Closely connected to traditional attempts to distinguish between observation terms and theoretical terms (which focused on semantical or ontological issues) were debates about confirmation, in particular, debates about whether and how claims about observables could rationally confirm claims about theoretical entities, now and better understood as those things which cannot be observed. At least one problem about confirmation is that evidence about observables underdetermines claims about unobservable entities both in scope, in that observable evidence can at best bear an inductive relationship to claims about unobservables, and in content, in that evidence is about observables, and so claims about unobservables are made immediately problematic. While the underdetermination of theory by data has long been a recognized problem for scientific methodologists, since the publication of van Fraassen’s *The Scientific Image* and through the more recent *Images of Science*, discussants have focused on problems of justification in science and have re-interpreted the traditional problem of distinguishing observation terms from theoretical terms about unobservables as an epistemological problem. Even if we can have justified belief about the referents of observation terms, can we have justified belief about unobservable objects and events? One reason that van Fraassen’s constructive empiricism has been controversial is that he explicitly equates observables with those things about which we can have justified belief, leaving beliefs about unobservables forever unjustified. Since, for van Fraassen, observables are those things which can be humanly perceived using unaided sensory modalities, most of our scientific posits are ipso facto unobservable and beliefs about them unjustified. Consequently even if we can observe and form justified beliefs about geiger counters, we can neither observe nor form justified beliefs about alpha-particles and quantum events. In order to show that
we can have justified belief about things with which we cannot have sensory contact, many contemporary realists have sought to refute van Fraassen’s claim that the objects of justified belief must be observable. Their project amounts to producing a principle for justified belief for the problematic entities. All the while most epistemological realists maintain with van Fraassen that the class of observables is correctly limited to those things about which we can gain information using unaided human senses.

Should we continue to assume that observable objects are limited to those which can be perceived through the senses? I will argue that there are compelling reasons for extending the category of observables to include many objects and processes which are not objects of sensory perception. It is an assumption in the following discussion that objects of sensory perception are observable. But once we examine the conditions for sense perception, we find that the senses exhibit systematic characteristics, in particular, characteristics of componential structure and causal interactiveness which allow signal transmission from the sensory object to the sensory organ. These systematic characteristics are generalizable and, as a matter of empirical fact, non-sensory sorts of processes can satisfy the same systematic conditions. So, from the point of view of what it takes for a system to be an observation system, non-sensory systems can be observation systems as well as our sensory modalities can. If so, then it is plausible to regard observables as those things which form one terminus of an observation system. On this view sensory systems are but one type of observation system, and perceivables are one type of observable which do not exhaust the class.

In order to argue for the systematic quality of observation, it is important to see that the problem of observation is different from the problem of theory-ladeness of observation terms, and both are different from the problem of cognition or observing that. For this discussion it will be non-problematic that observation terms are theory-laden. An available body of common beliefs, laws, and theory tells us how we can expect particular objects to behave; objects have dispositions to behave in the law-like ways described by the theories from which the terms which refer to them derive their meaning. As van Fraassen has pointed out, from the fact that all terms are theory-laden, it by no means follows that there is no distinction between things which are observable and