The Metaphysics of Time

A Dialogue

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ROWMAN & LITTLEFIELD PUBLISHERS, INC.
Lanham • Boulder • New York • Toronto • Plymouth, UK

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1

Introduction

SETTING: John and Naomi are riding the city bus home from campus on Thursday afternoon. John has not seen Naomi since last spring semester when she was the teaching assistant for the "Physics for Poets" course he was taking. Naomi is a physics grad student. After their chance meeting on the city bus, their conversation has drifted into swapping their favorite quotations.

Naomi: "Take your stinking paws off me, you damned, dirty ape!"

John: Excuse me?

Naomi: That's the quote.

John: Oh, I thought for a second . . .

Naomi: It's from the film *Planet of the Apes*.

John: Hmm . . . I've been on that planet. It's the one with the fur-lined teacup.

Naomi: Fur-lined teacup?

John: Yeah, you surprised me with that sci-fi quote, so I decided to do the same to you with my comment about surreal art. The fur-lined teacup is famous, like Salvador Dali's floppy clocks.

Naomi: I don't know about your teacup, but I saw a few of his clocks oozing over rocks and tables and looking like they were as soft as blankets. They made me nervous.

John: Because they're so illogical?

Naomi: Yeah. Hey, what were you listening to when I got on the bus?

John: An old song by the Chambers Brothers: "Time Has Come Today." I picked it because today was the first day of my metaphysics of time seminar.

Naomi: I've never heard the song.

John: A classic, and really long. Over ten minutes. When I first heard it I didn't realize it was longer than any other song. It's like time slowed down.

Naomi: A sign of a good song.

John: So, why're you on the bus today? Just out of a class?

Naomi: Yeah, and now I'm on my way home so I can stop drinking coffee. I've had my nose in a physics journal all day working on my research.

John: What's your research about?

Naomi: Star suicides.

John: Suicides?

Naomi: Well, star explosions. Supernovas and hypernovas.

John: So many physicists seem to be interested in things that blow up.

Naomi: Absolutely! Extreme situations tell us about the underlying physics. Explosions can be useful. Maybe a well-placed explosion on Mars could move it into an orbit closer to Earth where it would become habitable for us—not so cold. Imagine being able to choose which planet you want to live on. When this world has you down, try looking at it from another one.

John: How soon will you be seeking seed capital to develop vacation homes there?

Naomi: Ah, a philosopher who thinks like a land developer.

John: Actually it's not the land but the getting there. I'm more interested in how space travel to Mars or somewhere could affect time. The chance to study time travel is a big part of the reason why I signed up for this semester's seminar on the metaphysics of time.

Naomi: Sounds like an interesting course. When I was an undergraduate, I almost minored in philosophy while majoring in physics, but I never took a metaphysics course.

John: We've got some common interests.

Naomi: Yeah, I'm sure we do. So, what happened today in your course?

John: We started with a survey of the field. We meet once a week, and everyone has to do an oral presentation at some class meeting. I signed up to talk about time travel. The professor—his name is Henryk Mehlberg—asked us to introduce ourselves, then he talked about the definition of time. Here, look at the list of topics.

Naomi: You started out with a definition of time?

John: Well, not so much a definition as a discussion of what a definition would be like. How would *you* define time?

Naomi: I'll get back to you later on that.

John: [laughs] Then you'll tell me time is what keeps everything from happening all at once. Seriously.

Naomi: Well, let me think. Time isn't the sort of thing that can cause anything. It doesn't really cause aging, or alarm clocks to ring. OK, time is what the time variable "t" is referring to in the basic laws of physics. Time gets an implicit or indirect definition this way, don't you think?

John: Yes, but there's a problem. Think about the form of the definition. It's in the style of a definition that says time is what people are referring to when they use the word "time." It's not that these remarks are false, but that they're not especially helpful. Having a nice, brief definition of time isn't an important goal though. It's OK to start out with a definition when you're trying to figure out about time, but only as long as you haven't decided in advance to stick with the definition. The important goal is to figure out the important characteristics of time and resolve inconsistencies and controversies. That's where your laws of physics come in, but they play only a part in the grand scheme of understanding time.

Naomi: Are you saying time can't be properly defined?

John: No, but when we define a term we state its meaning. Metaphysicians who study time aren't really interested in stating the meaning of the word, at least initially. They want some deeper insight, like when some chemist had the insight that water is identical to H_2O. This was an insight about what water is, not an insight about what the word "water" means. The identity of water and H_2O successfully related the familiar to the unfamiliar in a deep and helpful way. Only later did this insight lead scientists to change their meaning of the word "water." We need something like this for time. We need a theory that provides insights about how to answer the important questions that metaphysicians want answered, and then later we can use this theory to change the meaning of the word "time" if it needs changing. Besides, even if metaphysicians were to agree

that time had a certain property, they'd be likely to disagree on whether the property was contingent or necessary.

Naomi: OK, I guess holding off on a definition is a good strategy.

John: In the meantime, our class will go on to other topics. Next week is fate and knowing the future. Like, if God knows our future actions, will this deny our free will to affect the future?

Naomi: I'd like to know ahead of time whether I'm going to die on my next airplane flight.

John: Why?

Naomi: So I could cancel my reservation if there's death ahead.

John: You can't do that. If there's death ahead, then when you cancel and prevent your death, you produce a situation where there's death ahead and no death ahead. See?

