

Chapter 2

Cause – Effect – Ground – Power.

I continue to track down the first source of our knowledge of things, although I am in danger of tiring you out with intricacies. But if one wants to escape the snares of sophism, at least once in one's life one has to work meticulously through all sorts of subtleties and make them clear. We have seen that the very frequent succession of one appearance upon another provides us with the grounded supposition that they stand in some connection with one another. We call the foregoing appearance the *cause*, the subsequent appearance the *effect*, and are convinced that they can both be combined in a logical proposition. That is to say, in the concept of the cause as subject, something will necessarily be found, on the basis of which the effect can be conceived as [its] predicate. This *something* or the characteristic in the cause, from which the effect may be inferred, we call the *ground* and say: every effect is grounded in its cause. With the same grounds of the truth, we conclude from two appearances accompanying one another, that they must be subject to a third, common cause, without deciding whether they are immediately or mediately subject to it.

One may detect here a threefold source of knowledge. Even an animal expects similar consequences in similar cases but not on the basis of the same ground of knowledge. In such cases the mere association of concepts does for animals precisely what experience does for the common mass of humanity and what reason establishes for philosophers. Even animals, for example, shy away from entrusting themselves to a surface lying on an incline and fear sliding down. The frequent repetition of the same case has combined the ideas in the animal soul to such an extent that, at the sight of the surface on an incline, the idea of plummeting and sliding down becomes the liveliest of ideas and produces fear. Human beings, by contrast, are not ruled merely by a representation that has become lively. Instead, on the basis of experiences that they have often had, they form for themselves the universal rational proposition: "all heavy bodies slide down surfaces on an incline." They suppose, as the reason for the truth, that once the idea of a surface on an incline has been unraveled, [19] something is to be found in it, on the basis of which the possibility of plummeting can be made comprehensible. The philosopher adds the knowledge of the ground, i.e., reason on the basis of mechanics, and brings the general proposition closer to purely rational knowledge.

In the fear, common to animals and human beings, of entrusting themselves to a steeply sloping surface, there lies hidden a formal inference that can be gradually elevated from the knowledge proper to an animal to a purely rational truth. The minor premise “this is a surface with a steep slope” is provided by the sense of sight. Without further development, by means of the combination of ideas that the frequent perceiving has established in the animal, the representation of a fall awakens in the animal; it becomes the dominant conception in its soul and has an effect on its capacity to move. Reason, however, finds much to unravel and develop here. Sight provides us with the appearance of a surface on an incline. – But how would it be, if sight were to deceive us? It is not impossible for this to be case since it has often tricked us. Yet the more frequent agreement of appearances justifies our expectation that, insofar as they are instructive regarding what is spatial and extended, those appearances will occur and appear in no other way (1) at every other distance, (2) in a different situation, and (3) via different means of seeing (that the appearance befalling such a surface no less yields), (4) to the touch and every other sense of living beings. In a word, [that agreement justifies the conclusion] that it not merely *seems* to be but *actually is* a surface on an incline. Where so much is in agreement in cases so often repeated, under altered circumstances, we make the inference to an object that finds itself outside us and contains the ground for this agreement. Here philosophical knowledge adds nothing further to common evidence than to seek to account, in keeping with the fundamental principles of the art of reason, for our right to make this inference, for the use we make here of the kinds of inference called ‘induction’ and ‘analogy.’

The look of the steeply sloping surface awakens the representation of sliding down, a representation that has often been combined with that look. The most thoughtless human being does not let himself be governed merely by a representation that has become lively. Instead he abstracts for himself the experiential proposition: *A surface on an incline...etc.*, of which he provides [20] no further ground, i.e., reason, than the fact that he has so often seen it. From the repetition he infers the connection and forms for himself a universal proposition that he uses as a major premise in cases that occur. If a similar experience teaches him, for example, that one may split bodies more easily with a wedge and that one can set them in motion more easily by means of a screw, then these are for him individual propositions, of which he makes use, without having an inkling of anything rational in it. The philosopher traces his knowledge back further and attempts to combine it, as much as he can, with purely rational knowledge. He finds, for example, in these three experiential propositions the same universal laws of nature, the law of the weight of bodies and communication of movement, diversely altered merely by the diversity of the figures. What enters into the alterations that these natural laws must undergo through the figure of the surface on an incline, the wedge, and the screw, he explains these to himself according to geometric principles, i.e., according to the laws of the thinkable and unthinkable, and finds that wedge and screw, along with the surface lying on an incline, can be made intelligible on the basis of the same principle. From this side, then, his knowledge is [a] pure truth of reason. From this side at least, he distinctly discerns the connection between subject and predicate, without relying on the expectation that experience justifies him in having.

