

HUME'S PROBLEMS WITH INDUCTION

Avi Sion, Ph. D.

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Published 2008.

By Avi Sion in Geneva, Switzerland.

Abstract

Hume's Problems with Induction is intended to describe and refute some of the main doubts and objections David Hume raised with regard to inductive reasoning.

It replaces the so-called problem of induction with a principle of induction.

David Hume's notorious skepticism was based on errors of observation and reasoning, with regard to induction, causation, necessity, the self and freewill.

These are here pointed out and critically analyzed in detail – and more accurate and logical theories are proposed.

The present work also includes refutations of Hempel's and Goodman's alleged paradoxes of induction.

This book is drawn from the author's larger work *Logical and Spiritual Reflections*.



David Hume (Scotland, 1711-76).

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1. Hume's "problem of induction"

In the present essay, I would like to make a number of comments regarding Hume's so-called problem of induction, or rather emphasize his many problems with induction. I am mindful of Hume in all my writings. In at least two places, I devote some attention to Hume's particular viewpoints¹. If elsewhere I often do not mention him, or I just mention him in passing², as one proponent of this or that doctrine under discussion, it is because my emphasis is on proposing coherent theories rather than lingering on incoherent ones.

David Hume is undoubtedly a challenging and influential philosopher. In his works, he repeatedly attacks many

¹ Namely, in *Phenomenology*, chapter II (section 5), and in *Ruminations*, part I, chapter 8 (sections 4-7).

² See mentions in: *Future Logic*, chapters 65 and 67. *Phenomenology*, ch. I, V, VI and VII. *Judaic Logic*, ch. 2. *Buddhist Illogic*, ch. 7. *The Logic of Causation*, ch. 3, 10, 16 and app. 1. *Volition and Allied Causal Concepts*, ch. 2. *Ruminations*, part I, ch. 9, and part II, ch. 1, 6, 7. *Meditations*, ch. 32.

common concepts, such as the validity of induction (notably, generalization); the existence or knowability of natural necessity or law, causal connection or causation; and the existence or knowability of a self or person; that will is free of determinism and indeterminism; that an “ought” may be derived from an “is” or is a special kind of “is”.

These are of course essentially various facets of one and the same assault against common sense, against human reason. I will briefly now reply to each of these skeptical objections. The central or root question here is, I believe, that of the validity of induction. For the other problems are solvable mostly by inductive means. So that if induction is invalid, it is indeed difficult to see how the various other basic ideas of reason could be justified.

With regard to Hume's problem with **generalization**: Hume³ doubted the validity of generalization on the ground that *having in the past observed certain regularities is no guarantee that in the future such regularities will hold*. To appeal to a principle of Uniformity of Nature would, according to him, be a circular argument, since such a principle could only itself be known by generalization.

In Hume's view, a generalization is just a mental knee-jerk reaction by humans (and even animals, though they do it non-

³ In his *Treatise of Human Nature* (1739-40), and subsequent works. The *Treatise* is posted in full at <http://socserv2.socsci.mcmaster.ca/~econ/ugcm/3ll3/hume/treatise1.html>.

verbally), an expression of the expectation formed by repeated experiences of a similar kind, a sort of psychological instinct or habit rather than an epistemologically justifiable scientific methodology.

This might all seem credible, were we not to notice some glaring errors in Hume's understanding of generalization, and more broadly of induction⁴.

*Hume's error was to concentrate on the positive aspect of generalization and totally ignore the negative aspect of particularization.*⁵ Since he unconsciously equated inductive reasoning solely with generalization from past regularity, he naturally viewed the fact that some breach of regularity might indeed (as often happens) occur in the future as evidence that generalization *as such* is flawed. But this is just a misapprehension of the nature of induction on his part.

He should have known better, since Francis Bacon had (some 80 years before, in his *Novum Organon*)⁶, already clarified the all-importance of the "negative instance" as a check and balance against excessive generalization and in other forms of induction. Because Hume failed to grasp this crucial

⁴ I here refer the reader to *Future Logic*, Part VI, for a fuller understanding of the issues. Read at least chapters 50 and 55.

⁵ This error has, I have read, already been spotted by Karl Popper.

⁶ England, 1561-1626. The full text (1620) is posted on the Internet at <http://etext.library.adelaide.edu.au/b/bacon/francis/organon/complete.html>.

insight, we can say that his understanding of induction was fragmentary and inadequate.

All generalization is conditional; we may infer a generality from similar particulars, *provided we have sought for and not found evidence to the contrary*. To generalize to "All X are Y" we need to know two things, not just one: (a) that some X are Y, and (b) that no X to date seem not to be Y. Though the latter condition is usually left tacit, it is absolutely essential⁷.

If we did find such contrary evidence early, before we generalized, we would simply not generalize. If we find it later, after we generalized, we are then logically required to particularize. Synthetic generalities are not meant as static absolutes, but as *the best available assumptions in the given context of knowledge*. Generalization is a dynamic process, closely allied with particularization; it is not a once and for all time process.

The same logic applies to other forms of induction⁸, notably **adduction**. The latter refers to a broader concept of induction, from any evidence to any derived hypothesis (which may contain different terms than the evidence). The

⁷ Still today, many writers, philosophers and teachers fail to realize and mention this essential condition when they define or discuss generalization. It should nevermore be left tacit, to avoid the perpetuation of Hume's error.

⁸ Indeed, in the very act of concept formation, we do not merely *include* certain cases into it, but also (if only tacitly) *exclude* other cases from it. There is always both a positive and a negative aspect to thought, though the latter is often less manifest. Integration is always coupled with differentiation.

hypothesis is not merely confirmed by the evidence it explains, *but equally by the absence of contrary evidence and by the absence of better alternative hypotheses.*

Note this well: the data that confirm a hypothesis do *not* suffice to make us believe it. The simple proof of this is that when a hypothesis is rejected for some reason, the data that in the past confirmed it *continue* to logically confirm it, yet the hypothesis is thrown out in spite of that. There are essential additional conditions, which make our inductive conclusion unassailable thus far, namely (to repeat) that we have to date no data that belies it and no more fitting hypothesis.⁹

Inductive truth is always frankly contextual. It is absurd to attack induction as “unreliable” because it does not yield truths as certain and foolproof as deduction is reputed to do. To argue thus is to claim that one has some standard of judgment other than (or over and above) the only one human beings can possibly have, which is induction.

When inductive logic tells us: “in the given context of knowledge, hypothesis X is your best bet, compared to hypotheses Y, Z, etc.” – it is not leaving the matter open to an additional, more skeptical posture. For what is such

⁹ The logical calculus involved is thus not a simple dependence on “confirmation”, but a much more complex and global set of considerations, including “non-rejection” and “competitiveness”. See in this regard my detailed essay “Principles of Adduction” in *Phenomenology* (chapter VII, section 1).

skepticism, but itself just a claim to a logical insight and a material hypothesis?

If one examines skepticism towards induction, one sees it to be *nothing more than an attempted generalization from past occurrences of error (in other domains), one that pays no heed to past and present non-occurrences of error (in the domain under consideration)*. That is, it is itself a theory, open to inductive evaluation like any other.

Inductive logic has *already* taken that skeptical hypothesis into consideration and pronounced it inferior, because it does not duly take into consideration the specific current evidence in favor of X rather than all other alternatives.

Even if a scientific theory is not absolutely sure forevermore, we must stick by it if it seems at this time to be the closest to truth. The skeptic cannot come along and object that “closest is not close enough” – for that would mean he considers (nonsensically) that he has a theory that is closer than closest!

Hume foolishly ignored all this reasoning. He focused only on the positive aspect, and rightly complained that this could not possibly be regarded as logically final and binding! Under the circumstances, it is no wonder that he could see no “proof” of generalizing or adductive reasoning. If we wrongly define and fail to understand some process, it is bound to seem flawed to us.

When Hume discovered the unreliability of induction as he conceived it, he should have looked for a flaw in *his own*

view of induction, and modified it, rather than consider induction as invalid. *That* would have been correct inductive behavior on his part. When one's theory leads to absurd consequences, our first reaction should be to modify our particular theory, not theorizing as such. Instead of doubting his own thinking, Hume attacked human knowledge in general, whining that it cannot be "proved".¹⁰

But of course, logic – by that I mean deductive logic this time – cannot tolerate such self-contradiction. If someone claims the human means to knowledge, which includes induction as well as deduction, is flawed, then that person must be asked how come he arrived at this supposedly flawless proposition. One cannot reasonably have one's cake and eat it too.

The argument against generalization is itself a generalization, and so self-contradictory. We cannot say: since *some* generalizations are evidently erroneous, therefore *all* generalization is invalid (i.e. we cannot be sure of the validity of any generalization, which makes it as good as invalid) – because, of course, this argument is itself a generalization, and therefore is invalidated by itself! What we can say for sure is that a generalization (like that one) that leads to a contradiction is deductively invalid.

¹⁰ Hume's egotistical thinking in this and many other matters was very similar to that of certain philosophers much earlier in India (notably the Buddhist Nagarjuna). Not to mention Greek sophistries.

When one discovers a contradiction in one's thinking, it is not logic as such that is put in doubt but only one's current thinking. It is silly to cling to a particular thought and reject logic instead. Hume had greater faith in his particular logical notions (which were not, it turns out very logical) than he had in logic as such. The true scientist remains humble and open to correction.

Our ideas and theories have to be, as Karl Popper put it, *not only verifiable but also falsifiable*, to be credible and trustworthy. Albert Einstein likewise remarked¹¹:

“The belief in an external world independent of the perceiving subject is the basis of all natural science. Since, however, sense perception only gives information of this external world or of “physical reality” indirectly, we can only grasp the latter by speculative means. It follows from this that our notions of physical reality can never be final. We must always be ready to change these notions – that is to say, the axiomatic basis of physics – in order to do justice to perceived facts in the most perfect way logically.”

If one examines Hume's actual discourse in his books, one sees that even as he explicitly denies the reliability of induction he is implicitly using induction to the best of his ability. That is, he appeals to facts and logic, he

¹¹ I cannot say just where – having gleaned this quotation out of context somewhere in the Internet.

conceptualizes, generalizes and proposes theories, he compares his favored theories to other possible interpretations or explanations, he gives reasons (observations and arguments) for preferring his theories, and so forth. All that is – induction. Thus, the very methodology he rejects is the one he uses (albeit imperfectly) – and that is bound to be the case, for human beings have no other possible methodology.

To say this would seem to suggest that self-contradiction is feasible. Not so, if one considers how the two aspects, viz. the theory and the practice, may be at odds in the same person. When Hume says that induction is unreliable, he of course means that induction *as he sees it* is unreliable; but he does not realize that *he sees it incorrectly*¹², i.e. that a *quid pro quo* is involved. Indeed, he does not seemingly realize that the way he views it *affects* the way he gets his views of it, i.e. that he misleads himself too.

While he consciously denies the validity of induction, he unconsciously and subconsciously naturally continues to use it. However, because he has (prejudicially) chosen to deny induction in principle, he cannot study it as openly, impartially and thoroughly as he would otherwise have done, and he is led into error both in his understanding of it and in his actual use of it. Bad theory generates bad practice. And

¹² Or at least, incompletely – being for instance aware of the positive side (e.g. apparent constancy), but unaware of the negative side (e.g. testing for inconstancy).

the converse is of course also true, wrong practices promote wrong theories. He is trapped in a vicious circle, which requires a special effort of objectivity to shake off.

We must always keep in mind that what seems impossible or necessary to a philosopher (or anyone else, for that matter) depends on how he views things more broadly. Every philosopher functions within the framework of some basic beliefs and choices. These are not an eternal prison, but they take time and effort to overcome. Sooner or later, a philosopher gets locked-in by his past commitments, unless he takes great pains to remain open and inquisitive.

