

## Philosophical Problems and Theories

—BHAGAVAD GITA

Because our lives are shaped by our philosophy, many have been willing to die for their philosophy. Revolutions, for example, are often inspired by a philosophy. The American, Russian, and Iranian revolutions, for example, were fueled, respectively, by the philosophies of democratic capitalism, Marxist communism, and Islamic fundamentalism. Whether a revolution ultimately

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succeeds is determined not by force of arms but by the strength of its philosophy. As Napoleon realized, "There are two powers in the world, the sword and the mind. In the long run, the sword is always beaten by the mind." But the mind can overcome the sword only if it is armed with viable ideas. The goal of philosophical inquiry is to determine whether our philosophical beliefs are, in fact, viable.

## Philosophical Problems

Philosophical beliefs fall into four broad categories, which correspond to the major fields of philosophy: (1) *metaphysics*, the study of ultimate reality, (2) *epistemology*, the study of knowledge, (3) *axiology*, the study of value, and (4) *logic*, the study of correct reasoning. The following are some of the questions explored by the various branches of philosophy.

*Science without epistemology is—insofar as it is thinkable at all—primitive and muddled.*

—ALBERT EINSTEIN

### Metaphysics

- What is the world made of?
- Does the world contain only one basic type of substance (e.g., matter), or are there other types (e.g., mind)?
- What is the mind?
- How is the mind related to the body?
- Can the mind survive the death of the body?
- Do we have free will, or is every action determined by prior causes?
- What is a person?
- Under what conditions is a person at one time identical with a person at another time?
- Is there a God?

### Epistemology

- What is knowledge?
- What are the sources of knowledge?
- What is truth?
- Can we acquire knowledge of the external world?
- Under what conditions are we justified in believing something?

### Axiology

- What is value?
- What are the sources of value?
- What makes an action right or wrong?
- What makes a person good or bad?

- What makes a work of art beautiful?
- Are value judgments objective or subjective?
- Does morality require God?
- Are there universal human rights?
- What is the best form of government?
- Is civil disobedience ever justified?

### *Logic*

- What is an argument?
- What kinds of arguments are there?
- What distinguishes a good argument from a bad one?
- When are we justified in believing the conclusion of an argument?

Whether or not we have consciously considered any of these questions, we all unconsciously assume certain answers to them. We all have beliefs about what is real, what is valuable, and how we come to know what is real and valuable. Philosophy examines these beliefs in an attempt to determine which of them are worthy of our assent.

Philosophical beliefs affect not only how we live our lives, but also how we conduct our inquiries. What we look for is determined by our theory of reality, how we look for something is determined by our theory of knowledge, and what we do with what we find is determined by our theory of value. In science, as in everyday life, having a good philosophy is important, for, as English philosopher Alfred North Whitehead observed, "No science can be more secure than the unconscious metaphysics which it tacitly presupposes." The philosophical assumptions underlying various endeavors are studied by such additional subfields of philosophy as the philosophy of science, philosophy of religion, philosophy of art, philosophy of history, philosophy of education, and philosophy of law. Even though every intellectual pursuit takes certain answers to philosophical questions for granted, the correct answer to those questions is by no means obvious. What makes definitive answers to philosophical questions so hard to come by is that conflicting views of reality, knowledge, and value often appear equally plausible.

Consider, for example, the beliefs that the universe contains only material objects and that we have minds. The success of science lends credence to the former, whereas our personal experience supports the latter. It also seems that both of these beliefs can't be true, for minds do not appear to be material objects. Material objects have properties like mass, spin, and electric charge; minds, apparently, do not. Take, for example, your thought that you're reading a book right now. How much does that thought weigh? How long is that thought? What is its electric charge? Such questions seem absurd because thoughts do not seem to be the type of thing that can have physical properties. Does that mean that the mind is immaterial? If so, how can the

*Philosophy is the art and law of life, and it teaches us what to do in all cases, and, like good marksmen, to hit the white at any distance.*

—SENECA

mind affect the body (and vice versa)? Such are the issues raised by the **mind-body problem**.

The **problem of personal identity** arises from the beliefs that we change in many ways throughout our lives and that these changes happen to the same person. But if we change, we're different. So how is it possible for a person to change and yet remain the same?

The **problem of free will** arises from the beliefs that every event has a cause and that humans have free will. Yet if every event is caused by some prior event, how can anything we do be up to us?

The **problem of evil** arises from the beliefs that the world was created by an all-powerful, all-knowing, and all-good being (namely, God) and that there is evil in the world. If God is all-knowing, he knows that evil exists; if he is all-good, he doesn't want evil to exist; and if he is all-powerful, he can prevent evil from existing. So how can there be evil in a world created by such a being?

The **problem of moral relativism** arises from the beliefs that certain actions are objectively right or wrong and that all moral judgments are relative. If all moral judgments are relative (to individuals, societies, religions, etc.), then no actions are objectively right or wrong. But if no actions are objectively right or wrong, how is moral disagreement possible? If believing something to be right makes it right, how can anyone legitimately claim that what another did was wrong?

The **problem of skepticism** arises from the beliefs that knowledge requires certainty and that we have knowledge of the external world. Our knowledge of the external world is based on sense experience. But our senses sometimes deceive us. Given that we can't be certain of what we've learned through our senses, how can we have knowledge of the external world?

Some of our most fundamental beliefs about reality, knowledge, and value seem to be inconsistent with one another. To anyone who wants to understand the world and our place in it, this situation should be disturbing. If the beliefs in question really are inconsistent with one another, at least one of them must be false, and if we act on a false belief, our action is unlikely to succeed. To come up with a way of looking at the world that not only makes sense but also helps us achieve our goals, philosophy tries to eliminate these inconsistencies from our belief system.

## The Stakes in Philosophical Inquiry

Making our belief system consistent is no idle task, for not only do our individual thoughts and actions depend on the truth of certain philosophical beliefs, but so do many of our social institutions. If those beliefs turned out to be false, the institutions that rely on them would have to be radically altered or even abolished. To get an idea of what's at stake in philosophical inquiry, let's examine the implications of accepting or rejecting some of the beliefs just mentioned.

### **mind-body problem**

The philosophical problem of explaining how it is possible for a material object to have a mind.

**problem of personal identity** The philosophical problem of explaining how it is possible for a person to change and yet remain the same person.

**problem of free will** The philosophical problem of explaining how it is possible for a causally determined action to be free.

**problem of evil** The philosophical problem of explaining how it is possible for there to be evil in a world created by an all-powerful, all-knowing, and all-good being.

**problem of moral relativism** The philosophical problem of explaining how it is possible for there to be absolute moral standards.

**problem of skepticism** The philosophical problem of explaining how it is possible for there to be knowledge.

*Metaphysics is the  
anatomy of the soul.*

—STANISLAS  
BOUFFLERS

### *The Mind-Body Problem*

Many philosophers and scientists have held that the mind is nothing but the brain. Francis Crick, the Nobel Prize-winning codiscoverer of the structure of DNA, has defended this view. In his book *The Astonishing Hypothesis*, Crick claims, "The astonishing hypothesis is that you, your joys and your sorrows, your memories and ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules. As Lewis Carroll's Alice might have phrased it, 'You're nothing but a pack of neurons.'"<sup>2</sup> Although Crick's hypothesis may be astonishing, it is by no means new. The idea that we are purely material beings was proposed more than twenty-five hundred years ago by the ancient Greek philosophers Leucippus and Democritus. In their view, we are nothing but a pack of atoms—indivisible material particles that are in constant random motion. If Crick and Leucippus are right, then most religious believers are wrong—we can't survive the death of our bodies. When our bodies die, we cease to exist.

