appropriate to certain subject matters. R. G. Collingwood was one such thinker. D. W. Dray in the essay “Historical Understanding as Re-thinking” tries to articulate Collingwood’s view. The reader must evaluate whether the Collingwood-Dray position really is coherent and really is different from the Hempelian view.

5

What Is Explanation?

John Hospers

I

We are sometimes presented with a statement describing some observed fact, and when we ask “Why?” we are presented with another statement which is said to constitute an explanation of the first. What is the relation between these two statements? What is it that makes the second statement an “explanation” of the first? By virtue of what does it explain? Though everyone is constantly uttering statements which are supposed in one way or another to explain, few persons are at all clear about what it is that makes such statements explanations. Nor is the situation clarified when it is declared on the one hand that science explains everything and on the other hand that science never explains at all but only describes.

The question “What is it to explain?” admits of no general answer, for the term “to explain” covers many activities: one may explain how, and why, and whither, and whence, and how much, and many other things. Very frequently when we ask someone to explain what he has just said we are merely asking him to restate his assertion in clearer or simpler words.

In this essay I shall treat only explaining why. Even within this area there are some cases with which we shall not be concerned: one may explain why the angles of a Euclidean triangle must equal 180°, and this is quite different from explaining why iron rusts. The latter is an event or a process, and I shall be concerned solely with explaining why in the special context of temporal events: roughly, why did event X happen, or why do events of class X happen? The illustration from geometry is, I should prefer to say, an example of giving reasons rather than explanations. Another example may further illustrate the point: If you ask me to explain why I hold a certain belief, I may reply by
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giving reasons for it—statements which I take to be evidence for the belief in question. Now, if I am rational, the fact that there is good evidence for \( p \) may explain why I believe \( p \) — that is, the reason for my believing \( p \) may also constitute an explanation of why I believe \( p \). But this may not be so: the explanation of a person's believing in a benevolent Deity may be that he wants a father-substitute or that he needs a protector in a cold harsh world; but when asked to explain why he believes in a benevolent Deity he may cite reasons, e.g. the Argument from Design, which may have nothing to do with why he holds the belief. We shall be concerned here, then, with the explanation of events, not with reasons or evidences one might cite in favour of propositions.

II

What, then, is it to explain why an event occurs? (1) It has sometimes been said that we have explained it if we have stated its purpose. “Why did you walk through the snow for ten miles when you could have taken the bus?” “Because I wanted to win a wager.” “Why does that dog scratch at the door?” “He’s cold and he wants to get in.” When such answers are given we are inclined to feel that our question has been answered and that the event has been satisfactorily explained; and it has been explained with reference to a purpose which some sentient being(s) had in attaining a certain end. This is the most primitive conception of explanation. People like to feel that there is a purposive explanation for everything: if not in terms of human or animal purposes, then of divine ones, or mysterious forces and powers. We tend to extend what holds true of some events to all events whatever; we know what conscious motivation is like from our own experience of it, and so we “feel at home” with this kind of explanation.

We shall examine the scope and legitimacy of purposive explanation later in this paper. It is enough to remark here that if explanation must always be in terms of purpose, then the physical sciences do not explain anything. The properties of uranium, the rise of aeroplanes, the phenomena of magnetism are not explained in terms of any purposes at all; biologists even avoid talking about animal events such as the hen sitting on eggs in terms of purpose. However animistically the nature of explanation may at one time have been conceived, purposiveness is certainly no essential part of its meaning now. The stone is no longer held to fall because it wants to get to the centre of the earth.

(2) Another account of the nature of explanation is that an event has been explained when it has been shown to be an instance of some class of events which is already familiar to us. For example, when a person's behaviour seems strange to us, we are satisfied when it is “explained” to us as being really impelled by the same sort of motives and desires as occur in us, and are therefore familiar to us. “Why is he introducing the man he hates to the woman he loves?” “Because he wants them to fall in love with each other” would not generally be accepted as an explanation, for this very reason. When we observe that a balloon ascends rather than descends, unlike most objects, and it is made clear to us that air has weight and that the gas inside the balloon weighs less than would an equal volume of air, we are satisfied; the phenomenon has been “reduced” to something already familiar to us in everyday experience, such as a dense object sinking in water while a hollow one floats. The event is no longer unusual, strange, or unique; it has been shown to illustrate a principle with which we were already acquainted. When we want to know why gases diffuse when released into a chamber from which the air has been pumped out, the explanation offered by the kinetic theory of gases is satisfactory to us because it asserts that molecules behave like particles with which we are already acquainted in our everyday experience.

