Inference to the Best Explanation
Harman, 1965
van Fraassen, 1989
Lipton, 1991

Since Lipton's account was published after van Fraassen's criticisms of the theory, but it gives a more substantive account of Inference to the Best Explanation than Harman's article, the plan of attack here is to lay out Harman's and Lipton's theories of Inference to the Best Explanation (IBE), and then evaluate the most charitable interpretation of IBE against van Fraassen's objections. I hope this non-chronological approach will allow us to see more clearly what van Fraassen and Lipton have to say to one another, and how Lipton's account fills in and/or departs from Harman's earlier account.

I. IBE

Scope: what kinds of questions seek explanations? IBE is a theory of *nondeductive inference*. Harman says IBE is a theory of nondeductive inference that includes, but is broader than, 'enumerative induction'. Van Fraassen's criticisms of IBE are made on the assumption that it purports to replace traditional ideals of induction. According to Lipton, IBE accounts for how we answer any inductive question that can properly be construed as a request for an explanation-- all why questions, and many how/what questions, if we answer them by way of an 'explanatory detour'.

What sort of inferences are we making?
We'll be considering different versions of IBE. Generally, any inference to the best explanation will be made from a set of premises that can be expressed generically:

$\{H_1, \ldots, H_n\}$	The field of hypotheses or candidate explanations from which we're selecting the 'best' explanation
E	The explanandum (evidence, data; phenomenon to be explained)
H_b is the 'best' explanation of E in e	The assertion that one of the candidate hypotheses is the best explanation of E, where 'e' is the *context* in which the inference occurs

From this generic set of premises, however, different versions of IBE infer different things.

$Pr(H_b \mid E) > Pr(H; \mid E)$	Infer that the best explanation is the one that is more *probable* [note: this would be *deductive* inference to Harman]
H_b	Infer that the best explanation is *true* (Harman)
One should *believe* H_b (It is *warranted* to believe H_b) One should *accept* H_b One should *act on* H_b	Infer that various different epistemic responses to the premises are called for (Lipton)

Two broad questions all versions of IBE have to address:

1. What's the relationship of the 'best' explanation to *truth* and *knowledge*? (potential v. actual explanations (Lipton), knowledge of our purported explanations (Harman), challenge to IBE's objectivity (van Fraassen)).
2. How can we give content to the idea of a 'best' explanation? (non-trivial, non-question-begging, and non-arbitrary)

Harman.

Harman's characterization of IBE:

> one infers, from the premise that a given hypothesis would provide a 'better' explanation for the evidence than would any other hypothesis, to the conclusion that the given hypothesis is true. (89)

Keeping in mind the two general questions above, Harman takes for granted some things that Lipton will take the time to articulate and defend:

(1) By 'any other hypothesis', Harman should refer be referring to any other hypothesis *that we know of.*

(2) Harman brackets the problem of how to judge what counts as the best hypothesis in a given situation, presuming such judgments will be based on characteristics like

> simplicity
> plausibility
> 'explaining more' (explanatory power/breadth or depth), and
> being more or less 'ad hoc', etc.

He does give two necessary conditions for an explanation's being the 'best':

$Pr(H_b \mid E) > Pr(H; \mid E)$	H_b must be the most *probable* explanation
$Pr(E \mid H_b) > Pr(E \mid H;)$	The explanandum must be more *likely* on H_b

Harman's argument in part I:

(a) "there are many inferences which cannot be made out to be applications of enumerative induction"

(b) "we can account for when it is proper to make inferences which appear to be applications of enumerative induction, if we describe these inferences as instances of the inference to the best explanation." (91)

In support of (a), Harman mentions a number of inferential scenarios in order to demonstrate the intuitive inadequacy of enumerative induction as a description of our general inferential practices.

He then suggests in support of (b) that ordinary enumerative induction is warranted only when this sort of inference provides the best explanation of the evidence we're trying to explain. So any application of enumerative induction must be justified by its being an instance of inference to the best explanation.

In part I it is not clear that Harman has *argued* for the inadequacy of enumerative induction ((a), above), but at least he has made it intuitively plausible to suppose that we should look further for a better general description of our inferential practices.

Similarly with respect to (b), above, since Harman has not yet given real content to the rule of thumb that we should always infer to the best explanation, it seems to me that he has only made it intuitively plausible thus far to think that inference to the best explanation could be used to rule in or rule out applications of enumerative induction.

Harman's argument in part II:

IBE has the advantage over other models that it answers questions about the conditions under which a particular inductive inference is warranted. This impacts our ability to say we *know* what we have inferred in a given instance:

> our ordinary judgment of when there is and when there is not knowledge [must] be accounted for in terms of our belief that the inference involved must make use of certain lemmas...the use of these lemmas can be understood only if the inference is in each case described as the inference to the best explanation. (92)

The idea is that we can best satisfy conditions shown to be necessary by Gettier's counter-examples if we understand the process of inference as making an inference to the best explanation.

Lipton.

