Chapter 16

THE JUSTIFICATION OF OUR BELIEFS

Knowledge, we saw, is *justified* true belief. A true belief can count as knowledge only if we have good grounds for accepting it. Otherwise, it is merely a lucky guess or an accident that we are right, and not knowledge. In this chapter, we will look at how we justify our beliefs. But first, we must make an important distinction—between our *reasons* for holding a belief, and the *causes* of our doing so.

REASONS AND CAUSES

To give our justification for a particular belief is to answer the questions "Why do you believe that?" and "How do you know that?" If our justification is a good one, it shows that our belief is a rational one, and that it is more likely true than not. But notice—not all answers to the question "Why do you believe that?" are relevant to our justification. Some answers do nothing to show that the belief is more likely true than not. Suppose, for instance, that you are asked why you believe that Western-style liberal democracy is a better system of government than Soviet-style communism. Two types of answers, both true, can be given. First, you might say that you believe it because you grew up

in America and were conditioned to believe it. Second, you might say that you believe it because you believe that the system of government that guarantees the greatest amount of freedom for all is the best system, and Western-style liberal democracy guarantees greater freedom than Soviet-style communism.

The first answer provides a *cause* of your belief, but it does not provide a *reason*. Although it mentions an undeniable factor in your coming to hold your belief, it does nothing to show that your belief is rational or correct, nor does it provide anyone else with a reason for agreeing with you. Certainly, if we were debating the question, your first answer would do nothing to convince me that you are right. The second answer, however, does provide a reason. It attempts to show that it is more reasonable to believe that liberal democracy is better than communism, that it is true that liberal democracy is the better system. It is precisely the sort of answer that you would give in a debate.

The difference between a cause and a reason is this: Although both answer the question "Why do you believe it?," only the second answers the question "Why is it rational for someone to believe it?" or "What considerations *support* your belief?" or "What other beliefs show that your belief is more likely true than not?"

In other words, to give your reasons for holding a belief is to offer an *argument*. It is to say "I believe *p* because I believe *q*, *r*, and *s*; and if *q*, *r*, and *s* are true, then *p* is true also." For example, I believe that it is now 11:30 because I believe that my watch says it is 11:30 and that my watch is correct; and if it is true that my watch says 11:30 and is correct, then it is true that it is 11:30. Similarly, I believe that it didn't rain last night because I believe that the grass is not wet but would be wet if it had rained; and if it is true that the grass is not wet but would be wet if it had rained, then it is true that it did not rain. Thus, our interest in what follows will be in reasons rather than causes.

JUSTIFICATION CHAINS

In the ordinary course of events, the question "How do you know?" is usually given a short answer. How do I know the time? By my watch. How do I know that my sister is planning to visit me? She told me so. How do I know that Japan is in Asia? I learned it in school. Although these answers are usually sufficient in daily life, they do not really mark the end of the matter. Take the first answer—that I know the time by my watch. How do I know my watch is correct? Similarly, how do I know my sister told me the truth? How do I know that my teachers were right about Japan?

Each of these further questions has an answer, of course, but their answers raise still further questions. Suppose I say that I know my watch is correct because I checked it against the school clock. How do I know the school clock is correct? How do I know that I read my watch and the clock accurately when I compared them?

As we continue to spin out answers and questions, it becomes obvious that our justifications for believing what we do are far more complicated than we immediately realize. To give some idea of this complexity, let us take my belief that I had orange juice this morning. How do I know that?

Well, most obviously, I remember drinking it. But how did I know it was orange juice when I drank it? Well, it looked, tasted and smelled like orange juice. Also, it came from a can marked "orange juice." But how did I know it looked, tasted and smelled like orange juice? Because I have seen, tasted, and smelled orange juice before, and the stuff I drank this morning looked, tasted, and smelled the same way. But how do I know that I remembered the look, taste, and smell accurately? And how do I know that all the other stuff I thought was orange juice really was orange juice? Moreover, how do I know the label on the can was honest?

At this point, my justification begins branching out in all sorts of directions. No doubt, I will mention various federal and state regulations, the reputation of the supermarket in which I bought the juice and of the company that produced it, other instances in which my memory of look, smell, and taste were accurate, the corroboration of my beliefs by other people, and so on—and all of these considerations will lead to still further ones.

Thus, even the simplest belief is justified in a number of complicated ways, involving a wide variety of beliefs about current and past experiences, all of them admitting of further justification. We can think of this series of questions and answers as a *justification chain*, or, more accurately, as a set of individual justification chains leading to the same belief. One chain runs through my beliefs about the look, taste, and smell of what I drank this morning and of the other things I thought to be orange juice, another through my beliefs about the label on the can and the reliability of the supermarket and producer. In turn, each of these chains breaks up into further chains, which will themselves break up into still further chains.

A few points about justification chains warrant immediate mention. First, every link in these chains is a *belief*. We justify the initial belief by appealing to other beliefs, and then justify these other beliefs by appealing to still other ones. That is why the chains can continue as they do. All beliefs are capable of justification, but the only way we can justify them is by appealing to other beliefs.

Second, the vast majority of beliefs in the chain are *not consciously entertained* when we accept the initial belief. While drinking my orange juice this morning I gave no conscious thought whatever to the can it came in, federal regulations, or the smell of any other orange juice I'd had. Such beliefs came to the fore only when I began thinking in earnest about my justification.

Third, my own *observations* play a crucial role in such chains. Even if I must depend on the testimony of others in many cases for part of the justification of my beliefs, their testimony is still something that I hear or see, and my judgment about the reliability of any bit of testimony must depend on other observations of mine. If I believe what I learned in school, it is because my own observations have confirmed many of the other things I learned in school. If I believe my sister when she tells me she's planning on visiting me, it is because my own observations have shown me that she can be trusted.