Naomi: Yes, unfortunately.

John: Mehlberg says when we discuss fate he'll be showing us Aristotle's argument designed to prove we don't have free will to affect tomorrow's sea battle. We're going to have to write a two-page response.

Naomi: I hope you can figure out a way around the argument so you can save free will. There on your list in topic three—what does he mean by "mind and conventionality"? Like whether time is all in the mind?

John: That's part of it. Metaphysicians disagree over the connection between mind and time.

Naomi: I once read an anthropologist's true story about a man who lived in the countryside in Afghanistan fifty years ago. He'd agreed to meet his brother in the capital city of Kabul, but when he got there he couldn't locate him despite some serious searching. Eventually someone helped him figure out the problem. He and his brother hadn't agreed on the year they'd meet.

John: You're kidding!

Naomi: No, I swear. It happened. And what you'd be surprised about is that so many people in other cultures don't get the humor. They sympathize with the man about the miscommunication and can easily imagine it happening. Different tempos for different folks, I guess. So are you studying this sort of tempo thing?

John: Not really. That's more social psychology than philosophy, but it's interesting how different societies approach time differently. Sociology

and psychology study questions such as "What kinds of people are most likely to spend their time with friends made at work rather than friends made elsewhere?" and "What's the accepted range of punctuality for a given social situation?" Like, it's worse to be very late to a dinner party than a regular party.

Naomi: Yeah, you need a better excuse.

John: The city of Cincinnati, Ohio, resisted the pressure of the railroads to have everyone within a time zone synchronize their clocks. For six years in the late nineteenth century, all Cincinnati, Ohio, clocks were synchronized to be twenty-two minutes faster than standard railroad time. Anyway, metaphysicians don't study these questions.

Naomi: I suppose they also don't study whether time exists after our death, right?

John: That's right. Instead we're going to study questions like whether time was invented or discovered. Our civilization invented football; did it also invent time?

Naomi: It's obvious to me we discovered it.

John: I think it was invented. See, there's disagreement right here on the bus, and philosophers are especially interested in areas where experts disagree. Not because disagreement is the goal, but because it shows where we need to think harder. Mehlberg said that we'll also be discussing how we tell whether an event last year lasts exactly as long as another event today. It's like asking whether last year's Christmas tree is as tall as this year's tree.

Naomi: I don't know whether the analogy is so good. It's not like we can pick up this year's event and lay it alongside last year's to see if they have the same duration.

John: Yeah, that's it. There's a big disagreement about how to make the comparison and whether the answer is conventional or instead forced on us by the way nature is. After this comes time travel, my favorite topic, and then we'll talk about whether time has an infinite past.

Naomi: I notice the experts keep changing their minds about what the universe's past is like.

John: Mehlberg says he wants to investigate what happened before the big bang.

Naomi: Good luck on that one.

John: You don't seem very optimistic.

Naomi: There won't be many traces left from before the big bang. Everybody's pre–big bang diaries are going to have burnt edges.

John: We'll be taking on an even more difficult question: Why is there something rather than nothing?

Naomi: Something rather than nothing? Do you mean why anything exists now?

John: No, the answer to that would be because of what existed yesterday. Our issue is about why there hasn't always been a completely empty universe.

Naomi: Oh. Who could know?

John: Some metaphysicians think they know.

Naomi: Hmm. Does your course have a central issue or most important topic?

John: I can't tell yet if there's a central issue. If I had to guess, I'd say it's how to answer the question, "What is time, and why does it have the properties it does?" Mehlberg believes the second half of this question is too difficult to answer, but he thinks we have a better chance with the first half.

Naomi: A physicist would say time is a one-dimensional continuum of instants.

John: I'm not sure what that means exactly, but Mehlberg mentioned this, too, and said it's some kind of smooth string of point instants, and that we'll be learning more about it. The key idea is that between any two points there's another point. His complaint was that a definition like this doesn't tell us enough of what time is, especially for metaphysical purposes. We need to resolve many other issues. One big one is whether time exists when nothing changes. No clocks ticking. No events at all. Everything is still. He says that if we don't have a position on this issue, then we don't know what time is.

Naomi: I think change is crucial to time. I mean, without it, how could there be time? Nothing would happen.

John: I don't agree. Suppose all changes on the bus stopped—no motion, no ticks of clocks, no new thoughts. Time would still go on in Russia, wouldn't it? And if it still exists in Russia, then it exists everywhere, even if we wouldn't know it does.

Naomi: Are you saying change isn't so important? It's not essential to time?

John: Yes. Well, it's important for *detecting* time. There'd be no working clocks, but without change there'd still be time itself. It would exist without our knowing it. What I'm saying is that we need to distinguish what we could know from what is.

Naomi: I'm not convinced, but I generally understand what you'll be talking about.

John: OK. Our next topic is McTaggart's argument about the unreality of time. He believes the standard approach to time, something he calls the B-theory of time, can't adequately explain time's connection with change, and that any approach that does get the connection right—his A-theory—is going to be inconsistent. Mehlberg says this issue is related to the issue of whether tensed or tenseless facts are metaphysically basic.

Naomi: You'd have to say a lot more to explain all this to me.

John: I know. I don't understand much about it either, but I will soon. Then we'll be exploring the debates about whether the past and future are real.