Only those who have practiced experimental physics know anything by actual experience about the laws of gases; they are not things which force themselves on our attention in common life, and even those who are most familiar with them never think of them out of working hours. On the other hand, the behaviour of moving solid bodies is familiar to everyone; everyone knows roughly what will happen when such bodies collide with each other or with a solid wall, though they may not know the exact dynamical laws involved in such reactions. In all our common life we are continually encountering moving bodies, and noticing their reactions; indeed, if the reader thinks about it, he will realize that whenever we are passively affected by it, a moving body is somehow involved in the transaction. Movement is just the most familiar thing in the world; it is through motion that everything and anything happens. And so by tracing a relation between the unfamiliar changes which gases undergo when their temperature or volume is altered, and the extremely familiar changes which accompany the motions and mutual reactions of solid bodies, we are rendering the former more intelligible; we are explaining them. (Norman Campbell, What Is Science?, Dover, N.Y., p. 84).

Professor Bridgman holds that all explanation is of this kind: "I believe that examination will show that the essence of an explanation consists in reducing a situation to elements with which we are so familiar that we accept them as a matter of course, so that our curiosity rests" (P. W. Bridgman, The Logic of Modern Physics, p. 37).

And yet I am sure that such a view as this must be mistaken. In the first place, we may seek explanations for the most familiar events as well as of those unfamiliar to us. We may ask why stones fall as well as why aeroplanes rise, and be curious for an answer equally in both cases. True, our motivation for asking the latter question is probably greater because the kind of phenomenon in question is (or was) less familiar; most people would not think to ask it about stones because the falling of stones is familiar and usual—but the question can as legitimately be asked in the one case as in the other. In the second place, the explanation may not be familiar at all: it may be far less familiar than the event to be explained. The discoloration of a painted kitchen
wall when gas heat is used may be a familiar phenomenon to the housewife—surely more familiar than its explanation in terms of the chemical combination of sulphur in the gas fumes with elements in the paint, producing a compound that is dark in colour. Yet this is the true explanation. If the explanation is not familiar, one is tempted to say, it ought to be, as long as it is true. Surely its familiarity is irrelevant to its validity as an explanation. Familiarity is, in any case, a subjective matter—what is familiar to you may not be familiar to me; and yet the explanation, if true, is as true for me as for you.

The only grain of truth in the view that explaining familiar seems to be this: the law that does the explaining may not be familiar, but the fact that the phenomenon in question, such as the flight of an aeroplane, can be subsumed under a law—the fact that the behaviour is lawful and hence predictable—tends to make it less mysterious, less like a miracle, and thus in a sense more familiar. To show that the behaviour of something is lawful is to show it to be a part of the order of nature, and in that sense familiar, although the particular law or laws stating the uniformity may be quite unfamiliar.

In what, then, does explanation consist? The answer, I think, is quite simple: (3) to explain an event is simply to bring it under a law; and to explain a law is to bring it under another law. It does not matter whether the law is one about purposes or not, or whether it is familiar or not; what matters is that if the explanation is to be true (and we surely seek true explanations, not false ones), the law invoked must be true: indeed, this is already implied in the use of the word “law,” which refers to a true, i.e. a really existing, uniformity of nature; if the uniformity turned out to be only imaginary, or having exceptions, we would no longer call it a law.

In saying that explanation is in terms of laws, I use the word “law” in a wider sense than is sometimes employed: in the sense I mean, any uniformity of nature is a law. Thus, it is a law that iron rusts, and it is a law that iron is magnetic—although both of these are usually listed in textbooks as “properties of iron” rather than as laws. In this sense, it seems to me that explaining why something occurs always involves a law. If we ask, “Why don’t the two liquids in the flask mix?” and someone answers, “Don’t you see, the one is transparent and the other is red?” this does not strike us as an explanation (i.e. as a true explanation) of the phenomenon, because we know of no law according to which red liquids will not mix with transparent ones. But when we are told that the red liquid is coloured water and that the transparent liquid is gasoline, we consider the phenomenon to be explained, for we hold it to be a law of nature that water and gasoline do not mix. In the sense in which I am using the word “law,” the non-mixture of water and gasoline is a law; and only if a law is brought in do we have an explanation of the phenomenon.