2. The principle of induction

Concerning the uniformity principle, which Hume denies, it is admittedly an idea difficult to uphold, in the sense that we cannot readily define uniformity or make a generality of it. We might speak of repetition, of two or more particular things seeming the same to us; but we are well aware that such regularity does not go on ad infinitum. On the contrary, we well know that sooner or later, something is bound to be different from the preceding things, since the world facing us is one of multiplicity.

Therefore, this “principle” may only be regarded as a heuristic idea, a rule of thumb, a broad but vague practical guideline to reasoning. It makes no specific claims in any given case. It just reminds us that there are (or seem to us to be) ‘similarities’ in this world of matter, mind and spirit. It is not intended to deny that there are also (apparent) ‘dissimilarities’. It is obviously not a claim that all is one and the same, a denial of multiplicity and diversity (in the world

of appearances, at least¹³). To speak of uniformity in Nature is not to imply uniformity of Nature.

We might also ask – can there be a world *without any* ‘uniformities’? A world of universal difference, with no two things the same in any respect whatever is unthinkable. Why? Because to so characterize the world would itself be an appeal to uniformity. A uniformly non-uniform world is a contradiction in terms. Therefore, we must admit *some* uniformity to exist in the world. The world need not be uniform throughout, for the principle of uniformity to apply. It suffices that some uniformity occurs.

Given this degree of uniformity, however small, we logically can and must talk about generalization and particularization. There happens to be some ‘uniformities’; therefore, we have to take them into consideration in our construction of knowledge. The principle of uniformity is thus not a wacky notion, as Hume seems to imply. It is just a first attempt by philosophers to explain induction; a first try, but certainly not the last. After that comes detailed formal treatment of the topic. This proceeds with reference to specifics, symbolized by X’s and Y’s, and to strict logic.

The uniformity principle is not a generalization of generalization; it is not a statement guilty of circularity, as

¹³ I.e. such recognition of pluralism does not at the outset exclude monism. The former may be true at the superficial phenomenological level, while the latter reigns at the metaphysical level of ultimate reality.

some critics contend. So what is it? Simply this: *when we come upon some uniformity in our experience or thought, we may readily assume that uniformity to continue onward until and unless we find some evidence or reason that sets a limit to it.* Why? Because in such case the assumption of uniformity already has a basis, whereas the contrary assumption of difference has not or not yet been found to have any. The generalization has some justification; whereas the particularization has none at all, it is an arbitrary assertion.

It cannot be argued that we may equally assume the contrary assumption (i.e. the proposed particularization) on the basis that in past events of induction other contrary assumptions have turned out to be true (i.e. for which experiences or reasons have indeed been adduced) – for the simple reason that such a generalization from diverse past inductions is formally excluded by the fact that we know of many cases that have not been found worthy of particularization to date.

That is to say, if we have looked for something and not found it, it seems more reasonable to assume that it does not exist than to assume that it does nevertheless exist. Admittedly, in many cases, the facts later belie such assumption of continuity; but these cases are relatively few in comparison. The probability is on the side of caution.

In any event, such caution is not inflexible, since we do say “until and unless” some evidence or argument to the contrary is adduced. This cautious phrase “until and unless” is of

course essential to understanding induction. It means: until *if ever* – i.e. it does not imply that the contrary will necessarily occur, and it does not exclude that it may well eventually occur. It is an expression of open-mindedness, of wholesome receptiveness in the face of reality, of ever readiness to dynamically adapt one's belief to facts.

In this way, our beliefs may at all times be said to be as close to the facts as we can get them. If we follow such sober inductive logic, devoid of irrational acts, we can be confident to have the best available conclusions in the present context of knowledge. We generalize when the facts allow it, and particularize when the facts necessitate it. We do not particularize out of context, or generalize against the evidence or when this would give rise to contradictions.

Hume doubted the validity of generalization because he thought that we adopt a general proposition like All X are Y, *only* on the basis of the corresponding particular Some X are Y. But if the latter was *sufficient* to (inductively) establish the former, then when we were faced with a contingency like Some X are Y and some X are not Y, we would be allowed to generalize both the positive and negative particulars, and we would find ourselves with a contradiction¹⁴ in our knowledge, viz. with both All X are Y and No X are Y.

But since contradiction is error, according to the 2nd law of thought, it follows that a particular is not by itself enough to

¹⁴

Or more precisely a contrariety.

confirm a generality. To do so, we need also to first adduce that the opposite particular is not currently justified. Note well what we have shown here: this criterion for generalization follows from the law of non-contradiction. Hume and his skeptical successors did not take this additional criterion into account. They noticed the aspect of ‘confirmation’, but ignored that of ‘non-rejection’.

The uniformity principle ought to be viewed as an application of a much larger and important principle, which we may simply call *the principle of induction* (in opposition to the so-called problem of induction). This all-important principle could be formulated as follows: *given any appearance, we may take it to be real, until and unless it is found to be illusory.*¹⁵

This is the fundamental principle of inductive logic, from which all others derive both their form and their content. And indeed, this is the way all human beings function in practice (with the rare exception of some people, like Hume, who want to seem cleverer than their peers). It is, together with Aristotle’s three laws of thought, the supreme principle of methodology, for both ordinary and scientific thought, whatever the domain under investigation¹⁶.

¹⁵ I have formulated and stressed this principle since I started writing logic, although I here name it “principle of induction” for the first time. See, for instances: *Future Logic*, chapter 2, etc.; *Phenomenology*, chapter 1, etc.; *Ruminations*, chapters 1 and 2.

¹⁶ I stress that here, to forestall any attempt to split ordinary and scientific thought apart. We should always stress their

Indeed, we could construe this principle of induction as *the fourth law of thought*. Just as the three laws proposed by Aristotle are really three facets of one and the same law, so also this fourth law should be viewed as implicit in the other three. Induction being the most pragmatic aspect of logic, this principle is the most practical of the foundations of rational discourse.

The principle of induction is a phenomenological truth, because it does not presume at the outset that the givens of appearance are real or illusory, material or mental, full or empty, or what have you. It is a perfectly neutral principle, without prejudice as to the eventual content of experience and rational knowledge. It is not a particular worldview, not an *a priori* assumption of content for knowledge.

However, in a second phase, upon reflection, the same principle favors the option of reality over that of illusion as a working hypothesis. This inbuilt bias is not only useful, but moreover (and that is very important for skeptics to realize) logically rock solid, as the following reasoning clearly shows:

continuity. The difference between them is (theoretically, at least) only one of rigor, i.e. of effort to ensure maximal adherence to logic and fact. This only means, at most, that more ordinary people fail to look carefully and think straight than do most scientists – but both groups are human. Another important thing to stress is that this method is the same for knowledge of matter or mind, of earthly issues or metaphysical ones, and so forth. The principle is the same, whatever the content.

This principle is self-evident, because its denial is self-contradictory. If someone says that *all appearance is illusory, i.e. not real*, which means that all our alleged knowledge is false, and not true, that person is laying claim to some knowledge of reality (viz. the knowledge that all is unreal, unknowable) – and thus contradicting himself. It follows that we can only be *consistent* by admitting that we are indeed capable of knowing some things (which does not mean everything).

It follows that the initial logical neutrality of appearance must be reinterpreted as in all cases an initial reality *that may be demoted* to the status of illusion if (and only if) specific reasons justify it. Reality is the default characterization, which is sometimes found illusory. Knowledge is essentially realistic, though in exceptional cases it is found to be unrealistic. Such occasional discoveries of error are also knowledge, note well; they are not over and above it.

If we did not adopt this position, that appearance is biased towards reality rather than illusion, we would be stuck in an inextricable agnosticism. Everything would be “*maybe real, maybe illusory*” without a way out. But such a problematic posture is itself a claim of knowledge, just like the claim that all is illusory, and so self-inconsistent too. It follows that the interpretation of appearance as reality until and unless otherwise proved is *the only* plausible alternative.¹⁷

¹⁷ Worth also stressing here is the importance of working hypotheses as engines of active knowledge development. A

If appearance were not, *ab initio* at least, admitted as reality rather than as illusion or as problematic, we would be denying it or putting it in doubt without cause – and yet we would be granting this causeless denial or doubt the status of a primary truth that does not need to be justified. This would be an arbitrary and self-contradictory posture – an imposture posing as logical insight. All discourse *must* begin with some granted truth – and in that case, the most credible and consistent truth is the assumption of appearance as reality unless or until otherwise proved.

We may well later, *ad terminatio* (in the last analysis), conclude that our assumption that this appearance was real was erroneous, and reclassify it as illusory. This happens occasionally, when we come across conflicts between appearances (or our interpretations of them). In such cases, we have to review in detail the basis for each of the conflicting theses and then decide which of them is the most credible (in accord with numerous principles of adduction).

It should be stressed that this stage of reconciliation between conflicting appearances is not a consequence of adopting reality as the default value of appearances. It would occur

skeptical or agnostic posture is essentially static and passive; taken seriously, it arrests all further development. Scientists repeatedly report the crucial role played by their working hypothesis, how it helped them to search for new data that would either confirm or refute it, how it told them what to look for and where and how to look (see for instance, Gould, p. 172). This is true not only of grand scientific theories, but of ordinary everyday concepts.

even if we insisted on neutral appearances and refused all working hypotheses. Conflicts would still appear and we would still have to solve the problem they pose. In any case, never forget, the assumption of reality rather than illusion only occurs when and for so long as no contradiction results. Otherwise, contradictions would arise very frequently.

Note well that I do not understand appearance in quite the same way Edmund Husserl does, as something *ab initio* and intrinsically mental; such a view is closer to Hume or even Berkeley than to me.

The ground floor of Husserl's phenomenology and mine differ in the primacy accorded to the concepts of consciousness and of the subject of consciousness. My own approach tries to be maximally neutral, in that appearances are initially taken as just 'what appears', without immediately judging them as 'contents of someone's consciousness'. Whereas, in Husserl's approach, the wider context of appearance is from the start considered as part and parcel of the appearance.

For me, some content comes first, and *only thereafter* do we, by a deduction or by an inductive inference, or perhaps more precisely by an intuition (an additional, secondary, reflexive act of consciousness), become aware of the context of consciousness and conscious subject. At this later stage, we go back and label the appearance as a "content of" consciousness, i.e. as

something whose apparition (though not whose existence) is made possible by an act of consciousness by some subject. Content is chronologically primary, the context is secondary.

Whereas in Husserl's philosophy, the fact of consciousness and its subject are present from the start, as soon as the appearance appears. Husserl's mistake, in my view, is to confuse logical order and chronological order, or ontological and epistemological. Of course, logically and ontologically, appearance implies consciousness and someone being conscious; but chronologically and epistemologically, they occur in succession.

As a result of this difference, his approach has a more subjectivist flavor than mine, and mine has a more objectivist flavor than his. Note, however, that in his later work Husserl tried more and more to shift from implied subjectivism to explicit objectivism.

We have seen the logic of induction in the special case of generalization. Given the positive particular 'Some X are Y' (appearance), we may generalize to the corresponding generality 'All X are Y' (reality), *provided* we have no evidence that 'Some X are not Y' (no conflicting appearance). Without this caveat, many contradictions would arise (by generalizing contingencies into contrary generalities); that proves the validity of the caveat. If (as sometimes occurs) conflicting evidence is eventually found

(i.e. it happens that Some X are not Y), then what was previously classed as real (viz. All X are Y) becomes classed as illusory (this is called particularization).

Induction is a flexible response to changing data, an ongoing effort of intelligent adaptation to apparent facts. Few logicians and philosophers realize, or take into consideration, the fact that one of the main disciplines of inductive logic is **harmonization**. They discuss observation and experiment, generalization and adduction, and deduction, with varying insight and skill, but the logic of resolving contradictions occasionally arrived at by those other inductive means is virtually unknown to them, or at least very little discussed or studied. This ignorance of, or blindness to, a crucial component of induction has led to many foolish theories¹⁸.

