1

The Enterprise of Theoretical Psychology

. . . the conceptual systems [of science] . . . are bound by the aim to permit the most nearly possible certain . . . and complete coordination with the totality of sense-experience. . . .

—Albert Einstein (1951, p. 13)

1.1 Theoretical Psychology Defined

The epigraph above alludes to two mental processes that are essential to the scientific enterprise: observation and ratiocination. (Ratiocination is directed thinking, just as observation is directed perception.) If the aim of science is to coordinate conceptual systems with sense experience, then it is clear that scientists must allot some of their professional time to acquiring sense experiences and some to tinkering with concepts. The former is the observational side of science; the latter is its ratiocinative side. This much is universally acknowledged. There have been vast disagreements, however, concerning the proper roles of observation and ratiocination and concerning their relative importance. Roughly, *empiricism* is the tendency to emphasize the importance of observation and *rationalism* is the tendency to emphasize the importance of ratiocination. (These broad definitions will be refined in chapter 10.) Empiricists are of the opinion that the systematic acquisition of observational data is where the action is in scientific research. With the right sensory data, constructing and coordinating appropriate conceptual systems is thought to be relatively straightforward. Conversely, rationalists believe that the difficult problems and the major breakthroughs in science are played out largely in the conceptual arena.

The type of scientific work favored by empiricists is *empirical* work. By definition, an empirical project is one that requires observation at some

stage. The type of scientific work favored by rationalists is *theoretical* work, a theoretical project being defined as one that does not require observation at any stage. The prototypical empirical project is the *experiment*, wherein conditions are systematically arranged for observing whether a particular phenomenon takes place. However, the realm of empirical investigations is broader than the realm of experimental studies. This is a lucky thing for sciences like extragalactic astronomy, where it would be difficult to arrange for phenomena to occur at our convenience. In addition to experimentation, there is a place in science for the empirical activity of *naturalistic observation*—the observation of phenomena as they occur in the world, independent of our control. There are also types of work whose empirical status is subject to debate. The most important example of this class in psychology is *introspection*, the systematic observation and description of the investigator's own mental states. A history of psychology could be written entirely in terms of the status granted to introspective reports. In the nineteenth century, introspection was deemed the only acceptable form of empirical work for a psychologist. During the first half of the twentieth century, it was almost universally condemned as unscientific. In recent years, psychologists probably have been more divided on this issue than ever before (Kukla 1983; Lyons 1986). I will have more to say about introspection below. Here my point is that scientists may very well disagree as to whether a particular activity is a legitimate instance of empirical work.

The prototypical theoretical project is the construction of a scientific theory explaining a set of data. The data themselves will have been obtained by empirical means, but constructing a theory to explain them is not another piece of empirical research. It is a project that requires nothing but thinking. Just as empirical work is a broader category than experimentation, theoretical work encompasses more than theory construction. Of the seven chapters in this book that deal with the varieties of theoretical projects, only one is devoted to theory construction. Not surprisingly, there are at least as many controversies concerning the boundaries of legitimate theoretical work as there are over the boundaries of the empirical. I will deal with these controversies in chapters 9 and 10.

I have defined *empirical* and *theoretical* as types of scientific activities. It seems a straightforward matter to use the same words to describe types of scientific *issues*, an empirical issue being one that is resolved by empir-

ical means and a theoretical issue being one that is resolved by theoretical means. That would be ambiguous, however. Would it mean that an empirical issue is one that is *in fact* resolved by empirical means, or one that *should be* resolved by empirical means, or one that *can be* so resolved, or one that can be resolved *only* by empirical means? These notions are certainly not equivalent. Consider the famous problem of the seven bridges of Königsberg. Two islands in the river that passes through the city of Königsberg were connected by seven bridges as shown in figure 1.1. The question arose whether it was possible to cross all the bridges without crossing any single bridge twice. The experience of generations of townspeople provided strong empirical evidence for the proposition that no such path existed. The townspeople could therefore be said to have solved the problem of the seven bridges by empirical means. But in the early eighteenth century the great mathematician Leonard Euler was able to prove the same proposition mathematically. Bradley and Swartz (1979, p. 152) describe this episode as follows: "What was first learned experientially outdoors by tramping around the banks of the river Pregel . . . was later relearned by the powers of pure reason (presumably) in the comfort of Euler's study where he merely carefully and ingeniously thought about the problem." So is the problem of the seven bridges empirical, or theoretical? We can, of course, define our terms in any way we like. What matters is that we understand one another. According to common usage, any issue that can be settled by purely theoretical means is deemed theoretical, whereas an empirical issue is one that can be settled only by empirical means. The asymmetry built into these definitions is a bit confusing at first, but there it is. To say that an issue is empirical is to imply that it cannot be resolved