Sometimes, I should add, all we have available is a “statistical law”—a law not of the form “All A is B” or “Whenever A, then B,” but, e.g., “75 per cent of A is B.” Can such a “law” constitute an explanation? I should be inclined to say that it is, although we would still want an explanation of why 25 per cent of A’s are not B’s. If water did not always boil at 212° F. but did so only 75 per cent of the time, we might explain the boiling of this kettle of water by saying that its temperature had reached 212°, though we would still want an explanation of why the kettle of water next to it, which had also reached 212°, did not boil. In other words, our statistical law would still not answer the question, “Why this and not that?” and in order to answer this question, we would need a non-statistical law of the form, “Under such-and-such conditions, water always boils at 212° F., but under such-and-such other conditions, it does not.” It would seem, then, that a statistical law has in turn to be explained by a non-statistical one, although of course we may not, at any given stage in the progress of science, know of any non-statistical law by which to explain the statistical one.

Another example: “Why does Johnny have a cold?” “Because Johnny has been playing with Roger, and Roger has a cold.” It is not a law that everyone who plays with someone who has a cold also gets a cold; the best we can do here is to state a percentage of cases in which this happens. So far as it goes, this is satisfactory; some uniformity is better than none. And yet, surely, we do not rest satisfied with this; we want to go on and ask why it sometimes happens but sometimes not. And the answer to this question would be a non-statistical law: “People always get colds under such-and-such conditions.” Whether a statistical law can always be explained in terms of a non-statistical one depends not only on our powers of discovery but upon the nature of the universe. It is certainly no a priori truth that nature’s uniformities are all of the 100 per cent variety instead of 75 per cent.

One further qualification: We have said that we explain particular events in terms of laws, and laws in terms of wider laws. But sometimes we give at least tentative explanations of them in terms not of laws but of general hypotheses: if a law is a well-established statement of how nature works, a statement about nature’s workings that is not well established, or perhaps not even probable but only possible, cannot be a law. And yet we can use it to explain a law. But to whatever degree the hypothesis is uncertain, to that degree the explanation is jeopardized. An explanation cannot be known to be true if it involves a hypothesis which (by the definition of “hypothesis”) is not known to be true. Whether the explanation is a true explanation, then, depends on the fate of the hypothesis. (In the “higher reaches” of most sciences, where the most general laws are involved, the only explanations possible are usually those in terms of very general hypotheses.)

III

So much for a general statement of what explanation consists of. I should like now to append some comments and to answer some questions to which the above account may give rise.

1. Thus far we have been content to answer the question “Why does A do B?” by saying “Because all A’s do B.” But there are those who say that such an answer is no explanation at all. “To say that all gases expand when heated,” says Norman Campbell (What Is Science, p. 80), “is not to explain
why hydrogen expands when heated; it merely leads us to ask immediately why all gases expand. An explanation which leads immediately to another question of the same kind is no explanation at all."

I want to insist that the answer given is an explanation of the occurrence in question; to say “Hydrogen is a gas, and all gases expand when heated” is a perfectly satisfactory answer to the question why hydrogen expands when heated. But it is not, of course, an answer to another question—Why do all gases expand when heated? —and this is probably the question which the person meant to ask in the first place. These questions must not be confused with each other; I believe Campbell's position is the result of this confusion. It is fatally easy to telescope (unconsciously) two questions into one, and then be dissatisfied with the answer. Distinguishing them, we get:

**Question 1.** Why does this gas expand when heated?
*Explanation.* It is hydrogen, and hydrogen expands when heated.

**Question 2.** Why does hydrogen expand when heated?
*Explanation.* Hydrogen is a gas, and all gases expand when heated.

**Question 3.** Why do all gases expand when heated?

Here we attempt to give an explanation in terms of the kinetic theory of gases. To criticize Answer 1 because it is not an answer to Question 2, or Answer 2 because it is not an answer to Question 3, is surely a confusion. I want to say that Answer 1 is a perfectly satisfactory explanation for the phenomenon referred to in Question 1, though of course not for those referred to in Questions 2 and 3. But there is a frequent tendency to telescope these questions and demand to Question 1 the answer to Question 3.

The situation may be illustrated in another way. If I ask, "Why did the water-pipes in my basement burst last night?" someone may answer that it is because the basement got too cold, and another may answer that it is because water expands when it freezes, while yet another may say that we do not know the "real explanation" unless we can state why water expands when it freezes. Here, again we must separate the questions:

**Question 1.** Why did the water-pipes break?
*Explanation.* They always do when the temperature falls to below 32°.

**Question 2.** Why do they break when the temperature falls . . . etc.?
*Explanation.* Because the water in them expands when it freezes, and the water on expanding breaks the pipes.

**Question 3.** Why does water expand when it freezes?
*Explanation.* Here we try to answer in terms of the structure of the water-molecule.

But to say that we have not explained (1) until we have explained (3) is grossly to underestimate the number of phenomena for which we do have perfectly satisfactory explanations. That is, we do have explanations for (1) and (2), and our having them is not contingent upon having an explanation for (3).