Fourth, the search for *explanations* also plays a crucial role in justification chains. That is, each link is connected to the next one by an *explanatory statement*. Take my beliefs that what I drank this morning was orange juice and that what I drank this morning tasted like orange juice. These two links are connected by the explanatory statement "What I drank this morning tasted like orange *because* it was orange juice." Likewise, the belief that what I drank was orange juice is connected to the belief that the label on the can said it was orange juice by the explanatory statement "The label said it was orange juice *because* it was orange juice."

This is no accident. If one belief serves as a reason for another, there must be some connection between the two beliefs that allows the one to serve as a reason for the other. Suppose, for example, I told you that my reason for believing that the Phillies beat the Cubs last night is that I slept until nine this morning. You would no doubt be very confused by that remark. But suppose I added this: I have a friend who is a Cubs fan and knows that I am a Phillies fan. If the Cubs had won she would have awakened me at six this morning to rub it in. In that case, you would no longer be confused. Why not? Because the Cubs' loss *explains* why I was not awakened at six.

Fifth, *generalizations* form an important part of justification chains. At each step along the way, we depend on statements beginning with such words as "all," "every," or "most." Why can I say that this liquid is orange juice because it looks, tastes, and smells like orange juice? Because I believe that anything (or almost anything) that looks, tastes, and smells like orange juice is orange juice. Why can I say that I slept until nine this morning because the Phillies beat the Cubs? Because I believe that whenever the Cubs beat the Phillies, my friend will call me at six the next morning.

THE WEB OF BELIEF

When we reflect on the large number of varied beliefs that belongs to any justification chain, it begins to look as though almost any belief can be involved in the justification of any other belief. It begins to seem that if we are asked how we know any one statement, we may eventually have to appeal to all of our other beliefs.

On the face of it, this seems absurd. After all, whenever we are asked how we know a particular thing, we can give a relatively short answer that will satisfy the asker. Also, it is difficult to see how all of my beliefs can be suitably connected. My belief that there is peanut butter in the house, for instance, seems totally unrelated to my belief that there is only one president of the United States. How could one be part of the other's justification?

I can explain how with an example I often use with my students. At some point in class, I will "accidentally" bump into the table at the front of the room. I then write the following statements on the blackboard:

"I was fifteen feet away from the table."
"I can take no step longer than a yard."
"The table did not move."
"I took two steps."
"I bumped into the table."

Notice that the above statements are inconsistent. That is, not all of them can be true. At least one must be false. Either the table moved, or I took more than two steps, or I was closer than fifteen feet from the table, or I can take eight-foot steps, or I didn't bump into it.

Which is it?

Since my students saw that I was only about three feet from the table, they all say that the first statement is the false one. If I agree with them, I can justify my belief as follows: Obviously, I was closer to the table that I'd thought, because I bumped into it after taking two steps, and I can take no step longer than a yard, and the table didn't move.

But why should I agree with them? I could do otherwise. I could say, for example, that I didn't really bump into the table—because I was fifteen feet away, took two steps, the table didn't move, and I can't take a step longer than a yard. Or I could say that the table must have moved—because I took two steps, am unable to take a step longer than a yard, was fifteen feet away from the table and bumped into it. Or I could say that I obviously can take a step over seven feet, or that I obviously took five steps. Why say that I was closer to the table than I'd thought?

No doubt, you are tempted to say that I *know* that the table didn't move, and that I *know* that I can't take eight-foot steps, and that I *know* that I only took two steps, and that I *know* that I bumped into the table. The problem with that answer is that I also thought I *knew* that I was fifteen feet away from it. Obviously I have to admit that one of the things I thought I knew is false, but why the distance to the table? Because it is most *rational* to say that I was wrong about the distance. But why is that?

The question asks, in effect, what our standards of rationality are. When our beliefs conflict, how are we rationally to choose which one to reject? Our answer to this question will tell us something very important about the justification of our beliefs.

Why is it most rational to say I misjudged the distance to the table? Because it is more *likely* that I misjudged it than that I was wrong about the other beliefs. After all, people often misjudge distances, especially when their mind is on something else. So the hypothesis that I misjudged the distance has an *initial plausibility* compared with the other hypotheses.

What else? Well, my students saw what happened, and they say that I w[as] less than fifteen feet away from the table. So this belief is corroborated by th[e] testimony of others. If I were to disagree, I would need an explanation of thei[r] being wrong. Are they lying? If so, why all of them? Am I the victim of a con[-] spiracy? Are they victims of a mass hallucination? Did someone drug the wat[er] supply? These questions demonstrate that the hypothesis that I misjudged th[e] distance is the *simplest* one to accept. If I accept it, no further explanation i[s] needed. If I reject it, a whole bundle of further explanations is required. So sim[-] plicity is an important factor.

Anything else? Well, suppose that I were to say that the table moved. Bu[t] how? As I walked toward it, I could see everyone else in the room, and nobod[y] was even close to the table. Did they move it by a concentration of mental en[-] ergy? Or did the table move itself? But I don't believe that there is any suc[h] thing as mental energy that can move tables. If my students have such a powe[r] how could they have acquired it? Do I have it? Does everyone? Why have I never seen it displayed? If there is such a thing, don't all my beliefs about th[e] laws of nature have to be changed?

And if the table moved itself, why haven't I seen any other table move itself? What about chairs, typewriters, books, glasses of beer? Can they move them[-] selves as well? Must all my beliefs about the difference between animate an[d] "inanimate" objects be thrown out the window?

The point is this. If I agree that I misjudged the distance to the table, I nee[d] change few, if any, of my other beliefs. But if I choose another alternative, th[e] number of other beliefs that must be changed grows considerably. Indeed, if I were to say that the table moved itself, it would be difficult to find an end to th[e] process. Who knows how many beliefs I would have to change before I re[-] moved all the inconsistencies? Therefore, *conservatism* is an important factor. W[e] choose the hypothesis that requires the fewest changes in our other beliefs.