Notice well, to repeat, the *conditional form* of the principle of induction: it grants credibility to initial appearances “until and unless” contrary appearances arise, which belie such immediate assumption. Thus, in the case of the narrower uniformity principle, the initial appearance is the known few cases of similarity (or confirmation) and the fact of not having to date found cases of dissimilarity (or conflicting data); this allows generalization (or more broadly, theory adoption) until if ever we have reason or evidence to reverse our judgment and particularize (or reject, or at least modify, the theory).

¹⁸

For example, Hempel’s so-called paradox of confirmation.

The principle of induction may likewise be used to validate our reliance on intuition and sensory and inner perception, as well as on conception. It may also be applied to causality, if we loosely formulate it as: order may be assumed to exist everywhere, until and unless disorder appears obvious. However, the latter principle is not really necessary to explain causality, because we can better do that by means of regularity, i.e. with reference to the uniformity principle, i.e. to generalization and adduction.

In any case, the principle of induction is clearly a *phenomenological* principle, before it becomes an epistemological or ontological one. It is a logical procedure applicable to *appearance as such*, free of or prior to any pretensions to knowledge of reality devoid of all illusion. The claims it makes are as minimal as could be; they are purely procedural. It is for this reason as universal and indubitable as any principle can ever be.

Moreover, the principle of induction (and likewise its corollary the uniformity principle) applies equally to the material, mental and spiritual realms. It is a valid method of dealing with data, independently of the sort of data involved, i.e. irrespective of the 'substance' of the data. Many people associate induction exclusively with the physical sciences, but this is misconceived. Inductive logic sets standards of judgment applicable in all fields – including in psychology and in moral and spiritual concerns.

3. Causation, necessity and connection

One of the main battlegrounds of Hume's attack on induction is his treatment of **causation**. This is no accident, since one of the most important functions of induction is to find and establish causal relations. If we now turn our attention to this issue, we find almost exactly the same error on Hume's part.

He defines causation as "constant conjunction", ignoring the equally important inverse (*a contrario*) aspect of it. In truth, causation (in its strongest determination) of Y by X would be defined as follows: "X is always accompanied or followed by Y" (the positive aspect), *and* "not X is always accompanied or followed by not Y" (the negative aspect).

The constant conjunction of *the presences* of X and Y would not by itself convince us there is causation between them; we would also have to find that *the absences* of X and Y are likewise related. This is at least true in the strongest determination of causation, known as complete and necessary causation. There are in truth lesser determinations, but these

similarly include both a positive and a negative side, so the argument holds for them too¹⁹.

To define causation, as Hume did, only with reference to the positive aspect of it, would necessarily make the bond involved seem more flimsy. The negative aspect is what gives the positive aspect its full force. The coin is two-sided. If one focuses only on the complete causation and ignores the underlying necessary causation, it is no wonder that one (like Hume) sees no “necessity” in causation.²⁰

The idea of causation thus involves not just one but two generalizations, viz. a seemingly constant conjunction between X and Y, *and* a seemingly constant conjunction between the negation of X and the negation of Y. Note this well, one cannot refer to “constant conjunction” without admitting generalization.

And one cannot refer to causation without considering both the presences and the absences of the putative cause and effect. I say ‘putative’ because it is not right to call the two events or things concerned a cause and an effect till they have

¹⁹ As I show in great detail in my work *The Logic of Causation*.

²⁰ Indeed, if one or both of the things labeled X and Y is/are categorically constant, the constant conjunction of X and Y is formally true even though the two things are independent of each other. For the constancy to be applicable specifically to the conjunction of X and Y, there must be inconstancy in opposite circumstances.

been formally established to be so²¹. A cause is generally understood to be something that *makes a difference to*, i.e. has an effect on, something else. If something has no effect on anything it cannot rightly be called a cause.

Another way to express this is to point out that “constant conjunction” is a very ambiguous term, because it does not specify direction. At first sight, it means that the cause (X) is always followed (or accompanied) by the effect (Y) – i.e. ‘if X, then Y’. But upon reflection, it also might refer to the reverse direction, viz. that the effect always implies (or presupposes) the cause – i.e. “if Y, then X”. And in the last analysis, the correct understanding (for the strongest form of causation) is that both those directions should be intended – for that would ensure the above mentioned double condition of causation; i.e. that the relation have both a positive and negative side (since “if Y, then X” can be contraposed to “if not-X, then not-Y”).

“Constant conjunction” would be a correct description of (complete necessary) causation, only if the expression were understood in this double manner. The vagueness of the phrase makes it possible for Hume to treat it as if it only meant “every occurrence of C has an occurrence of E attached to it” – while at the same time the phrase subconsciously impinges on us as meaning a two-way

²¹ Many fake arguments against causation are based on naming the items under consideration cause and effect before they have been demonstrated to be so.

constancy of conjunction, i.e. as including “every occurrence of E has an occurrence of C attached to it”. Because of this theft of tacit meaning, many of Hume’s skeptical statements about causation seem superficially credible when they are not in fact so.

As a result of the vagueness of his treatment, Hume seemingly considered only complete causes to be causes – and simply did not take into consideration partial causes. Moreover, he seems to have totally ignored necessary and contingent causation. These suspicions are suggested by his definition of causation as ‘constant conjunction’. Such a definition fails to take into account partial causes on the positive side, and necessary and contingent causes on the negative side. It covers just one corner of the domain of causation. (And of course, as we shall see later, it also ignores indeterministic causality, i.e. volition.)

Hume, furthermore, argues that generality of conjunction is not the same as **necessity**. If two things *are* constantly conjoined, it does not mean that they *must be* so. This is true, but to raise this as an objection is to fail to realize the exact logical relation between the actual modality (are) and necessity (must be). They are two *modal categories*, and their relation is simply this: that necessity is *more general than* actuality, just as actuality is more general than possibility.

That is to say: to affirm the ‘necessity’ of some relation is to engage in a larger generalization than to affirm its ‘general’ actuality. It follows that if one admits the meaningfulness and

validity for a general actual conjunction, one must equally admit them for the more pronounced necessary conjunction. If generalization can go so far, it can in principle go farther still. To accept the one without the other, just because necessity is more abstract (higher up the modal scale) than general actuality, would be arbitrary. There is no logical basis to be choosy like Hume.

Indeed, when Hume denies the possibility of human knowledge of necessity (admitting at best generality, if that), what is he doing in fact other than claiming for himself a necessity? After all, impossibility (i.e. negation of possibility) is simply the negative form of necessity (i.e. it is necessity of negation). Therefore, Hume is here again in a position of inextricable self-contradiction.

Additionally, it is logically impossible to deny the concept of necessity while admitting that of possibility. The moment one admits some things as possible (as their actuality logically implies them to be), one must equally admit some others are impossible. That is, there are limits to all possibilities. If everything were only possible, nothing at all would be possible for contradictories would have to intertwine. Thus, denying all necessity is a logically untenable position.

There is yet another way that Hume's skeptical approach to causation relates to his problem with induction. He repeatedly asks on what basis we believe in a causal "**connection**". According to him, all we observe and can observe are the happenstances of conjunction; *we never*

observe and can never observe any link or tie between the things conjoined.

Connection is not an observable fact that we can generalize from, even granting generalization to be valid. Causation is at best, he implies, a generalization about conjunction – but it tells us nothing of a stronger underlying bond, which is really what we popularly understand by causation. The idea of connection is thus an after-the-fact projection of some obscure force unto an essentially statistical report; it assumes something more than what is empirically given.

In reply, we should first point out that ‘conjunction’ is not a concrete object, but an abstraction. Phenomenologically, it refers to the appearance of two objects side-by-side in some context. The term does not refer to a phenomenon, something with sensible qualities in itself – it refers rather to a relation between phenomena (or, similarly, other appearances or concepts) that we project to unify them for our rational purposes. It is a tool of ratiocination.

‘Connection’ is also an abstract term. We might therefore ask how come Hume acknowledges conjunction but not connection. The answer would be that the latter is a more complex abstraction than the former. Connection is not as immediately related to observation as conjunction. More imagination is needed to grasp it, because it refers to collective rather than to individual properties of things.

It is true, as Hume implies, that causation (i.e. deterministic causality, as distinct from volition) is never known or

knowable in individual cases, except through knowledge of the behavior of kinds of things. Therefore, causation cannot be generalization of perceived individual connections, but only generalization from individual conjunctions. Connection is a rational, top-down idea, more than an empirical, bottom-up idea. It is imagined with reference to many observations, rather than simply observed.

Even though Hume correctly realized this, his objection to connection has no weight, because according to inductive logic (viz. the principles of adduction), we can imagine any thing we choose as a hypothesis, and affirm it as true, provided and so long as it remains compatible with all experience (on both the positive and negative sides), meaningful, consistent with itself and all other empirical and abstract knowledge, and more coherent, relevant²² and credible than all alternative hypotheses.

In other words, what Hume is here refusing to comprehend is that most human knowledge is based on abstraction and imagination. He fails to understand that this is quite legitimate, provided it is properly regulated by the rules of adduction. Generalization directly from experience is just one

²² Relevance here refers to there being more than only compatibility between the thesis and empirical data; for the thesis to be relevant to the data at hand, it must imply some of them and thus conversely be fortified by them. The thesis is thus useful, in somewhat explaining the data. And it must be more useful than others, for if it is only as useful and sound as its alternative(s), it remains problematic (i.e. we cannot decide between them all).

kind of induction, the simplest. More broadly, we have the process of adduction, i.e. of forming fancy or complex hypotheses and testing them repeatedly both experientially and rationally.

The idea of causal connection (or tie or link or bond) is just one such hypothesis. It is indeed not a direct generalization from experience like "constant conjunction", but is a quite legitimate and ordinary adduction from experience. It is a rational construct we find useful for our understanding, both consistent with all evidence we have from experience and internally consistent. That is, the genesis of the concept of connection accords with the scientific method.

A common objection is: "night follows day and day follows night, but we do not say that day causes night or vice versa". Indeed, more generally, every impermanent thing is sure to be followed sooner or later by its negation; but we do not consider such sequences of events as consequential. Sequence is not always consequence. Hence, causation is something more to us than mere repeated togetherness. We need a concept of connection, over and above that of mere constant conjunction, to be able to express this important thought. No tautology is involved.

We could further suggest that "connection" is not commonly thought of as something general, the same abstract ingredient in all particular cases of causation. In practice, something specific and relatively concrete is in each case identified as the operative connection. A more precise analysis is required

in each case, to determine where the connection lies. For instance, in the case of day and night, the common ingredient is that of the sunshine and earthly rotation, with some exceptions during eclipses due to the moon.

Thus, the phenomena of day and night may be said to be due to the operation of common causatives. Their constant conjunction is due to them both being alternative effects of certain other phenomena. They must succeed each other, because they cannot occur at the same time. Under certain circumstances, the one occurs; under the remaining circumstances, the other occurs. Sun plus earth facing this way and moon in that position gives day; the same with earth facing the other way gives night; and so on.

We may generalize this example by saying that we should regard constant conjunction as only a first *indicator* of causation. It is indicative of causation in most instances, as the initial default categorization. But in some instances, we must admit that the conjoined phenomena succeed each other due to some third factor (or collection of factors), with which they are indeed both in turn constantly conjoined. They have some common cause(s), or constant conjunct(s), which more precisely explain their surprising regularity of succession.

In such cases, we would not call the two phenomena ‘directly’ causally connected (even though they invariably alternate). We would, however, instead consider each of them as indeed directly causally connected to the third

phenomenon (or set of phenomena)²³. Thus, our idea of causal connection is a subcategory of constant conjunction, rather than a mysterious universal additive to it. For this reason, we need two distinct concepts.

If we take the trouble to analyze Hume's own discourse, we are sure to find thousands of concepts and beliefs in it *as abstract as* that of causal connection that he so derides²⁴. His will to attack this particular abstraction is just an arbitrary refusal to give credence to perfectly rational arguments. He gives no evidence or solid reason to show us that this concept is more tenuous than any of those he himself accepts. We must not condone such double standards.

