

Chapter 3

Empirical Facts and Philosophical/Conceptual “Facts”

In the previous chapter, we saw that issues surrounding truth are more complex than generally appreciated. In this brief chapter we explore the related topic of facts.

There is no question that facts and science are closely tied to one another. Whatever else one may wish from scientific theories, there is a general consensus that such theories ought to account for the relevant facts. But the notion of facts is more complex than often appreciated, and in this chapter we explore some of these complexities. Let’s begin with some preliminary observations on the reasons we have for some beliefs we take to be obvious facts.

Preliminary Observations

I am going to go slowly through an example involving pencils and desks and drawers. Although the example may seem trivial at first, bear with me. The point is a subtle and important

one for appreciating issues involved in the history and philosophy of science.

Consider a case involving what is probably the most straightforward sort of fact we can have. For example, let's assume you are sitting at a desk, and that you put a pencil on the desk in front of you. That there is a pencil on the desk in front of you is as clear an example of a fact as you can find. You can see and feel the pencil, hear the sound the pencil makes as you tap it on the desk, and even taste and smell the pencil if you are so inclined. You have straightforward, direct, observational evidence that there is a pencil on the desk.

Facts of this sort, based on observation, are often referred to as empirical facts. As we will see shortly, what counts as an empirical fact is not as clear cut as it might initially seem. Moreover, as we discussed in the previous chapter, there is a sense in which you cannot absolutely know for sure that reality is as you perceive it to be. Given this, you cannot be absolutely sure that there is a pencil on the desk in front of you. But nonetheless, this is a case in which you have the most direct, straightforward, "in your face" sort of observational evidence, and if anything counts as an empirical fact, it is that there is a pencil on the desk in front of you. In general, facts of this sort, which are supported by direct, straightforward, observational evidence, provide the clearest examples of empirical facts.

Now consider another case. Suppose you put another pencil on the desk in front of you. Again, you can see, feel, hear, and (if you wish) smell and taste the two pencils. Again, that there are two pencils on the desk in front of you would be as straightforward an empirical fact as you can find.

Now take one of the pencils and put it in a desk drawer, closing the drawer so that you cannot see, feel, or otherwise perceive the pencil. Chances are you believe the pencil continues to exist even when you are not perceiving it. That is, you believe it is a fact that there is a pencil in the drawer.

But now reflect on your reasons for these beliefs. Notice in particular that your reasons for believing there is a pencil in the drawer *cannot* be the same as your reasons for believing there is a pencil on the desk. Your belief about the pencil on the desk is based on direct observational evidence, whereas your belief that there is a pencil in the drawer cannot be based on any such direct observational evidence. After all, you cannot see, touch, or otherwise observe the pencil in the drawer, so you cannot have direct observational evidence for this belief. So why do you believe so strongly that there is a pencil in the drawer?

I suspect you believe this because of the way you view the world. Most of us cannot imagine that objects go out of existence when they are no longer being observed. Our conviction about the sort of world we live in—our belief that the world consists largely of stable objects that remain in existence even when not being observed—is the root of our belief that there is a pencil in the drawer.

So notice the substantial difference between the reasons for believing there is a pencil on the desk and the reasons for believing there is a pencil in the drawer. The one belief is based on direct observational evidence, while the other belief stems largely from our views on the sort of world we live in. So although we tend to have the same depth of conviction in each of these beliefs—that there is a pencil on the desk and that there is a pencil in the drawer—there is a substantial difference in the reasons we have for believing each of them.

What does this have to do with the history and philosophy of science? As noted, a scientific theory has to respect the relevant facts. But in looking at theories from the history of science, and in looking at the facts those theories were required to respect, we can in hindsight clearly see that some of those “facts”—although people believed they were reasonably clear empirical facts—were actually based more on philosophical/conceptual convictions about the sort of world the people involved inhabited.

An example may help to illustrate this point. From the time of the ancient Greeks, and continuing until the early 1600s, it was widely believed that planets (and other objects in the heavens) moved with perfectly circular and uniform motion. For example, all motion associated with a planet such as Mars was thought to be perfectly circular. The motion was also believed to be uniform, that is, the motion was always at the same rate, never speeding up nor slowing down.

In contrast, on our current theories (for which there is strong support), a planet such as Mars moves in an elliptical (not circular) orbit about the sun, and moves at varying speeds in different parts of its orbit. So both of the beliefs mentioned above—let’s call them the “perfect circle fact” and the “uniform motion fact”—turned out to be mistaken.