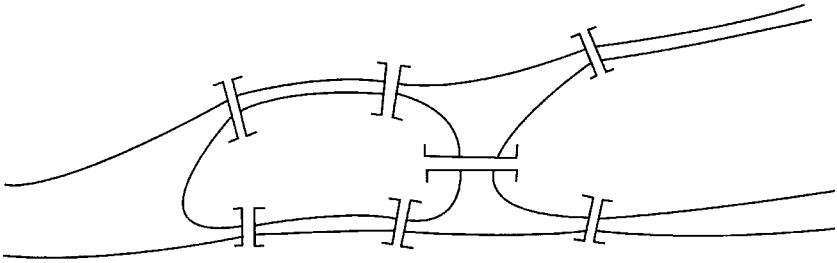

Figure 1.1
The seven bridges of Königsberg.

by purely theoretical means, but to say that an issue is theoretical does not rule out the possibility of an empirical resolution. With these definitions, the problem of the seven bridges turns out to be a theoretical problem that the townspeople had attacked by empirical means.

Both empirical and theoretical investigations have roles to play in the advancement of science. In some sciences (most notably physics), the preparation required for original empirical or theoretical work is so extensive that scientists must specialize in one or the other. Those who deal with the empirical side of their science are often called its *experimentalists*, after the most familiar (but not the only) form of empirical activity. Those who deal with the theoretical side of science are called, appropriately enough, its *theoreticians*. Thus, physicists are either experimental physicists or theoretical physicists. Despite their name, theoretical physicists do not spend all their time constructing new theories; they have a lot of other theoretical business to attend to. Also, under the definitions in the previous paragraph it is not strictly correct to say that theoretical physicists have exclusive rights over the theoretical issues of physics. Under my definitions of the terms, it is possible to seek a solution to a theoretical problem by empirical means. That is not what theoretical physicists do, however. Theoretical physics is the attempt to resolve theoretical issues in physics by theoretical means.

This book is about *theoretical psychology*, which stands in the same relation to psychology as theoretical physics does to physics. Only very recently has theoretical psychology developed, on the model of theoretical physics, into a distinct area of specialization within psychology. This is a story that should be told in some detail. It begins in ancient Greece.

1.2 Empiricism and Rationalism in the History of Psychology

As defined in section 1.1, empiricism and rationalism comprise a continuum of viewpoints rather than only two. Every region of this continuum has had its proponents at one time or another. At the very beginning of Western thought, we find Plato and Aristotle occupying positions near the extremes. According to Aristotle (1973, p. 235), "no one can learn or understand anything in the absence of sense." Plato, his teacher, had a different view about how we arrive at the truth. According to Plato (1961, pp. 48–49), he who wishes to obtain knowledge must proceed by "cutting him-

self off as much as possible from his eyes and ears . . . which prevents the soul from attaining to truth and clear thinking."

The same disagreement raged among twentieth-century fictional detectives. Inspector Maigret is a radical empiricist (Simenon 1971, p. 34):

> "Do you think . . ."
> "I don't think. You know that. I look."

Hercule Poirot is the complete armchair rationalist (Christie 1984, p. 103):

> "Miller, the man who's on this case, is as smart chap. You may be very sure he won't overlook a footprint, or a cigar ash, or a crumb even. He's got eyes that see everything."
> "So, *mon ami,*" said Poirot, "has the London sparrow. But all the same, I should not ask the little brown bird to solve the case of Mr. Davenheim. . . ."
> "You don't mean to say, Monsieur Poirot, that you would undertake to solve a case without moving from your chair, do you?"
> "That is exactly what I do mean. . . ."

Ever since Plato and Aristotle, the history of Western thought has seesawed between empiricist and rationalist tendencies. Here is a brief recap of the most recent swings.