Generalization and adduction are equally justified, and logically not very different processes. Indeed, each could be viewed as a special case of the other. One cannot admit the one and reject the other. One cannot more or less admit the one, and more or less reject the other. They are essentially the same. Both are *indispensable and inescapable* means of human knowledge, which is mostly conceptual and

²³ We can then also say that the two phenomena are 'indirectly' causally connected *through or by* the third phenomenon.

²⁴ To name just one: the notion of "association" of ideas. What is the concrete content of this abstract term? Has "association" a sensible quality, like a color, tune, smell, taste or feel? Clearly not – yet Hume freely uses this abstraction. Indeed, it is to him the main force (another abstraction) in the mechanics of ideas that he wishes to institute for psychology, emulating Isaac Newton's treatment of physics.

theoretical. No one can claim to rationally criticize them without using them.

The likes of Hume have this fastidious dissatisfaction with the inherent tentativeness and uncertainty of induced knowledge, because their narrow minds are firmly set on the notion that only deduction yields “proof”. Nothing could be further from the truth. Most or all apparently deduced truths depend to some extent on induction from experience. Deduction is just one tool among others in the essentially inductive enterprise of human knowledge. Even the fanatic empiricist cannot formulate any idea without using induction.

The validity (as well as need) of induction is equal to that of deduction. Deduction is not somehow superior to induction. The validation of deduction (i.e. the science of deductive logic, including the laws of thought) depends on a host of inductions. The validation of induction depends on a host of inductions, too. In either case, we rely on our *logical insights*, on what seems or does not seem logical and credible, as well as on a mass of information.

Skeptics cannot refuse such logical insights without appealing to this very same faculty in us. When a skeptic says that this or that idea or belief is or is not logical, or credible, or reliable, or convincing, or provable, or valid, or anything or the sort, he is claiming a logical insight and asking us to have the same logical insight. We may agree or disagree. He cannot in any case claim to function over and above logical insight. He is not superhuman, graced with special privileges.

4. The psychology of induction

Hume tried his best to do away with the science of induction by psychologizing our understanding of it. Of course, there is a psychology of induction, since humans have a psyche and induce. But Hume attempted to reduce induction to psychological mechanisms, i.e. to substitute a psychology of inductive thought for the logic of inductive thought. He proposed a description that effectively eliminated the possibility of evaluation and prescription. He sought to permanently undercut all attempts to validate induction.

With this goal in mind, Hume proposed a psychological theory of **generalization**. Generalization was to him a mere quasi-mechanical or instinctive reaction of expectation due to repeated imprints in the mind; it was, effectively, an acquired habit. Essentially, Hume was arguing that the repeated experience of cases of X that are Y drives us to conclude that all X are Y (i.e. to expect that yet unseen cases will conform

to past experience), even though in principle things might well (and often do) turn out otherwise.

But according to inductive logic, Hume's theory is just a hypothesis that has to, itself (like all hypotheses), be confirmed repeatedly and never infirmed. Hume cannot regard it as somehow exempt from or transcending inductive logic. It is subsumed by it like any other theory. In fact, there is no psychological drive such as Hume projects – and his theory is itself proof of that, since he himself is aware that things might (and often do) turn out differently than expected.

It is important to notice that, in practice, while we do frequently generalize, we often do so tentatively fully aware that we might have reason to change our minds later on. Moreover, we often abstain from generalizing, because we do not want to proceed hastily or because we are already aware of contrary evidence. Also, we often particularize after having generalized, due to coming across new evidence to the contrary.

It follows from such simple considerations that *Hume's claim to a psychological law is empirically inaccurate*. It is a false observation, an overly hasty generalization from limited or selective introspection. Not only does it not explain the phenomenon of generalization, nor replace the need for a logical and epistemological treatment of the issue, it is an erroneous psychological claim, incorrect psychology.

Another attempt at reductive psychologizing was Hume's attempt to write-off causation as mere **association of ideas**. Basically, this suggests, Hume had personal difficulty distinguishing the fact of causation from our way to knowledge of causation; because he confused the two issues, he tried to conflate them.

Underlying Hume's notion of association of ideas was of course his belief that what we perceive (when we seem to perceive the world) are not things in the world out there but images of such things produced in the mind through sensations. Due to this erroneous (because internally inconsistent, self-contradictory) analysis of the experiential process, he seems (in some people's eyes) to have some credibility in affirming causation as mere association of ideas.

For Hume effectively adopted John Locke's theory of human knowledge as his starting point. This theory admittedly seems like common sense: we have senses and they obviously somehow produce images and memories in us. However, this is the basis of the worldview that has come to be called Naïve Realism (or uncritical materialism). It seems reasonable, but upon reflection it is found to be wobbly.

If the senses truly produce images in our minds of the world beyond them, it follows that we have no direct knowledge of the world out there at all, but only knowledge of the said images (this term here intends all phenomenal modalities, i.e. not only sights, but also sounds, smells, tastes, and various

touch sensations). In that case, how do we know of the bodily senses at all, and on what basis could we at all affirm a world beyond them? It is a seemingly inextricable dilemma.

At first glance, to affirm that our cognitive relation to the world out there is mediated by ideas seems innocuous. It seems obvious enough that our ideas, or most of them, somehow 'represent' or 'correspond to' the world. But upon reflection, such a view of how our knowledge is constituted and justified is logically untenable. How can we claim our ideas representative or correspondent to reality if we have no immediate contact with it by which to make this judgment? How indeed can we even claim our ideas *not to* represent or correspond to reality? We are seemingly doomed to utter ignorance.

To his credit, Hume (unlike Locke²⁵) became aware of the insuperable difficulty that the common sense theory of knowledge raised. Less to his credit, Hume derived a deep skepticism from this puzzle, because he effectively assumed there was no other approach. That is, rather than considering Locke's particular theoretical approach to have caused the dilemma, he viewed the problem as a definitive cause for doubting all human knowledge as such.

²⁵

I am stereotyping things a bit, because in truth Locke was somewhat aware of the problem, and so was Berkeley after him (and before Hume). Perhaps the philosopher most to blame should be Descartes. But I cannot here get into the fine details of history.

That such a radical doubt in turn cast doubt on his own faculty of knowledge and conclusions apparently did not cross Hume's mind (or not sufficiently). For, though henceforth fundamentally a skeptic, he continued seeking and claiming knowledge. But he did not try very hard to find a solution to the inherent problem. He never discovered the solution made possible by a phenomenological approach.²⁶

This approach is encapsulated by the aforementioned *principle of induction*, which starts the enterprise of knowledge with regard to appearances rather than to sense perceptions. 'Appearances' refers to the contents of consciousness irrespective of their source, so this term does not have presuppositions like 'sense perceptions'. It is not a verbal issue, but one of ordering of knowledge, note well. In a phenomenological perspective, Locke's theory regarding sensations and ideas is just that – one attempted explanation of certain appearances. Seen in this light, the difficulties it presents seem far less threatening.²⁷

Now, all this is said here only to explain why Hume was more or less bound to opt for a reduction of causation to

²⁶ This has come much later in the history of philosophy. Even Immanuel Kant, Hume's intellectual successor, never grasped phenomenology, but instead produced a complicated system of philosophy that increased the appearance-reality chasm. Note that when I use this term, I do not necessarily mean the Hegelian or Husserlian attempts at phenomenology, though these two later philosophers certainly played important roles.

²⁷ The reader is referred to my work on phenomenology for more on this topic.

'association of ideas'. Since his viewpoint effectively *divorced* ideas from their objects, he could not talk about the objects themselves without some nagging discomfort, and he was pretty well cornered into rather discussing ideas.

But it must be stressed that for us, who are free of the dilemma posed by Locke's theory thanks to a more phenomenological approach, the scenery looks very different. We can logically distinguish ideas from the objects they intend – be these objects physical, mental or spiritual. Although ideas might conceivably always appear in certain sequences, this is not for us sufficient reason to declare the objects they intend to be causally related.

Here again, we must apply deductive and inductive standards to judge the issue.

For a start, it is worth pointing out that the concept of association of ideas is inherently one of causation. Leaving aside Hume's view of causation as mere constant conjunction as against connection, to say that ideas are associated in some way is to claim a connection of some sort between them. If we think in terms of one idea 'giving rise to' another, or we use any other such expression, we are thinking causation. The implication may be tacit, but it is clearly there.

That the causal sequence concerns the specific kind of thing we call ideas, rather than the kind of thing we call objects, is irrelevant to the relation itself, which is conceived as technically the same irrespective of the kind of thing related.

Causation is a certain kind of relation between terms or theses, which has nothing to do with their actual contents.

To say that the idea of X causes the idea of Y is as much a claim to causation as to say that X causes Y. The formal proof is that we can call “the idea of X” a special case of X, and “the idea of Y” a special case of Y. In formal logic, X and Y are symbols for any two terms; they are not reserved for objects as against ideas. For this reason, the principles developed with regard to X and Y are universal.

If we formally admit a causative relation between ideas (or impressions, sensations, concepts, beliefs, thoughts, or any such mental phenomena), there is no reason for us not to admit a causative relation between other kinds of things (i.e. between non-ideas, viz. the objects of most ideas). To accept the one and refuse the other, as Hume does, can only be arbitrary, for there is nothing to formally distinguish the two. The variables differ, but the underlying relation between them is the same.

In short, our use of the word association in one case and causation in the other is a mere verbal embellishment. Hume’s main argument is thus based on a superficial verbal distinction. And here again, his attempt to substitute psychology for logic is implausible. The truths of logic are independent of any psychological thesis.

Secondly, Hume is incoherent when he formulates a concept of association of ideas that is meant *to exclude* a concept of causation between the objects the ideas refer to. Such an

exclusive contrast between the two concepts commits the stolen concept fallacy. For to invalidate the association of ideas, i.e. to point out that ideas may be erroneously associated, we need to have a more objective knowledge to compare to. It is logically impossible to claim associations of ideas to be occasionally or inherently wrong, without claiming separate knowledge of the true causation between the objects concerned.

In the very act of downplaying or denying causation between objects by positing association of ideas, Hume is relying on his and our past experience that sometimes associations do not match causations. If we had no such past experiences, we could not comprehend Hume's argument, or be convinced by it. Hume's discourse tacitly implies his and our ability to grasp causation independently of association, i.e. that we all have access to some objective reality.²⁸

Hume is here committing the same silly error Kant would later commit when claiming that things as they really are ("in themselves") are radically different from things as they appear. How could *he* know it? No one can consistently postulate a conflict between reality and appearance without having access to both. If someone accuses humans of total delusion, he forfeits all logical right to discuss the presumed 'real' world, for all such discussion (even hypothetically)

²⁸

Hume obviously in fact believed in the existence of the external world, since he invested so much of his time writing and publishing books for others to read!

would be self-contradictory, since it is itself a claim to some knowledge.

The critic cannot claim to be an exception to the general rule he posits. We cannot project a scenario that excludes us – but some people keep trying to! We admittedly all have some illusions sometimes; none of us are infallible – but this is a far cry from total delusion.

It should be noticed that we are well able to distinguish the two classes, i.e. ideas and objects. Hume does so in practice, though he denies our ability to do so theoretically. Indeed, how could his discourse be at all meaningful to him and us, if we could not all make the distinction? If apparent objects were truly no more than ideas, it is doubtful we could even imagine such a distinction; certainly, it would be logically self-contradictory in the way that Kant's dichotomy later was.

Thirdly, let us consider the facts of the case in more detail. Note that we ordinarily pass no time wondering whether our ideas are repeatedly conjoined, but only concern ourselves with their objects. Moreover, we might ask whether any two ideas are ever in our actual experience constantly conjoined; the answer seems evident to me – it is no. On the other hand, many objects do seem to us constantly conjoined.