What's more, if the mind is a physical thing, it should be possible to construct one. Many working in the field of artificial intelligence believe that it's only a matter of time before we produce a robot that is as intelligent as we are. Because computers evolve much more rapidly than we do, intelligent robots could quickly become much smarter than we. Of such robots, Marvin Minsky, co-founder of MIT's artificial-intelligence laboratory, has reportedly said, "If we're lucky, maybe they'll want to keep us around as pets."

### *The Problem of Free Will*

*To deny the freedom of the  
will is to make morality  
impossible.*

—JAMES FROUDE

It is commonly believed that we can be held responsible only for those actions that we freely perform. If we are forced to do something against our will, we aren't to blame. But if every event has a cause, then it would seem that nothing we do is up to us, for all of our actions are determined by forces beyond our control. The principle of universal causation, then, seems to be inconsistent with the notion of free will.

The view that we have no free will has long been thought to follow from materialism. The ancient Greeks realized that if everything happens as the result of a collision between atoms, then we are powerless to change the future. Whatever will be, will be. We may seem to be masters of our destiny, but that is just an illusion.

In recent years, this view has been most forcefully argued by the late Harvard psychologist B. F. Skinner. Skinner claims that the belief in free will is a prescientific belief left over from animist days when we believed that every object contained a spirit. Physics, chemistry, and biology advanced only after they had given up that notion. Similarly, he says, psychology can become a science only if it gives up the belief that human behavior is caused by an indwelling agent. According to Skinner, we are robots that are programmed by our environment. What we do as adults is the result of what happened to us as children. Consequently, we should not be held responsible for

our actions and should not be given credit for our achievements. A truly enlightened society would have no use for the notions of freedom and dignity.<sup>3</sup>

Although Skinner believes that our behavior is determined primarily by how we are brought up, or nurtured, other scientists believe that it is determined primarily by our genetic endowment, or nature. According to these scientists, the information encoded in our genes determines not only what proteins our bodies manufacture but also how we respond to our environment. As biologist Richard Dawkins puts it, "We are survival machines—robot vehicles blindly programmed to preserve the selfish molecules known as genes."<sup>4</sup> So Dawkins shares Skinner's belief that we are robots. He simply has a different view about where our dominant program comes from.

If either of these scientists is right, then a good number of our social institutions need to be overhauled. Skinner recognized this and wrote a novel, *Walden II*, depicting what life would be like in a world where the idea of free will had been abolished. In such a world, there would be no lawyers, for lawyers determine responsibility, and, according to Skinner, individuals are not responsible for their actions. There would also be no jails, for if individuals are not responsible for their actions, no one should be punished for what he or she does. Those who engage in antisocial behavior have simply been programmed improperly and thus need to be reprogrammed at a behavioral reconditioning center.

Some psychologists have argued that the use of behavioral reconditioning techniques should be much more widespread than it currently is. Psychologist James McConnell, for example, writes,

... the day has come when ... it should be possible ... to achieve a very rapid and highly effective type of positive brainwashing that would allow us to make dramatic changes in a person's behavior and personality. ...

We should reshape our society so that we all would be trained from birth to want to do what society wants us to do. We have the techniques now to do it. ... No one owns his own personality. ... You had no say about what kind of personality you acquired, and there is no reason to believe you should have the right to refuse to acquire a new personality if your old one is antisocial. ... Today's behavioral psychologists are the architects and engineers of the Brave New World.<sup>5</sup>

A world in which these techniques were the norm would indeed be a brave new world.

### *The Problem of Personal Identity*

The belief that people retain their identity over time is a cornerstone of our legal system. If you sign a thirty-year mortgage contract, for example, you will normally be expected to honor the terms of that contract even though your body and your memories will change considerably during that time. The law recognizes, however, that under certain circumstances people change enough to alter their legal responsibilities. At parole hearings, for example, it isn't uncommon to hear the following sort of argument: "He isn't the same person he was ten years ago. He has realized the error of his ways and has completely

*An idea that is not dangerous is unworthy of being called an idea at all.*

—ELBERT HUBBARD

*The sense of identity provides the ability to experience one's self as something that has continuity and sameness, and to act accordingly.*

—ERIK ERIKSON

reformed. Therefore, he should be granted parole." But how much and in what ways must someone change in order to be considered a different person?

Some maintain that any change, no matter how slight, makes us a different person. Buddhists, for example, maintain that because everything in the world is constantly changing, so are we. For them, the self is created anew each instant. Others maintain that only certain types of changes can alter our personal identity. Who we are seems to be closely tied to our memories. If we suffered from total amnesia and were unable to remember anything about ourselves, there would be grounds for saying that we had ceased to exist. Does that mean that we are our memories? If we have no memory of doing something, can we legitimately claim that we didn't do it? Would it be wrong to punish us for something that we had no recollection of doing? What if there were a way to transfer our memories from our present body to another, say through a brain transplant? (Partial brain transplants have already been performed.) Would we survive such a transfer? What if our memories were transferred into a body of a different sex? A number of computer scientists believe that it will soon be possible to transfer our memories from our brains into a computer. Could we exist inside a computer? What if we uploaded our memories into two different computers? Would there then be two of us? Although these questions may seem far-fetched, some believe that we will have to face them in the not-too-distant future. How we answer them will be determined by our notion of personal identity.

### *The Problem of Moral Relativism*

*When in Rome, do as the  
Romans do.*

—ST. AMBROSE

All of us make moral judgments. We all have beliefs about what is morally right or wrong. Sometimes we even get into heated arguments about the morality of an action or a policy. But the widespread disagreement about what is moral—as for example in discussions over abortion, capital punishment, and drug use—has led many to believe that there are no objective moral standards. If morality is just a matter of personal opinion, however, then there is no more reason to argue about what is right or wrong than there is to argue about what tastes better—chocolate or vanilla—because there is no accounting for taste.

Furthermore, if there were nothing more to something's being right than our believing it to be right, we would be morally infallible. As long as we did what we thought was right, we could do no wrong. But that, too, seems implausible. Our believing something to be right doesn't make it right. If it did, we would have to say that what Hitler did was right (provided, of course, that he believed in what he was doing). Doing the right thing seems to involve more than simply doing what you believe in.

The notion that morality is subjective faces serious difficulties. But so does the notion that morality is objective. Resolving these difficulties is of the highest importance, for many of the problems we face as individuals and as a society are moral ones. When we ask, "What should we do about . . . ?" we are asking a moral question. How we answer such questions will be determined by what we consider our moral obligations to be. So it's important to be clear about just what those obligations are.

### *The Problem of Evil*

We have seen that the existence of an all-powerful, all-knowing, and all-good being seems to be incompatible with the existence of evil. If God possessed only two of these three attributes, however, there would be no problem. For example, if God were all-knowing and all-good but not all-powerful, we could account for the existence of evil by claiming that God is powerless to prevent it. If God were all-powerful and all-good but not all-knowing, we could account for the existence of evil by claiming that God is ignorant of its existence. If God were all-powerful and all-knowing but not all-good, we could account for the existence of evil by claiming that God isn't opposed to it. To many, however, a being that is limited in any of these ways would not be God. So unless a solution to this problem can be found, it looks like the traditional conception of God must be revised.

