

## Reasoning by Analogy in Hume's *Dialogues*

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Hume's *Dialogues Concerning Natural Religion* is a work widely admired for the clarity of its thought, the importance of its theme, and the felicity of its literary expression. However, the logic of its argumentation often is not adequately appreciated, for readers frequently fail to recognize how centrally the work relies upon reasoning by analogy, and this of two different types. To try to characterize the role of reasoning by analogy in Hume's *Dialogues* is a worthwhile undertaking in logical interpretation, and success in this can advance our understanding of Hume's thought. Moreover, if we can satisfactorily characterize this reasoning of Hume's, a pedagogical application will emerge: one valuable way for us to teach students about the logic of analogy will be to have them study Hume's *Dialogues*, attending both to the specific reasonings it contains and to their bearing on more general issues about logical reasoning.

### 1. Background

Throughout the history of Western philosophy one of the arguments most widely employed in attempting to prove the existence of God has been the argument from design (or teleological argument, as Kant called it). First explicitly stated by Plato,<sup>1</sup> this argument became a standard weapon in the arsenal of traditional philosophy of religion. In the modern period a number of British thinkers, including Henry More,<sup>2</sup> Joseph Butler,<sup>3</sup> and William Paley,<sup>4</sup> began to attach preeminent importance to the argument from design, regarding it as the main

justification for religious belief. They used the phrase "natural religion" to refer to the philosophical basing of religious belief on the argument from design. This argument achieved very wide acceptance for a long time, and even today it continues to have some advocates who think it a good argument.<sup>5</sup>

However, most philosophers eventually ceased to regard the argument from design as convincing, and this important change occurred mainly because of the way the argument was criticized in Hume's *Dialogues* and in Kant's *Critique of Pure Reason*.<sup>6</sup> Still later, of course, the argument was further undermined from a scientific point of view by the implications of Darwin's work.<sup>7</sup> Even though Kant's treatment of the argument probably had wider influence than Hume's upon the opinions of philosophers, still it was Hume in the *Dialogues* who provided the first major philosophical criticism of the argument from design, and the incisiveness of Hume's treatment far outshines that of Kant on this matter.

The discussion in Hume's *Dialogues* is carried on through three principal speakers. One is Cleanthes, who advocates natural religion. Then there is Demea, the conservative, who sometimes calls for religion to be based on nonrational faith rather than on proofs, and at other times calls for it to be based on the cosmological argument and perhaps the ontological as well, but not on the argument from design. Finally there is Philo, who is called a sceptic, and who, in most passages, clearly comes closest to speaking with Hume's own voice. There are problems about exactly how to formulate

Philo's scepticism,<sup>8</sup> but for the purposes of the discussion in the *Dialogues* it seems to consist merely in the demand that arguments based on observation which are offered in support of religious conclusions be judged by the same standards as observational arguments in science and in everyday life.

## 2. Deductive Formulations of the Argument

Before we consider the way Hume's Cleanthes formulates the argument from design, let us first notice how previous philosophers had formulated it. Before Hume's time philosophers typically had put the argument into deductive form, most often into the form of a deductive syllogism. As one outstanding example, consider St. Thomas Aquinas. As his fifth way of demonstrating that God exists he offers a version of the argument from design.<sup>9</sup> He says in effect that whatever is designed has a designer (this is his major premise); he adds that natural beings in the world act with design, but not by their own design (this is the minor premise); and from these two premises he draws the conclusion that therefore the world has a Designer separate from itself. St. Thomas's version of the argument is representative of the deductive form that most philosophers have tried to impose upon the argument.<sup>10</sup> That they tried to do this accords with the widespread traditional preference for deductive reasoning, which often was allied with the view that genuine reasoning can only be deductive. When the argument from design is formulated in this way, the logical link between its premises and its conclusion has been made absolutely tight; the premises strictly imply the conclusion, and thus the argument completely avoids committing the fallacy of *non sequitur*.

Yet formulating the argument so that it is deductively valid does not guarantee that the argument can provide a successful proof of its conclusion. To achieve a successful

proof, more is required than avoidance of *non sequitur*. Consider someone who doubts that the world has a designer. May we expect to succeed in proving to such a person that the world does have a designer, by using the deductive argument just considered? No. For to whatever degree one is doubtful that the world has a designer, one surely ought to be at least equally in doubt that the world is designed. That is, if one is sceptical of this conclusion, one should be at least equally sceptical about the minor premise of the reasoning. To be successful, a proof needs to *show* that its conclusion is true; this deductive argument cannot do that, for, in trying to support its conclusion, it appeals to a premise which is at least as suspect. This deductive form of the argument from design begs the question, and hence it is fallacious and not a successful proof. This is a general criticism of deductive versions of the argument from design: formulating the argument as deductive pretty well ensures from the start that the argument is going to beg the question.

