As anyone aware of the current intellectual scene has probably noticed, there has recently been a virtual explosion of interest in narrative and in theorizing about narrative; and it has been detonated from a remarkable diversity of sites, both within and beyond the walls of academia. Along with progressively more sophisticated and wide-ranging studies of narrative texts—historiographic, literary, cinematic, psychoanalytic—we find a burgeoning development of disciplinary appropriations or mediations: narrative and psychology, narrative and economics, narrative and experimental science, narrative and law, narrative and education, narrative and philosophy, narrative and ethnography, and so on, as well as numerous, newly negotiated cross-disciplinary approaches. The large question I want to ask is, Why? Why narrative? And, more particularly, why narrative now? Why have we decided to heed the story, to trust the tale? And what does this say about how we define, talk about, and organize knowledge? Initially, though (and this is the object of this essay), I think it is necessary to scan the field with this thematics in mind, to take, first, a long view and quickly chronicle what I want to call the narrativist turn, and then to close in and follow some of the different paths that it takes. I want to examine the way narrative, as both a subject and tool, is configured and described from diverse disciplinary and methodological positions.

As odd as it may seem, until about twenty-five years ago, I think it is safe to say that narrative qua narrative was very little discussed. To be sure, from the time of the Greeks, innumerable examinations of narrative features have been part of the ongoing study of literary, religious, and historiographic texts. Considerations of plot, strategies of telling, generic differentials, and narrative hermeneutics and semantics—how stories produce meaning (in historiographic and religious, as well as in literary
discourse) — all have marked critical inquiry from its beginnings, and up through its various institutional and professional manifestations of the last hundred years. Yet, it is only quite recently that narrative itself has moved from the periphery to the centre, from the role of ancillary or adjunct to a position of control, even of dominance. Discussion typically no longer focuses on the narrative features of a play, biblical story, historiographic text, or film, but rather on the narrative nature of those texts, or on those yet-to-be-identified features themselves that make us call something a narrative, above, below, or within any phenomenal manifestation. Narrative, like 'grand' or 'meta' concepts such as language or reason, has begun to leave the reflected light of specific disciplinary, institutional, or methodological arenas and become a source of illuminary convergence itself. Story is no longer in the spotlight, but the lamp by which other things are seen.

During the last twenty years the study of narrative moved away from what were formerly dominant semiotic — or narratological — perspectives, focused primarily on literary texts — such as Gérard Genette's Narrative Discourse and Mieke Bal's Narratology, and moved towards approaches deriving from a more diverse range of conceptual and disciplinary orientations, directed towards an equally diverse range of objects.¹ A sample list of these kinds of investigations might include the following: Paul Ricoeur's three-volume Time and Narrative, Mark Freeman's Rewriting the Self: History, Memory, Narrative, Donald McClone's If You're So Smart: The Narrative of Economic Expertise, Didier Coste's Narrative as Communication, Carolyn Abbate's Unsung Voices: Narrative in Nineteenth Century Music, Robert Cover's Narrative, Violence, and the Law, Kathryn Hunter's Doctors' Stories: The Narrative Structure of Medical Knowledge, Denis Jonnes's The Matrix of Narrative: Family Systems and the Semiotics of Story, Livia Polanyi's Telling the American Story: From the Structure of Linguistic Texts to the Grammar of a Culture, Jonathan Rée's Philosophical Tales, Marie-Laure Ryan's Possible Worlds, Artificial Intelligence, and Narrative Theory, Gayle and Raphael Ormiston's Narrative Experiments: The Discursive Authority of Science and Technology and, not unexpectedly, various metacritical overviews of these diverse positions, such as Donald Polkinghorne's Narrative Knowing and the Human Sciences, Thomas Leitch's What Stories Are: Narrative Theory and Interpretation, Wallace Martin's Recent Theories of Narrative, Philip J.M. Sturgess's Narrativity: Theory and Practice, and Gerald Prince's Dictionary of Narratology (see also Adams; Britton and Pellegrini; Brooke-Rose; Brooks; Cornis-Pope; DeConcini; Egan; Fisher; Flynn and Judovitz; Geisner; Holiday; Kerby; Landau; Lloyd; Pfeil; Rashkin; Singer; Smith and Morris; Welsh; Young). These works examine narrative as much in non-textual as in textual forms, as it relates not only to cultural products, but to communication theory, cognition, therapy, memory, and artificial intelligence. Specifically literary modes of analysis are, moreover, seen less in these studies than methods of investigation deriving from history, philosophy, pragmatics, sociolinguistics, and even the more empirical wings of the social sciences. As Ursula Le Guin has put it: having looked at the histoire or the what of narrative, and the discours or the how of narrative, what has seemed most pressing in the last fifteen years is to look at the pourquoi, or the why of narrative and to re-examine its potential contribution to questions and disciplinary assumptions that had formerly been approached in other ways and by other means.