### *The Problem of Skepticism*

We claim to know many things about the world around us. We claim to know, for example, that snow is white, that the earth orbits the sun, and that  $E = mc^2$ . If we really know something, however, it seems that we must be certain of it, for any possibility of error appears to undercut our claim to know. The problem is that most of our information about the external world comes to us through our senses, and we can't be certain of anything we've learned through our senses. There is always the possibility that we've misidentified or misinterpreted our sense experience. Because we can't rule out these possibilities, some claim that we can't have knowledge of the external world.

Skeptics in the Western intellectual tradition usually don't claim that our sense experience is illusory, only that it could be. As long as knowledge requires certainty, all the skeptics need to make their claim is the possibility that our sense experience misleads us. Many Eastern thinkers, however, go further than the Western skeptics and claim that our sense experience is illusory. This doesn't mean that we cannot have knowledge of reality, however, because, for them, knowledge can be acquired through mystical experience. Mystical experience, they claim, puts us in direct contact with reality and reveals that our ordinary waking consciousness is just a dream. Because what the mystics tell us about reality seems similar to the claims of some modern physicists, some Western thinkers have endorsed the claim that mystical experience is a source of knowledge. If knowledge of the external world is impossible or if there are other sources of knowledge than those traditionally recognized in the West, our conception of education and intellectual inquiry would have to be radically altered.

It should now be clear that a lot hangs on our philosophy. The structure of our belief system can be compared to that of a tree. Just as certain branches support other branches, so certain beliefs support other beliefs. And just as bigger branches support more branches than little ones, so fundamental beliefs support more beliefs than secondary ones. Our philosophical beliefs are among our most fundamental because their truth is assumed by so many of

*If it turns out that there is a God, I don't think that he's evil. But the worst that you can say about him is that basically he's an underachiever.*

—WOODY ALLEN

*What we know here is very little, but what we are ignorant of is immense.*

—PIERRE-SIMON LAPLACE

### What Is Your Philosophy?

Where do you stand on these issues? What are your philosophical beliefs? You can indicate your views by writing the appropriate number in the space provided at the end of each question. Use the following scale: 5 = true; 4 = probably true; 3 = neither probable nor improbable; 2 = probably false; and 1 = false.

1. The mind (soul) can exist independently of the body. \_\_\_\_\_
2. The mind is the brain or a by-product of the brain. \_\_\_\_\_
3. Humans have free will. \_\_\_\_\_
4. All of our actions are determined by forces beyond our control. \_\_\_\_\_
5. Persons retain their identity over time, so a seventy-year-old and a five-year-old can be one and the same person. \_\_\_\_\_

6. Persons do not retain their identity over time because they are constantly changing. \_\_\_\_
7. There are universal moral principles that apply to everyone everywhere. \_\_\_\_
8. Morality is relative to the individual or to society. \_\_\_\_
9. An all-powerful, all-knowing, all-good God exists. \_\_\_\_
10. There is no God. \_\_\_\_
11. We can have definite knowledge about the external world. \_\_\_\_
12. Real knowledge is impossible; all we can have are opinions. \_\_\_\_

Are your views consistent? After you've finished the book, you might want to take the survey again to see whether your views have changed.

our other beliefs. Consequently, rejecting a philosophical belief is like cutting off a large branch or even part of the tree's trunk: all the beliefs that depend on that fundamental belief must be rejected as well.

Philosophical inquiry attempts to arrive at a belief system or worldview that is both comprehensive and coherent: comprehensive in the sense that it can account for every aspect of our experience, coherent in the sense that none of the beliefs contradict one another. Such a worldview would not only give us a better understanding of the world but also help us deal more effectively with it.

## Necessary and Sufficient Conditions

As we have seen, philosophical problems arise because some of our most fundamental beliefs seem to conflict with one another. To solve these problems, we have to eliminate the conflict. The first step in this process is arriving at a correct view of the things those beliefs are about.

Many philosophical problems have the form: What is the nature of \_\_\_\_? where the blank is filled in with the thing in question. For example: What is the nature of the mind? free will? personal identity? morality? God? knowledge? To inquire into the nature or essence of something is to try to identify the features of it that make it what it is. These features are its distinguishing or defining characteristics because they are had by all and only things of that kind.

*It may well be doubted whether human ingenuity can construct an enigma of the kind which human ingenuity may not, by proper application, resolve.*

—EDGAR ALLAN POE

To solve the mind-body problem, for example, we have to know what it is to have a mind. To know that, we have to know what all and only things with minds have in common in virtue of which they have minds. And to know that is to know the necessary and sufficient conditions for having a mind.

A **necessary condition** is a requirement; it's a condition that must be met in order for something to occur or exist. For example, a necessary condition of your graduating is your taking the required number of courses. It's a necessary condition because you will graduate *only if* you fulfill that requirement. Similarly, a necessary condition for being a bachelor is being unmarried because someone is a bachelor *only if* he's unmarried; a necessary condition for being a cow is being an animal because something is a cow *only if* it is an animal; and a necessary condition for being a triangle is to have three sides because something is a triangle *only if* it has three sides. In general, then, if something X is a necessary condition for something Y, then the presence of Y implies the presence of X because Y can't occur or exist without X.

If something X is a necessary condition for something Y, then it's impossible to have Y without X. For example, being a citizen of the United States is a necessary condition for being the president of the United States because it's impossible to be the president without being a citizen. To show that something X is not necessary for something Y, then, all you have to show is that it's possible to have Y without X. For example, if someone claimed that being a male is a necessary condition for being the president of the United States, all you would have to do to refute that claim is show that it's possible for a woman to be president. Even if no woman ever holds that office, it is still false that being a male is a necessary condition for being the president because a woman could be president.

While a necessary condition is a requirement, a **sufficient condition** meets all the requirements. In other words, it suffices, it gives you everything you need. For example, graduating from college is a sufficient condition for meeting all your course requirements. It's sufficient because *if* you've graduated, then you've met your course requirements. Similarly, being a bachelor is a sufficient condition for being a male because *if* someone is a bachelor, then he's a male; being a cow is a sufficient condition for being an animal because *if* something is a cow, then it's an animal; and being a three-sided plane figure is a sufficient condition for being a triangle because *if* something is a three-sided plane figure, then it is a triangle. In general, If something X is a sufficient condition for something Y, the presence of X implies the presence of Y because the presence of X guarantees the presence of Y.

If X is a sufficient condition for Y, then it's impossible to have X without Y. For example, being a priest is a sufficient condition for being unmarried because it's impossible to be a priest and not be unmarried. To show that something X is not a sufficient condition for something Y, then, all you have to show is that it's possible to have X without Y. For example, if someone claimed that being a four-sided plane figure is a sufficient condition for being a square, all you would have to do to refute that claim is show that it's possible for a four-sided figure not to be a square, perhaps by drawing a rectangle with unequal sides.

**necessary condition**  
Something X is a necessary condition for something Y if and only if it's impossible for Y to exist without X.