Moreover, if we introspect sufficiently, we easily notice that ideas may become associated in our minds for reasons that have nothing to do with the objects they intend. Such association is not based on constant conjunctions, but on a

single coincidence. The strength of mental association is not due to statistical frequency. For instance, a certain musical tune reminds me of a certain woman, just because it happened to be playing in the restaurant where we sat the day I met her. I may well have heard the same tune a hundred times before, without any association occurring.

This means that in our common everyday experience, without reference to Hume, the conjunction of ideas and the conjunction of the objects they intend are two quite different issues. *Even if* we observed our ideas and found them constantly conjoined, we would not necessarily conclude that the objects they intend are causally related; we are not (most of us) that stupid. As well, we are well able to believe two objects to be causally related *even while* our ideas relative to these objects do not readily arise together.

It is also worth pointing out that, intuitively, we have the volitional power (often if not always) to arouse or suppress ideas, whereas we do not seem to have similar power relative to apparent objects. We can ignore objects, or forget them, but that does not wipe them out: if we look for them again they reappear or someone else might still see them. But in the case of ideas, or more precisely many memories and derived imaginations, we experience a greater power of manipulation. On this basis, we expect the associations between ideas to be more tenuous: they depend more on our will.

All such simple observations and arguments again take us to the conclusion that Hume indulged in an excessively hurried

generalization, from very little introspection and reflection. He was either lazy or dishonest, focusing on the data that supported his pet theory and ignoring the data and reasoning that contradicted it. The matter is open to objective judgment – it is not my word against his: everyone can carefully consider the data and judge independently.

The philosophical sciences of logic, phenomenology, epistemology and ontology provide the blueprint and guidelines for induction. There is of course additionally the need to consider the psychology of induction, since after all induction is an activity of the human psyche. Through such a complementary study, we can better comprehend how induction actually occurs. But psychology and logic are two very different fields.

Briefly put, I would describe the psychology of induction as follows. The human soul has powers of cognition, volition and valuation. All three of these functions come into play in every inductive act. The end is cognitive; the means is volitional (combined with non-volitional elements, provided by the nervous system, mainly the brain); the motivation comes from the valuing of knowledge, or the things or events that knowledge can serve as a means to.

The relation between the said philosophical sciences (including logic) and the psychology of induction (in an individual at a given time) is that the sciences (to the extent that they are known to the person concerned and kept in mind) *influence* the inductive activity of the person. They do

not determine it, note well, but they influence it. This relationship thus leaves room for the cognitive, volitional and value-oriented factors of induction.

If the person has a low degree of knowledge or understanding of the scientific underpinnings of induction, he or she will naturally often make errors. However, even without formal training and reflection on the issues of induction, most people do subconsciously frequently think logically and thus a lot of the time have some measure of success in their inductions. Humans, after all, have considerable natural intelligence; else they would not have survived till now. The said sciences are, after all, very recent productions of the human mind.

The root of Hume's problem with induction is perhaps his misconception as to what ideas²⁹ are. I suggest that in his mind's eye, ideas are clouds of 'mental stuff' produced by sensation. These perhaps very often look like the objects that generated our sensations, but we cannot be sure of that since we have no access to such objects other than through ideas. Thus, what we actually perceive and know are only ideas. Thus, ideas are veils that separate us from reality, rather than conduits to reality.

²⁹ Whereas Locke used the word idea very generally (including all mental phenomena, even emotions), Hume distinguishes primary impressions from derivative ideas, i.e. simple empirical sensations from the more complex mental constructs made with them. However, I here use the term idea much like Locke, because Hume's finer distinction does not affect the issue at hand.

This view is, as already pointed out, self-defeating, since it accuses also itself of ignorance and error. However, the point I want to stress here is how ideas are *reified* in Hume's discourse. Because he effectively visualized ideas as atoms of mental substance, his view of human knowledge as a whole was completely distorted.

In fact, an idea is something very abstract, an intention³⁰ towards some object, a *relation* of pointing in a certain direction, directing our attention hither, rather than a substantial entity. An idea is an idea *of* an object. It has no existence apart from an object of some sort (although, of course, the object concerned need not be real, but may be illusory).

It is certainly true that the physical processes of sensation play a central role in our noetic relation to a domain beyond our apparent physical body. But *it does not follow* that what

³⁰ The word "intention" is very well chosen here, note well. It is not the idea, or the name for it, that intends the object – it is us, we the subject, who do. The word does not refer primarily to an act of consciousness, in the sense that Husserl defined consciousness with reference to some mysterious "intentionality". Consciousness is not essentially an action, but rather a receptive event. No, intending refers to *an act of volition*. The subject (I, you) programs such an intention into every notion or symbol he produces. The subject wills his attention (awareness, consciousness) in the direction of the object concerned when he again comes across that idea or word. When we communicate, we pass such guides to mental action to each other.

we perceive when we sense this 'external world' are sensations or even images³¹ of the world.

- **The only coherent theory is that what we perceive is *the world itself*.**
- **The images we form in our minds of such primary perceptions are only *ex post facto memories* of what we perceived³².**
- **The abstract concepts we form thereafter are not mere manipulations of concrete memories, but *relations we intend to the objects initially perceived*.**

³¹ A verbal problem to always keep in mind is the equivocation of the word "sensations": used in a general sense it refers to all sensory material, whereas more specifically it makes us think of touch sensations. Likewise, the word "images" tends to evoke visual images, but in the present context it is meant to refer to any resemblance, i.e. equally to auditory and other sensory phenomena. Such equivocations may seem anodyne, but they mislead many people.

³² More precisely, **memories** are *physical* items (produced by sensations of visual and auditory phenomena) stored in the brain, which, when (voluntarily or involuntarily) reactivated, project *mental* images or sounds that we inwardly perceive and recognize as previously directly perceived (in the physical world, when that is the case). In the case of smells, tastes or tactile phenomena, I suspect we cannot in this way 'recall' past or present perceptions, but only 'recognize' them as familiar, so the term memory has a slightly different meaning. Note well that we do not commonly confuse our perceptions of material things and events with our memories of such perceptions; it is only armchair philosophers like Locke and Hume who equate these two experiences, quite unthinkingly.

The fact that we perceive external objects, and not impressions or ideas of those objects, is certainly marvelous, so much so that we still cannot understand how that might happen. But our difficulty and failure to explain this marvel of nature is not a reason enough to deny its occurrence. That we perceive the world is obvious enough; how such a thing is possible is a distinct question, which we may never answer. Science does not normally deny the very existence of what it cannot thus far explain.

Note well, we can claim knowledge *that* we directly perceive the external world itself, without claiming to know yet *just how* we manage to do so. We know we can, because this is the only consistent theory we can posit, as already explained. But exactly what role the senses and brain play (other than memory production, storage and reactivation) in this evident direct perception is still an open question. The fact that a partial question remains does not invalidate the truth of the partial answer already obtained. There are many issues in the special sciences that remain unsolved to date – and we do not for that reason throw out the knowledge we already have.³³

³³ For example, just what is a “force” like gravity in physics? Or just what is “energy”? Isaac Newton admitted his ignorance, saying “*hypotheses non fingo*” (meaning, I have no explanation); and even after modern developments in physics, like the Relativity and Quantum theories, we still do not know just ‘what’ these abstractions refer to concretely or ‘why’ these processes occur. Despite this partial (and even crucial) ignorance, we do not consider physics less of a science. For what is science? It is not

It does not follow from such non-skeptical, objectivist theory of knowledge that perception or conception can never be erroneous. Errors in human knowledge are essentially conceptual, and it is the task of logic to minimize them. Perception sometimes seems wrong, after the fact, due to our noticing later percepts that seem to contradict the earlier. In such cases, we realize that in fact we drew some conceptual inference from the initial percepts, which the later percepts make clear was unjustified, and we correct our previous assumption. This is just an application of the laws of thought and the principle of induction to sorting out conflicting perceptions.

Once we comprehend human knowledge in this truly enlightened manner, it becomes clear why Hume was so confused and self-contradictory in his views of induction, and other logical and philosophical issues. If one starts with false premises, one is very likely to end up with false conclusions. He should have been more careful.

Philosophers like Hume have always found the idea that we might indeed be perceiving and conceiving the world out there, and not merely our impressions and ideas of it, difficult to comprehend or explain. This is understandable, because this seeming ability of ours (*viz.* external consciousness) is

omniscience, but merely a guarantee that our current opinions are the best possible in the current context of experience – because the most *rigorously* induced.

something truly surprising and, well, *miraculous* – no better word for it comes to mind.

But then these same philosophers take for granted that our inner perceptions and conceptions are valid and not in need of explanation. They apparently do not realize that this ability (viz. internal consciousness) is also miraculous – indeed, just as miraculous. For the difference between the two, after all, is just one of distance. And who is to say how big the soul (the subject of consciousness) is or where it is in fact located? Why do they assume that it is more ‘inside’ than ‘outside’ the apparent body?

In both cases, there is something marvelous, inexplicable – namely consciousness, a line of relation between an object and a subject. How can one existent (a soul, a spiritual entity) experience another (a mental or material phenomenon)? In the case of self-intuition, the subject and object are exceptionally one and the same. But even this is a marvelous event, that something can experience itself.³⁴

The mere fact of consciousness is the biggest mystery. In comparison to it, the issues of how far consciousness can go, and how in some instances it is aroused and made possible by sensation and yet the body does not block or distort our view – these are relatively minor issues.

³⁴ I leave open whether we can experience *other* souls. Some people suggest it is possible, i.e. claim a sort of other-intuition. Some people claim even to have experienced God.

Of course, a theory of the exact role of the senses remains highly desirable. Obviously, each sense organ (whether in humans or other animals) somehow gives the overall organism 'access to' a range of data of a specific sort, and no other: e.g. human eyes open the window to a range of light waves (the visible spectrum) but not to all frequencies (not to radio waves, ultraviolet rays or microwaves, for instances) and not to other modalities (such as sound or chemical signals). The different sense organs have evolved over millions of years (at different rates and in different directions in different organisms).

Without these sense organs, we would not (so it seems) be able to sense external reality. So their role is not only that of memory production, but they are somehow essential to the actual contact between the organism as Subject and material objects it perceives. Even so, to repeat, it cannot consistently be affirmed that what the Subject perceives are internal products of sensation. Nor is the explanation that sense organs serve to filter out some of external reality sufficient. The sense organs must have a more significant role in the Subject-Object interface. But what?

5. The self or soul

As we saw in the examples of Hume's psychological theories of generalization as habit and of causation as association of ideas, he tended in practice to engage in faulty induction (and of course, faulty deduction).

He synthesized from a little data or a superficial analysis, without paying heed to information or arguments that would have delimited or belied his foregone conclusions. He would focus on or select positive aspects of an issue, those that confirmed his theses, and blithely ignore or discard negative aspects, those that weakened his positions.

Such faulty practices on his part are not surprising, in view of his theoretical opposition to induction, i.e. his belief that induction has an intrinsic problem. If one has a general failure of logical understanding, this will inevitably eventually translate into errors of practice. Conversely, the theoretical error is itself due a practical failure. Of course,

such error is never ubiquitous; else the person committing it could not at all engage in discourse.