Yet, the difficulty in coming to terms with recent narrative theory is not only its diversity, but also its ubiquity. 'Narrative,' as Hayden White has noted, 'is a mode of verbal representation so seemingly natural to human consciousness that to suggest that it is a problem might well appear pedantic. But it is precisely because the narrative mode of representation is so natural to human consciousness, so much an aspect of everyday speech and ordinary discourse, that its use in any field of study aspiring to the status of a science must be suspect' (The Content of the Form 26). Virtually any attempt to provide a description of events or phenomena in time — concrete or abstract, fictional or factual, formal or informal — invariably takes a more or less narrative form. Even the cursory sketch of late-twentieth-century narrative theory that I am now attempting to offer could itself be examined in terms of a narrative problematic. How should one organize the series of phenomena into an interlinked causal chain? What would one need to produce a proper plot? And wouldn't it be necessary to find some thematic 'armature' that would make for this story's tellability? To see, in this case, for instance, the recent obsession with narrative forms of interpretation and understanding as a response to (or compensation for) our current climate of anti-foundationalism, post-structuralism, and/or postmodernism — a response, that is, to the breakdown of transcendental truth-claims, to various overturnings or assaults on formerly hegemonic logico-deductive and patriarchal models of reason and knowledge. And, furthermore, could such a story be seen as the same sort of construct as one dealing with human agents? Can a narrative, that is, be composed of ideas, concepts, or intellectual categories rather than representations of people?

To look at the grounding of criteria for such orderings and plottings of past events or phenomena (including textual ones) has traditionally been
the province of philosophy, particularly philosophy of history. Yet, as in other disciplines, it is only in the past twenty-five years that narrative itself has become the primary problematic. To be sure, important work was carried out on historiographical narrative and its attendant epistemological and cognitive issues before the recent narrativist turn by Arthur Danto, R.G. Collingwood, W.B. Gallie, and Maurice Mandelbaum, to name a few. But those thinkers were operating largely within a narrative-science dialectic, whose theorizing was formulated in agonistic relationship to Hempelian covering-law models, or to distinctions between analytic and non-analytic modes of historiographic thinking.

Those studies, as it were, remained debate- or discipline-specific, like comparably important examples in literary theory, such as Scholes and Kellogg’s immensely suggestive *The Nature of Narrative*. In the one case the question of narrative was posed only in terms of rival philosophic theories of historiography and its attendant problematics of representing and explaining the past; in the other it was posed in terms of a diachronic movement of the ‘narrative tradition,’ which was perceived as travelling essentially from oral to written literary forms. These developments were also complicated, to some degree, by a theory-practice split: the writers of history frequently resists or ignored engagement with the self-reflexive examination of theoretical presuppositions and methodological questions brought up in, say, journals like *History and Theory*, frequently by members of other disciplinary persuasions, just as literary critics and exegetes questioned the relevance of global pronouncements on narrative that were being put forward by linguists, semioticians, and literary theorists. Beginning with Hayden White’s profoundly influential *Metahistory: The Historical Imagination in Nineteenth-Century Europe*, and continuing with his work, along with that of Paul Ricoeur, William Dray, Louis O. Mink, Paul Veyne, F.R. Ankersmit, David Carr, and Michel De Certeau, right up to the present, narrative becomes, as it did in the literary/linguistic community, less a dialectical counterweight, or binary alternative, than a fertile field of inquiry in its own right (see also Kellner; Porter). At the same time, as was also the case with literary theory, the more narrative itself moved towards the centre of discussion, the more entrenched disciplinary presuppositions and bankrupt theory-practice distinctions became augmented, dialogized, or reconstituted. White is probably the first, and certainly the most significant, theorist of narrative to ignore disciplinary and methodological restraints; drawing from the rhetorical and tropological theories of Vico and Kenneth Burke, the archetypal literary theories of Northrop Frye, the cognitive theories of Jean Piaget, the ideological theories of Karl Mannheim, and the epistemological theories of Stephen Pepper, he developed an eclectic yet incisive set of instruments for investigating narrative’s discursive complexity – teasing out its ideological and aesthetic components as well as its hermeneutic and representational ones.