Lipton's characterization of IBE:

> our inferential practices are governed by explanatory considerations. Given the data and our background beliefs, we infer what would, if true, provide the best of the competing explanations we can generate of those data (so long as the best is good enough for us to make any inference at all). (58)

Lipton fleshes out his account of Inference to the Best Explanation in terms of two distinctions:

(1) actual vs. potential explanations

(2) likeliest vs. loveliest explanations

Actual vs. Potential Explanations:

IBE must be construed as Inference to the Best *Potential* Explanation. This strengthens the account in three ways:

(1) it "allows for the distinction between warranted and successful inferences"

(2) since we can incorrectly infer explanations, it "permits the competition between explanations to take place among incompatible hypotheses" (as opposed to hypotheses all of which must be true).

(3) lastly, since it does not assume pre-existing knowledge of which explanation is the 'actual' one in order to infer an explanation, inference to the best potential explanation "gives an account that is epistemically effective." That is, it is non-question-begging (it doesn't define 'best' as 'actual'). (60)

Likeliest Vs. Loveliest Explanations:

the *likeliest* explanation is the explanation that is 'most warranted'.

the *loveliest* explanation is the explanation which provides the most understanding, or is the most explanatory (assuming it is true).

It would be question-begging to construe IBE as Inference to the *Likeliest* Explanation, because what we're looking for in the first place is "a model of inductive inference to describe what principles we use to judge one inference more likely than another..." (62) Inference to the Loveliest Potential Explanation provides this. It suggests that

> the explanation that would, if true, provide the deepest understanding is the explanation that is likeliest to be true. (63)

Therefore, we ought to construe IBE as Inference to the Loveliest Potential Explanation, and attempt to give "an account of explanatory loveliness that is conceptually independent of likeliness" (64)

Summary of purported IBE pros:

scope-- covers most or all inductive inference

flexibility-- it can account for inference in many different contexts in service of answering different kinds of questions

ability to deal with objections/problem cases that pose problems for other theories (see Lipton pp.69-70) (consider Fred Fox on birth control, and the pre-eminence example)

loveliness of IBE (the theory accounts for itself or recommends itself)

compatibility with scientific realism

ability to account for scientific conclusions as knowledge (thanks to Harman)

II. IBE challenges/objections

Van Fraassen.

Van Fraassen rejects the idea that explanatory considerations can provide a rule to govern inference. In light of the failure of "traditional ideas of induction," van Fraassen considers Inference to the Best Explanation as a candidate "ideal of induction" and finds it wanting. (131) He defines such an ideal as

> a rule of calculation, that extrapolates from particular data to general (or at least ampliative) conclusions. Parts of the ideal are
>
> (a) that it is a *rule*,
>
> (b) that it is *rationally compelling*, and
>
> (c) that it is *objective* in the sense of being independent of the historical or psychological context in which the data appear, and finally,
>
> (d) that it is *ampliative*. (132)

Objection:

> Inference to the Best Explanation is not what it pretends to be, if it pretends to fulfill the ideal of induction. As such its purport is to be a rule to form warranted new beliefs on the basis of the evidence, the evidence alone, in a purely objective manner. It purports to do this on the basis of an evaluation of hypotheses with respect to how well they explain the evidence, where explanation again is an objective relation between hypothesis and evidence alone. (142)

breakdown: IBE fails (c) above because it selects the best explanation from the pool of potential explanations which are historically given, instead of selecting from among all possible explanations. As a consequence, it fails (b) and is unjustified in drawing any sort of 'ampliative' conclusions. The 'ampliative' characteristic (d) would be stemming from some ungrounded faith in the likelihood that the actual explanation is likely to be among the explanations that have been proposed.

Van Fraassen considers several possible responses that a proponent of IBE might make to this objection:

Privilege: "we are by nature predisposed to hit on the right range of hypotheses." (143)

Force majeure: we have to believe *something* from among the choices available to us, so we are forced to believe in the best explanation of the evidence that we can find. van Fraassen responds that being forced to act on one hypothesis or another does not entail belief in the chosen hypothesis.

Retrenchment, form 1: the best explanation has certain features which increase the likelihood of its truth (but do not make it certain).

Voltaire's objection/incompatibility of IBE with empiricism: Lipton calls this "Voltaire's objection": the concern is that loveliness may in fact have no relation to truth. (73-74) van Fraassen says that empiricism ("the position that experience is our one and only source of information") entails that "if we do have innate or instinctive or inborn expectations, will be just lucky if they lead us aright, and not like lemmings into the sea." (144)

Giving content to 'best': There are several different aspects to this potential problem: Per Lipton: one is "the suspicion that Inference to the Best Explanation is still nothing more than Inference to the Likeliest Cause in fancy dress, and so fails to account for the symptoms of likeliness." Barring that, we have either the concern that "explanatory loveliness is too subjective and interest relative to give an account of inference that reflects the objective features of inductive warrant," or the concern that loveliness may in fact have no relation to truth. (73-74)