We could put our point in another way. Logically the answers given to each question in turn are satisfactory explanations; but psychologically they may not be equally satisfying, depending on the previous knowledge of the questioner. To the questioner who knew nothing about the relation of pipes bursting to temperature, the answer "Because they got cold" (to the first question) would be psychologically quite satisfactory, but not to the person who already knew that it had something to do with temperature, for the question he meant to ask was (2) or (3). Again: If I ask why this wire conducts electricity, it is a perfectly good explanation to answer "Because it is made of copper, and copper is a conductor of electricity." Psychologically, however, this answer would not be equally satisfying to everyone; it would be to the person who knew nothing of the properties of copper (or who did not know that this wire was copper), but it would not be to the person who already knew the properties of copper but was really enquiring as to why copper, unlike many other substances, is a conductor of electricity.

2. Can an event have two explanations? Why not? Let us suppose that we want to explain an event E, and that we have a law saying that every time conditions A are fulfilled, E happens, and another law saying that every time conditions B are fulfilled, E happens. A will then be a complete explanation for the occurrence of E, and B will also be a complete explanation. Whether any such state of affairs actually occurs in the world is, of course, another question. Most of the suggested double explanations of events are in fact parts of a single explanation. Thus, for example, if we are asked to explain why the burglar committed the robbery last night, the detective may explain it in terms of his expertise at picking locks, the butler may explain it in terms of the family being out of the room, the maid may say it was because the bedroom window was open, the policeman may say it was because the night was foggy and visibility at a minimum, the sociologist may explain it in terms of the criminal's background of slum conditions, and the psychologist may explain it in terms of psychoanalytical impulses dating from a childhood period marked by intense family quarrels. All these explanations are probably correct enough as far as they go. It may well be that in the absence of any one of these factors the burglary would not have occurred. But these are, it would surely seem, parts and aspects of one complete explanation—and in explaining human actions the whole explanation may be inconceivably complex. Still, the possibility remains that in some cases there may be two separate and complete explanations for an occurrence; at least it cannot be ruled out a priori.

3. Must there be a deductive relation between the thing to be explained and the explanation, such that one can deduce the statement of the phenomenon to be explained from the explanation?
Thus far in enquiring about the need for a deductive relationship, we have
considered only the explanation of particular events: we have deduced them
from two premises, one stating a law and the other stating a particular con-
tion: “All copper conducts electricity; this is copper, therefore this con-
ducts electricity.” “All water freezes at 32° F., the water in the pond went
below 32° last night; therefore the water in the pond froze.” And so on. But, as we saw
earlier, we not only explain particular events; we also explain laws. And
the same question could be repeated here: is the deductive requirement
necessary? There is no doubt that in the “neat, tidy” cases it is fulfilled: for example,
Kepler’s laws of planetary motion can be deduced from Newton’s laws of
motion together with the law of gravitation; and thus the latter clearly explain
the former. But is this strictly a requirement for all explanation of laws?
Again, some would say that it is—that anything short of this is not a full
explanation. Others would say that it is not—that the deductive case is only the
ideal one but that explanation does not require it. For example, a law can be
explained in terms of a very general theory, from which the law cannot be
strictly deduced, but which will nevertheless entitle the theory to be called an
explanation. (The deductivist will reply that it is not known to be an explana-
tion until the acid test, i.e., the deduction, is performed.)

4. In any case, whether deducibility is a necessary condition of explanation
or not, it is not a sufficient condition. One can deduce that this watch will not
work from the premises that watches will not work if gremlins get into them
and that gremlins are in fact in this watch. Yet no one would accept this as an
explanation for the misbehaviour of the watch. Similarly, one might deduce it
from the premises that whatever God wills happens and that God has willed
the misbehaviour of this watch. One can deduce anything if one selects one’s
premises carefully.

One might remark at this point that it is also necessary that the premises be
ture, and that this is the required addition. I would unhesitatingly agree that
the premises must indeed be true—false statements cannot form parts of true
explanations (indeed, if explanation is in terms of law, and a law is a true state-
ment of a uniformity, i.e., one that actually occurs, then this proviso has
already been implicit in our account of explanation). But suppose we make this
proviso explicit—is it enough? I do not believe so. It might be true that God
wills everything that happens, but as long as we have no means of knowing
this, we cannot use it as a premise in our explanation. That is, we cannot use it
as an explanation unless the proposition is not only true, but is known to be so.