We are now in a position to see how it is that any belief can enter into th[e] justification of any other belief. My beliefs form one huge network. Some ar[e] *particular* statements, that is, statements about individual things; others are *gen[-] eral* statements, that is, statements about entire groups of things. The particula[r] statements serve as *evidence* for the general ones. If I believe that this emerald i[s] green and that emerald is green, and so on for every emerald I have seen, thes[e] particular beliefs provide evidence for the general belief that all emeralds ar[e] green. Moreover, the general statements serve to *explain* the particular ones. If I believe that all emeralds are green, that belief explains why this thing is green. I[t] is green because it's an emerald, and all emeralds are green.

Furthermore, general beliefs serve as evidence and explanations for othe[r] general beliefs. If all gins make me drunk and all bourbons make me drunk an[d] all vodkas make me drunk, that is evidence for the general statement that all liquors make me drunk. And the general statement that all liquors make m[e] drunk explains why all gins make me drunk.

Let us think of this network of beliefs as a map. The particular beliefs ar[e] country roads and city streets. The general beliefs are major highways connect[-]

In discussions remember to use "particular" illustrations to help others see your point /justification ıg the smaller streets, and the most general beliefs are the interstate highways ɔnnecting the other highways. In this way, the smallest dirt road in Oregon is ɔnnected to the narrowest back alley in New York. So, eventually, is my belief ɔout the peanut butter in my house connected to my belief about there being nly one president of the United States at a time.

Take my general belief that inanimate objects cannot move themselves. hink of all the objects in the world that are connected by that belief. Think .so of the other beliefs I have about these objects that are connected to the be- ef that they are inanimate. How many of those must be changed if I decide that ıe table moved itself? How many other general beliefs will I have to give up if I ıange those particular beliefs? Then how many other particular beliefs? Where ill the process end?

Of course, we don't think about such matters when we unexpectedly bump :to a table. We just automatically conclude that the table was closer than we'd ıought. But these matters explain why we automatically come to that decision. Ve do so because the experience of bumping into a table puts our entire net- ork of beliefs on the line, and rather than create havoc in that network, we ıoose the simplest, most conservative hypothesis. That is how the entire net- ork enters into our justification for every belief in that network. It is also why e give such short answers to the question "How do you know that?" Since the ıtire network is taken for granted, there is no reason to go too deeply into it. A ıort "by my watch" will suffice when asked how I know the time, just as a ıort "because I bumped into it" will suffice when asked how I know the table as closer than I'd thought.

Once we recognize all of this, we can see that the metaphor of the justifica- ɔn chain is a bit misleading. It makes the justification of beliefs seem like sin- e lines, proceeding independently of one another in a single direction. Instead, e lines cross and merge and move every which way, as all of our beliefs help justify one another.

Thus, a more apt metaphor, borrowed from the contemporary American phi- sopher W. V. Quine, is that of a vast *web* of belief. This metaphor emphasizes at justification is a matter of *explanatory coherence*. To say that is to say that a ːlief is justified if it fits well into the entire network. If it is consistent with our her beliefs, provides evidence for other beliefs in the network, and is ex- ained by other beliefs in the network, then we are justified in believing it. And hen it comes to choosing between rival hypotheses, we are justified in believ- g the one that fits in the best. Since the hypothesis that I misjudged the dis- nce to the table fits in better than any other hypothesis, that is the hypothesis I n justified in accepting. Indeed, it is because it fits better than the others that it has the initial plausibility it does.

A PRIORI KNOWLEDGE

According to Quine's metaphor of the web, all of our beliefs justify And are justified by all of our other beliefs. They are all connected by an ex-

planatory network, and changes in one place can require changes elsewhere Thus, all of our beliefs are connected to our observations of the world. What w observe can lead us to change any of our beliefs, no matter how certain we ma have been that they were true. As our example of bumping into the table show: we try to change as few beliefs as possible, but we cannot rule out the possibil ity that some observations will require sweeping changes in the web.

Such sweeping changes do not occur often. When they do occur, they ar usually heralded as scientific revolutions, such as when Albert Einstein (1879–1955) replaced Isaac Newton's (1642–1727) world view with his special and general theories of relativity, and when Charles Darwin (1809–1882) pre sented his theory of evolution, and when Sigmund Freud (1856–1939) revealed the powers of unconscious motivation. Similar sweeping changes may also occur in our personal lives, as when we embrace a new religion with great fer- vor or decide that atheism is the correct attitude and reject all religion.

Are any beliefs *immune* from this process? Many philosophers believe so. They hold that some beliefs do not depend on observation for their justifica tion, and that no observations whatever could show them to be wrong. Belief of this type are said to count as *a priori* knowledge, meaning that their justifica- tion is independent of experience. A priori knowledge is contrasted with *empiri cal* knowledge, which does depend on observation for its justification.

Thus, these philosophers give certain beliefs a privileged place in the web. They are protected by something like a one-way glass. The beliefs behind the glass, our a priori knowledge, provide justification for the beliefs in front of it, our empirical beliefs, but nothing that happens in front of the glass can change what goes on behind it.

A variety of beliefs have been held to be a priori. Among them are the truths of logic and mathematics, the belief that everything has a cause, and the belief that nothing can be red all over and green all over at the same time.

Unfortunately, some alleged a priori knowledge has been given up. Modern physics, for example, tells us that events occurring at the level of such basic particles as the electron cannot be given causal explanations. This has led many philosophers to restrict their claims about the a priori to logic and mathematics, to which we now turn.

LOGIC AND MATHEMATICS

Logic and mathematics are called *formal systems*. That is, they begin with certain statements called *axioms*, from which are derived a number of other statements called *theorems*.