**sufficient condition**  
Something X is a sufficient condition for something Y if and only if it's impossible for X to exist without Y.

Logicians use the phrase “if and only if” to indicate that a condition or set of conditions is both necessary and sufficient. For example, something is a noun *if and only if* it is a word used as a name or designation. It’s important to realize that a condition can be necessary without being sufficient. Oxygen is a necessary condition for fire but it’s not sufficient because you can have oxygen without having a fire. Similarly, a condition can be sufficient without being necessary. Getting your head cut off is a sufficient condition for dying but it’s not necessary because you can die in many other ways.

Philosophers are not the only ones who search for necessary and sufficient conditions. Scientists, too, often want to know what makes something what it is. For example, in constructing the periodic table of the elements, chemists were trying to discover the nature or essence of each element. What they found was that the necessary and sufficient condition for being a particular element is having a certain atomic number. (The atomic number of an element is the number of protons in the nuclei of its atoms.) The necessary and sufficient condition for being gold, for example, is having the atomic number 79.

Determining whether a condition is necessary or sufficient for something involves deciding whether it’s possible for the thing to exist without the condition being met, or vice versa. If something can exist in the absence of the condition, then the condition is not necessary for that thing. For example, being less than ten feet tall is not a necessary condition for being a bachelor because it’s possible for someone to be a bachelor and be over ten feet tall. It may well be that all bachelors who have ever lived—and all bachelors who ever will live—are less than ten feet tall. Nevertheless, being less than ten feet tall is not a necessary condition for being a bachelor because height is not a requirement for bachelorhood. Conversely, if it’s possible for a condition to be met without the thing existing, then the condition is not sufficient for that thing. For example, loving someone is not a sufficient condition for being loved by that person because the feeling might not be mutual.

To fully understand the nature or essence of a thing—to know what makes a thing what it is—is to know both its necessary and its sufficient conditions. If we knew only one or the other, we wouldn’t always be able to tell whether the thing in question was present. For example, if all we knew about being a bachelor was that being unmarried was a necessary condition, we wouldn’t be able to tell whether an unmarried woman was a bachelor. Similarly, if all we knew about being a bachelor was that being a priest was a sufficient condition, we wouldn’t be able to tell whether someone who wasn’t a priest was a bachelor. Ideally, then, our search for understanding should result in both necessary and sufficient conditions.

The ideal may not be realizable in practice, however, because the concepts we’re interested in may not have precise boundaries. Consider, for example, the concept of a game. The British philosopher Ludwig Wittgenstein famously claimed that there is no set of necessary and sufficient conditions that all games have in common in virtue of which they are games. He asks us to think of all the different types of activities we call games: board games, card games, ball games, Olympic games, and so on. He asserts that there is no feature or set of features that is shared by all of them. Rather, there is a network of overlapping

similarities that criss-cross one another, like those that exist among members of a family. So he prefers to say that games share a "family resemblance" with one another instead of a common nature or essence.<sup>6</sup>

Some think that Wittgenstein is wrong about the concept of a game and claim that necessary and sufficient conditions can be given for being a game. For example, Bernard Suits in his book *The Grasshopper: Games, Life and Utopia*, provides an in-depth analysis of games, which he summarizes this way: "the voluntary attempt to overcome unnecessary obstacles."<sup>7</sup> Others have offered similar analyses.<sup>8</sup> Even if our concept of a game is vague, however, we may still search for a more precise characterization of it. As we have seen, our conceptual scheme is shot through with inconsistencies, and if we can eliminate some of those inconsistencies by taking a vague concept and making it more precise, that's all to the good. The German philosopher Rudolf Carnap called this process "explication" and defined it this way: "the transformation of an inexact, prescientific concept into a new exact concept."<sup>9</sup> By making our conceptual scheme more coherent, conceptual explication can both deepen and broaden our understanding of the world.

What's more, in many cases, solving a philosophical problem doesn't require coming up with both necessary and sufficient conditions. Identifying one or the other or showing that a condition is *not* necessary or sufficient may be all that is needed. For example, the problem of free will arises because it seems that we can't act freely if all of our actions are determined by forces beyond our control. If only one course of action is open to us—if we can't do otherwise—we have no free will. Some, however, have argued that this condition is not necessary for free will—that we can act freely even if we couldn't do otherwise. If they are correct, then they may have solved (or dissolved) the problem of free will.

Identifying necessary and sufficient conditions is difficult because we can have a concept without being able to state the conditions for applying it. For example, we can have the concept of a joke without being able to say what it is that makes something a joke. When the conditions for applying concepts are unclear, clarifying them usually requires taking a hypothetical approach. This involves formulating a hypothesis about the conditions for applying a concept and testing that hypothesis to determine whether the conditions specified are necessary or sufficient. This method of conceptual inquiry was pioneered by the celebrated Greek philosopher Socrates (469–399 BCE.).

## Socrates and the Socratic Method

Socrates is the pivotal figure in the history of Western philosophy. Not only was he the first to ask many of the questions that are central to the discipline, but he also pioneered a method of answering them that is still in use today. There were philosophers before Socrates, but they are known collectively as "pre-Socratics," again indicating his importance to the discipline. The pre-Socratics were concerned primarily with questions about the nature of reality. Socrates, too, was originally interested in such questions. He studied under Anaxagoras, who was charged with the crime of impiety for teaching that the sun was a molten mass of rock. Socrates eventually gave up the study of nature,

*The philosophy of one century is the common sense of the next.*

—HENRY WARD  
BEECHER

*The men of action are, after all, only the unconscious instruments of the men of thought.*

—HEINRICH HEINE

perhaps because there seemed to be no way to decide among competing theories. (The experimental method that we associate with scientific investigation had not yet been devised.) Instead, he focused his considerable intellectual talents on the study of problems more directly relevant to human life. He sought answers to such questions as "What is justice?" "What is virtue?" "What is knowledge?" Because our lives are guided by what we take to be the correct answers to such questions, Socrates claimed that only those who had considered such questions could lead a good life.

Socrates was a native of Athens, Greece, and a stonecutter by trade. Like most able-bodied Athenian men at that time, he served in the army. But unlike most of them, he distinguished himself on the battlefield. In the battle of Delium, he reportedly saved the life of Xenophon and retreated with dignity when the other Athenians were running for their lives. In the battle of Potideaea, he won a citation for valor for holding his ground throughout the night. He is most famous, however, for the public conversations he had with the leading figures of Athens.

Socrates' strength of character and force of mind were widely known. So much so, that when his friend Chaerophon asked the Oracle at Delphi whether anyone was wiser than Socrates, the priestess replied, "Of all men living, Socrates is the wisest." When word of this got back to Socrates, he thought the Oracle must have made a mistake. So he set out to prove the Oracle wrong. He reasoned that if he could find at least one person who was wiser than himself, he would have shown the Oracle to be in error. He sought out the greatest politicians, poets, and craftsmen of his day in an attempt to determine whether any of them possessed true wisdom. Socrates describes his search this way:

I went to one who had the reputation of wisdom, and observed him. When I began to talk with him, I could not help thinking that he was not really wise, although he was thought wise by many, and wiser still by himself; and I went and tried to explain to him that he thought himself wise, but was not really wise; and the consequence was that he hated me, and his enmity was shared by several who were present and heard me. So I left him, saying to myself, as I went away: Well, although I do not suppose that either of us knows anything really beautiful and good, I am better off than he is—for he knows nothing, and thinks that he knows. I neither know nor think that I know. In this latter particular, then, I seem to have slightly the advantage of him.<sup>10</sup>

Although Socrates was unable to find anyone wiser than himself, he did not conclude that he had any substantive knowledge that they lacked. What made him wiser than they, he claimed, was that, unlike them, he knew that he didn't have any wisdom.