It is a distinctive merit of Hume's approach to the argument from design that he carefully avoids having Cleanthes formulate it as a deductive argument. Hume's aim in the *Dialogues* is to subject the argument from design to searching criticism, so as to establish whether it yields a good proof. To do this properly he first needs to get the argument formulated so that it puts its best foot forward in such a way that it shows to the maximum whatever logical force it can have. Were Hume to have Cleanthes formulate the argument from design as a deductive argument, any victory that Philo might then win over Cleanthes would be a hollow one, for Philo would not be defeating the argument in its strongest version.

## 3. Argument by Inductive Analogy

The focus of discussion in the *Dialogues* is Cleanthes' version of the argument from

design. In a famous passage he states it as follows:

Look round the world: Contemplate the whole and every part of it: You will find it to be nothing but one great machine, subdivided into an infinite number of lesser machines... All these... and even their most minute parts, are adjusted to each other with an accuracy which ravishes into admiration all men who have ever contemplated them. The curious adapting of means to ends, throughout all nature, resembles exactly, though it much exceeds, the productions of human contrivance—of human design, thought, wisdom, and intelligence. Since therefore the effects resemble each other, we are led to infer, by all the rules of analogy, that the causes also resemble, and that the Author of Nature is somewhat similar to the mind of man... By this argument alone... do we prove at once the existence of a Deity and his similarity to human mind and intelligence.<sup>11</sup>

The wording used by Hume's Cleanthes in putting forward his version of the argument from design makes clear that he regards his premises as significantly increasing the probability of the conclusion, but he does not claim that the conclusion is a deductive consequence; nor can it be made into one by adding plausible suppressed premises which do not beg the question. In twentieth-century jargon, Cleanthes is formulating the argument as an *inductive* argument<sup>12</sup> (though Hume himself did not use the term "inductive").

Furthermore, Cleanthes presents this as an inductive argument *by analogy*. An inductive argument by analogy may be regarded as having the general structure:

- a, b, c... each has been observed to have property F and property G;
- n is observed to have property F;
- Therefore, probably n has property G.

Here a, b, c, etc. are previously observed cases (there may be only one, or there may be many); while n is the new case concerning which a conclusion is being drawn. The adverb "probably" is used here because the argument claims merely that the

premises significantly increase the degree to which it is reasonable to believe the conclusion.<sup>13</sup>

Now, some old-fashioned logicians<sup>14</sup> have thought that it cannot be logically legitimate to move from particular premises like these to a particular conclusion like this unless a universal generalization is implicitly being affirmed. On their view, we must first generalize inductively that all F's are G's, and then from this generalization we deduce our particular conclusion that n, which is an F, is a G. (An alternative version would be that by inductive generalization we conclude that most F's are G's, and from this we inductively infer that n, which is an F, probably is a G.)

However, such an interpretation of the reasoning is unsatisfactory. If the reasoning really had this structure, our conclusion about n could be reached with no greater probability than the probability we are entitled to attach to the generalization about all (or most) F's. Yet in reasoning of this type we frequently do reach particular conclusions such as this with considerably higher degrees of probability than we would be justified in attaching to such generalizations. This indicates that, in the type of thinking we are considering, the reasoning goes *from case to case*. The logical nerve of the reasoning depends on case n's being similar to the other observed cases, but not upon our being able to establish any generalization to the effect that all or most F's are G's.

Consider a pedestrian example. Suppose that in the past one has bought several pairs of shoes of a certain brand and style, and in each case they stayed comfortable and wore well. Now one wonders whether a new pair will stay comfortable and wear well. One can reason by analogy that since the new pair (n) resembles the past ones (a, b, c...) in its brand and style (F), probably it will resemble them also in staying comfortable and wearing well (G). Circumstances can be such that this reasoning reaches its conclusion with a substantial

degree of probability. Moreover, this reasoning can go directly from case to case; it does not have to pass through any intermediate step of the form "All (or most) shoes with property F have property G"—for one may be unable to frame any such proposition that would have more than a low probability under the circumstances, and an improbable generalization could not help toward conferring a substantial degree of probability on the conclusion that case *n* has property G. Even if we are not in a position to affirm any helpful proposition to the effect that all or most F's are G's, we can be justified in concluding that *n* probably is a G, and we can conclude this directly because of the resemblance between case *n* and the previously observed cases.