The same tendency of faulty induction is to be found in Hume's treatment of the human soul and of freedom of the will. Rejecting offhand the Cartesian inference "*cogito, ergo sum*", Hume denied the existence or knowability of a human self or soul, conceiving our common belief in such a thing as due to nothing but the "bundling or collection" of our various perceptions:

*"It must be some one impression, that gives rise to every real idea. But self or person is not any one impression, but that to which our several impressions and ideas are supposed to have a reference. If any impression gives rise to the idea of self, that impression must continue invariably the same, through the whole course of our lives; since self is supposed to exist after that manner. But there is no impression constant and invariable. Pain and pleasure, grief and joy, passions and sensations succeed each other, and never all exist at the same time. It cannot, therefore, be from any of these impressions, or from any other, that the idea of self is derived; and consequently there is no such idea."*³⁵

Though his thinking on this important issue, as on many others, is clearly based on personal observation and insight, showing Hume to be a real philosopher, worthy of considerable respect, his reasoning is here again faulty. He argues that we would need to experience a single “impression”, one permeating our whole experience, to justify the idea of a self. By this, he seems to mean a concrete mental phenomenon of some distinct sort. Not finding such a core experience, he reduces our personal identity to at best the sum total of the mass of fleeting impressions of all sorts that we obviously have. But we may disagree with this viewpoint on several counts.

First, on what ground does Hume demand at the outset that the self be configured in the way of a single permanent “impression” underlying all inner experience? That must be seen to be a hypothesis of his, one that needs to be inductively proven, and not necessarily as he assumes the only possible way of conceiving the issue. The self might not be as phenomenal an entity as he projects (i.e. an impression), and it may be wiser to define it by referring to its functions (cognition, volition and valuation) rather than to its substance.

With regard to Hume’s condition of singularity of impression: it would not be inductively erroneous to claim that the self is the sum total of all impressions. This might be taken to mean that all our impressions are indicative of or even actually cause an underlying entity, which though never

perceptible is assumed to endure through time. In other words, the whole is more than the parts. Such assumption would simply constitute a conceptual hypothesis, like for example the hypothesis of electrons in physics as entities underlying electrical phenomena. An abstraction does not have to be identical with the experiential data that supports it.

With regard to Hume's condition of permanence of impression: to demand as he does that we be conscious of the self full time, or even part time, before we believe in it, is not in accord with inductive logic. The latter allows us to extrapolate from occasional apparent self-awareness to an assumption of permanent presence of a real self – this would just be generalization. We might even postulate a self without any direct impression of it, in the way of an adductive hypothesis to be supported by various other experiences and considerations. Either approach would be in accord with inductive logic, provided we obeyed the usual rules of induction (especially, that no contrary evidence or inconsistency be found).

Secondly, Hume is arguing in a circular manner when he says (in the above quotation): “It cannot, therefore, be from any of these impressions, *or from any other*, that the idea of self is derived”. Even if we accepted (which I do not, as just explained) his contention that the self cannot be inferred from impressions other than that of the self, it does not follow that we do not in fact have impressions of the self. When he says

“or from any other”, he means to categorically exclude this special experience, which he claims never to have.

We need to seriously consider the empirical and inductive status of Hume’s claim to have no self-awareness. It is important to note that this claim is *negative*, which means that it reports an unsuccessful search for something (an impression he can identify with the self). *How much introspective observation is this claim actually based on?* Did he meditate with great effort an hour a day for five years, say, in search of his self? Or did he, as I suspect, casually look into his mind for five seconds of so, a couple of times, and conclude what he had already decided to assert as true, viz. that he had no self?³⁶

Moreover, whether proposed prejudicially or casually, or after very conscientious investigation, a negative statement like that *always and necessarily involves a generalization*.

³⁶ I do not mean to say that had Hume meditated sufficiently, he would necessarily have affirmed the self. Many presumably major meditators deny the self’s existence (e.g. the Buddhist *anatman* doctrine), or at least its knowability (e.g. in the *Brihadaranyaka Upanishad*: “Nobody can know the atman inasmuch as the atman is the knower of all things”) – not that I always agree with their logic. But the word of a casual observer like Hume is not comparable to that of such meditators. In any case, we are still faced with mere hearsay, which must be empirically and rationally weighed. The said meditators might well be right, but other people cannot take them on faith and abstain from meditation. To claim the knowledge for oneself, one must personally meditate like those meditators did. After that, one must also judge their theoretical claims, and not just assume they were infallible geniuses.

We generalize from “I looked everywhere in me for a long time, and did not find what I sought” to “there’s no such thing as the thing sought, in me or anyone else”. This to repeat is a generalization, and there is no way for us to arrive at an empirical negative statement in any other way.

Hume generalizes: from the few moments when he perceived no self, to all his temporal existence; and from his own inner life to the same condition in all other persons. Yet Hume does not officially believe in generalization! Is he exempt? Are we to suppose that he is allowed to generalize (and indeed to do so from very tenuous data, his doubtful introspection), but no one else is? This is clearly either a double standard or a self-contradiction on Hume’s part. He postures as an empiricist³⁷, and is widely so regarded, but his empiricism is clearly very superficial and make-believe.

Thirdly, there is an alternative position (which I adhere to), which is fully in accord with the principles of inductive logic. It is that we all do experience our own self quite often, though such experience may vary in degree and depend on circumstances. The self is always implied and present, in every moment of cognition, volition or valuation. But to be aware of it, or sufficiently aware of it to declare it present with surety, an effort of ‘self-consciousness’ is needed.

Moreover, such self-consciousness is not a perception, but an intuition, because the self is not a phenomenal entity (i.e. one

³⁷ Even as an extreme empiricist, in the sense of modern “logical positivism”.

with visible, audible, or other sensible qualities), but a *non-phenomenal* one. To experience it, one must aim one's awareness 'inward', i.e. towards the sought-for subject, and not outward in the direction of mental or physical objects.

A lot of meditation practice is needed to pacify, silence and still the mind sufficiently to contemplate the self with some clarity and confidence. If there is a stage at which the self effectively disappears, or is seen to be 'empty', as some advanced meditators claim, that stage is much deeper than Hume ever evidently went. So Eastern philosophy cannot be appealed to in support of Hume.

If one expects to find the self in gross sensory or mental "impressions" of the sort Hume had in mind, one will of course be disappointed. But if one realizes that the self is a much more *subtle* appearance than those, to be apperceived rather than perceived, one can well claim to experience the soul directly.³⁸

It appears more readily in the way of a 'presence' inherent in all intentions and acts of consciousness, will and valuing, than as an isolated object. But there are suggestions that, at a

³⁸ If we try to tell a blind man about color, he may ask us whether it is loud or smells nice or tastes good or feels rough. But we cannot answer his question with reference to such phenomenal qualities, because the answer is a completely other sort of experience. He may then say: there's no such thing as color! But that is just because *he* cannot see it. Similarly, to experience the self, one needs to intuit it – one cannot perceive it, for it has no phenomenal characteristics.

deeper level, the self can be contemplated 'in itself', and further on (more mystically) as a part or aspect of a universal Self.

Additionally, we have a justifiable *concept* of self. We could accept the self as no more than a conceptual construct – this would logically be an acceptable position. We are logically allowed and even recommended to propose hypotheses that *unify and explain* empirical data.

We could well argue that events like consciousness, volition and valuation imply a self. They are incomprehensible without the assumption of a self. To be conscious is to have a self; to will is to have a self; to desire or dislike is to have a self. The brain and other sense and motor organs are not themselves conscious or in possession of the power of will; these are not a subject or agent, but mere channels or instruments.

But in my view, this narrow, constructivist position would *not* explain all the facts of experience. For how would we then claim to know specific *particulars* about our own individual mental workings from such a general abstraction? To overcome this difficulty, we have to adhere to an intuitionist postulate.

For instance, if I have a thought right now, I can intimately tell whether that thought is my own will, or occurring without or against my will. I am quite able to distinguish between my own beliefs, wills and values – and those imposed on me by my brain or external influences. If I had no direct intuition of

myself, or at least of my own inner acts, no such distinction would be feasible.

No theoretical knowledge of the self can produce such intimate certainties. Therefore, we must admit we do experience the self itself – if only occasionally, e.g. when we specifically make the effort to do so. It is not merely a concept for us, but also a direct experience.

A difficulty in self-awareness is perhaps due to our inability, except possibly in deep meditation, to detect the self as such. Ordinarily, we experience our self through its actual functioning, i.e. when we are involved in particular acts of cognition, volition or valuation. When the self does not ‘express’ itself in any such acts, it is transparent like space is to our eyes, except perhaps (to repeat) in meditation. Although intuition of self is also an act of the self, there seems to be a requirement that the self first express itself otherwise than through intuition, before intuition can detect it!

Hume refused to acknowledge such appearances of self-consciousness as valid data. He engaged in introspection, but clearly not enough of it; perhaps he was too impatient, and drew a premature conclusion. He generalized – from his own non-experience of self at some time(s) to all persons forever. For these reasons, his negative conclusion cannot be considered an undeniable fact (as many take it to be). It is just a theory, one with very little and inconclusive evidence going for it.

For my part, I insist: there *is* non-phenomenal experiential data from which a concrete idea of self can legitimately be drawn. That momentary self can then be generalized and reasonably claimed more permanent, at least to the earthly lifetime of the individual. We can further speculate that the self exists before and after death; but that is another issue, much harder to establish inductively if at all.

We can *furthermore*, on the basis of the said subtle data as well as with reference to phenomenal impressions, adductively posit a concept of self, an abstract self. Such adduction is even possible without reference to the intuitive data, but merely on the basis of the grosser data that Hume acknowledges. The abstraction so begun then provides support for the intuitive data, and the intuitive data in turn serves to further confirm and enlarge the abstraction.

Thus, to conclude, Hume's skeptical posture towards the self is mainly due to his personal difficulties with introspection and with inductive procedure. He sets wrong theoretical standards of observation and of judgment, and moreover fails in practice to adhere to his own rules and restrictions.

6. Freewill

Next, let us consider Hume's opinions regarding freewill. Given his opinions with regard to the self and to causation, we can with relative ease anticipate the way his thinking will go with regard to human volition and ethics.

Since Hume has denied the self, he cannot be expected to believe in volition in the ordinary sense, i.e. in freedom of the individual soul to will or not-will something irrespective of influences one way or the other. Therefore, one would expect him to opt for some sort of determinism³⁹. Although he has denied causation, or our knowledge of it, in the physical realm, this does not logically exclude causation in the

³⁹ Parenthetically: to his credit, Hume realizes that freewill ought not be identified with mere spontaneous occurrence. Indeterminism, whether in the physical or mental realm, constitutes a determinism of sorts relative to human beings. If things happen to us at random, without any cause, we are subject to them as surely as if they were determinist causal factors. That is, their own lack of causes does not diminish their causal impact on us.

“mental” realm, so such determinism would be consistent for him.

Yet, he struggles to salvage for human beings some vestige of volition. We are not in his view mere rubber balls that react to events in wholly predictable ways. We are it seems somewhat free to do what we feel like doing. Our actions are related to our character, desires, passions; it is such distinctive attributes of ours that make these actions our own. We are thus determined by impulses, preferences and emotions – or rather, they *are* ‘us’, we are their sum total. This is consistent with his view of the self as an aggregate of passing mental phenomena.

This is of course not what we would call free will. It is rather slavery to random passions. Hume admits as much when he says: “Reason is, and ought only to be, slave of the passions, and can never pretend to any other office than to serve and obey them”⁴⁰. By this he means that, though induction and deduction provide us with information that may affect our actions, they cannot determine it. According to him, only the passions can truly move us; it is ultimately with them that we identify and go.

Now, this tells us a lot about the way Hume’s mind works, and even about the way many other people’s minds work, but it does not accurately reflect the full range of human nature. It may apply to some of the people some of the time, but does

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Treatise, Book II, Part III, Sect. iii.

not apply to all of the people all of the time. For though it is true that reason does not necessarily affect our actions, it is also true that passions need not do so. Just as the information reason gives us can influence our actions but may well be ignored, i.e. is not determining – so it goes for the passions. We do not have to be slaves of our passions or identified with them; we are in fact distinct from them and able to transcend them.

It is true that many (maybe even most) people are not aware of this freedom of the will, and let their passions rule them. Some people, by the way, are similarly ruled by their reason, i.e. they are tormented by family, social, political or religious obligations, and unable to resist them. But such passivity or dependence is not normal or inevitable; it is a curable sickness of the soul. The passions, like reason, can only really ‘influence’ the soul, not ‘determine’ it – the soul still in all cases has the capacity and the responsibility to choose between them and decide which way to act. This is clear to anyone who practices self-control.