Socrates liked to conduct his inquiries in the marketplace, and he often drew a large crowd. No one likes to be made a fool of in public, however, and eventually some of those who felt the sting of his sharp tongue brought charges against him. His accusers were Miletus the poet, Anytus the tanner, and Lycon the orator. They claimed that he was guilty of worshipping false gods and corrupting the youth. The penalty they sought was death. Socrates was tried before the Athenian Council of 500, and the proceedings were recorded by his pupil Plato. (Socrates never committed his thoughts to paper,

### *In the News: The Oracle at Delphi*

The Oracle at Delphi was one of the most revered and powerful people in ancient Greece. She advised farmers when to plant their crops and generals when to wage war. No great project was undertaken without the blessings of the Oracle. The oracle in the movie *The Matrix* was modeled after the Oracle at Delphi. Both foretold the future, and both had the saying "Know Thyself" hanging over the entrance to their chambers (although one was in Greek and the other in Latin). Who was this enigmatic figure? It turns out that the Oracle at Delphi was not any one person, but a succession of older women of impeccable virtue who served as the mouthpiece of the god Apollo.

Delphi, which is situated at the foot of Mt. Parnassus, was considered sacred to Apollo because it was there, according to Homer, that he slew the dragon Python. The dragon's body allegedly fell into a fissure in the floor of a cave on the side of Mt. Parnassus. As it decomposed, it gave off fumes. The Oracle, also known as the Pythia, would sit on a tripod over the fissure in the cave, breathe in the fumes, and become possessed by the spirit of Apollo. In this intoxicated state, she gave her prophecies. They were often incoherent, but the Greek priests would make them more intelligible by translating them into hexameter verse.

Before Alexander the Great set out on his first military campaign, he traveled to Delphi to seek the Oracle's counsel. When he arrived, legend has it that the Oracle was unavailable. Anxious to know his prospects for success, he tracked down the Oracle and forced her to make a prediction. She is reported to have cried out in exasperation, "Oh, child, you are invincible." Alexander took this as a favorable omen and went on to conquer the world.

Recent geological research has identified a possible source of the fumes.

Several years ago, Greek researchers found a fault running east to west beneath the oracle's temple. De Boer [a geologist at Wesleyan University] and his colleagues discovered a second fault, which runs north to south. "Those two faults do cross each other, and therefore interact with each other, below the site," said De Boer. . . .

About every 100 years a major earthquake rattles the faults, the faults are heated by adjacent rocks and the hydrocarbon deposits stored in them are vaporized. These gases mix with ground water and emerge around springs.

De Boer conducted an analysis of these hydrocarbon gases in spring water near the site of the Delphi temple. He found that one is ethylene, which has a sweet smell and produces a narcotic effect described as a floating or disembodied euphoria.

"Ethylene inhalation is a serious contender for explaining the trance and behavior of the Pythia," said Diane Harris-Cline, a classics professor at The George Washington University in Washington, D.C.

"Combined with social expectations, a woman in a confined space could be induced to spout off oracles," she said.<sup>11</sup>

When the fissure at Delphi stopped producing gas, the Greek priests purportedly started burning belladonna and jimson weed in the cave and found that they could get some pretty good oracular declamations from the smoke that produced as well.

so most of what we know about Socrates' philosophy comes from the dialogues of Plato in which Socrates always appears as the main character.) Socrates argued that the charges were false—that he was guilty of nothing more than seeking the truth. The council wasn't convinced, however, and by a vote of 280 to 220 found him guilty as charged. When asked, as was the custom, what an appropriate penalty would be, Socrates defiantly replied that he should be kept in the Pyrtaneum (the dining hall of Olympic and military heroes) at the public expense in recognition of the service he had performed for the people of Athens. Outraged by his impudence, the council took another vote and by a vote of 360 to 140 sentenced him to death.

## Pre-Socratic Philosophers

Philosophy and science have a common origin in ancient Greece. There, on the banks of the Aegean Sea around 600 B.C., Thales (ca. 624–547 B.C.) asked—and answered—a question that philosophers and scientists are struggling with to this day: “What is the world made of?” Two important assumptions underlie Thales’ question: (1) that the nature of a thing is determined by the stuff out of which it is made, and (2) that everything is made out of the same kind of stuff. These assumptions lie behind our most advanced physical theory: string theory. According to that theory, everything in the world is made out of infinitesimally small, multidimensional strings that vibrate at different frequencies. Thales’ basic stuff is not so arcane. According to him, the world is made of water. Although that theory may not seem very plausible, it should be noted that water can exist in a number of different states: solid, liquid, and gas. Thales apparently believed that everything in the world was a different state of water.

The Greeks traditionally recognized four different substances: earth, air, fire, and water. Thales claimed that there was only one—water—and that everything else was a modification of it. Thales’ pupil Anaximander (ca. 610–546 B.C.) didn’t find Thales’ explanation convincing, however, because it couldn’t account for fire. Earth and air may be types of water, but fire cannot be made out of water because water puts out fire. Furthermore, he argued that Thales’ theory couldn’t account for change. Water may exist in many different forms, but Thales doesn’t explain what causes it to assume all those forms.

Anaximander sought to improve on Thales’ theory by postulating a mechanism for change. He argued that change was the result of a war between opposites that he called “the hot,” “the cold,” “the wet,” and “the dry.” Because each of these forces is struggling for dominance, none of them can be basic. So the original stuff, Anaximander reasoned, must be utterly different from anything that currently exists. He referred to this stuff as the *Apeiron*, meaning “the indefinite” or “the unbounded.” The four forces precipitated out of this basic stuff and gave rise to the world as we know it.

Echoes of Anaximander can also be found in current scientific theories. Modern physics recognizes four basic forces—electromagnetism, gravity, the strong nuclear force, and the weak nuclear force—as the causes of change. It also teaches that the original stuff out of which everything came is no longer present. That stuff existed at the moment of the big bang (the explosion that brought our universe into existence), but as it cooled, it turned into the particles we are familiar with.

Anaximines (d. 528 B.C.), another student of Thales, thought that Anaximander’s theory was no better than Thales’ because it couldn’t explain how the four forces emerged out of the *Apeiron*. He thought that Thales had the right idea but the wrong substance. According to Anaximines, the basic stuff is air. Unlike Thales, however, he was able to explain how air could take on so many different forms: through the processes of condensation and rarefaction. Condense air, he claimed, and you get water. Condense water, and you get earth.

Normally, convicted criminals were executed the day after the trial. Socrates’ execution was delayed for thirty days, however, because the sacred ship sent to Delos every year to celebrate Theseus’s victory over the minotaur had just set sail. In honor of the god Apollo, no one could be executed while the ship was at sea. During that time, Socrates had a number of remarkable philosophical discussions with his disciples.