Cleanthes' argument is of just this general type. In Cleanthes' argument the reasoning starts from observation of "productions of human contrivance": watches, clocks, ships, buildings, and so on (a, b, c...). These items are known to have the property of possessing complexly meshing parts which function harmoniously to yield useful results (this is property F). Also they are known to have the property of having been designed by intelligent minds (property G). Now Cleanthes turns to the world as a whole and declares that it can be seen to possess complexly meshing parts which function harmoniously to yield useful results (F). From this he concludes that the world probably has the property of having been designed by an intelligent mind (G). Thus Cleanthes' argument fits the structure of inductive argument by analogy.

Moreover, as further confirmation that Cleanthes' argument is to be understood in this way, Cleanthes and Philo in the *Dialogues* make various statements explicitly indicating that this argument is based on observed analogies. Cleanthes himself speaks of how the conclusion of his argument follows "by all the rules of analogy,"<sup>15</sup> and Philo repeatedly talks of Cleanthes' argument as turning upon analogies, which need to be strong in cer-

tain ways if the argument is to be convincing.<sup>16</sup>

That Cleanthes' argument is not a deductive argument but is an inductive argument by analogy has been recognized by some commentators,<sup>17</sup> though not by all.<sup>18</sup> It is a point deserving firm emphasis, because if it is misunderstood we can hardly begin to grasp the logic of Hume's reasoning.

Let us go on to notice three features of this type of argument which pertain to its *inductive*<sup>19</sup> character:

- (I) As was already noted, such an argument is not deductively valid, and the person advancing it does not claim that it is so; the arguer claims merely that the premises increase significantly the probability of the conclusion.
- (II) The argument takes as its premises empirical propositions which are to be known by observation.
- (III) The conclusion is a proposition whose empirical content goes beyond that of the premises; that is, it is logically possible that further observations could refute the conclusion without refuting the premises.

Another rather different point concerning this type of argument is that its strength does not just depend upon its logical form. That is, merely knowing that an argument is of this form does not settle whether it is a good argument. Inductive arguments by analogy which all share this same form vary greatly in their degree of strength, some being quite strong, others very weak. To evaluate the degree of strength or weakness of an inductive argument by analogy we must take account of other matters in addition to its schematic structure. Some important factors which bear on this are<sup>20</sup>:

- (i) The extent of the known similarities among the previously observed cases (a, b, c...). The more extensive and prominent are the known similarities among them, the weaker is the support which

the argument gives to its conclusion.

(ii) The extent of the known differences among the previously observed cases (a, b, c...). The more extensive and prominent are these differences, the stronger is the support which the argument gives to its conclusion.

(iii) The extent to which the new case (n) is known to resemble the previous cases (a, b, c...). The more extensive and prominent these resemblances are, the more strongly does the argument support its conclusion.

(iv) The extent to which the new case (n) is known to differ from the previous cases (a, b, c...). The more extensive and prominent these differences are, the weaker is the support which the argument gives to its conclusion.

(v) The scope of the conclusion. The weaker the statement which the conclusion makes about case n, the stronger will be the argument; that is, the higher will be the degree of probability of the conclusion. Conversely, the more the conclusion says about case n, the weaker the argument will be.

This list of five factors is not exhaustive, but it does draw attention to what we must chiefly look for when evaluating the strength of an inductive argument by analogy.<sup>21</sup> In the *Dialogues* these factors do not receive equal emphasis; in their debate about Cleanthes' argument it is the known resemblances and differences between the old cases and the new case which Cleanthes and Philo mainly stress.

#### **4. Can Such Arguments Have Logical Force?**

The way these five factors have been stated is such as to leave much room for the exercise of judgment. In considering, for instance, the extent to which in a given argument the previously observed instances are known to be similar, we must judge the

comparative importance of the properties involved and the comparative degrees of similarity. The way we do this will be based on our past experience and our empirical theories about the world. But in deciding what judgments to make in this area we cannot let ourselves be wholly guided by the mechanical application of formal rules. That is, we do not have available any "decision procedure" to guide us, any routine consisting of a prescribed sequence of unproblematic formal operations, which, when performed correctly will always suffice to yield a definite answer after some finite number of steps. Judgments about the strength of an inductive argument by analogy cannot be made in that mechanical way.

This point may seem to lead to trouble. Many philosophers are convinced that the logical goodness of reasoning must always be demonstrable by formal operations on the statements involved. Those who take this view will be inclined to think that since inductive arguments by analogy do not attain logical force merely by virtue of their logical form, they cannot have any logical force. Monroe Beardsley, for example, seems to have been thinking along these lines when he held that there is no such thing as successful reasoning by analogy, and that the only proper use of analogies in discourse is merely to contribute to the suggestiveness of our descriptions.<sup>22</sup>

One can understand how he was led to think this. Tendencies in traditional Aristotelean logic encourage such a view,<sup>23</sup> and tendencies in modern logic have encouraged it very strongly also (Bertrand Russell, a most influential advocate of this view, declared that "In all inference, form alone is essential"<sup>24</sup>). However, this viewpoint is not satisfactory, for it reflects too one-sided a preoccupation with logical form. To suppose that reasoning by analogy never has any probative value is very much contrary to what we all believe, for we do constantly rely upon inductive reasoning by analogy both in everyday life and in science.

