

Chapter 37

Two Promising Responses to the Thesis that Inductive Reasoning is Not Justificatory Reasoning

Each of the seven responses we examined in the previous chapter sought to show that we can have well-founded beliefs about the future. Some sought to show this by attempting to establish that inductive reasoning is justificatory reasoning after all, some sought to show it by attempting to establish that nature is uniform or law abiding. We have left open the possibility that one or another response will succeed, should it be developed further. Frankly, though, each seems hopeless.

Neither of the two responses we will examine in this chapter seeks to show that inductive reasoning is justificatory reasoning or that there is any such thing as rational expectation. Indeed, both responses accept that the argument developed in chapters 31 and 32 is sound and, so, both begin from the contention that inductive reasoning is not justificatory reasoning. More generally, both begin from the contention that there is no such thing as rational expectation. Both responses, that is, accept that no one is any more reasonable in expecting one thing to occur than in expecting anything else to occur. Each attempts, rather, to show that we can still be very much at home in a world in which our experience of things going one way rather than another gives us no reason for thinking that things will now also go one way rather than another. They attempt to make us feel at home by establishing that we can be principled in adopting certain methods of investigating the world and rejecting others. Since these responses accept that there is no such thing as rational expectation, each must establish the possibility of adopting and rejecting methods of investigation on principle without supposing that by applying those methods we increase our chances of coming to have true beliefs about the future.

1. The method of conjecture and refutation

We believe many general propositions about the things around us. We believe, for instance, that bread nourishes us, fire burns us, and water extinguishes fire. These beliefs make no specific reference to the past or the future or the here or the there but cover all times and places. Now, what we take to be scientific investigation of the world often aims at generating such generalizations and offering them for our acceptance. The task of science, at least in part, is to find exceptionless generalizations—generalizations that, if true, would serve to explain why the world works as it does. We can call an integrated collection of such generalizations or laws a body of scientific understanding. (We ought not call it a body of scientific knowledge, for we wish to allow that parts of it might be false.)

According to the argument of chapters 31 and 32, though, we can have no reason for thinking any empirical generalization true. We can have no reason for thinking any empirical generalization true no matter how often it has been put to the test and passed it. Generalizations of the sort with which empirical science deals outrun all evidence, of course, but, as we know, the problem is deeper than that. The problem is that we have no reason to think that what we call evidence actually is evidence, for our belief that it is evidence rests, at

best, on a circular argument, and so really rests on nothing. We have no reason to believe even the best confirmed empirical generalization of which we are aware. (Re-read section 1 of the previous chapter, the section on the appeal to regularity.)

Many people are extremely troubled by this result. But *should* they, should *we*, be troubled by it? The first response we will consider in this chapter says that no, we should not be troubled by the fact that noting that a generalization has passed one, two, a million tests is never any reason for thinking that that generalization is true. We ought not be troubled by this fact, for we can, at least in principle, justifiably conclude from noting that a generalization *failed* a test that that generalization is *false*. What we take to be evidence of falsity is, according to this response, something we can *with reason* take to be evidence of falsity. Noting this is the key to believing something rationally. We should not be troubled by the idea that we can never with reason believe a generalization true, for sometimes we can with reason reject a generalization as false.

Our trouble with the thought that inductive reasoning is not justificatory reasoning comes from the mistaken idea that warrant in belief comes from the source of the belief. A belief arrived at inductively, then, we think, is likely true because of its provenance. When we realize that its source in inductive reasoning does not make it likely true (or, more accurately, that we have no reason for thinking that its source in inductive reasoning makes it likely true), we feel that everything solid has melted into air. But it never was the case that warrant in belief is a matter of from whence the belief came. Once we have a generalization in mind, one that we believe or otherwise accept, what makes us rational in accepting it is our willingness to test it. And not to test it to see whether it is true or likely true, for that we cannot do. Instead, our rationality in holding true a generalization consists in our willingness to test that generalization and to find it false. If we find it false, we are rational in rejecting it; if we fail to find it false, we are rational in holding it another day. It is of no moment whether we arrived at the generalization inductively or in some other way. What matters is whether we are open to finding that generalization false by putting it to severe tests.

Believing some generalization rationally is not a matter of the source of one's belief. It is, instead, a matter of testing one's belief, and testing it such as to refute it if it is false. And nowhere in one's attempt to refute a generalization does one employ inductive reasoning. That is the central idea behind the response we are calling the method of conjecture and refutation.

Let us describe what the method of conjecture and refutation is before returning to the question whether in applying this method we have a principled distinction between reason and unreason. First of all, we must distinguish firmly between the context of invention and the context of justification. The context of invention (or of discovery or creation) is the context within which one formulates some generalization about the world. The context of justification is the context within which one puts that generalization to the test. (Whether one believes the generalization true or simply finds it worth investigating doesn't matter to anything. Believe it if believing it makes you happy.) From the point of view of reason, the generalization one entertains is an idea, a conjecture, an hypothesis, a guess.