Even though historiography is the dominant object of White’s gaze, it is the dialogical cross-disciplinarity of his view, manifested both in the breadth of his methodology and in the kinds of problems he confronts, that places him, along with Paul Ricoeur, probably the only other narrativist ‘generalist’ of comparable scope and multidisciplinary dexterity, at the centre of current narrative study. Although Ricoeur is concerned more with the continental philosophic tradition, temporality, and textuality than White, and works from a phenomenological/hermeneutic rather than an ideological/cultural perspective, both theorists, like some of the others mentioned above, place narrative at the nodal point of current inquiry into the human sciences and critically interrogate its own investigatory possibilities: they are concerned not only with asking what have been circumscribed as traditional literary questions – how narrative operates, how it can be categorized and judged – but also what narrative is (philosophical questions), and, to some degree, even more importantly, why it is, and what it does, and even what it does now (sociopolitical questions).

Some critics see this narrativist turn, particularly in historiographic theory, as a final and belated shedding of a formerly reigning ‘mimetic epistemology common to positivism and traditional narrative,’ a ‘constructivist’ replacement, as Dominick LaCapra argues, of the ‘matching’ or miming function of consciousness by that of the ‘making’ function (posisio) (76). As F.R. Ankersmit puts it, the historiographic narrativist’s new sensitivity to problems of language and rhetoric allows reflective thinking about history ‘finally to catch up with the developments in philosophy since the work of Quine, Kuhn, and Rorty’ and thus to enter fully into ‘the contemporary intellectual scene’ (‘Dilemma’ 21). As this view would have it, the prematurely aging philosophy of history, in a kind of last-ditch effort, has gone through a retraining program so that it can keep up with its more youthful disciplinary teammates: it, in short, can now proudly wear the uniform of philosophy again. Yet, as helpful as this kind of description (or progressive narrative?) might be for explaining some aspects of the new narrativist impulse, it falls back, I think, too much on some of the methodological and institutional constraints that...
It is important that the narrations of the analyses convey in some form the drama of the quest, with all its uncertainties and difficulties, and the timeless of the mode of investigation itself. These features of analysis are lost in single, combinatorial, linear, life histories. Consider in this regard each of Freud's great case reports—Dora, Little Hans, the Ratman, and the Wolfman. Although each one of these includes...summary retellings, in the main each is a narrative of the analysis itself. Or perhaps, taking Freud's accompanying theoretical and methodological remarks into account as well, one should say that each case report is better described as a narrative of Freud's continuing creation of psychoanalysis. I think that the widely recognized literary power of these case studies stems from their artful and brilliant telling of how arduously, and often uncertainly, Freud was creating psychoanalysis. (Narrative Actions 45)

To put this in more narratological terminology, Freud's theoretical speculations and methodological remarks function to create what Barthes calls 'a dilatory space' for the swerves, hesitations, and unravellings of the analysand's narrative, just as the overdeterminations and transferral complications in the analysand's story function to create hermeneutic gaps in Freud's.

Yet, while engaged in his double narrative discourse—telling the story of psychoanalysis against and through the psychoanalysis of his patients' stories—Freud himself still longed to participate in the anti-narrative language of nineteenth-century science and, consequently, never seemed to feel entirely comfortable with his own theoretical tools. For example, just at the point of bringing up the highly vexed question of homosexuality in 'Dora (A Case of Hysteria),' Freud engages in another apology for the narrativization of his theory and again separates himself from the writer of fictional stories:

I must now turn to consider a further complication to which I should certainly give no space if I were a man of letters engaged upon the creation of a mental state like this for a short story, instead of being a medical man engaged upon its dissection. The element to which I must now allude can only serve to obscure and effect the outlines of the fine poetic conflict which we have been able to ascribe to Dora. This element would rightly fall a sacrifice to the censorship of a writer, for he, after all, simplifies and abstracts when he appears in the character of a psychologist. But in the world of reality, which I am trying to depict here, a complication of motives, and accumulation and conjunction of mental activities—in a word, overdetermination—is the rule. (7:59-60)²

Yet, from our narrativist perspective, as both Schafer and Brooks, and indeed many others, have shown in their various ways, we have become aware that the force and meaningfulness of narrative—fictive or not—is dependent not on censorship, simplification and abstraction, not on linearity and the ego, but on Freud's own 'rule,' the rule of overdetermination, and the temporally complex accumulations and conjunctions of desire, of the id. What Schafer, in fact, criticizes in current psychoanalytic case studies is the same thing that Freud criticizes in literary narratives—their singular, unidirectional plots, their avoidance of the messiness of the unconsciousness, of the fundamental untidiness of what Freud here calls 'the world of reality.'