We can with effort learn to rule over our own minds, and indeed such policy is wisdom itself. But this demanding virtue depends on our making a clear distinction between causation (or deterministic causality) and volition (or personal causality), and on our understanding what ‘influence’ means.

A person is said to be influenced by something to act (or not act) in a certain way if the person’s perception or conception

of the thing makes acting in that way easier (or harder). Such *facilitation* (or on the contrary, impedance) of the will is never determining: the person remains free not to will in the direction of (or against) the influence; he or she can still go the other way. The potentiality of the will is increased (or decreased), but the person still has the final choice.

Thus, influence is a special sort of conditioning of voluntary action. The action is not caused (in the sense of causation) directly by the event or thing influencing it – but rather, our *awareness* to some degree of that event or thing (be it concrete or abstract) affects us (the doer of the deed), by making such action more or less easy than it otherwise would be. The influential thought pushes us or slows us down, but we still (so long as we have freewill) have to make an effort to actualize anything.

Once we understand the causal relation called influence, we can distance ourselves from our passions and even from our reason, and view them all as mere influential information, to be taken into consideration in motivating or deciding action, but which should never be allowed to usurp the sovereignty of the soul, who ultimately alone commands the will and is responsible for its orientations. But Hume cannot see this, because he is himself still too unconscious and too involved in his passions. Having denied the very existence of a self or person, he naturally misconceives the will as subservient to the passions.

Thus, Hume confuses his personal opinions and behavior with general truths about human nature. Here again, we find him making inaccurate observations and over-generalizing. He does not always realize the hypothetical nature of his propositions, and the need to try to establish them with reference to precise inductive procedures. Since he has misconceived induction to begin with, he has incapacitated himself methodologically.

Philosophers do not have special powers of 'insight' into truth, independent of logical scrutiny and correction. They think like everyone else by inductive means, and they can make mistakes like everyone else if they are not careful.

7. The is-ought dichotomy

David Hume's views and opinions on many philosophical topics seem (to me) to be driven by the desire to exempt himself from 'morality'. That often seems to be the underlying driving force or motive of all his skeptical philosophy, what it all manifestly tends towards. By denying induction, causation, the self and an effective power of freewill, he is justifying the idea that "anything goes" in knowledge and in personal behavior. This overall trend is again confirmed when we consider some of his positions regarding ethical reasoning.

Hume questions the possibility of deriving prescriptive statements, which tells us what we ought to do or not do, from descriptive statements, which tell us the way things are or are not. The distinction between these two sorts of statement is in his opinion so radical that one cannot be reduced to the other. This means effectively that moral or ethical propositions have no formal basis in fact, i.e. they

cannot be claimed as true in an absolute sense. There is no logical way, in his view, to deduce or induce an “ought” from an “is”.

Prescriptive statements are then, according to Hume, at best just practical advice on how to pursue our self-interest and the interests of the people we value (or more broadly, sympathize or empathize with). This is a kind of pragmatism or utilitarianism, in lieu of heavier moral notions of duty or obligation. In this way, ethics is made essentially amoral – an issue of convenience, a mere description of the ways we might best pursue our arbitrary values. The implication is one of relativism and convention.

It should be added that Hume's conclusion with a non-ethics or relativistic ethic is consistent with his position on freewill. For if we do not really have freewill, but are inevitably driven by our passions, and moreover can rely on them rather than reason for guidance, then we have no need for ethics. *Ethics is only meaningful if we have a real power of choice and must therefore take decisions.*

Hume's view of ethical logic is an interesting mix of truth and falsehood, which is why many have agreed with him and many have found it difficult to refute him. Ethics is of course a vast and complex subject, and I do not propose here to treat the topic in detail⁴¹. I would just like to show briefly how and

⁴¹ Note that I do not believe it is the task of the ethical philosopher to foresee every situation in life, and prescribe optimum behavior for them. Certainly, the philosopher is called

why Hume's approach, for all its seeming skeptical mastery, is here again superficial and narrow.

The issue raised is primarily formal. What are prescriptive propositions and how do they relate to descriptive ones? The obvious answer to the question would be that prescriptions *relate ends to means*. I ought to do (or not-do) this *if* I want to (or not-to) obtain or attain that. The 'ought' (or 'should' or 'must') modality is essentially the bond in a specific kind of if-then proposition, with a desire or 'value' as antecedent and an action or 'virtue' as consequent.

Such if-then propositions are not themselves descriptive, but are deductively derived from descriptive forms. When we say "if we want so and so, then thus and thus is the way to get it", we are affirming that "thus and thus" is/are *cause(s) of* "so and so"⁴². The latter is a factual claim, which may be true or false. It follows that the prescriptive statement can also be judged true or false, at least in respect of the correctness of

upon to consider difficult general cases and propose wise responses. But each situation is unique in some respects, so the main task in this field is to teach people to think for themselves – in sensitive, intelligent and logical ways – about ethical issues. Ethical philosophy is primarily ethical logic, and only secondarily deals with certain contents. It is not a totalitarian doctrine. Each person has to live his or her own life.

⁴² I won't here go into the different determinations of causation. Suffices to say that obviously if A is the only way to X, then I can say: "I must do A to get to X". But if there are alternative ways to X – say, A, B and C, then I can only say: "I must do A or B or C to get X" – i.e. my prescription is disjunctive.

the connection implied between its antecedent and consequent.

Be it mentioned in passing, prescriptive statements may be positive (imperatives) or negative (prohibitions). As well, note, the negations of prescriptive statements, viz. not imperative (exempt) and not prohibited (permitted) are also significant ethical modalities. But for brevity's sake we will here only concentrate on imperatives, for the rest logically follows.

We see from our above definition of an imperative that it is *conditional*. Good or bad mean good or bad *for* something or someone. The imperative is only true as such *if* we grant that the value pursued is indeed of value. But how can we ever know whether any of our values are valuable in an absolute sense? This is Hume's query, and it is quite valid. But his conclusion that values are formally bound to be arbitrary (i.e. cannot be deduced from plain facts) is open to challenge.

Our task is to show that we can arrive somehow at *categorical* imperatives⁴³, i.e. ethical standards that can

⁴³ It should be clear that, although I use this expression intentionally, I do not mean by it the same as Kant did. It is form, not content. I am here discussing formal ethical logic, not advocating a general or particular categorical imperative. Kant considers an imperative categorical if it is universal, i.e. applicable to everyone, all *agents*. Whereas in my view, a categorical imperative can be quite singular. What makes an imperative categorical, instead of hypothetical, is its necessity to all *goals* open to that agent. Logically, this is more symmetrical. What means are universal in this sense, i.e. universal to all goals (not

ground and justify all subsequent conditional imperatives. One conceivable way to do so is to use a dilemmatic argument: ‘Whether you want this or that or anything else, the pursuit of so and so would in any case be a precondition’.

Something is an absolute value if it is necessary to the pursuit of *any and all* arbitrary values one personally opts for. A relative value can be by-passed in the pursuit of other relative values, but an absolute value is one presupposed in every pursuit and must therefore be respected unconditionally.

Are there any such absolute values? Clearly, yes. An obvious such value is *life* itself: if one lacks life, one cannot pursue anything else; therefore life must be protected and enhanced. Another absolute value is *the self* – if the soul is the source of all our actions, good or bad, then the soul’s welfare is an absolute value. Whatever one wants, one needs the physiological and psychological means that make such pursuit at all possible – viz. one’s bodily and mental faculties. And most of all, one needs to be present oneself!

These are obvious examples. What do they teach us? If we wish to understand, use and validate ethical propositions, we have to realize *what makes all such discourse possible and necessary*. A simple illustration and proof of that is that if I tell you ‘don’t follow any ethical doctrine’, I am uttering an

necessarily all people)? Life, bodily wholeness and health, soul, cognition, volition, valuation, mental wholeness and health – these are means we always need to succeed, whatever our particular goals.

ethical doctrine, and therefore committing a self-contradiction.

Ethical propositions do not apply to inanimate objects. They apply only to living beings, because only such entities have anything to win or lose. But to apply them to all living beings is not correct, for though plants, insects and lower animals can objectively be said by us to have values, their functioning is either automatic or instinctive, and they cannot understand or voluntarily apply ethics.

Only humans, and maybe higher animals like chimps or dolphins, can have ethical thoughts and the power of will to carry them out. These thoughts are verbal or non-verbal in the case of humans, and necessarily non-verbal in the case of higher animals. Thus, in the last analysis, explicit ethical discourse concerns only human beings.

And we can say at the outset that to engage at all in ethical discourse, humans have to study and take into consideration their nature, their true identity. They have to realize their biological and spiritual nature, the nature of their physical-mental organism and the nature of their soul. Moreover, since biology and spirituality relate not just to the individual in isolation, but to larger groups and to society as a whole – ethics has to be equally broad in its concerns.

If this large factual background is ignored in the formulation of ethical propositions, one is bound to be arbitrary and sooner or later fall into error. In conclusion, we can develop an ethic that involves absolute values and is based on factual

truths. Ethics is clearly seen not to be arbitrary, if we consider the conditions that give rise to it in the first place – viz. that we are fragile living beings, with natural needs and limits, and that we are persons, with powers of cognition, volition and valuation.

If all the relevant facts are taken into consideration, then, an “ought” encapsulates a mass of “is” information, and can therefore be regarded as a special sort of “is”. That is, if properly developed, an ethical statement can be declared true, like any other factual claim. It is ethical fact, as against ‘alethic’ fact. Of course, if not properly induced and deduced, an ethical can be declared false – but not all ethical propositions are false.

Hume failed to realize the said logical preconditions of any ethics, and therefore got stuck in the shallow idea that ethics cannot be deeply grounded in fact. Since the scope of his considerations was partial, he could at least see that an “ought” is to start with conditional, but he could not see further how it could eventually be made unconditional. He therefore wrongly concluded that inferring an “ought” from an “is” is fallacious reasoning. This was later pompously called “the naturalistic fallacy”⁴⁴.

⁴⁴ By George Edward Moore, in his *Principia Ethica* (1903). I say ‘pompously’ to stress that no logical fallacy is involved, in my view. The issue is a logical problem – but one open to solution. My rejecting this so-called fallacy is not intended to reject offhand Moore’s central thesis, viz. that of the intellectual primacy of the

concept of 'good', i.e. that we tacitly understand the term in some way before any theory attempting to define it.

8. Hempel's paradox of confirmation

Carl Gustav Hempel⁴⁵ in the 1940s exposed an alleged “paradox of confirmation”, which suggested that a fully consistent formal inductive logic is impossible. This is commonly called “the raven paradox”, and may be described as follows:

- a) The observation that Some ravens are black (Some A are B) confirms the hypothesis that All ravens are black (All A are B).

The latter proposition may be contraposed to All non-black things are non-ravens (All nonB are nonA).

- b) Next, consider the observation that Some apples are green (Some C are D). This is convertible to Some green things are apples (Some D are C).

⁴⁵ Germany-USA, 1905-97.

It follows from this proposition that Some non-black things are non-ravens (Some nonB are nonA), since green things are not black and apples are not ravens.

Now, just as Some ravens are black (Some A are B) confirms the hypothesis that All ravens are black (All A are B), so Some non-black things are non-ravens (Some nonB are nonA) confirms the hypothesis that All non-black things are non-ravens (All nonB are nonA).

This induced proposition may in turn be contraposed to All ravens are black (All A are B), and here lies the difficulty, for it appears that the mere observation of some green apples is enough to confirm the hypothesis that All ravens are black! Note well that to achieve this result we did not even need to observe any black ravens.