Socrates’ friends knew that the charges brought against him were false and the conviction unjust, so they tried to help him escape. They prepared a ship for him and convinced the guard to unlock the door to his cell. Socrates refused to leave, however, arguing that because he had enjoyed the benefits of Athenian citizenship throughout his life, he owed it to the people of Athens

Rarefy air, and you get fire. Thus, Anaximenes could account for all four elements in terms of one basic substance.

Pythagoras (fl. 530 B.C.) is the only pre-Socratic philosopher whose name is still widely known. We recognize him as the discoverer of the Pythagorean theorem. But he also pioneered a novel approach to understanding the world. According to Pythagoras, what makes something what it is, is not the stuff out of which it is made but the form that it possesses. What's more, Pythagoras claimed, that form can be represented mathematically. Pythagoras made a number of important mathematical discoveries, including square numbers, cube numbers, and irrational numbers. Modern science shares Pythagoras's insight that the underlying form of nature can be represented mathematically. (That's why all science students have to take math courses.)

Other pre-Socratics focused on the problem of change and developed radically different theories to deal with it. The problem is, How can something change and yet remain the same thing? If it has changed, it's different, and if it's different, it's no longer the same. Heraclitus (ca. 540–480 B.C.) took change to be an undeniable fact and concluded that we must give up the notion that things remain the same through change. "The only constant is change," he paradoxically proclaimed. "You can never step into the same river twice." Parmenides (b. 515 B.C.), on the other hand, believed that only that which is unchanging is real, so he denied that change occurred. For him, change was an illusion.

Parmenides' view is important because it was backed by a logical argument. He recognized that anything that involves a logical contradiction cannot exist. So he concluded that nonexistence cannot exist. What's more, he reasoned that if there is no place where there is nothing—if every place is occupied—there is no place to move to. So motion, and thus change, is impossible. It may seem that we can move from one place to another, but that is just an illusion. For Parmenides, the world is a solid ball of matter that never changes.

This view did not sit well with most Greek thinkers, although Parmenides' pupil Zeno of Elea (ca. 490–435 B.C.) provided a number of additional arguments to support his claim. To resolve the impasse, Democritus (ca. 460–370 B.C.) combined the insights of both Heraclitus and Parmenides. He affirmed the existence of empty space and claimed that the world is made of particles that are constantly moving through space. These particles are like Parmenidean worlds: they have no internal structure and cannot be broken down into any smaller constituents. Democritus called them "atoms," which comes from the Greek *atomon*, meaning "uncuttable." What we call atoms are not indivisible, but we do recognize the existence of indivisible particles, such as electrons and quarks, out of which everything is made. What's important about the pre-Socratics is not the details of their theories but the types of questions they asked and the types of answers they gave to them, for they have shaped Western intellectual history for more than two thousand years.

to abide by their decision. When the sacred ship returned from Delos, Socrates drank a cup of hemlock and died.

According to the biographer Diogenes Laertius, the citizens of Athens soon recognized the error of their judgment. He writes,

Not long afterward, the Athenians felt such remorse that they closed the training grounds and gymnasiums. They put Meletus to death and banished his other accusers. They erected a bronze statue of Socrates to honor him; it was the work of Lysippus and was placed in the hall of processions.<sup>12</sup>

Apparently the Athenians came to agree with Socrates that he had indeed performed a valuable public service in teaching them to seek virtue and wisdom.



SOCRATES  
469–399 BCE.

When Socrates asked questions like “What is justice?” “What is virtue?” “What is knowledge?” those he interrogated often responded by citing instances of the concept in question. Socrates wouldn’t accept such responses, however, for they didn’t answer his question. He wanted to know what made the thing in question what it is, and listing examples didn’t give him that knowledge. Once he got his interlocutors to specify necessary and sufficient conditions for applying the concept, he would examine those conditions to determine whether they were indeed necessary or sufficient.

For example, in Plato’s dialogue *Euthyphro*, Socrates tries to determine what makes something holy. Believing that a theologian should know something about this, he questions the young theologian Euthyphro, who at the time was prosecuting his own father on a charge of murder. It seems that one of the father’s hired laborers had killed one of his house slaves in a fit of drunken rage. Euthyphro’s father captured the laborer, tied his hands and feet, and threw him into a ditch. He then sent a messenger to Athens to consult a religious authority to determine what should be done with the culprit. In the meantime, he neglected the laborer, figuring that it would not matter if he died, because he was a murderer. The laborer did die before the messenger returned, and Euthyphro alleged that his father was guilty of murdering the laborer. Socrates meets Euthyphro on the steps of the courthouse:

SOCRATES: Then tell me. How do you define the holy and the unholy?

EUTHYPHRO: Well then, I say that the holy is what I am now doing, prosecuting the wrongdoer who commits a murder or a sacrilegious robbery, or sins in any point like that, whether it be your father, or your mother, or whoever it may be. And not to prosecute would be unholy. . . .

SOCRATES: . . . my friend, you were not explicit enough before when I put the question. What is holiness? You merely said that what you are now doing is a holy deed—namely, prosecuting your father on a charge of murder.

EUTHYPHRO: And, Socrates, I told the truth.

SOCRATES: Possibly. But, Euthyphro, there are many other things that you will say are holy.

EUTHYPHRO: Because they are.

SOCRATES: Well, bear in mind that what I asked of you was not to tell me one or two out of all the numerous actions that are holy; I wanted you to tell me what is the essential form of holiness which makes all holy actions holy. I believe you held that there is one ideal form by which unholy things are all unholy, and by which all holy things are holy. Do you remember that?

EUTHYPHRO: I do.

SOCRATES: Well then, tell me what, precisely, this ideal is, so that, with my eye on it, and using it as a standard, I can say that any action done by you or anybody else is holy if it resembles this ideal, or, if it does not, can deny that it is holy.

EUTHYPHRO: Well, Socrates, if that is what you want, I certainly can tell you.

SOCRATES: It is precisely what I want.

EUTHYPHRO: Well then, what is pleasing to the gods is holy, and what is not pleasing to them is unholy.

SOCRATES: Perfect Euthyphro! Now you give me just the answer that I asked for. Meanwhile, whether it is right I do not know, but obviously you will go on to prove your statement true.

EUTHYPHRO: Indeed I will.<sup>13</sup>

Socrates has now received an answer to his question. Euthyphro has finally proposed necessary and sufficient conditions for something's being holy. Socrates proceeds to test this proposal by trying to determine whether the conditions identified really are necessary and sufficient.

SOCRATES: Come now, let us scrutinize what we are saying. What is pleasing to the gods, and the man that pleases them, are holy; what is hateful to the gods, and the man they hate, unholy. But the holy and unholy are not the same; the holy is directly opposite to the unholy. Isn't it so?

EUTHYPHRO: It is. . . .

SOCRATES: Accordingly, my noble Euthyphro, by your account some gods take one thing to be right, and others take another and similarly with the honorable and the base, and good and bad. They would hardly be at variance with each other, if they did not differ on these questions. Would they?

EUTHYPHRO: You are right.

SOCRATES: And what each one of them thinks noble, good and just, is what he loves and the opposite is what he hates?

EUTHYPHRO: Yes, certainly.

SOCRATES: But it is the same things, so you say, that some of them think right, and others wrong, and through disputing about these they are at variance, and make war on one another. Isn't it so?