Naomi: Real for everybody?

John: Yes, not like when we say something is real for you and not real for me; that's a misuse of the word "real." So think about the past. It contains Socrates, don't you think?

Naomi: I've never thought about it. He's more real than Santa Claus because he's not imaginary. But he's not real as I am because he's dead. Uh, but I don't want to say he's half real and half unreal.

John: To decide whether Socrates is real, we'll need to decide whether the past is real. There are three metaphysical theories about all this. One camp of metaphysicians, the presentists, say that only the present exists. A second camp says the present and past exist, but the future doesn't. A third says the present, past, and future all exist.

Naomi: Why would anybody be a presentist?

John: Because present events are so vivid compared with past and future events. Presentists aren't merely saying the past isn't part of *present* reality; they're saying the past isn't part of *any* reality. On the other hand, the second theory, the growing-universe theory, says the present and the growing past are both real because they're both determinate, but future events are merely possible. I like this theory. The American philosopher William James said the future is so unreal that even God can't anticipate it, but I don't place that much restriction on what God can know. Anyway, there's a third alternative. The eternalist theory says that even future

events are real. Actual future events, not all the possible ones. After we tackle that dispute, we talk about which objects are ontologically most basic, three-dimensional objects in space or four-dimensional events, where the fourth dimension is considered to be time.

Naomi: I wonder how you'd choose between the two, though I know in physics everybody assumes events are more basic than objects.

John: I know we'll be reading about Heraclitus to help resolve the issue. He argued in the sixth century BCE that you can't step into the same river a second time because the water you stepped into the first time is gone. Mehlberg wants us to think about whether this puzzle is best solved by assuming the basic objects are three-dimensional or four-dimensional. Puzzle solving is supposed to be a sign you're on the right path in metaphysics. The underlying problem here is how to understand change. How can something change from one time to the next? If *it*, the thing before the change, really changes, then it can't exist after the change, can it? Instead, it ceased to exist, and something else exists after the change. On the other hand, if the thing before the change is the same as afterward, then the thing didn't really change, did it? This is the big puzzle we need to solve.

Naomi: An interesting puzzle.

John: Yeah, I think so, too. Then we're going to analyze the metaphor of time's flow. Some philosophers say it's a myth. They mean time doesn't flow; it just exists. If there's any flow to time, the flow is something human consciousness grafts onto time itself. But I'm more inclined to believe the flow is real and objective and has something to do with becoming.

Naomi: Becoming?

John: With becoming real, with becoming determinate or unfuzzy.

Naomi: Is this connected with time's arrow?

John: Maybe the direction of the flow determines the direction of the arrow. Some people don't accept this, though. Anyway, the arrow is a big topic in the course. The arrow shows up when processes go one way and not the other. Like, you can scramble an egg, but you can't unscramble it. The direction that all processes normally go is the arrow of time. This arrow doesn't tell us whether time flows. There's a dispute about whether there is or isn't some physical property that gives time its arrow. And suppose all processes started going backward and the arrow reversed. Mehlberg asked us to decide whether schools would teach students the names of future presidents.

Naomi: That will be fun to think about.

John: Our list ends with Zeno. He created the ancient Greek paradox about Achilles chasing the tortoise that's crawling away from him. Zeno said Achilles' first goal is to run to where he sees the tortoise to be.

Naomi: Wait, can't we say his first goal is to run to where he expects to intercept the tortoise?

John: Yes, but that's not first according to Zeno's analysis, and he's doing the analysis.

Naomi: OK.

John: So by the time Achilles gets to where the tortoise started, he notices the tortoise has crawled to a new place. His second goal is to run to there. Yet by the time he gets there the tortoise has moved on . . . and so on. The gap between Achilles and the tortoise steadily decreases, but there's no end to the number of places he has to reach, so he can't ever catch the tortoise.

Naomi: A runner can always catch a tortoise.

John: Yes, Zeno knew it, too. Zeno's point is that there are good reasons to think that Achilles does and doesn't catch the tortoise, so our whole understanding of motion and change is screwed up.

Naomi: Oh.

John: Here's a related paradox. Switch a lamp on for a half minute, then switch it off for a quarter minute, then on for an eighth minute, off for a sixteenth, and so on. At the end of a minute there won't be any more switching. Will the lamp be on or off at the end of a minute?

Naomi: I guess it'll have to be one or the other, but I see why it can't be either because there's no last flip of the switch. I'll have to think about this.

John: Philosophers love to talk about paradoxes. The word comes from the Greek words *para* and *doxos*, which literally mean *beyond belief*.

Naomi: An apt name.

John: Mehlberg says metaphysicians should think of themselves as cooks who have to fix up a bad recipe that calls for a mix of commonly accepted beliefs, intuitions, scientific results, and metaphysical theory.

Naomi: You go to a very sophisticated culinary school.

John: I guess so. Oh, I get off at the next stop.

Naomi: Do you take this bus every day?

John: It's my first day. I stopped driving my car when I learned the grinding sound was its cry for a $1,300 transmission repair. Eventually I'll save up enough to fix it.

Naomi: Sorry about your car. I'm on this bus on Thursdays because it comes right after my section of the Physics for Poets class.

John: So maybe I'll see you next Thursday. Bye!

Naomi: See ya.