An *axiom* is a statement that is accepted without proof. According to many philosophers, the axioms of logic and mathematics are *self-evident*. To say that a statement is self-evident is to say that its truth can be recognized by anyone who understands the statement and reflects upon it with sufficient care. It is also to say that the statement requires no observational support or evidence. In the chapter on moral knowledge (Chapter 4), we looked at two statements of this type—the law of identity in logic (everything is identical with itself) and Euclid's axiom in geometry that equals added to equals are equal.

Someone could, of course, run around with a yardstick to find observational evidence for Euclid's axiom, but that is something of a fool's errand. Try, if you will, to imagine a case where it would fail to hold. Indeed, if you were to measure two lines and find that they are equal, and then measured two other lines and found that they were equal, and then joined one from the first pair to one of the second and then joined the other two, you would refuse to accept any measurement that showed the resultant lines unequal. You would say, instead, that you mismeasured, or that something is wrong with your yardstick, or that you were the victim of a hallucination. That is, you would let nothing count as evidence against the statement.

A *theorem* is a statement that is derived from a set of axioms. To say that it is *derived* from axioms is to say that it follows necessarily from the axioms. That is, certain operations are performed that guarantee that the results (the theorems) are true. The theorems are not self-evident, but since the axioms are, the truth of the theorems is guaranteed.

For example, take the statement that 5,492 times 24 equals 131,808. Although the truth of the statement is not self-evident to you, you can assure yourself of its truth by performing the computation yourself, where the truth of each step in the computation is self-evident. We can say, then, that the statement follows necessarily from such self-evident truths as "4 times 2 equals 8."

When we view logic and mathematics in this way, we can easily see why they are held to be a priori. Starting with self-evident axioms, we can continue to spin out theorems indefinitely without ever having to seek observational evidence. Certainly, you do not feel it necessary to find 5,492 barrels, each containing 24 apples, and then count them all, and then repeat the process for oranges, paper clips, puppies, and so on, before accepting that 5,492 times 24 equals 131,808. Still, some philosophers have grown suspicious of the special place afforded mathematics and logic. Let us see why.

Russell's Paradox

There is a barber who shaves all and only those people who do not shave themselves. Does he shave himself? Suppose we say that he does. If he does shave himself, that means that he does not, because he only shaves people who do not shave themselves. So let us say that he does not. But in that case, he does shave himself, because he shaves all people who do not shave themselves.

We have arrived at a contradiction. If he shaves himself he doesn't; if he doesn't shave himself, he does. Although this may seem a harmless paradox, the British philosopher Bertrand Russell (1872–1970) showed that it has far-reaching implications for a branch of mathematics known as *set theory*.

A *set* is a collection that is defined by its members. That is, set *A* is identical with set *B* if *A* and *B* have precisely the same members. Otherwise, they are different. So every time we add or subtract anything from the collection, we have a different set.

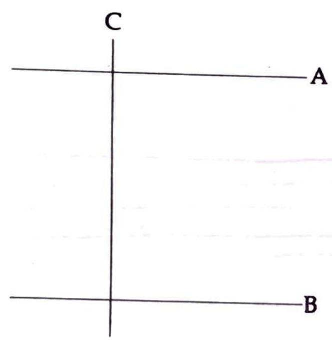
There are two ways of identifying a set. One way is to pick out every member by name. Another way is to pick out a certain characteristic and speak of the set of all things having that characteristic. Thus, we can identify the same set as the set consisting of the first three presidents of the United States or as the set consisting of George Washington, John Adams, and Thomas Jefferson.

Until Russell's discussion of his paradox, it was a basic assumption of set theory that we can name a set by naming any characteristic. Russell's paradox showed this basic assumption to be false. There is no set consisting of the people shaved by Russell's barber. There cannot be, because such a set would be self-contradictory. If it includes the barber it doesn't; if it doesn't include him, it does. Thus, Russell's paradox teaches us to be wary of claims to self-evidence. Even in mathematics, what may seem self-evident one day may be shown false the next. Still, Russell's paradox does not show that mathematics is empirical rather than a priori. The basic assumption was not shown false by *observation*. It was rejected because it led to contradictory theorems. Let us now turn to a recent development that has led some philosophers to claim that mathematics is empirical.

EINSTEIN AND EUCLID

In the previous chapter, I said that according to Einstein's general theory of relativity, parallel lines eventually meet in space if extended far enough. It is time to take a closer look at that claim.

In the diagram below, we have three lines, *A*, *B*, and *C*. Both *A* and *B* are perpendicular to *C*. In that case, *A* and *B* are parallel to one another, and, according to Euclidean geometry, they will never meet, no matter how far they are extended.

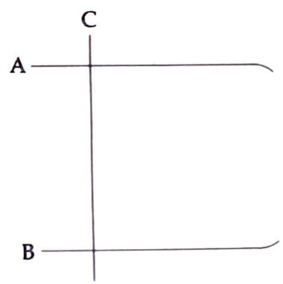


Until the nineteenth century, this was taken to be self-evident. To deny it, people believed, would lead to contradictory theorems. But in the nineteenth entury, geometries were devised that did deny it, and these geometries proved o be perfectly consistent. No contradictions could be derived from them. Although this was taken as a landmark result, no one thought that these geomeries could replace Euclidean geometry. They were interesting formal systems, but only Euclid's, it was thought, could describe the real world.

There were two good reasons for believing this. First, Euclid's *parallel postulate* as the claim about parallel lines is called) seemed to be a necessary truth about he world. It was considered inconceivable that space could be such that parallel ines could ever meet. In fact, the philosopher Immanuel Kant (1724–1804) had ırgued quite persuasively that space had to be Euclidean.

