Induction proceeds from the certain to the uncertain, or so it is commonplace to say. On the contrary, induction is inference from uncertain evidence to uncertain conclusions. This conception of induction will be articulated below. Before turning to this matter, let me explain why I bother.

Philosophers have argued that the acceptance of statements in science and other epistemically virtuous enterprises should not be explicated as inductive inference from evidence to hypothesis. The reasons are multiple. Some philosophers maintain that the distinction between observation terms and theoretical terms is untenable because observation is laden with theory and presupposes it. Hence, they conclude, it would be misleading to construe the acceptance of theories as based on inductive inference from observational evidence to theoretical conclusions. Others deny that any evidence statements are beyond rejection. They aver that any statement in science may be cast aside to obtain greater explanatory simplicity or coherence. Still others contend that scientific acceptance depends upon social factors within science, upon who wins the social revolutions of science. All of these contentions suggest the most fundamental reason philosophers have for rejecting the model of scientific acceptance based on inductive inference, to wit, that rejection and acceptance is influenced by conceptual change, by radical shifts in the way we conceive of the world, rather than being based simply upon inference from evidence to hypothesis.

The theory of inductive inference without certainty, which I shall champion, can accommodate all of the preceding considerations within a theory of inductive inference. Indeed, such considerations motivate my program. The fact of conceptual change leads to the conclusion that there are no certain and irrefutable evidence statements constituting the foundations of inductive inference. If a statement is certain, then there is no chance that it is wrong. But there is some chance that any contingent statement is wrong as may be illustrated by reflecting on the conceptual revolutions of the past. There is some chance that we shall arrive at the
conclusion that any concept lacks a denotation. The concepts of demons and entelechies are now on the junk heap of discarded concepts, and perhaps tomorrow the concepts of mind and existence may join them. There is a chance however slender you might think it is. Consequently, if we restrict the base of evidence to what is certain, we shall be so restricted that there will be nothing to infer. Instead, we shall abandon certainty to obtain richer epistemic fruits from the tree of inductive inference.

I

Let us now turn to the positive task of constructing a theory of inductive inference without certainty. We must first solve the problem of choosing evidence statements when nothing is certain. Some might appeal to observation to fill the emptied coffers of evidence, but we have noted that to do so may land us in doubtful dealings. Moreover, since observation statements are not certain, we are unjustified in restricting evidence to what is observed.

Instead of appealing to material conditions of adequacy, we shall begin with some quite abstract conditions to be satisfied by a selection rule for evidence statements. They are as follows.

E1. If $e$ is an evidence statement and $d$ is an evidence statement, then so is the conjunction of $e$ and $d$.

E2. There is some evidence statement $T$ which entails every evidence statement. $T$ is a statement of total evidence.

E3. A statement $T$ of total evidence is logically consistent.

The first condition tells us that the conjunction of evidence is evidence. The second says that some statement entails every evidence statement; a conjunction of all evidence statements would be such a statement, though it would be infinite in length. The third tells us that our evidence statements must not contradict each other. All of these conditions are to be understood as relative to a person and a time. It is the evidence of a person at a time that must satisfy these conditions. Within a theory of uncertain evidence, what is evidence at one time might not be evidence at another, and, moreover, what is evidence at one time might be inconsistent with what is evidence at another.

A rule for the selection of uncertain evidence statements satisfying