DISCUSSION QUESTIONS

1. What is the difference between what the word "time" means and what it refers to? Which of the two do you know the most about? Why is that?
2. What is the difference between the philosophy of time and the social psychology of time? Give an original example of a time question that concerns social psychology.
3. Are there any conceptual difficulties involved in a time machine's being invented that lets you (a) bring back the future cure for cancer, if there is one, and (b) meet your former self?
4. Does Socrates exist according to presentism, the growing universe theory, and also eternalism? Do all three theories allow change to exist? Why?
5. If the arrow of time reversed, would you know the outcome of a roll of the dice before the roll, and could absolutely every one of the laws of physics be the same as they are now?
6. Does Achilles complete an infinite number of tasks by the time he catches up to the tortoise? What's your definition of "task"?
7. What would our experience be like if the order of all events in time were analogous to the order of points (a) in a circle, or (b) in a branching letter Y?

FURTHER READING

Callender, Craig, and Ralph Edney. *Introducing Time*. Cambridge: Totem Books/ Icon Books Ltd., 2001.

Covers most of the topics in this dialogue while emphasizing the relevant scientific theories. Each page is two-thirds graphics and one-third text.

Hawking, Stephen. *A Brief History of Time: The Updated and Expanded Tenth Anniversary Edition*. New York: Bantam Books, 1998.

In chapter 2, this leading scientist informally explains the science behind our understanding of time, including Einstein's idea that an event's duration is rela-

tive to the reference frame chosen for measuring the event. "Reference frame" is defined in the glossary at the end of this dialogue.

Le Poidevin, Robin. *Travels in Four Dimensions: The Enigmas of Space and Time*. Oxford: Oxford University Press, 2003.

A philosophical introduction to conceptual questions involving space and time. There is a de-emphasis on the relevant scientific theories and an emphasis on elementary introductions to the relationship of time to change, the implications that different structures for time have for our understanding of causation, difficulties with Zeno's Paradoxes, whether time passes, the nature of the present, and why time has an arrow.

Levine, Robert. *A Geography of Time*. New York: Basic Books, 1997.

An informal introduction to the psychology and sociology of time. Page 14 contains the story about meeting the brother in Kabul.

Prior, Arthur N. "Some Free Thinking about Time." In *Logic and Reality: Essays on the Legacy of Arthur Prior*, edited by Jack Copeland, 47–51. Oxford: Clarendon Press, 1996.

Challenges Einstein's claim that time is relative to reference frame.

Smart, J. J. C. "Time." In *The Encyclopedia of Philosophy* 8, edited by Paul Edwards, 126–34. New York: Macmillan Publishing Co., Inc., and The Free Press, 1967.

A survey of philosophical ideas about time. Its section titles are "St. Augustine's Puzzles," "The Myth of Passage," "Spacetime," "Absolute and Relational Theories," "Time and the Continuum," "The Direction of Time," and "Time and Free Will: The Sea Fight Tomorrow."

2

Fatalism, Free Will, and Foreknowledge

Naomi: Hey, John. Is this seat open?

John: Sure. It's got your name on it.

Naomi: Were you just humming ABBA?

John: Yeah, I didn't realize anybody could hear me.

Naomi: ABBA is good music to dance to.

John: Or just good music for a hot day. I'm glad the bus is air-conditioned. Were you melting into the asphalt waiting out there?

Naomi: No, I timed it fairly well. Just a few minutes.

John: Hey, how was your physics class?

Naomi: Fine, nothing special, though one student asked me if my goal in life is to collect photons for a living. I'm looking forward to getting home and reading a book I started. It's a biography of John Wheeler. He invented the term "black hole" for any volume of space with matter so densely packed inside that its gravitational force prevents light from escaping. Wheeler was very interested in time travel, too. Your big topic for your class presentation, isn't it?

John: [groans]. Another student also chose the topic, and I lost the coin flip, so I had to choose again. I picked Zeno and his paradoxes.

Naomi: That'll be interesting, too. So how'd your class go today?

John: Well, we talked about fate.

Naomi: Uh-oh, the mummy of fate is getting up and opening the lid on its coffin.

John: It's not dead, but it's a very old topic and not as popular as in earlier centuries. It's worth thinking seriously about. It's not like there's been a refutation of fatalism. You see gravestones engraved with "A meeting with destiny." That's a fatalist slogan.

Naomi: Are you using the word "fatalism" as some sort of technical term in philosophy?

John: Yes, but it's ambiguous. It's the doctrine that fate exists, but the agreement ends here. Some say fatalism applies only to a few important kinds of events—who we marry, our career, our death, whether we go to heaven. It's like the fates are supernatural puppet masters pulling our strings to make those special events happen. This kind of fatalism doesn't rule out free will because we still have the ability to perform other free actions such as choosing what to have for lunch. An extreme form of fatalism implies that *all* our actions are fated; we can't do other than we do. No free will. It's like our actions are sitting out there in the future waiting to happen, and everything that happens is necessary. Philosophers are more interested in this extreme form, and often they write off the mild form as superstition.

Naomi: The extreme form isn't the same as the doctrine that we can't change the future, is it?

John: No, regardless of whether fatalism is true, no action can change the future, I'd say. Suppose a certain assassination occurs in the future. If we tried to change this by acting to prevent the assassination, we'd have to fail because the future can't both have and not have the assassination.