Second, Euclidean geometry lay at the foundation of physics. According to he physics of the time, light traveled through a vacuum in straight lines, and ight rays traveling along paths *A* and *B* of our diagram could never meet. So Euclid's parallel postulate held a special place both in ordinary experience and cience. The discovery of non-Euclidean geometries, it was thought, could do nothing to change that.

Then came Einstein's general theory of relativity. According to Einstein, two ight rays traveling along paths *A* and *B* will eventually meet. How can that happen? Here is another diagram.



When we look at this diagram, our immediate inclination is to deny that the paths are straight. Isn't it obvious that the lines have begun to curve?

Well, the lines on our *diagram* have certainly curved, but the point of Einstein's theory is that the paths of the light rays are straight—it is *space* that is curved. Euclidean geometry assumes that space is *not* curved. The geometry Einstein used, as noted in the previous chapter, is Riemannian geometry, which assumes that space is curved.

Why make the assumption that space, rather than the light ray, is curved? Well, how do we determine that a line is straight? One way is by determining hat it is the shortest distance between two points. That, indeed, is the classic definition of a straight line—the shortest distance between two points. And how do we determine that? By taking a measuring stick and laying it down end over end from one point to another. The path that requires us to lay it down the

fewest number of times is the shortest one, and therefore the straight one. Well according to Einstein, the paths *A* and *B* of our second diagram are, in the appropriate conditions, straight by that test.

Another way of determining that something is straight is by lining it up to the eye. Hold the end of a pencil up to one eye. As you gaze along the pencil an move it around, holding the end in the same place, it will reach a position a which you can only see the end of the pencil. At that position, you can say tha it is straight. Were it bent, you would always be able to see another part of the pencil. This test is used both by carpenters testing for warps in wooden plank and pool players testing for warps in pool cues. But it also works, under the appropriate conditions, for paths *A* and *B* of our second diagram. That is, anyone traveling one of those paths would have no way of telling that it is curved, and it would appear perfectly straight when lined up to the eye.

So there are at least three good reasons for accepting Einstein's claim that paths *A* and *B* in our second diagram are straight. First, they pass our commo tests for straight lines. Second, they are paths followed by light rays in a vacuum, and such paths have always been considered perfectly straight. Third there is a consistent geometry that preceded Einstein's theory that also considers them straight. Are there any other reasons?

Choosing the Better Theory

There are two ways of interpreting our second diagram, each belonging to a different theory. According to one, paths *A* and *B* are parallel straight lines traveling through curved space. According to the other, paths *A* and *B* begin as parallel straight lines and then curve.

We have already looked at three reasons for accepting the first theory. But we can easily think of two good reasons for accepting the second. One is that Euclidean geometry has played an important and reliable role in science and our ordinary lives for as long as it has been around. We use it every time we shoot pool, build shelves, draw diagrams and maps, or survey property. Engineers use it, as do architects, tailors, and people who mark out football fields and tennis courts. The second is that it is highly counterintuitive to think of *space* as being curved. How can space, of all things, be curved?

How, then, are we to choose? How did the physicists choose? Suppose we accept Einstein's account. If we do, we have two things to explain: how space can be curved and why Euclidean geometry works so well. The curvature of space i explained this way. The nature of space is determined by the matter that is in it It is a mistake to think of empty space as having certain characteristics that are unaffected by what is in that space. There is no universe without matter. So the space in our universe has the characteristics it does because of the matter in our universe. How does matter determine the characteristics of space? By its gravity Paths *A* and *B* of our second diagram are the paths that light rays follow when they approach a large body, the sun, for instance, from opposite sides. The gravitational field of the body creates a curvature in space. The success of Euclid ean geometry is explained this way. Euclidean geometry works "in the small" because the curvature of space is not a factor to be reckoned with "in the small." It is only at great distances that it begins to affect our calculations.

Suppose, on the other hand, we reject Einstein's account and insist that paths *A* and *B* curve. If we do, we must explain two things: how light rays in a vacuum bend, and why the paths pass our tests for straight lines. The curvature of light in a vacuum is explained this way: Gravity bends the light rays. Just as light is bent when it passes through water, so is it bent when passing through a gravitational field. That the paths pass our tests for straight lines has two explanations, one for each test. The paths seem to be the shortest distance between two points because gravity changes the size of measuring sticks. Just as temperature changes affect the size of objects, so does gravity. The paths pass the second test because the light is bent. Just as a straight stick appears bent when half submerged in water, so does a bent path appear straight when passing through a gravitational field. In other words, our ordinary tests for straightness are unreliable "in the large." Adjustments have to be made due to highly unusual forces.

So we seem to have a standoff. Either theory seems to "fit the facts" equally well. Each can explain away the difficulties.

Such apparent standoffs are not unusual in the history of science. Although we like to think that one theory can be proved by a series of experiments, matters are far more complicated than that. The complications arise because of the resiliency of the web of belief. Let us see how.

THE CENTER OF THE WEB

The web of belief is set up in such a way that it is always possible to hold any belief, come what may. To return to the example of bumping into the table, I could have refused to believe that the table did not move. Instead, I could have said that the table really moved itself. Of course, I would then have to change all sorts of other beliefs in my web, but if I were willing to do so, I could continue to believe that I was really fifteen feet away. Of course, that would be highly unusual behavior. To be willing to give up all my beliefs about inanimate objects on the basis of one experience is most odd. Why is that?

Think of our beliefs as being spread throughout our web. Some beliefs are in the center, some on the edges, and the rest scattered in between. The beliefs on the edges are those we are most willing to give up in the face of unexpected observations. The ones in the center are those we are least willing to give up, those we are most likely to hold, come what may. For most of us, the belief that tables do not move themselves is much closer to the center than the belief that we have not misjudged the distance to the table. A great number of unexpected observations would have to occur before we would begin to believe that tables move themselves. As we get closer and closer to the center, our beliefs seem to be totally protected from unexpected observations, so protected that we cannot

SELF-JUSTIFYING BELIEFS

In the discussion of justification, I concluded that all of our beliefs form a vast web held together by explanatory coherence, that each member of the web is ultimately justified by every other member of the web, and that observations are relevant to the justification of every member.