We do so whenever we conclude that one plant probably is edible because we have observed other similar ones to be so, or that one piece of material probably will conduct electricity because it resembles others that have been observed to do so. It is not to be supposed that all such thinking is illogical; we should recognize that some inductive arguments by analogy do have logical force, even though it is not their logical form alone that confers it on them.

In connection with this type of criticism, let us also notice that we need not have a “decision procedure” in order to be able to recognize genuine differences. For example, people who have some judgment can recognize that Einstein was a better scientist than Velikovsky, and that Leibniz was a better mathematician than Kant—even though there are no cut-and-dried “decision procedures” by means of which to compare degrees of scientific greatness or mathematical competence. Lack of such decision procedures does not need to make these judgments into merely subjective impressions, concerning which any opinion is as good as any other. Similarly, there can be real differences in strength among arguments by analogy, even in the absence of decision procedures for demonstrating these differences.

### 5. Reasoning about Arguments by Analogy

Are we falling back here upon the idea that it is by dogmatic appeal to untestable intuitions that we are to decide what the differences in strength are among arguments by analogy? To put it that way would misleadingly suggest that there is no sort of intellectual discussion by means of which we can move toward establishing answers about this. Yet how can there be any such procedure, if the logical forms of these inductive arguments do not determine their degrees of strength, and if there is no decision procedure by means of which these dif-

ferences in strength can be conclusively established?

In responding to this complaint, let us turn back to the text of Hume’s *Dialogues*, for there an answer is strikingly suggested. In the *Dialogues* the discussion between Philo and Cleanthes is above all concerned with trying to evaluate Cleanthes’ argument from design. Cleanthes maintains that it is a strong argument of its kind, while Philo ironically argues that it is “not the most certain and irrefragable” even of its kind<sup>25</sup>—by which he means that it is very weak indeed. How do they conduct this discussion? By no means do Cleanthes and Philo merely appeal dogmatically to their own individual intuitions concerning the strength of Cleanthes’ argument from design. Were they to do that, there would be little prospect of any movement toward a meeting of minds, little prospect that either party could show the other something about the strength of that argument that the other had not seen. Were both merely relying on dogmatic intuitions the discussion would not be a fruitful intellectual exchange. Yet the discussion in the *Dialogues* is a quite fruitful exchange. It would be too much to expect that total agreement between Cleanthes and Philo would be reached at the end; that does not seem to happen in Hume’s Part XII. Yet certainly by the end many valuable points have been made, and the discussion has enabled readers to improve their understanding of how strong the design argument is.<sup>26</sup> In this sense, there has been genuine intellectual progress.

How can Cleanthes and Philo proceed in carrying on their discussion, so that it can be an illuminating one, rather than merely a dogmatic conflict? One conventional modern response to such a question would be that the proper way to conduct such a discussion is to lay down general rules specifying the conditions that inductive arguments by analogy must satisfy in order to be good arguments, and then to check whether Cleanthes’ argument satisfies these rules. But do Philo and Cleanthes proceed

in this way?

It is true that Philo does enunciate some general rules concerning the goodness of arguments by analogy. He says, "Whenever you depart, in the least, from the similarity of the cases, you diminish proportionately the evidence,"<sup>27</sup> and in another place he says, "Every alteration of circumstances occasions a doubt concerning the event."<sup>28</sup> He suggests that "a great disproportion" will "bar all comparison and inference."<sup>29</sup> He stresses the principle "that like effects arise from like causes," and also the principle that "where several known circumstances are observed to be similar, the unknown will also be found similar."<sup>30</sup> These are sound enough principles, as far as they go. Yet notice how rough and vague these principles are. Is there or is there not a "great disproportion" between machines and the world? Has or has not Cleanthes reasoned from "like" effects? Surely Cleanthes will be inclined to say that his argument does not involve any "great disproportion," and that he has reasoned from "like" effects; yet Philo will not agree. If the principles appealed to are uncontroversial, their application to Cleanthes' argument will be too unclear to be helpful; while if the principles appealed to do decisively rule in or rule out Cleanthes' argument, then the principles themselves will be too controversial to be relied on without further ado. For Cleanthes and Philo to carry on their discussion simply through appeal to general principles would offer little illumination, and little prospect of enabling the discussion to move them toward better understanding of the status of Cleanthes' argument.

