11. CONSILIENCE OF INDUCTIONS AND THE PROBLEM OF CONCEPTUAL CHANGE IN SCIENCE

If, in our induction, every individual case has actually been present to our minds, we are sure that it will find itself duly represented in our final conclusion: but this is impossible for such cases as were unknown to us and hardly ever happens even with all the known cases; for such is the tendency of the human mind to speculation, that on the least idea of an analogy between a few phenomena, it leaps forward, as it were, to a cause or law, to the temporary neglect of all the rest; so that, in fact, almost all our principal inductions must be regarded as a series of ascents and descents, and of conclusions from a few cases, verified by trial on many.... The surest and best characteristic of a well-founded and extensive induction, however, is when verifications of it spring up, as it were, spontaneously, into notice, from quarters where they might least be expected, or even among instances of that very kind which were at first considered hostile to them. Evidence of this kind is irresistible, and compels assent with a weight which scarcely any other possesses.

—Sir John F. W. Herschel

_A Preliminary discourse on the study of natural philosophy_, 1830

I. In recent papers by L. Laudan, M. B. Hesse, and others, and in my "Whewell’s Logic of Induction," interesting and perhaps important questions have been raised concerning the concept of consilience of inductions. The name of the concept, if not the concept itself, was invented by William Whewell, who made quite extravagant claims for cases of historical consilience (for example, the Newtonian synthesis), holding that consilience of hypotheses constitutes a test of truth, and that whenever consilience occurs the laws in the resulting theories are necessary truths. Whewell’s own idiosyncratic metaphysics and epistemology attempted justifications of these claims, but I do not find evidence that any recent writers are disposed to become full-bodied disciples of Whewell. Apart from a certain inevitable aesthetic appreciation of the intricacies of his full metaphysics of science, there is little in Whewell’s complete system that has philosophical appeal for
today’s philosophers of science. Whewell’s writings abound in large and unrecoverable logical slips (of some of which he was enormously proud), and often in reading him one awakens from the sweet sleep induced by his Victorian prose and desperately looks for an argument, only to find a kind of suggestive philosophical poem instead.

Realizing these peculiarities of Whewell’s own philosophy, none of the recent writers has attempted to revive Whewell’s inductive logic as a viable alternative to any of today’s logics. Laudan’s task was to show that Whewell’s concept of consilience entails that the most important consiliences occur where a certain maximally acceptable level of corroboration of a theory has been reached, thus attempting to save one crucial empirical factor in a philosophy of science that is otherwise seventeenth-century rationalistic through and through. Hesse’s interest has been in seeing whether she can reconstruct something like Whewell’s consilience in the context of normal probabilistic confirmation theory; and she has concluded that confirmation theory alone will not capture the Whewellian notion that consiliences increase confirmation of laws. In my earlier paper, the analysis of consilience that I give seems to me to accord pretty well with Hesse’s conclusions about consilience, though I also agree with Laudan that there is something important about the concept that is worth retaining and talking about. That paper argues that Whewell’s inductive logic actually involves two logics, one the standard hypothetico-deductive method (of which Whewell’s exposition is masterful), the other a merely suggested methodology that would count consiliences of inductions as marks of the acceptability of laws or theories. In the second methodology, consilience counts along with simplicity as a measure of the acceptability of a theory.

Of course, one runs into problems on my line of analyzing Whewell’s inductive logic. Whewell clearly accepted the hypothetico-deductive method—for him induction is the inverse of deduction—and insisted to the end that all proper scientific systems be cast in deductive form. Given this fact, coupled with our present understanding of the defects in the hypothetico-deductive methodology, we should conclude that Whewell’s references to consiliences as tests of truth should be read as suggesting that consilience, like simplicity, is an extraevidential test of theories. However, in an important recent paper, Wesley Salmon has