Although this view has many adherents among contemporary philosophers, many others disagree with it. In the main body of this chapter, we considered the major source of disagreement—mathematical knowledge. In what follows, we will look at another.

To give our justification for holding a belief is to give our reasons for holding it. And to give our reasons is to offer an *argument*. It is to say that we believe *p* because we believe *q*, *r*, and *s*, and if *q*, *r*, and *s* are true, so is *p*. Suppose we are then asked to justify our beliefs that *q*, *r*, and *s* are true. We then give another argument. But suppose that our argument goes like this. We believe *q*, *r*, and *s* because we believe *p*, and if *p* is true, so are *q*, *r*, and *s*. Our reasoning has come full circle. We justified one belief by appealing to three others, and then justified the three others by appealing to the first belief. Clearly, this is unacceptable, as the following example shows.

Suppose that you ask Mary why she trusts John, and she answers that she trusts him because he's honest. Suppose that you then ask her how she knows he's honest, and she answers that he told her so, and she can trust whatever he says. How does she know she can trust him? Because he's honest. How does she know he's honest? Because she can trust him. The circle is obvious. But in that case, it is also obvious that she has not really justified her belief that he is honest or the belief that she can trust him. Unless she can break out of the circle, her justification is illusory. She must find some other belief to justify the beliefs in the circle—that he has never lied to her before, for instance.

This point is an important one. If every belief in the web justifies and is justified by every other belief, all justification eventually comes full circle. But if that is true, then it seems that we are not really justified in believing anything.

Thus, many philosophers have claimed that there must be some *self-justifying beliefs*, beliefs that do not depend on the rest of the web for their justification, but contribute to the justification of all beliefs in the rest of the web. If there are such beliefs, the circle is broken, and we are justified in believing anything that is justified by them. If not, we are justified in believing nothing. Are there any such beliefs?

Beliefs About Current Sense Experience

The most frequently mentioned candidates for self-justifying beliefs are beliefs about *current sense experience*. Beliefs of this type are beliefs about how things now *seem* to us, beliefs about how things look, sound, feel, taste, and smell, right now. An example of such a belief is this: I now seem to see something that looks like a typewriter, and I now seem to be touching something that feels like a typewriter, and I now seem to be hearing something that sounds like a typewriter.

Why are such beliefs the most frequently mentioned? For two reasons. rst, these beliefs do contribute to the justification of our other beliefs. All our beliefs are justified by observation, I said earlier. But what is our justication for believing that we observe what we think we do? What, for exnple, is my justification for believing that I *do* see and hear and feel a typeriter? That I *seem* to. That is, I believe I see, hear, and feel a typewriter ecause it seems to me that I see, hear, and feel something that looks, ɔunds, and feels like a typewriter. So if observation is relevant to the justifiation of all beliefs, so must beliefs about current sense experience be releant.

Second, such beliefs do not at first seem to depend on any other beliefs. low do I know that things seem a certain way to me? Because they do. Peod. How things seem to me is a fact about my own mind, and such facts are urely transparent. If I believe that things seem a certain way to me, then I m completely justified in that belief. Nothing else is relevant to my justifiation.

Suppose, for example, that I should suddenly hear my alarm clock go off nd then awaken to find myself in bed. That would show that I wasn't really eeing a typewriter at all. I was dreaming. But it would not show that it did ot seem to me that I saw something that looked like a typewriter.

Why the difference? My belief that I am really seeing a typewriter depends n a number of beliefs, including the belief that I am awake. So finding that I vas asleep and dreaming destroys my justification for believing I am actually eeing a typewriter. Since my belief that it now seems to me that I see somehing that looks like a typewriter does not depend on any other beliefs, no urther observations can destroy my justification for believing it.

Although the above remarks are persuasive, they do conceal a problem. Beliefs about how things seem *do* depend on other beliefs for their justificaion. Take even the simple belief that I seem to see something that looks red ınd round. This belief depends on many other beliefs for its justification—hat I can distinguish red from maroon, for example, and that I can distinguish a round shape from an oval one. And these beliefs also admit of justiication. Indeed, all of my beliefs about having seen red and round things are elevant, as are my beliefs about the proper conditions for distinguishing red rom maroon and round from oval. Therefore, we must conclude that beliefs ıbout current sense experience are not self-justifying.

Empiricism versus Rationalism

The view that all beliefs find their ultimate justification in self-justifying beliefs about current sense experience is the most extreme form of *empiricism*. More generally, an empiricist is someone who believes that all knowledge, often excepting knowledge of logic and mathematics, is empirical. But the great empiricist tradition, beginning with John Locke (1632–1704), George Berkeley (1685–1753), and David Hume (1711–1776), and running through John Stuart Mill (1806–1873), Bertrand Russell (1872–1970), and the German-American philosopher Rudolf Carnap (b. 1891), has included the claim that all justification of empirical beliefs ends in beliefs about sense experience, which are self-justifying.

Another great tradition in philosophy is the *rationalist* tradition, beginning with René Descartes (1596–1650), Baruch Spinoza (1632–1677), and Gottfried Wilhelm Leibniz (1646–1716), and running through Immanuel Kant (1724–1804), who is often said to have reconciled rationalism and empiricism, and the American philosopher Brand Blanshard (b. 1892). Rationalists, to a varying degree, hold that much of our knowledge beyond mathematics and logic is a priori.