The question how one came to have one's idea and the question whether one's idea is true are two very different questions. According to the method of conjecture and refutation, only one of those two questions is at all interesting, and that is the question whether one's idea

is true. How one came to have one's idea is merely a psychological question about its origin or source. One might have come to have one's idea through induction from a set of instances.

Or one might have come to it by listening to someone else. Or one might even have dreamt it. The important point here is that how one came to one's idea is entirely irrelevant to the question whether one's idea is true. Since justification is a matter of reasons for thinking that a belief is true or, at least, not false, the source of one's idea has nothing to do with whether one is justified in holding that idea.

It is difficult for us to accept that facts about the context of invention have no relevance to the context of justification. One reason it is difficult for us to accept this is that generalizations that occur to us often seem plausible. They *feel* true. But plausibility, one must remember, is a merely psychological matter. That you find one hypothesis plausible and another implausible has nothing to do with whether the one hypothesis is more likely true than the other or whether you should reject the other and embrace the one. That you find one plausible and the other implausible has to do entirely with facts about you.

Let us return to describing the method of conjecture and refutation. Suppose we have formulated some generalization—that pure water under the pressure of one atmosphere boils at 100° Celsius, say. Now we enter the context of justification (or, perhaps, we refuse to enter it and dogmatically hold our generalization true; we'll say more about dogmatism later). The context of justification is the context of criticism and testing—it is the attempt to refute the generalization, to show that it is false. Criticism can come from any direction. We might criticise our generalization as inconsistent with past observations or with other generalizations we hold. We might criticise it for failing to explain something. We might criticise it as irrefutable. (A generalization is irrefutable when we cannot conceive of an occurrence that would show it to be false.) None of these criticisms, should one apply to it, need be fatal to our generalization, though we would want to address any that do apply. Let us suppose that our generalization is consistent with past observations and with other generalizations we hold, that its truth would explain something, and that such-and-such an event's occurring would show our generalization to be false. Our task now, as critical researchers, is to put our generalization to the test.

Now no generalization is directly testable independently of a great lot of other things we hold true or, at least, assume to be true. We test not simply a generalization but a generalization within a host of suppositions, which we can call auxiliary hypotheses. To test a generalization we first deduce from it, given our auxiliary hypotheses, an observation we would make were we to bring about certain conditions. We deduce from our generalization that pure water under the pressure of one atmosphere boils at 100° Celsius that were this sample of pure water to be put under the pressure of one atmosphere and raised to 100° Celsius, we would see it boil. Having deduced from our generalization this statement of what we would observe were the generalization true, we then, second, bring it about that this sample of water is under the pressure of one atmosphere and raised to 100° Celsius. Third, we pay careful attention to see whether it boils. If it doesn't boil, we can say, with reason, that some proposition somewhere is false. We are able to say, with reason, that it is our generalization that is false if we are warranted in thinking that our deduction was valid, that the sample was pure, that we succeeded in putting the sample under the pressure of one atmosphere and raising it to 100° Celsius, and that indeed it did not boil. We might be mistaken about any of this,

though we can have good reason for thinking we are not. If we are warranted in thinking the test was conducted properly, then we have good reason for rejecting our generalization as false. Back to the drawing board we go—or, in our present lingo, back into the context of invention we go. If, though, we are warranted in thinking that the test was conducted properly and we find that the water does boil, we can conclude—... nothing. That our generalization passed the test does not give us any reason to think that it is true. We are simply entitled to continue to entertain our generalization, for we have uncovered no reason to think it false. We may remain in the context of justification.

Again, the context of justification is the context in which one criticises one's conjecture or hypothesis, finally by putting it to the test. First, take one's idea, and, together with a set of auxiliary hypotheses, deduce a statement describing an observable consequence of the idea.

The statement derived deductively from the idea and the auxiliary hypotheses will be to the effect that if this-and-this happens, then that-and-that will happen, where one has a clear idea of what both this-and-this and that-and-that happening look like (or sound, taste, smell, or feel like). Second, arrange to have this-and-this happen. Third, see (hear, etc.) whether that-and-that happens. Having followed these steps, one has put one's idea to the test.

If, having brought about this-and-this, that-and-that does *not* happen, then you have reason to think that there's something wrong somewhere, either with your idea or with one or another auxiliary hypothesis. Back to the drawing board you go, to generate a new idea or to add or subtract an auxiliary hypothesis. If that-and-that *does* happen, though, then you will know that...—well, you will know that your idea has not on this one occasion been falsified. And that is all that you will know. Your idea has survived one test, so it is yours to test again.