But as for the universal laws of nature themselves, the laws of gravity and motion, back to which we trace these particular cases, we do not know those laws so scientifically, in so purely rational a fashion as we are capable of knowing the consequences and alterations of them by means of the figure at hand. The sensory appearances and their agreement have allowed us to make the inference to an object that contains the ground of them. We call this object the ‘body’; but the characteristics of it that are familiar to us do not yet suffice to infer a universal weight or even a law of motion that is supposed to be combined with it [the body] into a logical proposition. Those characteristics can communicate to this or that wise individual the propositions: ‘all bodies have a weight; all bodies have a power of movement.’ Yet even for the philosopher these universal laws of nature remain from the outset merely experiential propositions that he has made universal by means of [21] an incomplete induction. Since they recur each time under similar circumstances and are never absent, he concludes to an inner causal connection between subject and predicate, even though he cannot discern this connection distinctly. Reason helped him merely transform the individual experiential propositions into universal laws of nature. The ground of the universal claim, however, is not scientific, not a purely rational knowledge but instead an incomplete induction which must take the place of pure reason.

It is not that this incomplete induction should be lacking in persuasive power or evidence. In many cases it perfectly suffices to provide us with complete assurance and set aside all doubt. Each of us expects with undoubted certainty, for example, that he will die, although the ground for the conviction is merely an incomplete induction. No one has the slightest hesitation about carrying out some secret business, upon which his life or fortune depends, in the presence of an infant, without worrying about being betrayed by the child or by a pet who sees him. On what does the doubt-free certainty rest here? Not on scientific rational knowledge, but instead merely on an incomplete induction that so approximates the complete induction that it is sufficient to make us fully convinced of it.

The same connection holds with respect to our knowledge in the doctrine of the soul and morals. As soon as we come to the science of the actual and the non-actual, our knowledge has a mixed make-up. In part, immediate experience or sensory perception of it [the actual] proceeds within us; in part, we compare these immediate observations, unraveling them, noticing their similarity, tracing them back to general principles grounded sometimes on reason, sometimes on complete or incomplete induction and a greater or lesser conviction, the more or less complete the induction itself is. This conviction can also grow here to such a degree of evidence that it allows no further room for reservations and provides us all the certainty that we can always expect only from pure reason. Unpacking [22] what in this act is to be ascribed to the inner sense, to pure reason, or to mere experience is a task of the doctrine of the soul and morals that we cannot pursue further here. If that Macedonian hero took the medicine from the hand of his doctor, regardless of how suspicious he had become of his friend’s honesty, doing so without hesitation and free of any suspicion, and expressed so innocent a trust in a tried and true friendship, his ethical conviction was of a very mixed nature. It was grounded in part on a familiarity with human beings in general and with the effect that motivations have

on the human will; it is also grounded on the experiences and observations of the friendship that he himself and others had gathered; and, finally, it is grounded on the repeated demonstrations of uprightness given him [the hero] by the sage, of whom the calumny was intended to make [the hero] suspicious.¹ All these instances of knowledge are put together from inner perceptions, scientific development of the latter, more frequent experiences, and the inductions formed from them; and from the integral sum of these inductions there grew up in him a firm conviction so innocent and elevated beyond all doubt that it falls only marginally below mathematical evidence.

Hence, every conviction that in the science of the actual and the non-actual is not purely rational knowledge is grounded on the agreement of diverse senses, under many different sorts of circumstances and modifications, and on the frequent outcome of diverse sensory appearances, placed after and next to one another. We thus have reason to investigate with what right we are justified to infer in these cases. In my essay on probability I unpacked this quite clearly and showed the grounds for the truth with which we consider ourselves convinced in such cases by analogy and induction. In the interest of the connection here, I want to repeat briefly the essentials of that essay. But I recommend that, for a better understanding, you read through and put to an exact test the reasons that come up there and that will be useful to us in what follows.