Naomi: I'll bet fatalists are fatalists because they make the mistake of thinking that since we can't change the future we can't affect it. So they say *que sera, sera*.

John: Not quite. They say whatever will be *has* to be.

Naomi: Oh, right. Is this extreme form the same as determinism?

John: They're similar but not the same. The future being fixed is what they have in common. Fatalists say it's fixed by fate or by some other supernatural force, and the determinists say it's fixed by any complete state of the universe at some time in the past plus the laws of nature that are operating. The laws are important because it's the laws that make causes have the effects they have. You could have fatalism in a world that had no laws of nature and so no determinism. But since both theories agree that the future is fixed somehow, they're both a challenge to free will.

Naomi: When I was growing up, my mother and I sometimes talked about this at the dinner table. Here's an old story she told. I memorized it. The master's servant went to the marketplace in Baghdad, and there he was jostled by Death. Startled, the servant returned to his master's house in fear and reported Death had made a threatening gesture in the marketplace. The master agreed to help the servant and loaned him a horse so he could flee to safety in Samarra, a half-day's ride away. Afterward, the master himself went to the marketplace in Baghdad, saw Death in the crowd, and asked why a threatening gesture had been made to his servant. "It wasn't a threatening gesture," Death replied, "only a reflex of surprise at seeing him in Baghdad, since I have an appointment with him tonight in Samarra."

John: This is about fate, isn't it?

Naomi: Yes. My mother believes God has preordained whether I'm going to heaven. He's already decided. I complained to her that whether I go to heaven ought to depend on what I choose to do along the way. If I choose to murder someone tomorrow, then God should not have decided in advance that I'm going to heaven. She responded that God has decided in advance that I won't murder anybody tomorrow. He has divine foreknowledge of his creation, she said, and if I were to do anything other than what he planned, then he wouldn't have known it in advance. Who am I to make a liar out of God?

John: Does your mother believe in free will?

Naomi: Not really.

John: Your mother's reasoning worries me. I worry that God is outside of time but with knowledge of everything that will happen, so this foreknowledge prevents me from having free will.

Naomi: I grew up thinking foreknowledge could be a problem for free will, but I don't now. Think of it this way. God's foreknowledge of my choosing to buy a cell phone depends on my choosing it. It's not that my choosing it depends on his knowledge. Let's get the dependency right.

John: I'm not so sure it doesn't go both ways, so free will is still impossible.

Naomi: OK, let me make the point a different way. I know my housemate Melissa bought a cell phone yesterday, but my knowing this didn't force her to buy it. Yes, it has to be true that she bought it, or else I don't really have the knowledge, but my knowledge doesn't force her hand. Knowledge of the past doesn't cause anything in the past, but the knowledge depends on what happened in the past. Now, turn this idea around and

apply it to knowledge of the future. Knowledge of the future doesn't cause anything in the future, but knowledge of the future does depend on what happens in the future.

John: I wish I could be so confident that the idea can be turned around this way.

Naomi: I don't have a problem with foreknowledge and free will, but I do have other problems with what we've been talking about.

John: Other problems?

Naomi: Well, besides my needing a justification for assuming God exists, I have a real problem with your idea that God can be outside of time. It doesn't make sense to me.

John: I got the idea from Augustine. God's being outside of time means he has the bird's-eye view, so to speak. God is aware of all activity at all places and times. He immediately intuits all states of the universe at all times, so he doesn't need to make any inferences to gain knowledge.

Naomi: You can say all this, but I don't think you can explain it. I can say there are round squares, but I can't really explain what a round square is, can I?

John: I don't think round squares are a good analogy. I have a very clear vision of what I mean for God to be outside of time. It's like having a grand perspective on everything that happens, but having it at all times, not just at one time.

Naomi: I don't understand your vision. I'm not saying it violates logic or anything like that. It just doesn't make any more sense than saying God might bring me back to life a thousand years from now. In a thousand years there won't be any me to bring back. My old molecules will be all over the place, even inside other people. I suppose you're going to say I'm my soul and not my molecules, right?

John: Well, souls make sense, but let's get back to time. Is my vision of God being outside of time really so hard to understand? I'll admit that there are all sorts of ways people understand what God is. Thomas Aquinas and René Descartes believed God had to intervene at all times to keep the universe going. They didn't think the material world could sustain itself from one moment to the next without God's help. They thought God continually acts to preserve every material object at each successive instant; and at each instant he's using the same kind of power that it takes to create that object. This is all a little too God-intoxicated for me. I prefer a more hands-off kind of God, who watches over the mate-

rial world from outside of time, but who might intervene occasionally to create a miracle.

Naomi: I still don't understand your vision of God.

John: I think you're looking for a convincing argument or justification. I'll admit that not everything I believe is based on nice, clear-cut reasons in the way you want. Usually I want those reasons too, but for a person of faith, belief in his God is usually stronger than belief in any scientific hypothesis, or in any epistemological desire for a scientific justification of their remark about God, or in the importance of satisfying any philosopher's demand for clarification.

Naomi: Well, I now feel we understand each other.

John: Wonderful! That's progress.

Naomi: You mentioned determinism earlier. I think the past influences the future but doesn't determine it, and I've got a proof that determinism is incorrect.

John: You do?