The perfect circle and uniform motion facts sound quite alien to modern ears. A typical reaction, when first learning of the belief in these “facts,” is to wonder “why would anyone ever have believed that?” Yet it is important to realize that, for a long period in our history, the perfect circle and uniform motion facts seemed to be obvious facts about the world in which we live. As mentioned in the first chapter, objects in the heavens were composed of the element ether, and the essential nature of this element was to move in perfectly circular, uniform motion. Obviously, then, all motion of the sun, stars and planets must be perfectly circular and uniform. In something like the way it seems like an obvious fact to us, given the sort of universe we think we inhabit, that the pencil continues to exist when out of sight in the drawer, so too did it seem like an obvious fact to our predecessors that heavenly bodies move with perfectly circular, uniform motion.

These sorts of “facts,” that is, strongly held beliefs that turn out to be based heavily on philosophical/conceptual views as to the sort of world we live in, are what I will generally refer to as “philosophical/conceptual facts.” However, we need to be careful here. I do not want to give the impression that empirical facts, on the one hand, and philosophical/conceptual facts, on

the other, are absolute categories, and that every belief falls cleanly into one of these categories. Most beliefs are based on a mixture of empirically-based observational evidence, together with more general views about the sort of world we inhabit. For example, consider again the perfect circle and uniform motion facts discussed above. Although these beliefs were tied closely to other beliefs such as the nature of the element ether, the heavens being a region of perfection, and so on, there was also an observational, empirical component to these beliefs as well. For example, going back at least to the beginnings of recorded history, people had observed that stars move across the sky in what appears to be perfectly circular, uniform motion. And that fact—that the points of light we call stars seem to move in perfectly circular, uniform motion—is based heavily on empirical observation. So even the perfect circle and uniform motion facts turn out to have at least some empirical component to them.

In light of such considerations, it is better to think more in terms of a continuum. At one end of the continuum are the most straightforward examples of empirical facts, such as the fact that there is a pencil on the table. At the other end of the continuum are the clearest examples of philosophical/conceptual facts, that is, beliefs such as the perfect circle and uniform motion facts. These are the sort of beliefs that are typically held quite strongly, and often do not (at the time) seem much different from straightforward empirical facts. But (and we often see this only in hindsight) such beliefs turn out to be based heavily on the way they tie into one's overall jigsaw puzzle of beliefs, rather than being based primarily on straightforward empirical evidence.

Most of our beliefs—most of what we take to be facts—lie somewhere on the continuum between the clearest examples of empirical facts and the clearest examples of philosophical/conceptual facts. That is, the reasons we have for most beliefs are tied partly to observational, empirically-based evidence, and tied partly to the way those beliefs fit in with our

overall jigsaw puzzle of beliefs.

As we will see, certain philosophical/conceptual facts, including the perfect circle and uniform motion facts, turn out to play substantial roles in the history and philosophy of science. And as we will explore in Part Three, certain beliefs that most people raised in the western world take to be obvious empirical facts turn out, in light of recent discoveries, to be mistaken philosophical/conceptual “facts.”

A Note on Terminology

In the discussion above, you may have noticed that I used the word “fact” when speaking of beliefs that we are now sure are incorrect. For example, I characterized the beliefs that the heavenly bodies move with perfectly uniform and perfectly circular motion as facts (albeit as philosophical/conceptual “facts”). Given that we generally do not use “fact” in this way—that is, when we discover that a previously held belief is mistaken, we usually cease to speak of it as a fact—a brief discussion of my use of the terms might be in order.

At bottom, we do not have the right word to properly characterize deeply held and (at least in the context of the time) justified beliefs, such as the beliefs in perfectly uniform and perfectly circular motion, that turn out to be mistaken. Of the two alternatives that come to mind first—characterizing such views as “assumptions,” on the one hand, or as “beliefs” on the other—neither is quite right.

The views in question are much more than mere assumptions. For example, as we discussed to some extent above, and as we will explore more fully in Chapter 9, our predecessors’ beliefs in perfectly circular, perfectly uniform motion were, in the context of the time, well-justified beliefs. They turned out to be mistaken, but it would be badly misleading to

characterize these beliefs as mere assumptions.

