the only virtue which concerns the world alone our commitments regarding the truth of scientific theories should be limited to what the theory says about what is observable.

If we take a semantic property of a theory to be one which concerns the theory's relation to the world (van Fraassen 1980, p. 90), the idea that observation is of semantic interest while virtually everything else is of only syntactic or pragmatic interest is a powerful one. But plainly it cannot be assessed without probing the scope and character of observation and correlatively of observability. While a complete investigation of observation is well beyond the scope of a single paper, I shall argue in the following pages (1) that as the concepts of observation and observability are ordinarily used, by

both scientists and laymen, the boundaries of these concepts are determined pragmatically, and (2) that the non-pragmatic facts about observation and observability suggest that the limits of observing are wider than expected so that virtually any event is potentially observable. If I am right in these claims, van Fraassen's attempt to divide the semantically relevant features from the pragmatic features of theories loses much of its plausibility, and his anti-realism loses one of the motivations that it might otherwise have had. Indeed, his anti-realism begins to look rather arbitrary.

Observing is tied to making judgments. What sort of tie (and even whether there is one) is, of course, controversial, but let us reflect just briefly on observational judgments. First, they must be non-inferentially made. That is to say, observational judgments are not the conclusions of deductive or inductive inferences from other judgments. Second, they must be trustworthy when non-inferentially made in the circumstances in which they are made. No specific level of trustworthiness or warrant is required, however. It is also important that warrant is relativized to circumstances, so that while an observational judgment may be possible in one situation it may not be possible in another. There may also be other restrictions beyond non-inferential warrant that one might wish to put on observational judgments, but such restrictions need not concern us here. The above considerations about judgments are nonetheless sufficient to reinforce the familiar idea that in observing an entity (thing, event, or process) we do not necessarily observe all of it or everything about it. Moreover, we are forced to distinguish those features (properties or relations) we do observe the entity as having from those features we do not or cannot so observe.

This tie between observing and making a judgment does not confuse *observing* and *observing that*. Van Fraassen correctly says:

Suppose one of the Stone Age people recently found in the Philippines is shown a tennis ball or a car crash. From his behavior, we see that he has noticed them: for example, he picks up the ball and throws it. But he has not seen *that* it is a tennis ball, or *that* some event is a car crash, for he does not even have those concepts. (1980, p. 15)

That *observing* and *observing that* are to be distinguished, however, should not suggest that there is no tie between them or that observing does not involve mobilizing concepts. Specifically, if a person observes an entity, he or she must observe that it has some feature or other. The Stone Age person cannot observe that the thing before him is a tennis ball, but he can observe that it is round, fuzzy, yellow, and within his reach. The causal process that results in observing is complex, and without *concepts* such as round, yellow, and over there, there would be no reason for us to pick out the ball as what was observed rather than, say, the pattern of electromagnetic radiation bouncing off it or the changes within the observer's eyes.

Our reflections on observational judgments also suggest criteria for determining both what sort of phenomena can be observed and in unfamiliar cases whether an observation is in fact being made. As a first approximation, a phenomenon can be observed just in case there can be circumstances in which warranted non-inferential reports of the presence of the phenomenon can be made. Also as a first, rough approximation we may say that, in general, if in the circumstances obtaining a person is a reliable reporter of some kind of phenomenon, then we may reasonably suppose that the person observed it. This, of course, needs considerable refining, but it does point to the way we learn which phenomena are observed. Thus, to go back to the beginning of this paper, the question of whether I am *seeing* a meteor turns largely on whether, in that sort of circumstance, I am a reporter who typically reports correctly according other available tests. In this case the other tests might include the report of other observers, even ones with telescopes.