Instead of putting any heavy reliance on general principles, Cleanthes and Philo carry out their discussion in the *Dialogues* in another manner. Throughout, they employ *reasoning by analogy*. Let us notice some examples of how it goes.

Cleanthes, himself, in defending his argument, uses other arguments by analogy for this purpose. For example, he points out

that "steps of a stair are plainly contrived that human legs may use them in mounting," and he urges that "human legs are also contrived for walking and mounting."<sup>31</sup> What Cleanthes is doing is to urge that there is an important analogy between two specimen arguments; let us call them A and B. A is the argument about the stairs. Let us sketch it in a little more fully. Suppose we land on an uninhabited island; we find there in the face of a cliff a long series of ledges extremely regular in shape and so proportioned that a person wishing to ascend them from the foot of the cliff to its summit finds it easy to do so. Here the conclusion forces itself on us that these structures were planned and constructed by some intelligent designer who formerly lived on the island. Our past experience has confronted us with many instances of stairs which we have found to have been constructed by intelligent design, and never have we come across anything closely resembling stairs that we found to have arisen without design. Under these circumstances, practically everyone will agree that the inductive argument by analogy which concludes that these ledges are designed is a strong argument.

The other argument (argument B) to which Cleanthes calls our attention is a special case of the argument from design. It starts from the observation that the legs of human beings are well suited to walking and climbing, and that these activities are beneficial to humans. From these observations the argument draws the conclusion that probably human legs are designed.

Cleanthes' aim in this part of the discussion is to urge that argument B is a rather good argument. He concedes that it may not establish its conclusion with quite as high a degree of probability as does argument A. But Cleanthes' goal is to lead us to see merit in argument B, through emphasizing how similar it is to argument A. In other words, Cleanthes, in this part of his discussion, is putting forward an argument by analogy (we may call it argument C) the

point of which is to emphasize the analogy between A and B in order to show us that B is a good argument. Argument C affirms that B must be a good argument, because of its strong analogy to A, which we already recognize to be good.

We have been considering Cleanthes' use of further reasoning by analogy in attempting to justify his favorable evaluation of his argument from design. So far, we have made no judgment endorsing Cleanthes' meta-argument concerning the status of his initial argument. Actually, Cleanthes' meta-argument is quite a bad argument, because B is not really similar enough to A. Thus argument C does not succeed in defending argument A against the charge of being bad. One might put it this way: Cleanthes' argument A is strong because it rests on extensive observations about how stair-like structures originate; however, argument B is weak because it too hastily leaps from the observation of complex structure to the conclusion that intelligent design must have been its cause, without marshalling adequate observational evidence indicating that such complex structure is to be found only in conjunction with intelligent design.

So far, we have spoken of Cleanthes' use of meta-argument by analogy in the effort to defend his original argument from design. However, through the central portions of the *Dialogues* it is Philo who most extensively uses reasoning by analogy in order to reason about how Cleanthes' argument is to be evaluated. Philo compares Cleanthes' argument from design to a wide variety of other inductive arguments by analogy. Philo makes clear that he is not trying to mount any general attack on inductive arguments by analogy; he and Cleanthes both take for granted that some of them are good and others are far from good. Philo wishes to bring out how Cleanthes' argument stands in relation to other possible inductive arguments by analogy, both strong and weak. Of course his conclusion is going to be that Cleanthes' argu-

ment is very weak.

On the one hand, Philo cites examples of strong arguments of this type: for instance, he says, on the basis of our experience we can reason that a particular unsupported stone will fall, or that contact with a particular fire will burn us.<sup>32</sup> These are good, strong arguments. However, he urges, there is little analogy between Cleanthes' argument and these strong arguments. This is because Cleanthes' argument has behind it nothing like the same enormous weight of highly relevant observational experience that supports the argument about the stone and that about the fire. Thus Philo is saying that there are strong inductive arguments by analogy, and these are specimens of them; but that Cleanthes' argument is very different from these strong ones.

Notice that it is important to Philo's procedure here that he does not merely lay down an abstract general principle to the effect that inductive arguments by analogy need to be strongly supported by extensive relevant experience; instead, he concretely draws to our attention specific possible inductive arguments by analogy that we will recognize as strong. In other words, Philo here is reasoning *from case to case*, rather than via general rules—which, if vague, would lack clear bearing on the matter, or if precise would be controversial in such a way that appeal to them would be question-begging.