That theories of this world have at our historical moment become narrativized may say as much about the theories as about the world, and perhaps even more about the institutional and disciplinary structures through which both are currently formulated and disseminated. But why this should be the case now, why at this time we want to hear the story, is a question that must remain for the next phase of this project.

NOTES

1 For a sampling of some of these primarily literary/linguistic or semiotic studies of narrative see the various special journal issues on narrative in New Literary History, Poetics Today, and Critical Inquiry, and Bal; Chambers; Chatman; Cohen and Shires; DuPlessis; Fehn, Hoesterey, and Tartar; Fleischman; Gelley; Genette; Hawthorn; Hite; Kermode; Kort; D.A. Miller; J. Hillis Miller; Prince; Rabinowitz; Reid; Rimmon-Kenan; Sternberg; Tilley; Toolan.

2 Danto's Narration and Knowledge, in fact, can be seen to revolve around the narrativist turn in philosophy of history: it was originally published, in a shorter form, under the title Analytical Philosophy of History (New York 1964).

3 In Consequences of Pragmatism, Rorty writes: 'The contrast between the old and the new [in philosophy] is no longer a contrast between an immature prescientific and a mature scientific stage of discussion of a common set of problems, but a contrast between styles—the "scientific" style and the "literary" style. The former style asks that premises be explicitly spelled out rather than guessed at, that terms be introduced by definitions rather than by allusion. The latter style may involve argumentation, but that is not essential; what is essential is telling a new story' (220). See also Norris, 'Philosophy as a Kind of Narrative.'
4 'Scientific knowledge,' Lyotard goes on to say, 'cannot know and make known that it is the true knowledge without resorting to the other, narrative, kind of knowledge, which from its point of view is no knowledge at all' (29). There are, as Lyotard notes elsewhere, various 'grand narratives under which one attempts to order the crowd of events: Christian narrative or redemption through love of the Adamic fault, aufklärer narrative of emancipation from ignorance and servitude through knowledge and egalitarianism, speculative narrative of the realisation of the universal Idea through the dialectics of the concrete, Marxist narrative of emancipation from alienation through the socialisation of work, capitalist narrative of emancipation from poverty through technico-industrial development. Between these narratives there is scope for litigation ... But all situate the data brought by events in the course of history whose end-point, even if it remains out of reach, is called universal liberty, acquital of humanity as a whole' (quoted in Bennington, 161). Richard Rorty, in 'Postmodernist Bourgeois Liberalism,' sees Lyotard’s metanarratives as 'stories which purport to justify loyalty to, or breaks with, certain contemporary communities, but which are neither historical narratives about what these or other communities have done in the past nor scenarios about what they might do in the future' (Objectivity Relativism, and Truth 199).

5 In 1977, for example, Lyotard wrote: 'It is not at all a question of [civil societies as networks of narratives] standing heroically against States in a sort of death-defiance ... If uncertain and ephemeral networks of narratives can gnaw away at the great instituted narrative apparatuses, it's by multiplying somewhat lateral skirmishes as was done [in France] in the last decade by women who had had abortions, by prisoners, by conscripts, by prostitutes, by students, by peasants' (quoted in Bennington, 114).

6 For example, Rorty, in 'Freud and Moral Reflection,' sees Freud’s contribution to a larger "decentering" movement of thought' and its moral ramifications largely in terms of narrative construction and integration. Freud’s work, according to Rorty, enables us to put together 'richer and more plausible ... narratives tailored ad hoc to the contingencies of individual lives.' These stories are 'more plausible because they will cover all the actions one performs in the course of one’s life, even the silly, cruel, and self-destructive actions.' Moreover, 'Freud helped us to see that the attempt to put together such a narrative – one that minimizes neither the contingency nor the decisive importance of the input into the machine that each of us is – must take the place of an attempt to find the function common to all such machines.' Yet, he goes on to say, we must 'see the narratives of our own lives as episodes within ... larger historical narratives,’ for ‘historical narratives about social and intellectual movements are the best tools to use in tinkering with ourselves, for such narratives suggest vocabularies of moral deliberation in which to spin coherent narratives about our individual lives' (Essays on Heidegger and Others 143, 161, 163).