Importantly, these criteria leave room for observation through instruments, for it makes no difference whether the circumstances for observing are natural or artificially produced, and those circumstances can include the presence of suitable devices. We would say that I can see the color of a book held at arm's length in broad daylight because under those conditions my non-inferential judgments about the book's color rarely have to be revised in the light of incoming data, or in other words, I have been able to build an increasingly coherent, useful picture of the world which takes such judgments as basic (i.e., non-inferentially provisionally trustworthy). This is what it is to establish that such judgments are warranted. I can show, in turn, that my judgments when looking through a magnifying glass or simple microscope are worth trusting by showing that where they overlap with judgments made in naked-eye observation the results are the same. Further, my judgments made with the help of high-power or even electron microscopes are underwritten by showing that where they overlap with judgments previously established as warranted, the results coincide. We then have two ways to establish the warrant of judgments made with electron microscopes or even more exotic equipment. It can be done indirectly by this method of overlap. And it can also be established in the same direct way as the warrant of naked-eye observations: by showing that in taking such judgments as warranted we are able to build increasingly coherent and useful pictures of the world.

These remarks have as a result that I may be genuinely observing the crystal structure of a substance when looking at it through an electron microscope. This, however, needs to be qualified because whether we correctly take something to be an observation depends in part on the context of inquiry. Suppose electron-microscope-judgments are underwritten only by the method of overlap suggested above. If, then, the trustworthiness of the high-power-microscope-judgments is challenged, one can hardly defend these latter judgments by showing that they coincide with judgments made when observing through an electron microscope.

If consideration of the context of inquiry introduces a pragmatic element into the question of what counts as observing, the further question of what counts as observable is even more emphatically pragmatic. A phenomenon is observable just in case it is possible to observe it, but all kinds of pragmatic issues lurk in the notion of possibility that is involved. Whether it is possible to observe something depends on what lengths it is reasonable to go to in obtaining reliable non-inferential reports. To what lengths it is reasonable to go is thoroughly pragmatic in reflecting the relevant human interests, concerns, and purposes.

In ordinary language these pragmatic issues go largely unstated. Sometimes they go unnoticed. At one point van Fraassen says:

I have a mortar and pestle made of copper and weighing about a kilo. Should I call it breakable because a giant could break it? Should I call the Empire State Building portable? Is there no distinction between a portable and a console record player? The human organism is, from the point of view of physics, a certain kind of measuring apparatus. As such it has certain inherent limitations--which will be described in detail in the final physics and biology. It is these limitations to which the 'able' in 'observable' refers--our limitations *qua* human beings. (1980, p. 17)

Van Fraassen is right; what giants can do is of no concern. But the limitations to which the 'able' in 'observable' refers need not be the limitations of a human being unaided by machinery. The mortar and pestle can be broken by a human being aided by a jackhammer, and the Empire State Building, or a house, or a castle, or even an Egyptian mountain complete with the temple it contains can be moved if the premium

on doing so is high enough. The fact that in ordinary language we would describe these things as unbreakable or immovable simply shows that the relativization of possibility to ordinary interests, purposes and concerns is unstated. Similarly, the question of whether something is possible can reflect pragmatic temporal considerations. Can I play the second movement from Beethoven's Sonata for Piano, Op. 27, No. 2? There are many reasons for saying that I cannot: I do not have a piano, though I could get one, or I would have to practice it. In both cases, whether the reasons given count as relevant to deny the possibility of playing the piece depend on the pragmatic considerations at hand. Even what counts as playing can be pragmatically determined.

The point being made is not the trivial and obvious one that observation is of pragmatic interest. Rather, it is that the very boundaries of observation and observability are determined with implicit reference to pragmatic concerns, at least as 'observe' and 'observable' are used in ordinary speech. This seems to fly squarely in the face of van Fraassen's suggestion that the virtue of a theory's being accurate within the observable domain "is, according to the anti-realist, the only virtue claimed which concerns the relation of the theory to the world alone." (1980, p. 57) Observability does not concern the world alone; it concerns pragmatic issues as well. Van Fraassen attempts to drive a wedge between empirical adequacy on the one hand and explanatory power and degree of inductive integration on the other by claiming that the latter "relate to specifically human concerns" (1980, p. 57) whereas the former do not. If I am right about the pragmatics of observation, then van Fraassen's attempt falters.