Furthermore, Philo cites a rich variety of other possible inductive arguments by analogy that we can recognize as very weak arguments indeed. Suppose someone who had observed the circulation of the blood in human beings but had observed nothing about whether sap circulates in plants were to argue in favor of the conclusion that sap circulates in plants, merely because of the analogy between humans and plants.<sup>33</sup> This would be a very weak argument, for the analogy is a distant one. Philo claims that Cleanthes' argument is very like this, and therefore is weak too. Philo also considers



the argument that the world is quite like an animal, so probably it originated as an animal does—in animal reproduction, rather than in intelligent design.<sup>34</sup> In addition he considers the argument that the world is like a vegetable, and therefore probably originated in the way vegetables do—by growing from seed.<sup>35</sup>

We need not review all the myriad examples spoken of in the dialogue in order to get a sense of what is going on here. Of course, in presenting these wild arguments, Philo is not seriously advocating their conclusions. He considers these arguments only for the sake of discussion, in order to help us gauge the strength of Cleanthes' argument in relation to them. Philo's conclusion is that Cleanthes' argument is no better than these; indeed, perhaps Cleanthes' argument is even weaker, because the world does look slightly more like an animal or a vegetable than like the machines to which Cleanthes compares it.

Putting it another way, Philo is in effect arguing against Cleanthes in the following vein: "You, Cleanthes, suppose it a good argument to say that, because the world is observed to resemble machines in having intricately interrelated parts, therefore probably the world originated, as machines do, through intelligent design. But if you think that is a good argument, then you ought also to regard as at least equally good the argument that the world is observed to resemble a plant, so probably it grew from seed, as plants are seen to do. But since these two arguments are of approximately equal strength, that means that neither of them can be at all strong." Thus Cleanthes' argument is tarred by its similarity to these wild arguments.

## 6. Noninductive Reasoning by Analogy

What kind of reasoning by analogy is it that Cleanthes and Philo are employing in their meta-arguments, as they strive to evaluate the strength of the argument from

design? How do arguments such as C resemble A and B, and how do they differ?

Of course C is like A and B in that they all are arguments by analogy. In each of them, the reasoning starts from one or more cases whose status is supposed to be uncontroversial, and draws a conclusion concerning a supposedly analogous but more controversial case. These arguments are problematic, rather than demonstrative, in that the truth of their premises is not intended strictly to guarantee the truth of their conclusions, but at best only to increase its probability significantly. If we were to define "inductive" reasoning as any and all reasoning whose conclusions are merely probable, then of course we would classify both these types of reasoning as inductive; yet to speak in that way would divert our attention from important differences between them. Instead, let us define "inductive" so as to make essential to it all three of the features (I)-(III) that were mentioned earlier; then arguments such as C will not count as inductive. Doing this will better serve to bring out the contrast between arguments A and B on the one hand and argument C on the other.

Among logicians who have accepted the legitimacy of inductive reasoning by analogy there have been varying views concerning the status of noninductive arguments like C. Some have held that the only legitimate type of reasoning by analogy is inductive<sup>36</sup>; according to this view, then, arguments like C never have any logical force. Others do not distinguish between these two types of arguments but in effect treat each type as having legitimate instances.<sup>37</sup> Still others distinguish between inductive and noninductive arguments by analogy, and explicitly hold that arguments of each type can be logically respectable.<sup>38</sup> It is this last view which seems to me to be the proper one.<sup>39</sup>

For an original and philosophically striking defense of this noninductive (or a priori) reasoning by analogy we may look back to the writings of John Wisdom a generation

or more ago.<sup>40</sup> Throughout his published work he has employed and defended reasoning of this type, urging that valuable conclusions which could not otherwise be reached often can legitimately be drawn by means of it.

Supposing it is agreed that noninductive argument by analogy can be an acceptable type of reasoning, let us return to the consideration of how it differs from inductive argument by analogy. The chief differences have to do with how the latter (arguments like A and B) are more empirical in two respects than the former (arguments like C).

One respect concerns the status of the premises in these arguments. Arguments A and B start from empirical facts, known by sense-experience; here the cases a, b, c... need to be actual cases that have actually been observed. With argument C, in contrast, the cases a, b, c... do not have to be actual cases; merely possible ones can serve. Now, the cases with which argument C happens to be concerned are themselves arguments (though the cases dealt with in other noninductive arguments by analogy of course need not be limited to arguments); so in advancing argument C Cleanthes is entitled to cite arguments that could conceivably be put forward—he does not have to limit himself to arguments that have actually been advanced.

This affects the way in which the strength of an argument like C is to be evaluated. The factors (i)-(v) that were mentioned earlier as relevant to the strength of inductive arguments by analogy will continue to be relevant to noninductive reasoning by analogy. However, with a noninductive argument like C, insofar as it deals with cases that are merely possible rather than actual, the similarities and differences referred to in (i)-(v) will not be empirically observed; they will be discerned by reflection.