EUTHYPHRO: Yes it is.

SOCRATES: Accordingly, so it would seem the same things will be hated by the gods and loved by them; the same things would alike displease and please them.

EUTHYPHRO: It would seem so.

SOCRATES: And so, according to this argument, the same things, Euthyphro, will be holy and unholy.

EUTHYPHRO: That may be.

SOCRATES: In that case, admirable friend, you have not answered what I asked you. I did not ask you to tell me what at once is holy and unholy, but it seems that what is pleasing to the gods is also hateful to them. Thus, Euthyphro, it would not be strange at all if what you now are doing

in punishing your father were pleasing to Zeus, but hateful to Cronus and Uranus, and welcome to Hephaestus, but odious to Hera, and if any other of the gods disagree about the matter, satisfactory to some of them and odious to others.<sup>14</sup>

Euthyphro suggests that holiness is what is pleasing to the gods. Socrates puts this suggestion to the test by exploring its implications. He points out that what is pleasing to one of the gods may not be pleasing to the others—for example, what is pleasing to Zeus may not be pleasing to Hera. So if being pleasing to the gods is what makes something holy, something could be holy and unholy at the same time. But that's impossible. Nothing can have a property and lack it at the same time. Consequently, the conditions proposed can't be correct. Being pleasing to the gods can be neither a necessary nor a sufficient condition for being holy.

The Socratic Method for analyzing a concept, then, involves the following steps:

1. *Identify a problem or pose a question.* Ask, "What makes something an X?" "In virtue of what is something an X?" "How is it logically possible for something to be an X?" "What is the logical relationship between X and Y?"
2. *Propose a hypothesis.* Specify the necessary or sufficient conditions for applying the concept in question. Try to identify the features shared by all and only those things to which the concept applies.
3. *Derive a test implication.* Ask, "What if the hypothesis were true?" "What does it imply?" "What does it commit us to?" Test implications have the following form: If hypothesis H is true, then concept X should apply in this situation.
4. *Perform the test.* Determine whether the concept applies in the situation envisioned.
5. *Accept or reject the hypothesis.* If the concept applies in the situation envisioned, there is reason to believe that it's true. If it doesn't apply, there is reason to believe that it's false. In that case, you should either reject the hypothesis or go back to step 2 and revise it.

## Science and the Scientific Method

*The ground aim of all science is to cover the greatest number of empirical facts by logical deductions from the smallest possible number of hypotheses.*

—ALBERT EINSTEIN

While philosophers are in the business of trying to identify the necessary or sufficient conditions for the application of concepts, scientists are in the business of trying to identify the necessary or sufficient conditions for the occurrence of events. Consider, for example, the problem of Uranus's orbit. By 1844, it was known that there was a wobble in Uranus's orbit that couldn't be explained by Newton's theories of gravity and motion. The observed orbit differed from the predicted orbit by two minutes of arc, a discrepancy much greater than that of any other known planet. If astronomers couldn't explain how this was possible, Newton's theory would be in trouble because it would be inconsistent with the data. In 1845, astronomer Urbain Leverrier explained how the wobble was

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possible by postulating the existence of an unknown planet. Using Newton's theories of gravity and motion, he calculated the mass and trajectory a planet would need to have in order to affect Uranus's orbit in the way observed. On the basis of those calculations, he requested astronomer Johann Galle to search a particular region of the sky for such a planet. Less than an hour after Galle began his search, he noticed something that was not on his charts. When he checked again the next night, the object had moved a considerable distance. Galle had discovered Neptune.

Uranus's orbit seemed impossible because it conflicted with Newton's laws of gravity and motion. Leverrier explained how it was possible by identifying sufficient conditions for Uranus having the orbit it did that were consistent with Newton's laws of gravity and motion. Because Leverrier's claim turned out to be true, Newton's laws did not have to be revised or abandoned.

The scientific method, then, involves the following steps:

1. *Identify a problem or pose a question.* Ask, "What causes something to be X?" "In virtue of what does X occur?" "How is it causally possible for X to occur?" "What is the causal relationship between X and Y?"
2. *Propose a hypothesis.* Specify the necessary or sufficient conditions for the event's occurring. Try to identify the features shared by all and only those things that cause X.
3. *Derive a test implication.* Ask, "What if the hypothesis were true?" "What does it imply?" "To what does it commit us?" Test implications have the following form: If hypothesis H is true, then event X should occur in this situation.
4. *Perform the test.* Produce the situation in the laboratory or look for it in the field.
5. *Accept or reject the hypothesis.* If the event occurs in the situation specified, there is reason to believe that the hypothesis is true. If it doesn't apply, there is reason to believe that it is false. In that case, you should either reject the hypothesis or go back to step 2 and revise it.

Philosophy, like science, aims at solving problems and getting at the truth. Unlike science, however, philosophy is more concerned with explaining how it's possible for concepts to apply than how it's possible for events to occur. Jerry Fodor illuminates the difference between these two types of inquiry with the following example:

Consider the question: "What makes Wheaties the breakfast of champions?" (Wheaties, in case anyone hasn't heard, is, or are, a sort of packaged cereal. The details are very inessential.) There are, it will be noticed, at least two kinds of answers that one might give. A sketch of one answer, which belongs to what I shall call the 'causal story' might be: 'What make Wheaties the breakfast of champions are the health-giving vitamins and minerals that it contains'; or 'It's the carbohydrates in Wheaties, which give the energy one needs for hard days on the high hurdle'; or 'It's the special springiness of all the molecules in Wheaties, which gives Wheaties eaters their unusually high coefficient of restitution', etc.

## The Laws of Thought

The laws of logic are often called the laws of thought because, just as social laws make society possible, so logical laws make thought possible. Aristotle (384–322 B.C.) was the first to codify these laws. They include:

*The law of noncontradiction:* Nothing can both have a property and lack it at the same time. (No statement can be both true and false at the same time.)

*The law of identity:* Everything is identical to itself. (Everything is what it is and not another thing.)

*The law of excluded middle:* For any property, everything either has it or lacks it. (Every statement is either true or false.)

In order to think about the world, your thoughts must have a specific content; they must represent the world as being one way rather than another. If the law of noncontradiction didn't hold, however, that wouldn't be possible because every one of your thoughts would be both true and false. In such a situation, thinking would be impossible. Aristotle explains:

... if all are alike both wrong and right, one who is in this condition will not be able either to speak or to say anything intelligible; for he says at the same time both "yes" and "no." And if he makes no judgment but "thinks" and "does not think" indifferently, what difference will there be between him and a vegetable?<sup>15</sup>

What difference, indeed? Without the law of noncontradiction, you couldn't affirm or deny anything

because every affirmation would also be a denial. But if you can't affirm or deny anything, you can't think at all.

Because the laws of thought are the basis for all logical proofs, they can't be directly proven by means of a logical demonstration. But they can be indirectly proven by showing that you cannot deny them without assuming them! Aristotle puts the point this way:

The starting point for all such proofs is that our opponent shall say something which is significant both for himself and for another; for this is necessary if he really is to say anything. For if he means nothing, such a man will not be capable of reasoning, either with himself or with another. But if any one says something that is significant, demonstration will be possible; for we shall already have something definite. The person responsible for the proof, however, is not he who demonstrates but he who listens; for while disowning reason he listens to reason. And again he who admits this has admitted that something is true apart from demonstration.<sup>16</sup>

The law of noncontradiction can't be demonstrated to someone who won't say something definite, for demonstration requires that our words mean one thing rather than another. On the other hand, the law of noncontradiction need not be demonstrated to someone who will say something definite, for in saying something definite, the speaker has already assumed its truth.