Suppose, then, that we accept this last revision—will it do the trick? I hardly
think so; it still misses the main point. Let us imagine a deeply religious scientist
who holds that everything that happens is the result of divine will; he may yet
reject the theological explanation as an account of why things happen as they do.
The reason is surely fairly obvious: what the scientist wishes to discover is why
this happened rather than that, and the theological explanation will not enable
him to make this discrimination: whatever happens, one can deduce it from
the premises that God willed it to happen and that whatever He wills happens.
What condition, then, remains to be supplied? The condition seems to be a rather simple one, yet one which it is difficult to state precisely. What we have in mind is this: we want to eliminate the indiscriminate "explanatory" power of the gremlin-hypothesis and the God-hypothesis, even though they slip through the deductive net, because they do not enable us to explain why this happens rather than that. "What explains everything explains nothing."

This can be put by saying that the explanation must have predictive value, but this is a bit misleading. For one thing, it places undue emphasis upon the future, whereas explanation of past is just as important as explanation of future; we would have, then, to use a tenseless sense of "predict." For another thing, there are many explanations which seem to be true but whose predictive power is minimal or at any rate difficult to see: many biological phenomena can be explained in terms of laws of mutations, for example, but it is not clear what these laws enable us to predict—certainly not where or when a mutation will occur or what kind it will be when it does arise.

Perhaps what we want to say can be best expressed by the simple proviso that the explanation must explain other phenomena than those it is invoked to explain, and yet, unlike the God-hypothesis, not just everything indiscriminately: in other words, it should explain other events (whether past, present, or future makes no difference), but it should all the same be capable of disproof by empirical observations, whether or not any actual empirical observations ever disprove it, it must be capable of testing. Without this condition it would not be considered an explanation in any science.

In fact all this is implicit in our requirement that an explanation be in terms of laws or principles. A law is a universal proposition about all events or processes in a certain class, and if it holds for A, a member of the class (a present event), it also holds for members B, C, and D (future events); thus by the very nature of a law, laws explain more than a single event. The testability of explanations is also implicit in the concept of law, for a law is an empirical statement of a uniformity of nature, and, being contingent, it is always subject to disconfirmation by observation. Still, it is well to make the implicit explicit to show why the deductive requirement is not enough and what more is required of an explanation.

5. In evaluating the extent to which proffered explanations yield us genuine empirical knowledge (i.e. are real empirical laws), much care is required, for in this field the verbal booby-traps in our way are numerous and intricate.

If someone asked, "Why is this object spherical?" and the reply were given, "Because it's globular," everyone would recognize the answer to be trivial because it is analytic. Many so-called explanations do not give much more information than this, although even very bad ones are not usually quite as empty as this one. Even when one says that opium produces sleep because of its dormitive power, we are at least told that it is because of something within it that sleep is produced, not by some outside factor such as the atmosphere. When we ask why hydrogen combines with oxygen to form water, and are told that it is because hydrogen has an affinity for oxygen, again the reply is relatively empty: it tells us only that under certain conditions hydrogen does combine with oxygen but tells us nothing of why hydrogen rather than some other substances does this; but at least we know from the answer that there is a law relating the combination of elements to some set of conditions, though we do not yet know what this law is. And if we ask why the mother cat takes care of her kittens and fights to defend them, and are told that it is because she has a maternal instinct, at least we know that the activity is not a learned one—and this is indeed something—although again the answer may not give us the kind of thing we were asking for. Most explanations in terms of instinct, tendency, affinity, power, and faculty are of this next-to-worthless kind, conveying only a minimum of information, and leading us to ask a why-question of the explanation given.

Let us observe how easily the invention of a name may make us assume that an explanation has been given. If it is asked, "Why is iron magnetic?" and we answer, "Because iron, cobalt, and nickel are magnetic," no one would think much of this as an explanation; but the moment we give a name to the behaviour of these metals, and call them, say, "fero-affinitive," then when someone asks why iron is magnetic, we can say, "Why, because it's a fero-affinitive metal, that's why." And yet no more has been said in the second case than in the first. Similarly, if we had a name for the tendency of seeds to sprout upwards to reach the surface of the ground, people would be readier to say that their tendency to rise could be explained by the presence of this property. Yet a name for what it does is a different thing from an explanation of why it does what it does.

Not all examples are as simple as this. When external influences tend to reduce or raise the bodily temperature of an organism, various bodily mechanisms come into play to return the temperature to normal. This is known as "homeostasis." So far, we simply have a name for the phenomenon, and if someone volunteered it as an explanation he would surely be mistaken. But now suppose a bird finds its nest partially destroyed and it sets about rebuilding it to the way it was before; we ask why, and are told, "That's the bird's homeostatic tendency." Now the name "homeostasis" is no longer merely a label for the temperature-controlling mechanisms; it relates these mechanisms to a quite different thing, the bird's attempt to restore the status quo. In both examples there is an attempt to restore a state which has ceased to exist. Is "homeostasis" now an explanation, or is it simply a description-in-a-nutshell, a generalized description, of what the organism does, without attempting to explain why?