7 Freud is, of course, partly speaking of the prudery of the literary world of his day, the literary writer’s inability to deal openly with, say, homosexuality ('the element'). But his criticism seems to be directed much more centrally at the over-simplifications of narrative causation that he perceived in certain fictional plots. I say ‘certain’ because there is no doubt that Freud was also aware of the kinds of ‘complications of motives,’ of overdeterminations, to be found in narratives, as in Oedipus, from which, it might be said, he developed the very notion of overdetermination.

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NARRATIVE EXPLANATIONS:
THE CASE OF HISTORY

PAUL A. ROTH

Narratives are stories, a telling that something happened. A narrative explanation, presumably, presents an account of the linkages among events as a process leading to the outcome one seeks to explain. Examples of explanations in a story-like format are readily found in history books, certain anthropological accounts, case histories in psychoanalytic writings, and the sort of stories one hears daily from students and colleagues as to why this paper was not done or that committee meeting was not attended. The use of narratives to explain is unquestioned; what is subject to philosophical dispute is whether this habit is to be tolerated or condemned.

An important focus of this dispute is not the fact that much is obscure with regard to the notion of narrative. Rather, objections arise because the notion of explanation is deemed by some clear enough to rule out any category of narrative explanation, no matter how “narrative” is to be understood.

Indeed, the very idea of a narrative explanation invites two objections. The first I term methodological. It runs as follows. Explanations have a characteristic logical form. And while the precise constituents of narrative form are a subject of much study and debate in literary theory, there exists a prima facie distinction between narratives and the standard form of a proper scientific explanation. Specifically, narratives relate discrete events; they do not invoke laws. The methodological complaint, in other words, is that narrative structure is too far from the form of a scientific explanation to count as an explanation. There cannot be narrative explanations, then, because such a category runs afoul of a received explication of “explanation.”

This objection is closely associated, of course, with positivism. Although my purpose in this paper is not to review the too familiar debate inspired by positivist models of historical explanation, I sketch reasons for believing that much of the debate—both pro and con—on the form of historical explanation is misguided.

The second objection I call metaphysical. This objection may be formulated in the following way. The academic division of labor is such that while, for example, historians work to construct true accounts of the past, philosophers toil to understand by what marks the truth may be known. Any satisfactory analysis of the notion of explanation, and so of historical explanation, should reveal the conditions which must be satisfied if that explanation is to be counted true. Attention to narrative form, however, slights this critical point. Since analyses of narrative structure underline the parallels between history and fiction, the study of narrative is not going to illuminate the relevant differentia of historical expla-
nations. The complaint, in brief, is that emphasis on narrative structure situates historical practice too close to the writing of fiction. So the category of narrative explanation is rejected given the nature of narrative and its contrast to the purpose of historical inquiry.

Notice that the objections require only the assumption that history is a non-fiction discipline. This hardly seems disputable. Yet, if non-fiction, history either is a science or it is not. If it is, then narrative explanations will not do for formal or methodological reasons. But suppose, if you wish, that history is not science-like. Perhaps the nature of historical inquiry is only to provide an understanding of events. To invoke a traditional distinction, history is an *idiographic* and not a *nomothetic* discipline. Historians, on this account, study unique and non-repeating occurrences, or, at least, what is unique about events.¹

Yet even on this conception of history, a question remains concerning how to verify a narrative. And the issue of verification does not intersect, in any obvious or interesting way, with the issue of narrative form. The extent to which history respects canons of narrative construction might influence the literary merit of that history. But it hardly seems relevant to determining the conditions under which that history is true. Thus, whether the emphasis of an historian’s task is taken to be explanation or is defined as understanding, verificationist concerns seem to rule out the relevance of narrative form.

Both of these objections, I argue, are ill-founded. The reasons in each case are quite different. The methodological objection and the dispute regarding the status of historical explanation can be disposed of by undercutting the view of knowledge which motivates it. The metaphysical objection is more subtle and stubborn. It is with this objection that I am primarily concerned. What is metaphysical about the objection is that it assumes a correspondence theory of historical knowledge. This assumption, I argue, is incoherent.