The seventeenth century saw the elaboration by Descartes, Spinoza, and Leibniz of what may be called *classical rationalism*. According to this doctrine, the properties of the natural world can all be discovered by pure reasoning, much as we discover the properties of mathematical objects. To the modern scientist, such a claim must seem utterly fantastic. Did the classical rationalists really believe that a process of pure reasoning could tell me whether I have any clean socks in my dresser drawer, or what the president of France ate for breakfast on December 11, 1983? The answer, at least in the case of Leibniz, is an unqualified Yes. Leibniz's chain of reasoning goes roughly as follows: First you prove that God exists and that He is both omnipotent and perfectly good. That the existence of God can be deduced like a mathematical proposition was a philosophical commonplace of Western philosophy in some eras; it survives in some circles even today. If one can get over this first hurdle, the rest of the job is easy. It follows from God's perfect goodness that He would have created the best world He possibly could. It follows from His omnipotence that He could have created any possible world. Hence, the world God created must in fact be the best of all possible worlds. But in order to establish whether I have any clean socks in my dresser drawer, I need only ask myself whether the best of all

possible worlds is one in which there are clean socks in the drawer or one in which there aren't—and that task can, at least in principle, be accomplished entirely by a conceptual analysis of goodness.

In the eighteenth century, the European world largely abandoned classical rationalism for *classical empiricism*. The major figures in this movement were Locke, Berkeley, and Hume—all of them British. Here we already see a dichotomy between Continental and Anglo-Saxon thought—a dichotomy that has persisted throughout the modern era. Indeed, the transitions between rationalist and empiricist periods can for the most part, be described as changes in the geographical center of intellectual life between Continental Europe and the English-speaking countries. Locke (1706) provided the basic framework of modern empiricist thought. According to Lockean empiricism, the mind takes in sensory impressions whose causes originate in the outside world, and forms beliefs out of them by means of various mental operations. Without the sensory input, however, the mental operations are powerless to arrive at any truths about the world. Berkeley (1710) and Hume (1739) showed that the amount of knowledge that can be justified on the basis of an empiricist theory of knowledge is far less than Locke had supposed. Berkeley noted that one cannot conclude on the basis sensory evidence alone that there exists an outside world from which the sensations arise. According to Berkeleyan *idealism*, an empiricist can claim no more than that sensations come in regular and predictable patterns. Hume argued, further, that if all knowledge comes from experience we have no basis even for supposing that there are predictable patterns. (This important argument will be discussed in chapter 5.) According to Hume, empiricism entails that we can have no justification for adopting any belief that goes beyond what is currently being observed. In sum, Hume showed that classical empiricism leads to extreme skepticism about the possibility of human knowledge.

In the nineteenth century, the philosophical ball was returned to the Continental rationalists' court. Kant (1781) accepted the basic Humean conclusion that empiricism leads to skepticism. Whereas Hume had been content to settle for skepticism, however, Kant opted to repudiate empiricism. From the viewpoint of the modern empiricist Bertrand Russell, Kant's influence on philosophy was entirely retrogressive: "Hume, by his criticism of the concept of causality, awakened [Kant] from his dogmatic slumber—

so at least he says, but the awakening was only temporary, and he soon invented a soporific which enabled him to sleep again." (Russell 1945, p. 704)

I will assess the virtues and demerits of Kant's soporific in chapter 10. At present it is sufficient to say that Kant did not advocate a return to classical rationalism. He originated a subtler and altogether more plausible tradition of rationalistic thinking—one that has continued to influence the history of ideas. Indeed, in the English-speaking world, his influence is probably stronger now than ever before. Kantian rationalism concedes to skepticism that there is a great deal about the world that we can never know. Furthermore, it concedes to empiricism that much of what we do know can be acquired only by empirical means. However, Kantian rationalists insist that some of our most basic knowledge of the world does not come to us via the route of sensory experience. Kant refers to knowledge acquired by observation as "a posteriori knowledge" and to knowledge acquired in the absence of observation as "a priori knowledge." These terms provide a much-used alternative to "empirical" and "theoretical" in characterizing our knowledge-seeking activities. Unlike "empirical" and "theoretical," however, they are not used to characterize types of issues; the problem of the seven bridges of Königsberg (which happens to have been Kant's home town) can be resolved either by a posteriori or by a priori means, but in itself it is neither an a priori nor an a posteriori issue.