Naomi: It comes from quantum theory, our best theory of molecules, atoms, and the subatomic realm. It's our only theory of why light goes through glass and not concrete, and why copper conducts electricity better than bamboo does. Rather than predicting with certainty what we'll observe, as in the deterministic theories of relativity and Newton's mechanics, quantum theory predicts all possible results of any particular observation of nature, but it assigns probabilities to each of these results. For example, if we observe a possibly radioactive atom, quantum theory tells us the probability that it'll decay during the observation; but the instant at which it actually does decay, if it does, occurs by chance because there's no detectable difference between a radioactive atom that is about to decay and one that's still far from splitting. I mean there's no difference at all, not just that we don't have good enough instruments to detect the difference. So the probabilities are a sign that nature herself is indeterminate, unfixed, fuzzy. According to this standard interpretation of quantum theory, the heart of nature is statistical. For many individual events, there are no determining causes, just influences. Einstein was notorious for complaining that quantum theory essentially has God playing dice with the universe, and that some day a more deterministic theory would replace quantum theory. However, today's physicists are convinced that quantum uncertainty is intrinsic to nature. To put it bluntly, quantum theory has refuted the old ideas of causality and determinism.

John: I'll bet you were determined to say that because of all the sugar in your snack.

Naomi: Right.

John: OK, the way you interpret quantum theory I can see how the present will influence the future but not determine it. I just think that God knows the future even if quantum uncertainty keeps *us* from knowing it.

Naomi: He knows the outcomes of random events?

John: Yes.

Naomi: How?

John: I don't know how.

Naomi: If you don't know *how* it happens, then I don't think you can be sure you know *that* it happens.

John: You're demanding a lot from us mere mortals.

Naomi: I think you even need to worry that, if you get to heaven, God will reveal to you that everything happens for no real reason.

John: You've got to be joking!

Naomi: I was.

John: OK then, here's a serious problem for you. In class today we studied Aristotle's argument about why human action is pointless. This is his argument about a sea battle tomorrow. Suppose you have no idea one way or the other whether there will be a sea battle tomorrow. Consider both possibilities. First, suppose it's true now that there will be a sea battle tomorrow. If it's true today, then it's got to be true tomorrow. But if so, then it's not possible for me to succeed in preventing a sea battle tomorrow because it's not possible to make the truth be false. So I don't have freedom to prevent the battle. Now let's go back and consider the other possibility. Suppose instead that it's false now that there will be a sea battle tomorrow. If it's false today, then it must be false tomorrow. But if so, then it's not possible for me to cause a sea battle tomorrow because I surely can't make what's false also be true. So I don't have the freedom to cause the battle. Now, consider what we've just shown about both those possibilities. Either way I don't have the freedom that free will requires, the freedom to affect the course of future events. This argument can be generalized beyond sea battles to any other activity, so it implies the uselessness of human action and is consistent fatalism about all future events and actions.

Naomi: Do you think this is a strong argument?

John: It worries me, but I can't swallow the conclusion. To save freedom, I think we should go back and give up on the idea that a statement made now about the future is either true or false. Instead, we should say that a statement about the future is in a middle ground of "undetermined." It will become true or false later, but right now it's neither because there's no evidence available to anybody to judge it true or false.

Naomi: There's got to be a better way to save freedom than by rejecting truth-values for statements about the future. If you reject the truth-values, you'll have all sorts of trouble. Think about it. Your motivation for rejecting truth-values was that the evidence for them is lacking, but lack of evidence isn't evidence of lack. For example, there's no evidence available to anybody to judge whether Napoleon rode a horse a week before his thirteenth birthday, but do you have any problem with saying the judgment is true or false?

John: No, but that's different.

Naomi: But why treat lack of evidence about the past differently from lack of evidence about the future? Look, wouldn't you say God knows the truth-values of statements about the future?

John: Yes, but those statements don't have truth-values for us.

Naomi: So in a sense those statements do and don't have truth-values. I'd say this is some of that trouble I was just talking about. Here's more trouble. Think about what a valid argument is. In the symbolic logic course I took as an undergraduate, we evaluated arguments based on their logical form, on what the instructor called "truth's logical liaisons." For example, here's an argument with two premises and then a conclusion:

There will be a sea battle tomorrow.
If there will be, then we should wake up the admiral.
Therefore, we should wake up the admiral.

Forget about free will for a second, and just assess this argument for whether it's deductively valid. Isn't it valid?

John: Yes, it's an example of *modus ponens*.

Naomi: But look what you're committed to by giving that answer. You want the argument to be valid, but it won't be valid if you deny truth-values to the premises because a valid argument is an argument in which the conclusion gets the truth-value of "true" whenever the premises do. By denying truth-values to the sentences in this argument, you're giving up on using our system of logic to analyze it. I'd say that in order to preserve

logic, you should stick with the idea that predictions are true or false at the time they're uttered. Give up on Aristotle. His way out is too radical.

John: How about just changing logic? You know, expand on validity and say the argument is valid because if the sentences *were* to have truth-values and be true, then the conclusion would be true. Would that work? I thought I heard that sometimes logicians talk about changing the rules of logic.

Naomi: Yes, they do, but you should change logic as a last resort. Otherwise, it's like burning your house down and moving to a new one when you can't immediately figure any other way to get rid of the bugs in your kitchen.

John: Is logic our servant, or are we the servants of logic?

Naomi: There's a less radical way to save free will because there's another problem with the sea battle argument.

John: What's that?