If the characteristics of an object A leave undecided whether it possesses B or not and whether this depends upon external, contingent determinations that can produce an instance of the negation just as much as the affirmation of this, then the proposition is in doubt and has [23] the same degree of probability for and against it. If it is just as possible for the picture side as for the shield side of a coin to turn up and if this depends on contingent movements of the hand that I unintentionally make, then it is equally correct for me to bet on the one or the other side. If it is thrown several times, the probability is that one case will be turn up just as often as the other. Two players have the same reason to hope, if one places a bet on the shield side, the other on the picture side. If the same result always comes about in several throws, then we suppose some internal determining reason favors this result. If in throw after throw by my opponent, the same side of the coin always turns up, then I suspect that he is not leaving the outcome to chance, according to the rules of the game, but instead has intentionally determined the outcome through some secret spin that he knows how to give the coin. My suspicion increases with the amount of throws. Let us try to indicate the degree of my supposition more precisely.

My opponent has as many instances [that count] against him as he has throws. Since he bets, for example, on the shield side turning up each time, he then has two

¹ Mendelssohn is referring to the following incident. Alexander the Great was languishing with a fever and, while his trusted physician Philip of Acarnania was preparing a purgative, he received a letter stating that Philip had been bribed to poison him. Alexander read the letter and, taking the purgative, gave the letter to Philip to read, demonstrating his trust of his friend and fearlessness in the face of death. See Arrian, *Anabasis of Alexander*, trans. P. A. Brunt (Cambridge, Massachusetts: Harvard University Press, 1999), II, 4 (pp. 135–7).

such instances against him in two throws and only one in which he can hope to win. Hence, he can posit (1), that in both throws the result is the shield side; but I can posit (2) against him that in one of the two throws the picture side will turn up. His hope of winning is proportional to certainty as one is to three; but mine is two to three. If we wished to divide the stakes up among ourselves without waiting for the result of chance, then he would rightly be able to demand $1/3$, but I would be able to demand $2/3$.

If we bet on three throws, then his hope would be $1:4$, but mine would be $3:4$. Each instance brings him one more instance of the loss, just as it brings one instance more of winning for me. For, according to the presupposition, I win the stakes if the picture side turns up only once. His hope, however, is always only the sole instance in which the shield side always turns up. Thus, in a hundred throws, my hope = $100:101$, but his = $1:101$ and, in general, in n throws, my hope = $n:n+1$; but the hope of my opponent = $1:n+1$.

Thus, if the result is nevertheless in his favor, then it is, of course, possibly the case that he honestly went to work and left the [24] game to chance. The probability of this case is $= 1:n+1$. But with the probability $= n:n+1$, it can be supposed that, either in the coin itself or in a spin that my opponent secretly gave the throw, a ground, i.e., reason for the correspondence [of the throw with his bet] may be found, a ground that has brought about that instance that is contrary to the [usual] supposition. The greater the number of throws, the smaller the ratio of $1:n+1$; my opponent's hope accordingly disappears all the more and, as a result, the greater the supposition of some reason for the correspondence, in the case that he is lucky. But this supposition of certainty cannot be equal, if n is not infinitely large. Only in this instance is $1:n+1=0:1$; that is to say, only in this instance is my expectation completely certain and the hope of my opponent equal to zero. As long, however, as n is still finite, there still remains always a slight degree of expectation in favor of my opponent, and the presupposition of a reason for the correspondence, in case he is lucky, has still not reached the level of irrefutable certainty.

The greatest part of our knowledge concerning the actual and the non-actual rests upon these simple laws of supposition.