A second respect in which argument C is less empirical than A and B concerns the empirical content of the conclusion. In A and B the empirical content of the conclusion does go beyond that of the premises,

giving the conclusion a predictive aspect; while in C this is not the case, for its conclusion is a proposition about logical force and has no empirical content.

In conclusion, the position being advocated is that noninductive arguments by analogy should be seen as providing a legitimate type of reasoning, different both from deductive and from inductive reasoning, and not reducible to either of them. Like inductive arguments by analogy, noninductive ones can differ greatly in strength, and there are no formal rules or “decision procedures” by appeal to which their degrees of strength can be demonstrated. Deductive or inductive reasoning is unlikely to be effective toward establishing the degree of strength of such arguments when this is controversial. How strong or weak a particular argument of this type is will depend on how good the analogy is upon which it rests. In gauging this, we need to exercise good judgment, but we need not fall back upon dogmatic intuitions. On the contrary, when it is controversial what degree of strength a given argument of this type has, we can reason toward the answer by employing other noninductive arguments which compare or contrast the given argument with other arguments whose degrees of strength are less controversial.

Hume's *Dialogues* exhibits in an illuminating manner the way in which disputants can employ inductive reasoning by analogy in trying to better their understanding of the world, and also the way in which they can employ noninductive reasoning by analogy to improve their evaluations of other reasonings. While the attention that most logicians and philosophers have given to these two kinds of reasoning by analogy has been somewhat scanty and grudging, Hume, in contrast, has displayed them actively in operation in the context of a discussion where they contribute indispensably to advancing our understanding. We who are concerned with applied logic can profit from reading Hume from this point of view, and our students can benefit from studying him in this way also.

Notes

- <sup>1</sup> Plato, *Laws*, Book X (886) and Book XII (966).
- <sup>2</sup> Henry More, *Divine Dialogues* (1688). Elmer Sprague has recently drawn attention to the close links between this work and Hume's *Dialogues*; see his "Hume, Henry More, and the Design Argument," *Hume Studies*, XIV, 2 (November 1988).
- <sup>3</sup> Joseph Butler, *The Analogy of Religion, Natural and Revealed* (1736).
- <sup>4</sup> William Paley, *Natural Theology* (1802).
- <sup>5</sup> As just one example of this, a prominent New York surgeon, a scientifically trained professional, in a recent popular book writes, "Sometimes I wonder how the most confirmed atheist can deny the presence of a deity in the face of such an ingenious design as that of the human eye." (Charles D. Kelman, M.D., *Cataracts: What You Must Know About Them* [New York: Crown Publishers, 1982], p. 7.) His thought is the same as Cleanthes' demand that we "anatomize the eye," in Hume's *Dialogues*, Part III, seventh paragraph.
- <sup>6</sup> Immanuel Kant, *Critique of Pure Reason* (1781); see section entitled "Critique of Speculative Theology."
- <sup>7</sup> Charles Darwin, *The Origin of Species* (1859).
- <sup>8</sup> Of course there are passages in Hume's *Treatise of Human Nature* and in his first *Enquiry* where he seems to be denying that we can have any knowledge of matters of fact; but such radical scepticism plays no real part in the *Dialogues*. In Part I where radical scepticism is briefly discussed we should notice that it is Cleanthes, not Philo, who takes the lead in saying what scepticism is; Philo turns away from Cleanthes' mocking characterization of the sceptic without explicitly accepting or rejecting it, and in the later discussion takes it for granted that some arguments for factual conclusions are far better justified than others.
- <sup>9</sup> St. Thomas Aquinas, *Summa Theologica*, Part One, Question II, Third Article.
- <sup>10</sup> This point is discussed further in my "Hume on the Logic of Design," *Hume Studies*, vol. IX, no. 1 (April 1983).
- <sup>11</sup> David Hume, *Dialogues Concerning Natural Religion*, Part II, fifth paragraph.
- <sup>12</sup> Unfortunately there is more than one current way of defining induction. My preference is to define reasoning as inductive if and only if: (a) it is not deductively valid, (b) the arguer does not intend it to be so, and (c) the conclusion has empirical content going beyond that of the premises. This definition is not the simplest in current use, but I believe it is the least likely to be misleading in the long run. See my *Elements of Logic*, 5th edition (McGraw-Hill, 1989), section 2.
- <sup>13</sup> Let us interpret the word "probably" here as merely indicating a significant increase in the degree of rational credibility of the conclusion, and not necessarily indicating that this degree of probability is above one-half.
- <sup>14</sup> For example, Richard Whately held this view in his widely used nineteenth-century textbook *Elements of Logic* (Ninth edition, London, 1872), Book IV, Chapter I, section 2.
- <sup>15</sup> *Dialogues*, Part II, fifth paragraph.
- <sup>16</sup> *Dialogues*, Part II, seventh and seventeenth paragraphs.
- <sup>17</sup> For example, J. C. A. Gaskin recognizes this in his *Hume's Philosophy of Religion*, 2nd edition (Macmillan, 1988), p. 12.
- <sup>18</sup> For example, Stanley Tweyman insists upon casting the argument into deductive form; see his *Scepticism and Belief in Hume's Dialogues Concerning Natural Religion* (Martinus Nijhoff, 1986), pp. 37-38.
- <sup>19</sup> As was mentioned in note 12, the term "induction" is not used in the same way by all contemporary writers. Here let us use it in such a way that each of these three features will be essential to inductive reasoning.
- <sup>20</sup> A classic discussion of the role of analogy in inductive reasoning is given by J. M. Keynes in his *A Treatise on Probability* (Macmillan, 1921).
- <sup>21</sup> These factors are presented in a slightly different way in my *Elements of Logic*, 5th edition (McGraw-Hill, 1989), section 32.
- <sup>22</sup> Monroe Beardsley, *Thinking Straight*, fourth edition (Prentice-Hall, 1975), pp. 112-114.
- <sup>23</sup> One factor here is Aristotle's doctrine that scientific knowledge is only of what is universal and necessary.