Observe, incidentally, how easily all these so-called explanations slip through the deductive net. We can deduce the required conclusion easily: "When organisms have homeostatic tendencies, they do so-and-so. This organism has homeostatic tendencies. Therefore, it does so-and-so." The deductive requirement will let good and bad explanations alike slip through like water through a sieve. This shows us again that, whether necessary to explanation or not, the deductibility requirement is not sufficient.

But let us return: Is homeostasis an explanation of the organism's behaviour or not? Before we say, "No, it isn't," let us reflect on this point: if appeal to
homeostasis is simply a short way of saying that birds do this and people do that, is not the appeal to gravitation simply a short way of saying that apples do this and stars do that? And yet the Law of Gravitation is one of the most sacred of our explanatory principles. Perhaps, as Wisdom says, talking about gravitation is simply a way of saying that apples fall and so on; but then is not homeostasis simply a way of saying that birds rebuild their nests and so on?

It is, of course, incorrect to say that apples fall because of gravitation, if we mean by this that gravitation is some animistic force or pull, just as it would be wrong to say that birds behave so-and-so because of homeostasis, if we mean it to be a separate force or magnetism within birds. If we are so tempted, it is both useful and important to say that each of the explanations referred to is simply a way of saying "this happens and so on." But it is, I should think, the extent and range of the "and so on" that matters here. What gives the Principle of Gravitation its remarkable explanatory power is not its appeal to an occult force but its bringing together under one formula an enormous range of diverse and complex phenomena. Because of this range, and the exactitude with which it can be applied to widely separate phenomena, the Law of Gravitation is the classical case of a law having predictive power—and it is extremely doubtful whether homeostasis possesses or ever will possess this. We rest, then, once again with this second and all-important necessary condition of explanation (the first being, at least in common opinion, the deducibility requirement): its power to explain a wide range of phenomena other than those it was invoked to explain.

6. No mention has thus far been made of explanation in terms of purpose. And yet this is the oldest concept of explanation and still the one most frequently employed by primitive peoples. And there are contexts in which we still employ the concept of purpose in giving explanations—for example, when we say that my purpose in going to the store was to do some Christmas shopping, and that this is why I went.

The word "purpose" is, of course, ambiguous. (a) Most frequently in ordinary usage a purpose is something of which I am conscious—a conscious intent to do something. The conscious intent is not the whole of the purpose; part of the criterion of whether it is my purpose to do X is whether I am disposed towards doing X, whether I take steps towards X and do X if I have the chance. (b) Some tendencies to act are not accompanied by any state of awareness; and here psychologists speak of unconscious purposes. We need not stop here over the exact interpretation of this way of speaking; let us simply say that one is said to have X as his unconscious purpose if he consistently acts, without intending it, so as to bring about X. (c) We speak of inanimate objects as having purposes—for example, the purpose of a hammer is to drive nails. This of course is not a purpose consciously envisaged by the hammer. All we mean here is that the mechanical object reflects the conscious purposes of its makers. We had a conscious purpose in making the hammer, and thus we speak elliptically of the hammer as having that purpose. Strictly speaking, of course, the purpose is ours and not the hammer's.

In all of these cases a purpose implies a purposer, or someone to have the purpose. We do sometimes use the word "purpose" in another sense which carries no such implication, (d) when we say, "What is the purpose of the heart?" "To pump blood through the body." Here purpose simply means function—i.e. what does it do? what part does it play in the bodily economy? If the word "purpose" is used here I would view it as a "degenerate" usage—a misleading locution in which another word, "function," would serve much better. It is true that someone, in asking the purpose of the heart, might have in mind a theological question, "What purpose did God have in endowing us with this organ?" but if this is meant, we are back again to purpose in sense I, in which purpose implies a purposer and the word "purpose" refers to conscious intent—the only difference now being that it is God's intent and not ours that is in question. But this, of course, is not what medical men generally have in mind when they ask purpose-questions about parts of organisms; else every such medical question would be a disguised theological question.