A consequence of rejecting this correspondence view is that it no longer makes sense to speak of historical narratives as true or false. At first blush, this sounds troubling. I suggest why, properly understood, it is not. Concluding considerations related to the suggested logic of narrative explanation are meant to illuminate why the failure of narrative form as such to be true or false engenders no special problem for assessing the objectivity or explanatory utility of narratives *qua* explanations.

Why insist on the Procrustean exercise of rendering histories into a format dictated by the current favorite model of scientific explanation? The problem is what it means to do science. A remark by Hempel offers a glimpse of what lies at the heart of this issue. “The necessity, in historical inquiry, to make extensive use of universal hypotheses of which at least the overwhelming majority come from fields of research traditionally distinguished from history is just one of the aspects of what may be called the methodological unity of empirical science.”²


The methodological objection, this suggests, is not tied to the viability of some particular model of scientific explanation, such as the covering-law model; the issue is what disciplines yield knowledge. Hempel's remark points to the fact that behind the old debate on the applicability of the covering-law model to history is the unity-of-method thesis.

Positivism attempted to legislate to the republic of letters a general criterion of what could count as knowledge. Is there still a basis for mandating that some one form or other is, for example, the form of explanation? The failures of positivism remain a source of important and instructive lessons. Perhaps the most instructive failure can be seen in the history of the efforts, beginning with Carnap's *Aufbau* and continuing to Hempel's "Empiricist Criteria of Cognitive Significance: Problems and Changes," to provide a reconstruction of scientific knowledge by their own standards. Positivism was done in by its own best advocates. It ceased to be a viable research program not for reasons tangential to its concerns, such as an inability to provide a plausible reconstruction of historical explanation. The failure took place at the heart, in the discovery that its methods were inadequate and inappropriate to characterize scientific explanation. The broader epistemological objections later developed by Quine and by Sellars argued convincingly that the problems are irremediable.

The question of what to count as an explanation becomes, in part, a question of the use of this term. The methodological objection assumes that a proper subset of disciplines ought to serve to define for the rest what this standard is. This debate on explanation has interesting parallels to the problem I have elsewhere termed the *Rationalitätstreit*. This problem concerns whether standards of rationality vary radically or whether one may insist, following Martin Hollis, on the "epistemological unity of mankind." Each side of this debate, I maintain, is committed to a view I dubbed "methodological exclusivism." Exclusivists (of whatever stripe) presume that there is exactly one correct methodological approach to a subject matter. Yet, once the philosophical presumptions of methodological exclusivism are exposed, exclusivism loses its appeal.

As to explanation, it is worth reminding ourselves there is no good reason to believe that there is just one correct explication of the notion of explanation. Such claims to explication come to have a purely stipulative or legislative force in the absence of some notion of analyticity.

My suggestion has been that the methodological objection presupposes the plausibility of some exclusivist explication of explanation. These explications appeal, in the case at hand, either to the unity-of-method thesis or some implicit notion of analytic equivalence. Only by presupposing such problematic philosophical doctrines does one justify demands either for countenancing or failing to countenance narrative as a form of explanation. Indeed, there is no clear candidate for the title of the logic of explanation.

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4. I discuss this issue further in *Meaning and Method in Social Science: A Case for Pluralism* (Ithaca, 1987).
ASPECTS of
And Other
Scientific Explanation

Carl G. Hempel

Essays in the Philosophy of Science

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1965
similarities and differences between different areas of empirical inquiry, except for indicating that the procedures used in those different areas will be taken to conform to certain basic standards of objectivity. According to these standards, hypotheses and theories—including those invoked for explanatory purposes—must be capable of test by reference to publicly ascertainable evidence, and their acceptance is always subject to the proviso that they may have to be abandoned if adverse evidence or more adequate hypotheses or theories should be found.

A scientific explanation may be regarded as an answer to a why-question, such as: 'Why do the planets move in elliptical orbits with the sun at one focus?', 'Why does the moon look much larger when it is near the horizon than when it is high in the sky?', 'Why did the television apparatus on Ranger VI fail?', 'Why are children of blue-eyed parents always blue-eyed?', 'Why did Hitler go to war against Russia?'. There are other modes of formulating what we will call explanation-seeking questions: we might ask what caused the failure of the television apparatus on Ranger VI, or what led Hitler to his fateful decision. But a why-question always provides an adequate, if perhaps sometimes awkward, standard phrasing.