Rationality, at least with regard to holding conjectures in science, consists in putting one's conjectures to the test and revamping them should they fail. Rationality does not consist in looking to confirm one's conjectures. No generalization (which ranges over innumerable cases) can be confirmed by any finite set of observations. Look instead, then, to *refute* your conjectures.

—But wait!, you exclaim. —This method of conjecture and testing says nothing about when it is reasonable to *believe* that such-and-such *will* happen. It does not address the problem of rational expectation, the problem of in virtue of what it is rational to expect an occurrence of one sort rather than not to expect an occurrence of that sort. (After all, some say, we want from a response to the claim that inductive reasoning is not justificatory reasoning an account of what makes it reasonable to expect *this* to happen and unreasonable to expect *that* to happen.) Suppose [you continue] that I have a large fund of conjectures each of which has passed many stringent tests. I draw on that fund when designing a bridge. Am I not reasonable to expect that that bridge will hold under the conditions for which it was designed? Could I just as reasonably expect that the bridge will collapse before the tenth car crosses it? (And would I not have been unreasonable to have drawn on a fund of untested conjectures in designing it?)

The answer to your question is that you are neither reasonable nor unreasonable to expect that the bridge will hold. After all, according to the response we are investigating, there is *no* account of reasonable expectation. You are *not* more reasonable in expecting the sun to rise tomorrow than to find yourself in darkness.

–But I *want* an account of reasonable expectation! And surely it is reasonable to expect one from what is supposed to be a solution to the problem of induction!

A partisan of this response will let Mick answer: You can't always get what you want. Your bridge, on the response we have called the method of conjecture and refutation, is but one more test of your pet conjectures. (–Don't tell this to the motorists who will use it, please!) If your bridge holds, the conjectures on which you drew in designing it survive as hypotheses for another day.

We need now to return to the hope expressed in the opening two paragraphs of this chapter. The concern we expressed was whether this response, the method of conjecture and refutation, enables one to feel at home in the world even though inductive reasoning is not justificatory reasoning and there is no such thing as a rational expectation. The key to understanding whether this response is satisfying lies in the distinction between the critical person and the dogmatic person. The critical person is one who strives conscientiously to formulate testable hypotheses that, if true, would explain much about the world, and who works hard to show these generalizations to be false. The dogmatic person is one who holds fast to generalizations she would like were true and who looks only for positive instances to confirm them. When a problem case occurs, she attempts to explain it away or to reformulate her generalization so that it is immune to refutation—anything other than reject as false her understanding of things. Both the critical person and the dogmatic person can conjecture that all crows are black, but the critical person searches to find a non-black crow while the dogmatic person piles up sightings of black crows. If there are any white crows, the dogmatic person either misses seeing them (as she is not looking for them) or declares that no *real* crow is white.

Now most of us, of course, are neither entirely critical nor entirely dogmatic. But to the extent that we approach the critical end of the continuum, we can be happy at least that we are open minded and concerned to reject as false those views of ours that are false. The dogmatic person, on the other hand, has no way to divest herself of whatever falsehoods and illusions she lives under. And her awakening, should it ever come, will be rude and painful (or so we conjecture).

2. The pragmatic vindication

We have better practical or pragmatic reason to use induction when thinking about how the future will go than to use any other method of which we can conceive. The issue isn't what rational warrant we have to be confident that predictions got inductively will be confirmed; the issue, actually, is what rational warrant we have to prefer to generate predictions inductively than to generate them other ways. The issue, according to the response we can call the pragmatic vindication of reasoning inductively, isn't an issue of being rational in belief; it is, rather, one of being rational in emotion (in our likings or preferences) or in action (in our ways of doing things).

Remember that while we usually reason inductively when thinking about the future, and often do so just as a matter of course (we can't help ourselves), reasoning inductively is not the only way in which people ever come to expect things and it is not the only method by which they fashion predictions. People settle in mind what will happen next in all sorts of ways. Some people consult the stars while others read palms or entrails or tea leaves. Some

look for omens revelatory of divine intentions. Some seek the opinions of authorities or without thinking just fall in with the consensus. On occasion we reason almost counter-inductively, figuring that we are overdue for a surprise. And sometimes a person will simply expect to happen what he most wants to happen (or what he most fears will happen). The question, then, is which method to use when thinking about what will happen next or further down the road—induction or something else? Now it is true that few of us would accept that a prediction's being in line with what the tea leaves say gives one any reason to think that that prediction will come true; but, then, for those of us convinced by the argument of the first two chapters of this Part of the text, that one came to a prediction inductively doesn't give one reason to think that that prediction will come true, either. So we won't be able to justify our preference for one method over another on the grounds that our preferred method is the more reliable one. Nonetheless, according to the response we are now considering, we can have excellent reason to prefer to fashion predictions inductively than to arrive at them in any other way.