Having disentangled these senses of "purpose," let us ask about the legitimacy of purposive explanations. Briefly I think it comes to this: explanations require laws, and if there are laws about purposes, there is no reason why they cannot figure in some explanations just as laws about falling bodies figure in other explanations. To the extent that laws about purposes have been established, they can be used as explanations like any other laws. Unfortunately the only laws (if any) that we are in a position to make about purposes are about human ones. Explanations in terms of divine purposes cannot be employed because no laws about divine purposes have ever been established. Even explanations of biological events in terms of animal purposes is frowned upon: we do not count it an explanation if it is said that the hen sits on her eggs in order to hatch chicks, because we have no indication that the hen does so with this purpose in mind; even if this is true, we do not know it, and therefore we cannot use it as a law in our explanation. In the human realm alone we know that purposes exist, and only there can we therefore employ them in explanations. We can even deduce conclusions from them, thus:

People act so as to fulfill their purposes, unless prevented by external circumstances. My purpose was to go shopping, and I was not prevented . . . etc. Therefore, I went shopping.

This way of putting it may sound rather silly, as the deductive model often does, but at any rate a deduction can be achieved from premises which are in all probability true.

The chief mistake which people are in the habit of making with regard to purposive explanation is probably that of wanting an answer to a why-question in terms of purpose when the conditions under which a purpose-answer is legitimate are not fulfilled. People extend their questioning unthinkingly from areas in which purposive explanation is in order into areas in which it is not. Thus: "Why did he go to New York?" "Well, in response to impulses
from certain centres in his brain, some muscles in his arms and legs started moving towards the airport and...” “No, that’s not what I mean. I mean, why did he go? what did he go for? what purpose did he have in view?” “He went in order to see some operas.” Contrast this with the following: “Why did he die?” “Well, a bullet entered his lung, puncturing some blood vessels, and the blood filled his lung so that he couldn’t breathe any more, and...” “No, that’s not what I mean. I mean, why did he die?” But here we can no longer give an answer in terms of purpose—unless, that is, our talk is rooted in a theological context and we are willing to say that, just as the first person went to New York because he wanted to see operas, so the second person died because God had some purpose (intent) in seeing to it that he was murdered. If this is what is meant, one could try to answer the question in the theistic context of divine purposes; but if this context is rejected, the why-question demanding an answer in terms of purpose is meaningless, because an answer is being demanded when the only conditions under which the question is meaningful are not fulfilled.

This point is worth emphasizing because it is so often ignored in practice. Having received answers to why-questions when these questions were meaningful and explanations could be given, people continue to use why-questions even when they no longer know what they are asking for. One need not be surprised that no answer is forthcoming to such questions. And in our discouragement with such questions we are all too prone to make a mistake ourselves and terminate an exasperating series of why-questions with a remark such as, “That’s just something we don’t know,” as if it were like cases where something definite is being asked but we do not yet know the laws which explain the phenomena we are asking about. If something in the case is not known, there must be something in the case which we could fail to know. If we are to ask a meaningful question, we must know what it is that we are asking for; only then can we recognize an answer as being one when we do find it.

7. This leads us directly into an important question, How far can explanation go? We may explain an event in terms of a law, and this law in terms of other laws, and so on? But must we not finally come to a stop? The bursting of the pipes is explained by the expansion of water on freezing; let us assume that water expands on freezing because the water-molecule has such-and-such a structure; now why does the water-molecule have this structure? Perhaps this can some day be explained by reference to electron-proton arrangements within the atom, and this in turn by reference to the disposition of more minute particles (if they can be called such) yet to be discovered; but sooner or later must we not say, “That’s just the way things are—this is just an ultimate law about the universe. We can explain other things in terms of it, but it we cannot explain?” Are there ultimate laws, laws which explain but cannot even in principle be explained?

In practice we come rather quickly to laws which cannot be explained further. Laws about atomic structure are typical of such laws. Laws of psycho-physical correlation are another example. Why do I have a certain colour-sensation which I call red, indescribable but qualitatively different from all others, when light within a certain range of wave-length impinges upon my retina, and another indescribably different sensation which I call yellow when rays of another wave-length strike the retina? That this wave-length is correlated with this visual experience seems to be sheer “brute fact”—a law which cannot be explained in terms of anything more ultimate than itself.

At the same time, we should be careful in dismissing any uniformity we cannot explain as a “brute fact” or “basic law.” Many things, such as why this element has this melting-point and these spectral lines, were once considered basic and unexplainable properties of the element, but have since been explained in terms of the intra-molecular structure of the element. No matter how much at a loss we may be for an explanation, we can always ask and speculate. If it had been accepted as a basic law that water starts to expand when it gets below 39° F., we would never have gone on to discover anything about the structure of the water-molecule. Fruitful scientific procedure depends on assuming that no given law is basic; if scientists did not continue always to ask the question “Why?” this process of scientific enquiry would stop dead in its tracks.

