A belief is justified by its explanatory role in a system of beliefs. Some beliefs are justified because of what they explain, and other beliefs are justified because they are explained, but every belief that is justified is so either because of what it explains or because of what explains it. These doctrines formulate a theory of justification which I shall label 'explanationism'. The theory has much support among contemporary philosophers, even though it is rarely stated this explicitly, and no general defense of it will be attempted here. Instead, I shall assume that the theory is correct and then proceed to consider two problems that must be solved by a philosopher who is committed to explanationism. The first problem concerns the question of how those basic beliefs which provide what is to be explained as well as what is to do the explaining can be justified within this theory. The second problem concerns the question of when a hypothesis is inductively justified and how inductive justification can be specified in terms of explanation. I shall attempt to formulate these problems with greater precision below, and, having done so, propose solutions to them.

Before considering the two problems mentioned above, I shall make some basic remarks concerning the nature of explanation. It has been argued by many philosophers that there are a great variety of ways in which something may be explained, and these various forms of explanation may all be considered scientific. So much diversity makes it more difficult to provide any general analysis of explanation. Hence my remarks shall be restricted to presenting some considerations that are important for my subsequent argument.

One form of explanation that has received considerable philosophical attention is that which explains some fact by deducing the fact to be explained from some law or theory and certain antecedent conditions. The attempts to analyze this familiar form of explanation have met with
greater difficulty and less success than one would initially expect. There is no analysis of such deductive explanation to which I would subscribe. However, certain results are clear enough. For my purposes the most important of these is that a deductive explanation may contain the fact to be explained as an essential conjunctive component. Thus, it is no objection to an explanation that the very thing to be explained occurs as an essential conjunct in the statement that constitutes the explanation.

To see that this is so, suppose that \( E \) is a premiss that would suffice for both the deduction and the explanation of some fact \( F \). Now anything that is logically equivalent to \( E \), which has exactly the same logical content as \( E \), must also suffice for the deduction and explanation of \( F \). However, \( E \) is logically equivalent to a conjunctive statement, namely, the conjunction of \( F \), which is a deductive consequence of \( E \), and the statement \( F \gg E \). It is obvious that \( E \) is equivalent to the conjunction of \( F \) and \( F := J E \), because from that conjunction we may deduce \( F \) and \( E \), and from \( E \) we may deduce the conjunction. Moreover, if \( E \) explains \( F \), then \( F \gg E \) will not explain \( F \). Thus in order to explain \( F \) in terms of the conjunction of \( F \) and \( F \gg E \), we need to employ \( F \) as a premiss to deduce \( E \) which explains \( F \). So \( F \) is essential in the conjunction for the explanation of \( F \); if \( F \) is dropped from the conjunction, the remaining conjunct will prove insufficient for the explanation of \( F \).

A more concrete example may be more illuminating if more controversial. Suppose we wish to explain why a certain animal \( a \) is sterile, and this is explained by the fact that \( a \) is a mule and the law that all mules are sterile. From the conjunction of this fact and law we can deduce and explain that \( a \) is sterile. However, the statement '\( a \) is a mule and all mules are sterile' is logically equivalent to the statement '\( a \) is sterile and (\( a \) is sterile \( \gg [a \) is a mule, and all mules are sterile])'. The second major conjunct of the latter statement '\( a \) is sterile \( \gg (a \) is a mule, and all mules are sterile)' is not a statement from which we may deduce '\( a \) is sterile' and therefore is not sufficient to explain the fact that \( a \) is sterile. Indeed, it is only by using the first conjunct '\( a \) is sterile' that we can derive the statement '\( a \) is a mule, and all mules are sterile' which does explain the fact in question. Thus the statement '\( a \) is sterile' is essential in the conjunction for the explanation of the fact that \( a \) is sterile. Therefore, an explanation may be satisfactory even though it contains a statement of the thing explained as an essential conjunct in the statement of the explanation.