Perhaps the most extreme rationalist was Spinoza, whose great philosophical system encompassed virtually every aspect of human knowledge, from ethics and religion to physics and psychology. Spinoza presented his system on the model of geometry, beginning with axioms and definitions and then offering formal proofs of a great number and variety of theorems.

Thus, rationalists agree with empiricists that justification chains end in self-justifying beliefs; but, in opposition to empiricists, they claim that many of these beliefs are a priori.

But we have already seen that there is good reason to believe that observation is relevant to the justification of all beliefs. In that case, there is good reason to reject rationalism.

Circles and Webs—Pragmatism

We began our search for self-justifying beliefs because of the following argument: If justification is a matter of explanatory coherence, then all justification eventually comes full circle. But if all justification comes full circle, all justification is illusory. Therefore, unless there are some self-justifying beliefs that get us out of the circle, we are not justified in believing anything. Since I have rejected the leading candidates for self-justifying beliefs, must I also conclude that we are not justified in believing anything? I think not.

It is a mistake, I think, to compare our webs of belief to the kind of circular reasoning exhibited by Mary when she answers our questions about John's trustworthiness. Our webs are not constructed like big circles. They are, rather, vast and intricate criss-crossing networks, which are designed to accommodate the fullest range of experience in the best possible way. If our webs succeed in this task, it is no fatal flaw that there are no self-justifying beliefs.

To accept this conclusion is to adopt the alternative to empiricism and rationalism known as *pragmatism*. When discussing theories of truth in the previous chapter, I noted that one classical theory is the pragmatist theory. The theory of justification defended in this chapter may be called the pragmatist theory of justification. Like the pragmatist theory of truth, the pragmatist theory of justification emphasizes the coherence of our entire web of belief and the usefulness of that web in both the practical and theoretical aspects of life. Unlike the empiricist and rationalist theories of justification, it does not require that any of our beliefs be certain or self-justifying. All beliefs are justified by their place in the web, and any belief may be discarded in our pursuit of the best web.

magine changing them. The belief that twice two is four, for example, seems ntirely immune from revision.

Although most of us put the same beliefs in the center, it is possible to put nything there. Think of the paranoid, for instance. A paranoid is convinced hat there is a plot against him, and nobody can convince him otherwise. That elief is in the center of his web, and he will go to the most outlandish extremes o maintain it, come what may.

The point of these remarks is that no observation or series of observations orces any particular beliefs on us. Depending on the geography of our web, we an believe whatever we like. That is not to say that all beliefs are equally ratio- al. Far from it. The paranoid is not as rational as the rest of us. Nor is the per- on who decides that the table moved itself.

Why not? For the reasons already offered. The most rational geography of ur web of belief is the one that allows for the greatest simplicity and conserva- ism. The paranoid must always explain why the plots against him never suc- eed, how various people were enlisted into the conspiracy, why the conspiracy egan in the first place, why nobody else is aware of it, and so on. The belief hat the paranoid places in the center demands constant adjustment in the rest of the web. Were he to drop that belief, after the initial adjustments life would go much more smoothly for him.

The same considerations are involved in choosing among rival scientific theories. Observations alone do not settle the issue. When Galileo (1564–1642), for example, explored the heavens with his telescope, his observations did not by themselves prove that the earth and other planets revolved around the sun. Those who believed that the earth was at the center of the universe responded by saying that their theory was basically right but needed certain minor adjust- ments. It was only when these "minor" adjustments grew more and more com- plicated that the far simpler theory of Galileo gained general acceptance. Why did it take the others longer than Galileo to come around? Because their belief that the earth was at the center of the universe was close to the center of their web.

Returning to Einstein and Euclid, we find this situation. Euclidean geometry was at the center of science's web. So were a number of other beliefs—that light travels in a straight path, for instance, and that there are no forces acting on measuring sticks in the way required by the alternative to Einstein's theory. Clearly, some very basic beliefs had to give. Since Einstein's theory left us with a smoother, less complicated, more useful web, just as Galileo's did centuries earlier, it was adopted. Thus, we say that parallel lines do eventually meet.

THE FINAL WORD?

Our excursion into physics has been a long but fruitful one. It has shown us how a belief thought to be an example of a priori knowledge can be overturned by the advance of science. It has shown us that the combination of

observation and theory can influence any part of our web, including the basic assumptions of mathematics. It has shown us that the axioms of mathematics and logic are not self-evident truths, but hypotheses about the world, which may be close to the center of our web, but are not unrevisable.

The moral, then, is this. It is a mistake to draw a firm line between empirical knowledge and a priori knowledge. Observation is relevant to the justification of all of our beliefs. Although scientists *could* have held on to Euclidean geome- try come what may, although they *could* have kept it immune from revision, they did not. Instead, they took the more rational course of accepting the best total theory. Ultimately, the demand for explanatory coherence, the first princi- ple of justification, led them to reject their commitment to Euclidean geometry.

That does not mean, however, that there is *no* difference between mathemati- cal beliefs and others. Our beliefs about mathematics are at the very center of our web. They are protected from revision by the other beliefs surrounding them. They are to be given up only when it would lead to intolerable strain to give them up.

The difference between empirical beliefs and so-called a priori beliefs is a difference of degree, then, not of kind. The closer a belief is to the center of the web, the greater our dependence on it. As we get closer to the center, any changes require greater and greater changes in the rest of the web.

My belief that a certain book is on the shelf in this room, for example, is on the edge of the web. If I don't find the book, I will believe it is someplace else, and that is the end of the matter. My belief that twice two is four, however, is in the center. To give it up would be to change so many other beliefs that I cannot even imagine doing so. Therefore, it seems to be totally protected from unex- pected observations. But if continued observations, however unimaginable, should show that even greater havoc would result by keeping the belief, or if it could be shown that the rejection of the belief would not lead to such havoc as we now imagine, it is then up for grabs.