To illustrate this point, consider again your belief that the pencil in the drawer continues to exist. Is this belief a mere assumption? That does not seem the right way to characterize this belief. Yet as we discussed above, our belief in the continued existence of the pencil is based largely on our overall view of the sort of universe we inhabit. But our predecessors' belief in the perfectly circular and uniform motion of the heavenly bodies was likewise based largely on their overall view of the sort of universe they inhabited. So it is not any more proper to characterize these beliefs of our predecessors as assumptions than it would be to characterize our belief in the continued existence of the pencil as an assumption.

Likewise for the term "belief." Distinguishing facts from beliefs suggests that there is a reasonably clear distinction between the two—it suggests that facts are one thing, mere beliefs another. But there is not such a clear distinction between the two—at least, not from within one's own lifetime or from within one's own worldview (again, consider the case of the pencil on the desk versus the pencil in the drawer). Strongly held and well supported beliefs appear, from within one's worldview, to be facts.

In short, none of the available terms is quite right. I think the best option is the one taken above—that is, with respect to strongly held and well justified beliefs, to characterize those based more on reasonably direct observational evidence as empirical facts, and those more closely tied to one's overall worldview as philosophical/conceptual facts. And even in the cases, which again holds for both our predecessors and for us, in which some of these strongly held beliefs turn out to be incorrect, I will continue to refer to them as philosophical/conceptual facts, to remind ourselves that, from within the relevant worldview, these were much more than mere assumptions, beliefs, or opinions.

Concluding Remarks

Before closing this chapter, it is worth taking a moment to make a few final observations about empirical and philosophical/conceptual facts.

To reemphasize a point made above, do not think of empirical facts and philosophical/conceptual facts as absolute categories. Again, most beliefs are based on a combination of empirical evidence and more general views about the sort of world we inhabit. Again, it is better to think of the distinction between empirical facts and philosophical/conceptual facts more in terms of a continuum, with the clearest examples of empirically-based beliefs (such as the belief involving the pencil on the table) at one end, and the clearest examples of beliefs more closely tied to general philosophical/conceptual views (such as the beliefs in perfectly circular and uniform motion of the heavenly bodies) at the other end.

Also, be careful not to make the error of viewing philosophical/conceptual facts as the sort of facts one would only find as part of an old, naive way of thinking. Our predecessors' beliefs in the perfect circle and uniform motion facts turned out to be wrong, but the beliefs were not naive. As is typical with philosophical/conceptual facts, the perfect circle and uniform motion facts fit in well with the overall system of beliefs, that is, with their overall jigsaw puzzle of beliefs. As noted, these facts tie in closely with beliefs about the essential nature of the element ether. They also tied in closely with the belief that the superlunar region (that is, the region from the moon outward) was a place of perfection, and also with the belief that perfectly circular, uniform motion was the most perfect sort of motion and hence appropriate for the perfect superlunar region. In short, the perfect circle and uniform motion beliefs fit in well with the Aristotelian worldview, and potential competing beliefs did not fit into that jigsaw puzzle. Again, the beliefs turned out to be wrong, but they were not naive.

As a corollary, calling a belief a philosophical/conceptual fact is not meant to suggest that the people holding that belief do not, or did not, have good reasons for believing it. As noted above, the perfect circle and uniform motion facts turned out to be wrong, but the people of the time had good reasons for believing these facts.

Likewise, do not make the mistake of thinking that we, in this period of modern science, have managed to avoid the pitfalls of believing in philosophical/conceptual facts. Such facts are still a part of the modern story, and as noted above, part of the point of Part Three of this book will be to look into developments in 20th century science, with an eye toward identifying some facts that we have long taken as straightforward empirical facts, but that turn out, in light of recent discoveries, to be mistaken philosophical/conceptual facts.

Also, calling a fact a philosophical/conceptual fact is not to suggest that it is incorrect. Many philosophical/conceptual facts of the past did indeed turn out to be wrong. No doubt some of our own philosophical/conceptual facts will turn out to be wrong. But most such facts will, we hope, withstand the test of time, and turn out to be at least more or less correct. To put this same point another way, the distinction between empirical facts and philosophical/conceptual facts is not based on whether the facts turn out to be correct; rather, the distinction is based on the type of reasons we have for believing the fact.

Finally, it is worth noting that, in everyday life, we typically do not make much of a distinction between empirical facts and philosophical/conceptual facts. With the benefit of hindsight, especially when looking at past cultures, it is relatively easy to see what beliefs were more empirical and which were more philosophical/conceptual. But within our own time frame, facts just look like facts to us, and they all look pretty much on a par. It is only on careful reflection, and often with great difficulty, that we can see that some beliefs we hold are more empirically-based, and some are more philosophical/conceptual.