... I suggested that there is another kind of answer that 'What makes Wheaties the breakfast of champions?' may appropriately receive. I will say that answers of this second kind belong to the 'conceptual story'. In the present case, we can tell the conceptual story with some precision: What makes Wheaties the breakfast of champions is the fact that it is eaten (for breakfast) by nonnegligible numbers of champions. This is, I take it, a conceptually necessary and sufficient condition for anything to be the breakfast of champions; as such, it pretty much exhausts the conceptual story about Wheaties.

The point to notice is that answers that belong to the conceptual story typically do not belong to the causal story and vice versa.<sup>17</sup>

Questions of the form "What makes something X?" can be answered in one of two ways: (1) by specifying the causally necessary and sufficient conditions for being X or (2) by specifying the logically necessary and sufficient conditions for being X. The first sort of answer—the causal story—is usually provided by science. The second sort of answer—the conceptual story—is usually provided by philosophy. To understand the difference between philosophy and science, then, it's important to understand the difference between logical and causal possibility.

## Logical versus Causal Possibility

Something is **logically impossible** if and only if it violates a law of logic. The fundamental law of logic is the law of **noncontradiction**, which says that nothing can have a property and lack it at the same time. For example, a round square is logically impossible because nothing can be both round and square at the same time. Anything that is logically impossible cannot exist. We know, for example, that there are no round squares, no married bachelors, and no largest number because these notions involve a contradiction. The laws of logic, then, not only determine the bounds of the rational, they also determine the bounds of the real. That is why the great German logician Gottlob Frege called logic "the study of the laws of the laws of science."

The laws of science must obey the laws of logic. But the laws of logic need not obey the laws of science. In other words, something can be logically possible even though it's causally impossible. Something is **causally impossible** if and only if it violates a law of nature. A cow's jumping over the moon, for example, is causally impossible because it violates natural laws concerning mass, force, acceleration, and gravity, among others. But such a feat isn't logically impossible, for the notion of a moon-jumping cow doesn't involve a logical contradiction. The notion of logical possibility, then, is more inclusive than that of causal possibility. Many more things are logically possible than are causally possible.

Because scientific theories try to explain how it's causally possible for an event to occur, they can often be tested by means of physical experiments in the laboratory. If a scientific theory is true, then certain events should occur under certain conditions. Scientists test their theories by constructing artificial situations in which those conditions are met. If the events occur as predicted, the test is successful. If not, it's unsuccessful. Suppose, for example, that you wanted to test the effectiveness of a new antibacterial drug. You could grow some bacteria in a culture and then apply the drug to them. If most of the bacteria died, you would have reason to believe that the drug was effective.

Because philosophical theories explain how it's logically possible for a concept to apply, they cannot be tested by physical experiments in a scientist's laboratory. But they can be tested by thought experiments in the laboratory of the mind. If a philosophical theory is true, then certain concepts should apply under certain conditions. Philosophers test their theories by constructing

*The only way to discover the limits of the possible is to go beyond them into the impossible.*

—ARTHUR C. CLARKE

**logical impossibility**  
Something is logically impossible if and only if it violates a law of logic.

**law of noncontradiction**  
The principle that nothing can both have and lack a property at the same time and in the same respect.

**causal impossibility**  
Something is causally impossible if and only if it violates a law of nature.

imaginary situations in which those conditions are met. If the concepts apply as predicted, the test is successful. If not, it's unsuccessful. So even though philosophy deals with abstract concepts rather than concrete events, its theories can be tested, and the results of these tests can be used to judge the plausibility of these theories.

### *Thought Probe*

#### Possibilities

- Are the following situations causally possible? Are they logically possible? A human with feathers. Traveling faster than the speed of light. A cat speaking English. A bowling ball speaking English. A rabbit laying multicolored eggs. A soft-shelled prime number. A thinking machine. A computer with a soul.

### Summary

We all have a philosophy, for we all have beliefs about what is real, what is valuable, and how we come to know what is real and valuable. The quality of our lives is determined by the nature of our philosophy, for every decision we make is influenced by our views of reality, value, and knowledge. The goal of philosophical inquiry is to determine whether these views are viable.

Philosophical problems arise from the realization that some of our most fundamental beliefs seem to be inconsistent with one another. Apparent inconsistencies among some of our central beliefs give rise to the mind-body problem, the problem of personal identity, the problem of free will, the problem of evil, the problem of moral relativism, and the problem of skepticism. Philosophical theories try to resolve such conflicts by explaining how it is possible (or why it is impossible) for a concept to apply to something.

Philosophy differs from science in that it tries to explain how it's possible for a concept to apply rather than how it's possible for an event to occur. Philosophical theories provide the logically necessary and sufficient conditions for a concept's applying, whereas scientific theories provide the physically necessary and sufficient conditions for an event's occurring. Because scientific theories explain the causal relations between events, they can be tested by means of physical experiments in the laboratory. Because philosophical theories explain the logical relations between concepts, they can be tested by means of thought experiments in the laboratory of the mind.

### Study Questions

1. What are the four main branches of philosophy?
2. How do philosophical problems arise?
3. How can philosophical problems be solved?

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4. What is a necessary condition?
5. What is a sufficient condition?
6. What do philosophical theories try to explain?
7. What do scientific theories try to explain?
8. What makes something logically impossible?
9. What makes something causally impossible?
10. How can scientific theories be tested?
11. How can philosophical theories be tested?

### Discussion Questions

1. How has your philosophy affected your decisions? Give specific examples.
2. Are philosophical beliefs the only beliefs worth dying for? Illustrate your answer by means of examples.
3. What if Crick were able to demonstrate convincingly that we are "nothing but a pack of neurons"? What effect, if any, should this have on our legal system? On our religious beliefs?
4. What if it were convincingly demonstrated that we do not have free will? What effect, if any, should this have on our legal system? On our religious beliefs?
5. What if it were convincingly demonstrated that knowledge is impossible? What effect, if any, should this have on our educational system? On government support for research?
6. Is being a resident of Iowa a necessary or a sufficient condition for being a resident of the United States?
7. Is being a citizen of the United States a necessary or a sufficient condition for being president of the United States?

### Internet Inquiries

1. How consistent is your belief system? To find out, take the "Philosophical Health Check" at *The Philosophers' Magazine* Web site:  
<http://www.philosophersnet.com/games/check.htm>
2. In 2006, the Edge "World Question Center" asked a number of leading thinkers: "What Is Your Dangerous Idea?" Their answers can be found at: [http://www.edge.org/q2006/q06\\_index.html](http://www.edge.org/q2006/q06_index.html). Which of these ideas are dangerous because they call into question philosophical beliefs? Which idea do you think is the most dangerous? Why?
3. Diogenes Laertius's biography of Socrates (and many other ancient Greek philosophers) can be found at:  
<http://classicpersuasion.org/pw/diogenes/>. Read Socrates' biography. Do you agree that he was the wisest of men? Why or why not?