Thus, if there are basic laws, it seems that we cannot know of any given law that it is one. We can know that it is not, by explaining it in terms of other laws; but how could we know that it is? Discovering basic laws is epistemologically similar to discovering uncaused events: if there are uncaused events, we can never know that there are, for all we can safely say is that we have not yet found causes for them.

One further point about basic or ultimate laws: If a law is really a basic one, any request for an explanation of it is self-contradictory. To explain a law is to place it in a context or network of wider and more inclusive laws; a basic law is by definition one of which this cannot be done; therefore to ask of an admittedly basic law that it be explained is implicitly to deny that it is basic and thus to deny the very premise of the argument. It is a request for explanation in a situation where by one’s own admission no more explaining can be done.

Like so many others, this point may seem logically compelling but psychologically unsatisfying. Having heard the above argument, one may still feel inclined to ask, “Why are the basic uniformities of the universe the way they are, and not some other way? Why should we have just these laws rather than other ones? I want an explanation of why they are as they are.” I must confess here, as an autobiographical remark, that I cannot help sharing this feeling: I want to ask why the laws of nature, being contingent, are as they are, even though I cannot conceive of what an explanation of this would be like, and even though by my own argument above the request for such an explanation is self-contradictory. The fact is, as we saw above, that why-questions have had answers so many times that we tend automatically to ask them here even when they can have no answers because we have ripped them out of the only context in which they have meaning—like the situation of the child who, being told what is above the table and above the ceiling of his room and above...
the house and above the earth, now asks what is above the universe. The question has now gone outside the context of meaningful discourse, and so has the request for the explanation of a basic law. We should remember: to explain is to explain in terms of something, and if ex hypothesi there is no longer any something for it to be explained in terms of, then the request for an explanation is self-contradictory: it demands on the one hand that you explain X in terms of a Y while insisting simultaneously that there is no Y.

8. One sometimes encounters the complaint that science does not really explain but only describes. "Science doesn't tell us why things happen," it is said, "it only tells us how things happen." Now it does often happen that the exact intention of the user of a why-question is not very clear—as we have already seen. But in the way in which the term "why" is most commonly used, science does explain why: for example, the bursting of the pipes, the formation of ice at the top of ponds rather than at the bottom, and many other phenomena, are explained by reference to the law that water expands when it freezes. (If someone says we have not explained why the pipes burst, then what does he mean by "why"? What sort of thing is he asking for? What would answer his question? Let him state in other terms what it is that he is asking for.)

"But is not explanation after all merely description?" It is all very well to say that when we explain something we actually describe—e.g. stating laws of nature is describing how nature works. But this does not preclude the fact that we are explaining. When the question is asked why pressing the button turns on the light, we explain by describing just what goes on—currents, open and closed circuits, conduction of electricity by wires, dynamos in the power plant, and so on. But have we not in so doing explained the phenomenon about which we were asking? We have explained by describing, if you will; but certainly we have explained. To say that because we are describing we cannot be explaining would be like saying that because an object is red it cannot also be coloured.

9. A similar complaint is sometimes voiced against scientific explanation, that it "explains things away." Explaining something is interpreted as equivalent to explaining it away. Now the precise meaning of the phrase "explaining away" is one which I have never been able to discover. What is one supposed to be doing when he explains something away? Surely not to declare that it does not exist! Explanation deprives us of no facts we had before. To "explain colour" in terms of light-waves is not, of course (as should have been obvious), to take away the fact of colour-experiences. "Thinking is nothing but the occurrence of certain neural impulses" should be changed into "When thinking takes place (and that it does is just as incontrovertible a fact as the neurons are), there are neural impulses."

In the special context of beliefs, perhaps "explaining away" may mean impugning the truth of one's conclusions. If so, there are again no grounds for fear. To "explain away" someone's politically reactionary tendencies by saying, "He's old, and people always get conservative when they get old," does not for a moment take away whatever truth the person's opinions may have; at most, it only exposes part of the causal genesis of his having them. And if the views of this person were "explained away" by these biographical observations, the views of his opponent would be equally vulnerable: "You needn't pay any attention to that young upstart, they're all hot communists when they're young." Reference to biography may, together with laws of human nature (if any are known in this area), explain why a person held a certain belief at a certain time, but the truth or falsity of the belief is quite unaffected by this, and, of course, is tested on different grounds entirely. The idea that reference to a person's mental or physical condition could "explain away" the truth of a belief is one of the most flagrant blunders of the materialistically minded laity of our day.
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