In the first half of the twentieth century, empiricism once again dominated the philosophical scene. Whereas Kantian rationalism had been a response to classical empiricism, this swing of the pendulum largely ignored its Kantian predecessor. Russell's assessment of Kant, quoted above, was characteristic of the period. Twentieth-century empiricism represented itself as a direct continuation of the program of Locke, Berkeley, and Hume, and so it was. Empiricists like Russell, the early Wittgenstein, and the members of the "Vienna Circle" made considerable headway toward solving various technical problems that had arisen in the course of elaborating the classical empiricists' program. This progress was made possible by the application to philosophical problems of sophisticated and powerful tools of symbolic logic that had been forged at the turn of the twentieth century (Whitehead and Russell 1910–1913). The use of logic was so central to the enterprise of these empiricists that this phase of philosophical history is

often called the era of logical empiricism. (A more common name for the same school is "logical positivism.") There are, however, no special bonds between empiricism and logic. Rationalists can play that game too. Indeed they may find it even more congenial, since the pursuit of logic is an a priori activity. In any case, having introduced formal logic into philosophical discourse is probably the logical empiricists' most enduring contribution. However, logical empiricism was remiss in offering new solutions to the big problems of classical empiricism that had led to the Kantian analysis in the first place.

The recurrence of the big problems—particularly the problem of how to avoid skepticism—has led to the demise of logical empiricism and to a renewed appreciation for Kant. These developments are so recent that it is inappropriate to discuss them in a historical vein. The writing of this book is itself a part of what appears to be a new era of rationalistic thinking. The pendulum has begun to swing again. Evidence of the decline of empiricist sentiment has by now been noted in virtually every academic discipline, from physics (Bohm 1971) to jurisprudence and literary criticism (Michaels and Ricks 1980). Among philosophers of science, for whom these matters are of central professional concern, nearly everyone now seems to agree that the role of a priori knowledge in science was vastly underestimated by the logical empiricists of the previous generation.

How does the science of psychology fit into this picture? Psychology's formative years coincided with the hegemony of logical empiricism. Hence, it is not surprising that psychologists, as a whole, have been more empirically minded than most of their counterparts in other disciplines. The empiricizing tendency was considerably mitigated among European psychologists by their geographically determined inclination toward rationalism. But historical and geographical tendencies combined to produce an extraordinary peak of empiricist sentiment in early- to mid-twentieth-century North America. It is arguable that no group of scholars in any discipline has ever emphasized the empirical side of the pursuit of knowledge more exclusively than North American psychologists circa 1950. The representative psychologist of this era was B. F. Skinner, who argued that there are no theoretical issues in science (Skinner 1950). According to Skinner (1974, pp. 109–110), even problems of logic should be settled by doing experiments. Skinner was the anti-Plato.

Not all mid-century American psychologists were as extreme as the Skinnerians. But most of them were taught to regard "empiricist" as intrinsically complimentary, as in the phrase "a good empiricist." This attitude was less than optimal for the development of a strong tradition of theoretical thinking. Theoretical psychology was often called "armchair psychology." This was an appropriate and attractive name for the enterprise if uttered in the right spirit, but among experimental psychologists it was used as a term of derision. Like armchair adventure, armchair psychology was supposed to be a counterfeit of the real thing—an opinion that cannot easily be reconciled with the fact that the two greatest minds of the twentieth century, Albert Einstein and Hercule Poirot, chose to be armchair practitioners of their respective disciplines. Non-Skinnerians conceded the existence of theoretical issues in psychology; however, they tended to regard them as ancillary to the main business of science, which was to "collect data" by empirical research—for example, Christensen-Szalanki and Beach (1983, pp. 1400–1401) write: "It seem to us that psychologists should spend more time collecting data and less time advocating their favorite opinions." Many psychologists believed that theoretical issues were inevitably so trivial that experimentalists could handle the theoretical chores of psychology in their spare moments away from the laboratory (Longuet-Higgins 1981). Naturally, this opinion functioned as a self-fulfilling prophecy: Since most psychologists thought of theory construction as trivial, very few of them wanted to put a great deal of energy into it; as a result, only trivial theories were articulated. Just as naturally, students with strong theoretical interests tended to look in other fields for career satisfaction. In brief, psychology became almost completely bereft of a tradition of theoretical work.