Sometimes the subject matter of an explanation, or the explanandum, is indicated by a noun, as when we ask for an explanation of the aurora borealis. It is important to realize that this kind of phrasing has a clear meaning only in so far as it can be restated in terms of why-questions. Thus, in the context of an explanation, the aurora borealis must be taken to be characterized by certain distinctive general features, each of them describable by a that-clause, for example: that it is normally found only in fairly high northern latitudes; that it occurs intermittently; that sunspot maxima, with their eleven-year cycle, are regularly accompanied by maxima in the frequency and brightness of auroral displays; that an aurora shows characteristic spectral lines of rare atmospheric gases, and so on. And to ask for an explanation of the aurora borealis is to request an explanation of why auroral displays occur in the fashion indicated and why they have physical characteristics such as those just mentioned. Indeed, requests for an explanation of the aurora borealis, of the tides, of solar eclipses in general or of some individual solar eclipse in particular, or of a given influenza epidemic, and the like, have a clear meaning only if it is understood what aspects of the phenomenon in question are to be explained; and in that case the explanatory problem can again be expressed in the form 'Why is it the case that \( p \)?', where the place of \( p \) is occupied by an empirical statement specifying the explanandum. Questions of this type will be called explanation-seeking why-questions.

Not all why-questions call for explanations, however. Some of them solicit reasons in support of an assertion. Thus, statements such as 'Hurricane Delilah will veer out into the Atlantic', 'He must have died of a heart attack', 'Plato would have disliked Stravinsky's music' might be met with the question 'Why should this be so?', which seeks to elicit, not an explanation, but evidence or grounds or reasons in support of the given assertion. Questions of this kind will be called reason-seeking or epistemic. To put them into the form 'Why should it be the case that \( p \)?' is misleading; their intent is more adequately conveyed by a phrasing such as 'Why should it be believed that \( p \)?' or 'Why are there reasons for believing that \( p \)?'

An explanation-seeking why-question normally presupposes that the statement occupying the place of \( p \) is true, and asks for an explanation of the presumptive fact, event, or state of affairs described by it; an epistemic why-question does not presuppose the truth of the corresponding statement, but on the contrary, solicits reasons for believing it true. An appropriate answer to the former will therefore offer an explanation of a presumptive empirical phenomenon; whereas an appropriate answer to the latter will offer validating or justifying grounds in support of a statement. Despite these differences in presuppositions and objectives, there are also important connections between the two kinds of question; in particular, as will be argued later (in sections 2.4 and 3.5), any adequate answer to an explanation-seeking question 'Why is it the case that \( p \)?' must also provide a potential answer to the corresponding epistemic question 'What grounds are there for believing that \( p \)?'

In the discussion that follows, I will first distinguish two basic types of scientific explanation, deductive-nomological and inductive-statistical, each characterized by a schematic "model"; and I will examine certain logical and methodological questions to which these models give rise, including a number of objections that have been raised against them. Following this, I propose to assess the significance and adequacy of the basic conceptions inherent in these models by exploring the extent to which they can serve to analyze the structure and to illuminate the rationale of different kinds of explanation offered in empirical science.

2. DEDUCTIVE-NOMOLOGICAL EXPLANATION

2.1 FUNDAMENTALS: D-N EXPLANATION AND THE CONCEPT OF LAW. In his book, How We Think,1 John Dewey describes a phenomenon he observed one day while washing dishes. Having removed some glass tumblers from the hot suds and placed them upside down on a plate, he noticed that soap bubbles emerged from under the tumbler’s rims, grew for a while, came to a standstill

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1. Dewey (1910), chap. VI.
and finally receded into the tumblers. Why did this happen? Dewey outlines an explanation to this effect: Transferring the tumblers to the plate, he had trapped cool air in them; that air was gradually warmed by the glass, which initially had the temperature of the hot suds. This led to an increase in the volume of the trapped air, and thus to an expansion of the soap film that had formed between the plate and the tumblers' rims. But gradually, the glass cooled off, and so did the air inside, and as a result, the soap bubbles receded.