<sup>24</sup> Bertrand Russell, *Our Knowledge of the External World* (1914), Lecture II, nineteenth paragraph.

<sup>25</sup> Hume, *Dialogues*, Part II, seventh paragraph.

<sup>26</sup> In Part XII, paragraphs 6-7, Philo says that the disagreement between himself and Cleanthes is merely verbal. This may seem to contradict my interpretation of the discussion as involving a genuine point of logic. However, what Philo means, or ought to mean, is only that the status of Cleanthes' argument has now been made as clear as it can be made within the limits of the time and energy of the disputants, and that the disagreement between them has now been reduced to a comparatively minor matter of degree.

Another puzzling statement by Philo in the *Dialogues* is that there is no room for doubt about the existence of God, only about His nature (Prologue, fifth paragraph; Part II, third paragraph). For Philo God seems merely to be whatever causes our experience of the world, and Philo holds that we cannot doubt there to be some such cause. Yet Hume can hardly have been unaware that reference to a cause whose nature is utterly unknown would make little sense and could not philosophically justify any attitude of reverence. Philo's concluding remark (Part XII, thirty-third paragraph) that to be a philosophical sceptic is the most essential step toward being a sound, believing Christian, I take to be ironic.

<sup>27</sup> *Dialogues*, Part II, seventh paragraph.

<sup>28</sup> *ibid.*, II, seventeenth paragraph.

<sup>29</sup> *ibid.*, II, eighteenth paragraph.

<sup>30</sup> *ibid.*, IV, second paragraph.

<sup>31</sup> *ibid.*, II, ninth paragraph.

<sup>32</sup> *ibid.*, II, seventh paragraph.

<sup>33</sup> *ibid.*, II, seventh paragraph.

<sup>34</sup> *ibid.*, VI, fourth paragraph.

<sup>35</sup> *ibid.*, VI, eighth paragraph.

<sup>36</sup> For example, Merrilee H. Salmon, in her *Introduction to Logic and Critical Thinking* (Harcourt Brace Jovanovich, 1984), appears to take this position.

<sup>37</sup> For example, James Carney and Richard Scheer in their *Fundamentals of Logic*, second edition (Macmillan, 1974), pp. 127-134, do not distinguish between the two types of reasoning by analogy, but approvingly offer examples of both kinds.

<sup>38</sup> For example, Trudy Govier in her *A Practical Study of Argument* (Wadsworth, 1985), chapter 9, and Robert Paul Churchill in his *Becoming Logical* (St. Martin's Press, 1986), sections 10-3 and 13-3, recognize both types of reasoning by analogy as legitimate.

<sup>39</sup> This view was advocated in my "Must Every Inference Be Either Deductive or Inductive?", in Max Black (ed.), *Philosophy in America* (George Allen & Unwin, 1965), pp. 58-73; and in my *Elements of Logic*, fifth edition (McGraw-Hill, 1989), section 38.

<sup>40</sup> Wisdom's *Philosophy and Psycho-Analysis* (Blackwell, 1953) contains much material relevant to this topic. See, for example, his discussion on p. 248 of comparing a hat to the Taj Mahal. In that passage Wisdom is making one of his favorite points, viz., that such an employment of analogy need not be merely emotive use of language but can serve to show us something we had not realized was so; that is, it can express worth-while reasoning. Wisdom carried further his discussion of reasoning of this type in a series of lectures entitled "Proof and Explanation" which he gave some years ago. He has recently consented to their being published.

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