Psychology has never succeeded in taking philosophy to itself nor in leaving it alone.
—Boring (1929, p. 660)

Not knowing how near the truth is, people seek it far away,—what a pity!
—Zen Master Hakuin, in Suzuki (1960, p. 151)

In this chapter, we discuss the place of philosophy of science in the work of the local clinical scientist. Our goals are twofold. First, we provide the reader with basic background in philosophy of science so as to set a foundation for later discussion of the relationship between scientific methodologies and critical thinking in the professional psychologist. Second, we propose an extrapolation model that describes how philosophical analysis can be used to raise questions about the information a professional seeks in the local clinical situations. We use the term extrapolation as elaborated in the last chapter: It involves extending a concept beyond its existing domain of applicability into a new, or in our case, a more specific domain.

The study of philosophy of science is an important prerequisite for the development of critical clinical thinking (Miller, 1992a; D. R. Peterson & R. L. Peterson, in press; Polkinghorne, 1983). We approach this material from an aerial perspective, standing somewhat above the debates of philosophy of science so as to grasp how philosophers approach the problem of inquiry. Three broad themes, or trajectories for analysis (see below), that characterize recent philosophy of science are emphasized. We believe these themes will continue to influence psychological science and professional practice in significant ways as we move into the next century.

The sections that follow will describe: (1) the philosophy of science and its relationship to a local model of clinical practice; (2) the need for a critical-pedagogical approach to philosophical material; (3) the basic themes that can be discerned in the philosophical and psychological literature, which include the positivistic/empirical approach, the idealist/paradigmatic approach, and the sociocultural/constructionist approach; and finally, (4) our extrapolation model and its usage with some examples from professional inquiry. Overviews of each historical trend will give the reader a basic understanding of its origins. However, it should be understood at the outset that these are not exhaustive characterizations. Rather, they...
are used here for expository purposes. Some may find the historical material rather abstract. However, such material is a necessary backdrop for linking philosophical thought to local clinical inquiry.

**WHAT IS PHILOSOPHY OF SCIENCE?**

Taken at face value, science presents itself in tidy packages: Problems flow endlessly, with apparent self-evidence, from theory and the literature. The methodological tools of science seem ever ready to shed light on even the most distressing complexities. Science is a remarkable approach to problem solving that is rooted in natural philosophy (e.g., Miller, 1992a). It has become the major source of professional legitimation in our field. Yet, professionals rarely understand how this has come to be. Captive to the immediacy of practice and the urgency of clinical problems, they often concentrate on the artistry of professional tradition, not feeling that their interests are well represented by science. Perhaps scientific packages are too neat; professional work certainly is not.

Philosophy of science is reflective study that probes deeply into the logic of how science works and into the adequacy of the assumptions supporting scientific thought and action. It explores scientific methods asking how, why, and if they accomplish what they claim to accomplish. It is concerned with the broader sociocultural implications of scientific formulations and scientific methods, and with limits on the applicability of science. Philosophy of science also explores the taken for granted, or ignored, and seeks ever greater precision in answers to basic questions, even to the point of questioning the questions themselves. It asks how inquiry might best proceed and how we might best think about what we do.

Philosophy of science has changed markedly over the course of this century. Two general approaches can be discerned: formulations designed to identify the best, or most definitive, way science can attain truth, and formulations attending to how science actually seems to operate. The former have been devoted to the elaboration of a set of epistemological and methodological "shoulds," the latter to the critique of these shoulds based on what seems to be the actual history of science. The twentieth century has been a very productive time; many ancient philosophical themes concerning the nature of knowledge have been revived and updated (see Miller, 1992a), and scientific knowledge has increased dramatically.

For much of this century, philosophers of science have searched for a solid empirical foundation for science, both to understand what had taken place in the dramatic scientific and technological progress of the previous century, and to establish a canon for all scientific endeavors as a way of evaluating the quality of knowledge produced by science. Their work is a chapter in the long development of naturalistic and humanistic philosophy in Western civilization, and the decline of an organized spiritual authority at the center of social life. With almost holographic consistency, we find the same themes enacted at various levels of intellectual dis-