The explanation here outlined may be regarded as an argument to the effect that the phenomenon to be explained, the explanandum phenomenon, was to be expected in virtue of certain explanatory facts. These fall into two groups: (i) particular facts and (ii) uniformities expressible by means of general laws. The first group includes facts such as these: the tumblers had been immersed in soap suds of a temperature considerably higher than that of the surrounding air; they were put, upside down, on a plate on which a puddle of soapy water had formed that provided a connecting soap film, and so on. The second group of explanatory facts would be expressed by the gas laws and by various other laws concerning the exchange of heat between bodies of different temperature, the elastic behavior of soap bubbles, and so on. While some of these laws are only hinted at by such phrasings as 'the warming of the trapped air led to an increase in its pressure', and others are not referred to even in this oblique fashion, they are clearly presupposed in the claim that certain stages in the process yielded others as their results. If we imagine the various explicit or tacit explanatory assumptions to be fully stated, then the explanation may be conceived as a deductive argument of the form

\[
\begin{align*}
\{C, C_2, \ldots, C_k\} & \quad \text{Explanans } S \\
L_1, L_2, \ldots, L_r & \\
\hline
E & \quad \text{Explanandum-sentence}
\end{align*}
\]

(D-N)

Here, \(C_1, C_2, \ldots, C_k\) are sentences describing the particular facts invoked; \(L_1, L_2, \ldots, L_r\) are the general laws on which the explanation rests. Jointly these sentences will be said to form the explanans \(S\), where \(S\) may be thought of alternatively as the set of the explanatory sentences or as their conjunction. The conclusion \(E\) of the argument is a sentence describing the explanandum-phenomenon; I will call \(E\) the explanandum-sentence or explanandum-statement; the word 'explanandum' alone will be used to refer either to the explanandum-phenomenon or to the explanandum-sentence; the context will show which is meant.

The kind of explanation whose logical structure is suggested by the schema (D-N) will be called deductive-nomological explanation or D-N explanation for short; for it effects a deductive subsumption of the explanandum under principles that have the character of general laws. Thus a D-N explanation answers the question 'Why did the explanandum-phenomenon occur?' by showing that the phenomenon resulted from certain particular circumstances, specified in \(C_1, C_2, \ldots, C_k\), in accordance with the laws \(L_1, L_2, \ldots, L_r\). By pointing this out, the argument shows that, given the particular circumstances and the laws in question, the occurrence of the phenomenon was to be expected; and it is in this sense that the explanation enables us to understand why the phenomenon occurred.

In a D-N explanation, then, the explanandum is a logical consequence of the explanans. Furthermore, reliance on general laws is essential to a D-N explanation; it is in virtue of such laws that the particular facts cited in the explanans possess explanatory relevance to the explanandum phenomenon. Thus, in the case of Dewey's soap bubbles, the gradual warming of the cool air trapped under the hot tumblers would constitute a mere accidental antecedent rather than an explanatory factor for the growth of the bubbles, if it were not for the gas laws, which connect the two events. But what if the explanandum sentence \(E\) in an argument of the form (D-N) is a logical consequence of the sentences \(C_1, C_2, \ldots, C_k\) alone? Then, surely, no empirical laws are required to deduce \(E\) from the explanans; and any laws included in the latter are gratuitous, dispensable premises. Quite so; but in this case, the argument would not count as an explanation. For example, the argument:

The soap bubbles first expanded and then receded

The soap bubbles first expanded

2. A general conception of scientific explanation as involving a deductive subsumption under general laws was espoused, though not always clearly stated, by various thinkers in the past, and has been advocated by several recent or contemporary writers, among them N. R. Campbell ([1920], [1921]), who developed the idea in considerable detail. In a textbook published in 1934, the conception was concisely stated as follows: "Scientific explanation consists in subsuming under some rule or law which expresses an invariant character of a group of events, the particular events it is said to explain. Laws themselves may be explained, and in the same manner, by showing that they are consequences of more comprehensive theories." (Cohen and Nagel 1934, p. 397.) Popper has set forth this construal of explanation in several of his publications; cf. the note at the end of section 3 in Hempel and Oppenheim (1948). His earliest statement appears in section 12 of his book (1935), of which his work (1959) is an expanded English version. His book (1962) contains further observations on scientific explanation. For some additional references to other proponents of the general idea, see Donagan (1957), footnote 2; Scriven (1959), footnote 3. However, as will be shown in section 3, deductive subsumption under general laws does not constitute the only form of scientific explanation.