Naomi: You said if it's true now that there'll be a battle, then I must not be free to prevent it. That reasoning doesn't work. If it's true now that there will be a sea battle, then I agree that there will be. But this doesn't rule out my freedom to prevent it.

John: I don't understand.

Naomi: Think of it like this. If it's true now that there will be a sea battle, then it's not true that there won't be. OK?

John: So far so good.

Naomi: But from this, you can't legitimately infer that it's not *possible* that there won't be. That's the mistake. And if it's possible that there won't be, then I can act to affect which possibility becomes an actuality, so how can you go on and infer that my hands are tied and that I don't have free will in the matter? In other words, if it's true that there will be a battle, then I'm free to prevent it even though in fact I won't. See what I mean?

John: No. It's already true ahead of time what will happen; you can't make it not happen. Free will is the ability to do otherwise, but you aren't free to do otherwise, so you don't have free will.

Naomi: OK, I'll say it another way. If it's true, it's not false. But if it's true, it's a mistake to say it's not possible that it's false.

John: I'm not sure what to say. Wait! Here's a better way to look at it. Suppose there will be a sea battle tomorrow. Then think about all the possible future situations from now. Here we are at time one with the universe

having progressed to the point where it's true there will be a sea battle tomorrow. That means that all possible futures containing the universe as it is at time one also contain a sea battle tomorrow. Right?

Naomi: Yes.

John: Now, if you say you can prevent the sea battle tomorrow, you're saying there's some possible world in which there isn't a sea battle. But that's contradictory because you just agreed a second ago that all possible futures contain a sea battle. So Aristotle's argument succeeds. I mean it would succeed unless we deny truth-values to predictions.

Naomi: I'm not convinced that your reasoning shows Aristotle succeeds because I don't like how you're treating the concept of "ability to do otherwise." Also, you're recommending what my philosophy of language instructor called a "tensed view of semantics" where statements about the future don't now have truth-values. That's overkill. To find a way out of Aristotle's problem, we just need not to make errors in reasoning about possibilities and to get right what free will really is. Free will is really something that takes time to reveal itself.

John: Yes, you need some evidence over a period of time that shows the ability to do otherwise in the same situation. I'm talking about situations where you have some choice and where there isn't external compulsion such as being hypnotized or having a gun held to your head. That's free will.

Naomi: Not quite.

John: What now?

Naomi: I don't think free will requires the ability to do otherwise in the same situation.

John: You don't?

Naomi: It just requires the ability to do otherwise in very similar situations so that you detect plasticity of action. Here's what I mean. Imagine some situation where you're sure Sam is acting freely. Maybe you give him a choice of soda drinks and watch that he doesn't act as mechanically as a soda machine. He doesn't, so you correctly draw the conclusion that he has free will. But wait. What you and Sam didn't know was that God earlier sent down an enforcer-angel to watch over Sam. The angel has been hiding in Sam's head and was going to prevent certain choices by Sam if he showed an intention to choose other than the way the angel wanted. But by luck Sam happened to have behaved the way the angel wanted. Wouldn't you say that in this angel situation Sam could still be acting with free will?

John: Yes, I guess so, though it's an odd situation.

Naomi: But Sam couldn't have done otherwise! Doesn't this story about Sam and the angel show that having the ability to do otherwise in the same situation isn't necessary for free will?

John: Yes, I guess so. But if you're right, then we need to figure out what exactly is necessary for free will—other than not having external forces making our choice for us. It's got to be something else.

Naomi: I've got a suggestion. First off, it's really necessary that you be affected by external forces. Suppose you were given a choice of Coke or Pepsi but were then told, and you understood and believed, that if you don't choose Pepsi, then you and your family will be murdered. Now in this choice situation if you went ahead and chose Coke, I'd be worried that you were just a machine and had no free will in the situation. If you couldn't be affected by threats, there'd be no "plasticity" in your actions, and so no free will.

John: OK, that seems right. You've got to be capable of being influenced, or you don't have free will.

Naomi: Yes, and second of all you have to have the ability to do otherwise in very slightly different situations.

John: Like what sort of situations?

Naomi: Let's go back to the sea battle scenario. Suppose at some time, call it time one, you're faced with a decision about whether to start a sea battle, and you decide at that time to start a sea battle. What "ability to choose otherwise" really means is that in some possible world similar to, but not exactly like this one, you make a choice to try to prevent the sea battle. In the similar world, there are no new external constraints on you, and all that's significantly different is that you change your intentions about whether to attack, and this change involves a change in your brain that is presently too subtle for anybody else to detect. No contradiction. That's real freedom.

John: Why are you saying the change is too subtle to detect?

Naomi: It's got to do with chaos theory. Think how hard it would be to roll a pair of dice a second time and be absolutely sure of getting the same total as the first roll. The outcome can be radically different with the very slightest change in initial conditions. That's a sign of chaos at work. Probably there was some slight but unmeasurable difference between the two situations at the beginning of the roll, and this is why you got a different total the second time. Now, suppose you ask me whether I want a Coke or Pepsi. I might choose Coke the first time and Pepsi the second time even though you try to set up the situation the second time so it's just like the

first time. You can't be sure of setting it up again with me having the same intentions because the brain traces of my intentions aren't sufficiently detectable and controllable by you, but my slight change in intention can precipitate a big difference in my actions involving choice of soda. You can carefully monitor my previous behavior and use the evidence from my brain scans, but you can't get enough information to predict with certainty. That inability to control the situation is what I was talking about when I said you get a different outcome when the present situation is a little different in a certain way. When you ask me to make a choice the second time around, I might surprise you; that's the sign of free will. Soda machines can't surprise you.