This empiricist hegemony fell quite suddenly and unexpectedly, like the Berlin Wall, in the mid 1970s. Indeed, the past few decades have produced an unprecedented flowering of theoretical activity in psychology. The attention to theoretical issues in psychology doesn't yet begin to match the pervasive role of theoretical work in physics, but it is now quite comparable to biology in this respect. The change is, no doubt, related to the broad shift in the zeitgeist noted above. However, some special influences have been at work on psychology. Probably the important of these has been the impingement of other fields in which the importance of non-empirical issues was

already taken for granted—notably linguistics, philosophy, and computer science. As a matter of fact, some of the very best recent work in theoretical psychology has come from non-psychologists, including Jerry Fodor (philosophy), Noam Chomsky (linguistics), and Allen Newell and Herbert Simon (computer science). Interest and criticism from non-psychologists have impelled psychologists to pay more attention to the neglected theoretical side of their discipline.

The main consequence for psychology of the new era of rationalism is that there now exists a subdiscipline of theoretical psychology with its own journals, professional associations, and conferences. This means, of course, that theoretical psychology now has a vocabulary, methodological precepts, a corpus of exemplary results, and controversies that are inscrutable to outsiders. A number of writers have suggested that one can no longer expect to make a theoretical contribution to psychology without special training in the field (Longuet-Higgins 1981; Mackay 1988). It seems to me that one cannot even *read* the contemporary theoretical literature without some special preparation. That's where this book comes in.

1.3 Plan of the Book

The traditional way to study theoretical psychology has been to take up one theoretical approach after another—behavioral, psychoanalytic, cognitive, and so on (Marx and Hillix 1973; Wolman 1981). But this book does not aim to impart a substantive knowledge of psychological theories, or even to engage in a critical analysis of selected theories. Its aim is to prepare the reader to evaluate the theoretical literature in any tradition. The good theoretician should be able to criticize and improve on psychoanalytic theory as readily as behavioral theory. The skills involved are the same. Discussing one specific theory after another is not the best way to acquire these skills. Instead of working through a list of theories, the material in this book is organized around various types of theoretical issues. The collection of all the issue types to be discussed may be regarded as an updated job description for armchair psychologists: These are the kinds of problems theoreticians may be called upon to resolve in their capacity as "consulting specialists." These issues cut across theoretical orientations. For example, in section 6.2, I will discuss the theoretical impact of arguments to the

effect that a theory is internally inconsistent. The general form of such an argument, as well as its consequences for science, are pretty much the same whether the target theory is Freudian psychoanalysis or Skinnerian reinforcement theory. Specific theoretical issues will, of course, also be discussed, but these will function primarily as examples of certain types of theoretical problems and endeavors. In sum, this book is not an essay *in* theoretical psychology; it is an examination *of* theoretical psychology. Its aim is to impart the tools of the trade.

Most of the issues to be discussed have their counterparts in sciences other than psychology. The charge of internal inconsistency, for example, has been leveled at theories in physics and chemistry as well as in psychology. A similar book could have been written about the role of a priori analysis in science generally. There are two reasons, however, for relativizing the discussion to psychology. The first has to do with psychologists' need to know. Scientific training in psychology has emphasized the development of empirical research skills far more heavily than training in most other disciplines. Thus the ideas presented in this book will come as news particularly to students of psychology. Secondly (and, in light of the first point, ironically), it will be seen that psychology is a particularly promising arena for the exercise of a priori modes of research—far more so than, say, botany or endocrinology.

The next two chapters are devoted to background material in philosophy of language, logic, and philosophy of science that will greatly facilitate my theoretical discussions. Readers who are already familiar with the rudiments of these fields may skip this material. In chapter 4, I begin my compendium of theoretical issues in psychology with the most familiar of all theoretical tasks: theory construction. The reader should not be greatly disappointed if the first two or three substantive chapters deal with theoretical issues whose nature and scope are already well understood by many psychologists. Before the end of the book, I will be discussing ideas that call for drastic revision of received empiricist views.