The more often the appearance B follows upon or accompanies the appearance A, the more cause we have to assume a reason for the connection between them. If they had been brought together merely by contingent causes, then each time the attempt was repeated, the opposite could also take place. Altered circumstances would have brought in their path an alteration of the outcome. Since this did not happen, we supposed a reason for the connection and did so with the degree of conviction that is proportional to certainty as the amount of observed instances n is to the same amount $n+1$. Thus, if the appearance B follows upon the appearance A every time, then we locate the reason for the connection in the constant properties of A. For the changing properties would again not exclude the opposite. We suppose, therefore, that the inner, constant properties of A have brought about the appearance B. That is to say, we infer a causal connection; let us call A the cause, B the effect, and let us call the constant properties of A or their enduring presence in A [25] the power. If we see the bodies expand whenever they are brought close

to fire, then we locate the reason for the expansion in the constant properties of the fire, attribute to the fire a power of expanding bodies, and expect precisely this outcome of the fire and the bodies, an outcome which we have not yet experienced. The degree of certainty increases with the amount of observed instances and, as we have seen, if the number of instances is very large, that degree of certainty is simply not distinct from perfect evidence in any noticeable way.

We consider (with precisely this legitimacy) two appearances constantly accompanying one another to be the mediate or immediate effect of a common cause and expect the one whenever we perceive the other. The combination of the color and the feel of bread with this taste, with this influence on the nourishment of our body, has been registered so often that we rightly consider both the consequences of an internal make-up of the bread. We also expect the same taste and the same nourishment from every bread that we see and feel. ‘Power’ is what we call that inner make-up by virtue of which the bread brings about these effects attributed to it.

This is the source of all the laws of nature assumed by us. They are universal propositions into which we have brought the specifically observed or inferred connections of causality, through the application of which we reckon on the outcome in each case that presents itself. Similar subjects will have also similar predicates by virtue of the inner ground, i.e., reason for the connection. Thus, the law of weight is a law of nature, that is, a universal proposition into which we managed to bring all observed diversities in the falling and rising of bodies. The Newtons, Galileos, and other discoverers combine theorems of the thinkable and unthinkable with this natural law. That is to say, they apply the principles of mathematics and logic to the law of weight, invent the entire theory of the gravitation of bodies, and expand our knowledge in a way that surpasses every expectation.

If diverse cases a, b, c, d can be derived from one and the same source e and can be derived in turn from just as many different sorts of sources, then it is probable that they have a common source [26] and this probability increases in turn with the number of cases and can be brought very near to certainty. I see that a number of human beings run towards a certain region or, at least, direct their eyes towards it. Each of them has his particular causes. Yet the agreement of many allows me to infer a common ground. I observe many actions of a human being. Each of them can perhaps be derived from different motives. But if, for example, I ascribe ambition to him, then all those actions can be grasped in a very natural way. I thus infer with a degree of probability that increases with the number of observed actions: the human being is ambitious.

The doctrine of hypotheses and their veracity rests on this ground. The more and the more manifold natural events can be grasped on the basis of a presupposition and the simpler the presupposition through which this can occur, the more ground or probability this presupposition has for itself and the greater the legitimacy with which it is assumed to be true. One might suppose believing that this criterion for the hypotheses could only be valid if we ascribe the world’s arrangement to a rational and wise cause who must have chosen the shortest means to reaching its goal. “Only in this case,” writes a sophist of modern times, “do you have a right to prefer

a simple arrangement to a complex one and to trust wisdom that it will have managed to accomplish much with little means. Your criterion for the hypotheses is thus itself a hypothesis.” However, according to the concepts presented above, this hypothesis is not necessary here, regardless of how much we are otherwise persuaded of its certainty. It is in keeping with the nature of the human intellect, not to ascribe a detected agreement to blind chance but instead, wherever a manifold concurs, to seek the ground of the concurrence. The convincing power of the probability with which we assume the ground of this agreement increases with the manifoldness of what is in agreement, on the one hand, and with the simplicity of the agreement, on the other. That convincing power can, as we have seen, approximate the highest sort of evidence to such a degree that its difference is no longer noticeable. Manifold appearances of nature [27] that can be explained on the basis of a simple presupposition yield a recognizable agreement, the ground of which we find in this hypothesis. If this hypothesis were not true, there would be no common ground and the diverse appearances would have to be actually explained on the basis of just as many diverse hypotheses. The agreement of those appearances would then be a matter of mere chance. But it is against the nature of things as well as human reason, it is against the laws by which we applaud the truth and prefer the probable to the improbable, for us to entrust this to chance and to have the agreement emerge arbitrarily.

Morning Hours

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