John: You're saying free will is just chaos and surprise in situations without external compulsion?

Naomi: No, that's an exaggeration. Not just any old surprise. It's not like your intention to choose Coke leads to such a chaotic result that the surprising words "Chartreuse isn't yellow" might pop out of your mouth without your intention to say this. That wouldn't be free will at work. The surprise has to be of your own making; it has to be what you intend. The action is a surprise to other people but not to you. Of course, an outside viewer could force the same outcome by pointing a gun at your head and saying, "You better make the same choice as last time or you'll be shot." But so what? That wouldn't be a situation where you'd expect free will to show itself, would it?

John: No. But there are a lot of other theories of free will out there, and I'm still not convinced that yours is the right one. For one thing, it's compatible with determinism, isn't it?

Naomi: Yes, even though I don't believe in determinism.

John: Oh, this is my stop. I'm off.

Naomi: Off to meet your destiny, no doubt. Hey, don't forget your phone.

John: [standing up] Oh, thanks. I can't live without it. All my music is in there. See you next week.

Naomi: Bye.

DISCUSSION QUESTIONS

1. What does free will have to do with time?
2. What is fatalism, and how does it differ from determinism?

3. Do you have any good evidence that the way you'll die in the future isn't fated?
4. What part of your future can be changed?
5. Could God know in advance the outcomes of your free choices? If someone disagreed with you about this, what sort of reasons would they be likely to offer?
6. Does Aristotle's argument about a sea battle tomorrow show that the future is fixed and free will is impossible? If someone disagreed with you about this, what sort of reasons would they be likely to offer?
7. When we try to answer the question, "What does reality consist in?" should we say it consists in part of (a) free will in some nonhuman animals, (b) trillions of years, (c) truth-values, and (d) sakes (as when we say he did it for her sake)?
8. What do John and Naomi have to say about whether free will requires the ability to do otherwise? What do you think?

FURTHER READING

Barnes, Jonathan, ed. *The Complete Works of Aristotle*. Princeton, NJ: Princeton University Press, 1984.
De Interpretatione (On Interpretation), Book 9, sections 18a–19b, is the source of Aristotle's third century BCE argument that statements now about tomorrow's sea battle lack a truth-value.

Blackburn, Simon. *Truth: A Compelling Introduction to Philosophy*. Oxford: Oxford University Press, 1999.
Pages 81–119 present a compatibilist definition of free will that works like this: The subject acted freely if she could have done otherwise in the right sense. This means that she would have done otherwise if she had chosen differently *and*, under the impact of other *true and available* thoughts or considerations, she *would* have chosen differently. True and available thoughts and considerations are those that represent her situation accurately and are ones that she could reasonably be expected to have taken into account.

Boethius. *Consolation of Philosophy*. Translated by Joel C. Relihan. Indianapolis, IN: Hackett Publishing Company, Inc., 2001.
This early sixth-century Roman philosopher creates a dialogue between himself and a woman named Philosophy. In the dialogue, Boethius worries that, if God knows now what you will do later, then what you will do is already determined and so is not free. Philosophy counters by arguing that God is outside of time and so knows all your actions atemporally, and this way of knowing does not require your actions to be determined.

Butterfield, Jeremy. "Determinism and Indeterminism." In *Routledge Encyclopedia of Philosophy*, edited by Edward Craig. London: Taylor & Francis Group, 1998.
Argues that the doctrine of determinism is commonly misunderstood. For example, much of Newton's physics is indeterministic. Focuses on arriving at

determinism from an analysis of scientific theories and claims that formulations of determinism in terms of causation and predictability are unsatisfactory.

Craig, Edward. "Fatalism." In *Routledge Encyclopedia of Philosophy*, edited by Edward Craig. London: Taylor & Francis Group, 1998.

A very short discussion of the variety of meanings of the term "fatalism."

Frankfurt, Harry. "Moral Responsibility and Alternate Possibilities." *Journal of Philosophy* 66 (1969): 829–39.

The source for the scenario with the enforcer-angel that has been hiding in Sam's head and was going to prevent certain choices by Sam if he showed an intention to choose other than the way the angel wanted.

Haack, Susan. *Deviant Logic*. Cambridge: Cambridge University Press, 1974.

Chapter 4 contains a clear account of Aristotle's argument for treating the scenario of the sea battle by denying truth-values to future contingent statements.

Le Poidevin, Robin. "The Experience and Perception of Time." *Stanford Encyclopedia of Philosophy*.

Explores how metaphysical theories of time accommodate various aspects of our experience. The entry discusses the flow of time, an issue discussed in a later chapter of this dialogue.

Maugham, W. Somerset. "Appointment in Samarra." *The Complete Short Stories of W. Somerset Maugham*. London: Heineman, 1951.

Contains the story in the dialogue about Samarra and fate.

Swartz, Norman. "Foreknowledge and Free Will." *The Internet Encyclopedia of Philosophy*.

Careful examination of the apparent inconsistency between divine foreknowledge and the human exercise of free will.