Again, we cannot defend the claim that induction will continue reliably to generate true predictions; yet we continue to reason inductively when thinking about the future and to prefer to reason inductively rather than to read tea leaves or to expect to happen whatever would most please us. According to the pragmatic vindication of our preference for reasoning inductively, we can defend our preference for reasoning inductively. We can defend our preference for, the fact is, we have nothing to lose and everything to gain by reasoning inductively, while that isn't true of any other method of generating predictions. This result gives us practical reason to use induction, even if we have no theoretical reason to think induction reliable.

The argument meant to vindicate our preference for induction over other methods of generating predictions begins with the observation that either strong inductive arguments with true premises will continue reliably to generate true predictions (as they have in the past) or strong inductive arguments with true premises will cease reliably to generate true predictions (or, at least, will be less reliable). This premise is clearly true. There is no third possibility.

Notice, though, the argument proceeds, that if induction continues to be reliable, then induction will continue to be no less reliable than any other method of generating predictions could be. On the other hand, if induction ceases to be reliable, then no other method will be reliable, either. These two points imply that when we fashion our expectations some way other than inductively, we can do no better than we would have done had we fashioned them inductively. Therefore, we can have no practical reason to abandon induction in favour of any other method of generating predictions, even as we have no reason to think induction will continue to be reliable. So we have good practical or pragmatic reason to use induction rather than any other method when attempting to generate predictions.

We said that the first premise is clearly true. If the argument fails, then, it must be because of either the second or third premise. What reason do we have for accepting the second premise?

The second premise is that induction will prove as reliable a method of generating true expectations as any method. This premise rests on the thought that if some non-inductive method of generating predictions is reliable, then we can state an inductive argument in favour of any prediction that that method generates. (Suppose that tea-leaf reading reliably generates

true predictions. In that case, we can formulate the following inductive argument: The tea leaves have usually been right in the past; the tea leaves are now saying that the rains will soon come; therefore, likely the rains will soon come. This is an inductive argument that generates exactly the prediction the tea-leaf reading generated.) On the other hand, that induction is reliable, if it is, does not imply that some other method is reliable. Induction, then, is the court in which any supposed method of accurately predicting the future must appear to plead its case.

And what reason do we have for accepting the third premise, the premise according to which if induction ceases to be reliable, then no other method could be reliable, either?

The third premise follows from the claim that what would account for induction's success, to the extent that it has succeeded, is that nature is regular in its operations or that events occur in accordance with natural law. Induction is reliable, if it is, only in virtue of regularities in nature. So, if induction ceases to be reliable, then that must be because there is no regularity in nature. But if there is no regularity, then things happen randomly. *No* method, though, can track randomness. (Again, if any method at all works, induction does; so if induction does not work, then no method will). Therefore, if induction ceases to be reliable, then no method is reliable.

It is important to notice that nothing in this entire argument says or implies that nature is regular or that we can have reason for thinking that it is. Nowhere is induction's past success taken to imply that nature is regular. The argument claims only that if thinking about the future inductively from true premises typically fails to generate true predictions, then there is no regularity in nature, and if there is no regularity in nature then forget it—reliably accurate prediction is simply impossible. So you have every reason to prefer to think inductively than to prefer to do anything else, even as you have no reason to think that thinking inductively will reliably lead you to predictions that will be borne out by the course of events.

The argument meant to vindicate our preference for induction over other methods of forming expectations or generating predictions appears to be sound. We turn now to the question whether we have in this pragmatic vindication of reasoning inductively a satisfactory response to the claim that inductive reasoning is not justificatory reasoning. Does this vindication enable us to feel at home in the world?

If all that we need to feel at home is the sense that our ways and our preferences are not mere arbitrary tastes, tastes that could well get us into trouble, then, yes, that we are vindicated in our preference for thinking about the future inductively should enable us to feel at home. We have seen that in our preference for induction we are not like moths drawn by habit to perish in the flames. Our preference for induction will not generally lead us astray, so long as we are careful to gather as much relevant evidence (relevant by the canons of inductive reasoning, of course) as we can before drawing our conclusions; indeed, a preference for induction is the preference anyone who wishes to predict the future accurately should have, for no method could work any better. We are not justified in believing that the world will unfold as our inductions predict it will, but that doesn't mean that we might as well take up palm reading or simply align our expectations with our fondest wishes for the future. For now, having explored the pragmatic vindication, we see that induction will guide us as well or better than any other method could, no matter how the world turns.