That is what Einstein and Riemann showed concerning Euclidean geometry. The parallel postulate could be given up without undue strain, and the result is a better theory.

STUDY QUESTIONS

1. What is the difference between our reasons for holding a belief and the causes of our holding a belief?
2. In this chapter I used two metaphors for the way that we justify our beliefs. First I talked of justification chains, then of the web of belief. Why is each metaphor appropriate? Why is the web metaphor more appropriate?
3. What role do generalizations play in the justification of our beliefs? What role do explanatory statements play?
4. What makes one hypothesis simpler than another? More conservative? What roles do simplicity and conservatism play in the justification of our beliefs?
5. Some philosophers have contrasted a priori and empirical knowledge.

What is the difference between the two types of knowledge? What candidates for a priori knowledge have been offered by philosophers?
5. What is a formal system? Why have some philosophers believed that the theorems and axioms of formal systems are known a priori?
7. What does Einstein's general theory of relativity show about the way we justify mathematical knowledge?
3. What does it mean to say that some beliefs are in the center of our web? Which of your beliefs are in the center of your web? What would it take to get you to change them?
9. Why have some philosophers believed that some of our beliefs must be self-justifying? What beliefs have they taken to be self-justifying? Why do other philosophers think that these beliefs are not self-justifying?
0. What is empiricism? Rationalism? How are they similar? Different? How do they compare with pragmatism?

;LOSSARY

\ priori knowledge. Knowledge that does not depend on observation for its justification.

Irgument. Process of reasoning in which certain statements (the reasons) are used to show that another statement (the conclusion) is true or most likely true.

Ixiom. In *formal systems,* a statement that is used to *derive* other statements, but is not derived from any other statement.

:ircular reasoning. An *argument* in which the same statement appears as both the conclusion and one of the reasons supporting the conclusion. For example: Everything in the Bible is true. Why? Because it's the word of God. How do I know? Because it says so in the Bible, and everything in the Bible is true.

Derive. To derive one statement from another is to show that if the second statement is true, the first one must also be true.

:mpirical knowledge. Knowledge that depends on observation for its justification.

:mpiricism. The view that all knowledge, or all knowledge apart from mathematics and logic, is *empirical.* Empiricists characteristically hold that empirical knowledge has its ultimate justification in *self-justifying beliefs* about current *sense experience.*

:xplanatory coherence. A feature attributed to belief systems by many philosophers in order to explain how we justify our beliefs. Roughly, a system has explanatory coherence if its members are connected by *explanatory statements.*

:xplanatory statement. A statement of the form "Such and such is true or happened because of so and so." For example: "The grass is wet because it rained last night."

-ormal system. A system of statements in which some statements (the *theorems*) are *derived* from other statements (the *axioms*). Examples are mathematics and logic.

General statement. A statement about all members of a particular group. For example: "All swans are white," and "Nobody likes peas and carrots."

Hypothesis. An *explanatory statement* provisionally adopted in order to test if it i true. For example, if my car does not start on a cold morning, I may adopt th hypothesis that the battery is dead. I will then test the hypothesis by at tempting to start the car with the help of jumper cables.

Justification chain. A series of statements, each one justified by the statements fol lowing it.

Parallel postulate. A postulate of Euclidean geometry, according to which we ca draw through a given point one and only one line that is parallel to a secon line and will never meet that second line.

Particular statement. A statement about individual members of a group. For ex ample: "John doesn't like peas and carrots," and "Some people like peas an carrots."

Rationalism. The view that we have a priori knowledge extending beyond ou knowledge of mathematics and logic.

Russell's paradox. Named after Bertrand Russell, a paradox that shows that cer tain *sets* are impossible, because if something belongs to the set it does no and if it does not it does. For example, take the statement, "This sentence i false." If it is true, then it is false. (If it belongs to the set of true statements, i doesn't.) If it is false, it is true. (If it doesn't belong to the set of true state ments, it does.)

Self-justifying beliefs. Beliefs that do not depend on other beliefs for their justifi cation. To hold such a belief is automatically to be justified in holding it.

Sense experience. Experiences that accompany all observations. Our sense experi ences are the ways in which things look, sound, feel, smell, and taste to us That is, they are the ways things seem to us when we observe them.

Set theory. Branch of mathematics dealing with sets. A set is a collection defined by its members. Whenever a member is added or dropped, a new set i formed.

Justification of our Beliefs

~~p.~~ ✓ Justification Chains appear to actually create a <u>Web</u> of connected beliefs

- So some beliefs serve as justification for others
  (see Cubs example p. 297)

p.298 ✓ Table example
- we are conservative + choose hypothesis requiring fewest changes to the web

p.301 "A priori" vs. empirical

302 Russell's paradox

303 etc. Euclidian 303

⟶ how choices became difficult

306 Center of web = least willing to give up.

311 final pg. ⟶ book example.

JTB

There is Peanut Butter in my house.

Its got a white cap and a shiny label.

The label says its PB.

The ingredients/label must be approved by the FDA as safe to consume

The FDA exists as a govt. entity to protect citizens in U.S. democracy

The citizens demanded that the govt. works for the people

To work well on behalf of the people, there must be balance of power/checks & balances

One element of this is an executive branch

EB requires that the "buck ~~stops~~ somewhere" for some executive decisions

There is only 1 president of U.S.

JTB Quick Quiz (3 pts)

1. Identify one of the Justification Chain examples offered in the reading.

- How do I know the time?
- I had O.J. this morning
- Phillies beat Cubs
- I bumped into the table.
- Peanut Butter in the house is related to only 1 president of U.S.

2. What's Russell's Paradox about shaving?

- There is a barber who shaves all and only those people who do not shave themselves.

  - Does he shave himself?

    Yes = he does not
    No = he does

3. What concrete visual metaphor does Olen use to describe the way all of our beliefs are connected? (web)