It is, of course, possible to remodel ordinary language by choosing, for certain theoretical purposes, a notion of observability which abstracts from the pragmatic concerns noted above. In this case no (pragmatic) restriction would be placed on the lengths one could go in creating conditions (instruments, training, etc.) for obtaining warranted non-inferential reports. This approach, however, would have the drawback for some anti-realists that it would greatly, and perhaps indefinitely, expand the domain of the observable. Perhaps it is not the case that every event would thereby be observable, but it would be imprudent to be too confident in placing the limits.

The reason that this would be a drawback for some anti-realists is that it would deprive anti-realism of one of the motivations that it might otherwise have had. In depicting the as-yet-unobserved world our theories sometimes describe goings on so perplexing and unexpected that we might prefer to be uncommitted to their real occurrence. If such events are unobservable, then anti-realism offers some hope of shielding us from this unwanted commitment. If the domain of the potentially observable is indefinitely expanded, however, then the hope that anti-realism offers correspondingly diminishes. This is not to say that van Fraassen's motivations are undermined, for it is difficult to say just what his motivations are. In any case, to the extent that one's motivation for anti-realism lies in wanting to avoid commitment to perplexing and heretofore unobserved events, then the non-pragmatic notion of observability tends to undermine one's anti-realism.

There is also a deeper and more troubling sense in which these considerations undermine van Fraassen's anti-realism. Van Fraassen would have us believe that there is a part of our scientific discourse, the observational part, that we can take for granted. It is the other part, the theoretical part, which should be the target of our epistemic worries. These worries, van Fraassen thinks, are sufficient to make us withhold belief from this second part. Once the division is taken for granted and we start on this road of selective skepticism, it is very hard for realists to show that theory lives up to the standard of perfection which is just *assumed* for observation. Against this, our considerations remind us that observational claims are not without epistemic problems of their own. Just because something *could be* observed, this need not mean that it is

worth believing. Or just because we think we have genuinely observed something, i.e., just because our access to it is direct, this need not mean that our warrant is at all strong.

Now, I am not recommending any blanket skepticism here--far from it. What I am suggesting is that van Fraassen has given us no reason for placing the line between what is to be believed and what is not just at the point of observability. Some observational claims are warranted; some are not. Some theoretical claims are warranted; some are not. The problems with warranting observational claims are themselves sufficiently deep and pervasive that it would appear to be completely arbitrary to choose observability as the boundary between the saved and the doomed. One might as well have chosen to believe only those parts of our theoretical structure which have Godel numbers below some arbitrarily chosen value.

Does all of this show that anti-realism in general or van Fraassen's view in particular is wrong? Of course not! What it does show is that observation and observability, as those notions are ordinarily used, reflect pragmatic concerns more than might be thought. In this they are like ordinary notions of simplicity and explanation. While we can abstract from these pragmatic concerns, doing so results in drawing the boundaries of observability far wider than they would have been otherwise. There is certainly nothing wrong with taking observability in this wider way, but it does undermine one motivation that anti-realism might have had. What is more, the difficulties in warranting observational claims show that unless van Fraassen can demonstrate that there really is a cleavage at the limit of observability his anti-realism remains arbitrary. As I look across the desert sky in search of meteors, perhaps the pragmatic dimensions of observation should bring me some comfort. When van Fraassen defends his anti-realism perhaps those same pragmatic issues should make us all uneasy. In either case, we can ignore them only at our peril.

Note

¹An earlier version of this paper was read at the Seventh International Congress of Logic, Methodology, and Philosophy of Science. I would like to thank colleagues there and at Arizona State for helpful comments.

References

van Fraassen, B.C. (1980). *The Scientific Image*. Oxford: Clarendon Press.