- c) It follows from the preceding that we can equally well, using the same logical process, given Some apples are green, confirm the hypothesis that All ravens are pink, or any other color (except green) for that matter.
- d) This is in itself a mystery: how can apples tell us about ravens? Intuitively, this has to be viewed as a *non sequitur*.

Moreover, in the case of black ravens, the existence of black ravens has empirical backing, as already indicated; so the 'inference' from green apples to All

ravens are black still seems somewhat reasonable. But in the case of pink ravens, we have never observed any such animals; so the 'inference' from green apples to All ravens are pink seems quite unjustifiable.

Moreover, knowing by observation that Some ravens are black, how can we 'conclude' that All ravens are pink? Even if we do not claim all ravens black, but only claim all ravens pink, we would in such circumstances be upholding contrary propositions, namely the particular one that some ravens are black and the general one that all ravens are pink.

Moreover, even if we have never observed the color of any ravens, we can according to the above inductive process simultaneously conclude many contrary statements such as All ravens are black, All ravens are pink, All ravens are orange, etc. This too is a result that flies in the face of the law of non-contradiction.

Furthermore, the same can be done with reference not only to green apples, but also to apples of other colors (except black or pink, etc. as the case may be), and indeed to things (non-ravens) other than apples. In that event, almost anything goes in knowledge, and *we can at will affirm or deny just about anything about just about everything!*

This then, according to traditional presentations⁴⁶, is Hempel's paradox. It appears, from such analysis that the inductive processes of confirming hypotheses (such as generalizations directly from experience or indirectly from logical derivatives of experience) are fundamentally flawed. The analysis involved is quite *formal*, i.e. it can be performed in terms of symbols like A, B, C, D – and so it has universal force.

It follows that induction is bound to result in various absurdities: apparent non-sequiturs, many contradictions, and ultimately imply the arbitrariness of all human knowledge. Clearly, Hempel discovered here a serious challenge to inductive logic and logic in general.

As I will now show in detail, *the above analysis is inaccurate in some important respects*. I will show that although Hempel did indeed discover an interesting formal problem for logicians to consider and solve, this problem does not result in what we would call a paradox. That is, there are valuable lessons to be learned from Hempel's paradox (as we may continue to call it conventionally), but it does not present logic with any insurmountable predicament.

- a) The first operation described above is the commonly used inductive process of *generalization*. A particular proposition (Some A are B) is turned into a general one (All A are B). The particular supports the general

⁴⁶ See for instance: the article in Wikipedia at http://en.wikipedia.org/wiki/Raven_paradox.

in the way that positive evidence confirms a hypothesis. Their logical relation is adductive. 'Some' here means 'at least some, possibly all and possibly only some' – and by generalizing we are opting for the hypothesis 'all' in preference to the hypothesis 'only some'.

However, it would be an error to consider that Some A are B is *alone* capable of inductively justifying All A are B. Such generalization is an inductively permissible inference *provided we have looked for and so far not found any A that are not B*. For if we *had* found (by direct observation or by some reasoning) that Some A are not B, we would certainly not have generalized. Moreover, if we *later* do come across an A that is not B, we would have to *particularize* All A are B back to Some A are B.

This condition *sine qua non* of generalization, viz. to remain on the lookout for contradictory instances and adjust one's judgment accordingly, is not stressed or even mentioned in the earlier presentation, note well. Yet this is a known and accepted rule of scientific thought at least since the time of Francis Bacon, who emphasized the importance of the "negative instance" in induction. To ignore this condition is bound to lead to contradictions sooner rather than later.

Regarding the contraposition of All A are B to All nonB are nonA, it is of course a deductive act. Even

so, we must keep in mind that the conclusion All nonB are nonA is only due to the prior inductive inference of All A are B from Some A are B. No observation is required for the deduction, but we remain bound by the need to keep checking the previous inductive act, i.e. to remain alert for eventual cases of A that are not B.

- b) Now, let us grant that Some C are D, as above. Some C are D readily converts to Some D are C. However, Some D are C does not formally imply that Some nonB are nonA – some syllogistic inference is tacitly involved here, which ought to be brought out in the open. Clearly, we tacitly take for granted the premises that *green is not black* and *apples are not ravens*, whence: the following two successive syllogisms are constructed:

1st figure, **EIO**:

No green thing is a black thing (No D are B)

Some apples are green (Some C are D)

Therefore, Some apples are not black (Some C are not B).

3rd figure, **AII**:

All apples are non-ravens (All C are nonA)

Some apples are non-black (Some C are nonB)

Therefore, Some non-black things are non-ravens (Some nonB are nonA).

Whence, by generalization we obtain: All non-black things are non-ravens (All nonB are nonA); and then by contraposition: All ravens are black (All A are B). Note that the premises that led to this general conclusion do not include Some ravens are black; i.e. this conclusion is based on no empirical observation of black ravens.

Note too that we could have obtained the same result with the premises No ravens are green (No A are D) and No apples are black (No C are B). Note also that, though the syllogisms involved are deductive processes, all such tacit premises require prior observations and generalizations (i.e. inductions) to be adopted.

Moreover, it is significant to note that these syllogisms could not be constructed if the colors of the ravens and apples under consideration were the same (both green or both black), or if ravens and apples were not mutually exclusive classes. We also assume here that a raven cannot have more than one color (e.g. be partly black and partly green or whatever, or sometimes the one and sometimes the other); and similarly for an apple.

The next step was to generalize Some nonB are nonA to All nonB are nonA. But here again, generalization

is allowed only provided we have no evidence or inference from any other source that Some nonB are not nonA. That is, in our example, we must remain conscious that it is possible that some non-black things are not non-ravens, i.e. are ravens, which means we might yet find some non-black (albino) ravens out there.

Here too, we must make sure, in accordance with Bacon's crucial principle of adduction, that there is no conflicting observation that obstructs our expansive *élan*. This is all the more necessary, since here the premise of generalization Some nonB are nonA was obtained indirectly by deduction from previous products of induction, whereas previously our premise Some A are B was (supposedly) directly observed.

Note further that these two generalizations have the regulatory conditions that Some A are not B or Some nonB are not nonA, respectively, not be found true – and these conditions are one and the same since these two propositions are logically equivalent by contraposition. This means that in either case, whether we reason directly from black ravens or indirectly from green apples, there is the same implicit condition for generalization – that in our experience or reasoning to date no non-black ravens have appeared.

Thus, whichever of these two generalizations we opt for, the condition that there be no known instances of A which are not B is unaffected, and the dependence of the truth of All A are B on this condition is unchanged. Note too, the same condition holds before and after such generalizations. That is, even after such inductive process, if we discover new evidence to the contrary, we logically may and indeed must *retract*.

As previously stated in c) and d): using the same logical process, given Some apples are green, we can equally confirm the hypothesis that All ravens are pink, and many other wild hypotheses that conflict with each other⁴⁷. Obviously, we are doing something wrong somewhere, and have to take action to either prevent such absurd eventual consequences or correct them when and if they occur. I will now explain the solution to the problem.

Generalization is never an irreversible process. So if any generalization leads to contradictions, we are free and indeed obligated to particularize. The question of course remains: *in what precise direction and how far back should we go?* Still, what this means is that there is no 'paradox' in inductive logic as there is in deductive logic; almost everything (with

⁴⁷ To show propositions with different predicates are in conflict, we use syllogism. For instance, All ravens are black and All ravens are pink are incompatible, because knowing that No black things are pink, we obtain, by syllogism (1st figure, EAE): No ravens are pink, which is contrary to All ravens are pink.

the exception of logic itself – especially the laws of thought on which it is built) is and ever remains ‘negotiable’.

In deduction, a contradiction is a far more serious event, because the process leading up to it is presumably necessary. *But in induction, we know from the outset that the connection between premise(s) and conclusion is conditional – so contradictions are expected to arise and it is precisely the job of inductive logic to determine how to respond to them.*

Dealing with contradictions is a branch of inductive logic, called *harmonization* or conflict resolution. This is not something rare and exceptional – but occurs all the time in the development of knowledge. *Sometimes conflicts are resolved before they take shape, sometimes after. If we see them coming, we preempt them; otherwise, we perform the possible and necessary retractions.*

Particularization of a general proposition is retraction. More broadly, retraction means rejection or modification of a theory in the light of new evidence. Thus, for example: till now, I have seen only black ravens, and assumed all are black; tomorrow, I may notice a white raven, and change my view about the possible colors of ravens.

Hempel is evidently or apparently unaware of this crucial aspect of inductive reasoning, else he would not have viewed contradictions arising in the course of induction as paradoxical. Nevertheless, the situation described by him is interesting in this context, for reasons he did not (I think) realize.

For after the first generalization, starting from Some ravens are black (Some A are B), if we belatedly discover that Some ravens are not black (Some A are not B), *we simply return to our initial observation* that Some ravens are black (Some A are B). Whereas after the second generalization, starting from Some non-black things are non-ravens (Some nonB are nonA), if we belatedly discover the same conflicting evidence, we cannot simply deny All ravens are black (All A are B).

Why? Because *this would still leave us with part of our generalization*, viz. the claim that Some ravens are black (Some A are B). That is to say, we would expect 'All A are B' plus 'Some A are not B' to yield the harmonizing conclusion 'Some A are B and some A are not B'. The negative particular does not eliminate the positive particular underlying the positive generality; since we previously (due to said generalization) believed the generality, we now have a leftover to account for.

In the case of All ravens are black, such retraction is not noteworthy, since we know from experience Some ravens are black; but in the case of All ravens are pink, we have a serious problem, for there is no shred of evidence for a claim that Some ravens are pink! In other words, the proposed retraction cannot suffice in the situation presented by Hempel, i.e. when All A are B is induced from Some nonB are nonA.

In my view, this is the crux of the problem revealed by Hempel's exploration. The problem is not exactly a paradox, since *the validity of generalization formally depends on such process not giving rise to any eventual contradiction*.⁴⁸

That from the observation of some green apples we may by generalization infer that All ravens are black and All ravens are pink and many other conflicting conclusions – this is amusing, but not frightening. For in such situation of self-contradiction, we can by retraction find ways to harmonize our knowledge again. The problem is temporary.

On the other hand, what Hempel has here uncovered is that we cannot always retract simply by particularization of the conflicting theses. Particularization seems acceptable in some cases (e.g. with black ravens), but in other cases it yields unacceptable results (e.g. with pink ravens), because the logical remainder of such retraction is devoid of empirical basis.

⁴⁸ A paradox is a thesis that formally contradicts itself or deductively leads to contradictory propositions. From a single such paradox, we may conclude that the thesis in question is false; logic as such is not put in question, because the contradiction involved is merely conditional. A double paradox, on the other hand, is a serious threat to logic; here, both a thesis *and* its contradictory are paradoxical, so the contradiction is *unconditional*. In that case, logic cannot declare either of them true or false – but must among them find either a non-sequitur (as in the Barber paradox) or a meaningless term (as in the Liar paradox). That is, logic must challenge either one or more of the implications involved, and/or one or more of the terms or theses involved. The Hempel scenario does not give rise to an unconditional/double paradox.

Suppose, using Hempel's method, starting from green apples, we induce both the generalities All ravens are pink and All ravens are orange. These two conclusions are in conflict. Let us say we decide to resolve the conflict by denying them both; that still leaves us with two propositions Some ravens are pink and Some ravens are orange.

These two particular propositions are not in conflict – and, let us take for granted, neither of them has any empirical basis, yet they both got somehow cozily 'established' in our knowledge! They were introduced by the generalizations from green apples, yet they were not dislodged when we abandoned the corresponding generalities. We are stuck with them, even though the complex processes that led to them have been revoked.

It is unthinkable that such *particulars* (whether true or untrue) should emerge from the unrelated observation of green apples (or whatever else). This I believe is the significant problem uncovered by Hempel. The problem is not the conflict of generalities or between general and particular propositions, so it is not about paradox. The problem has to do with 'collateral damage' to knowledge, through incomplete correction of errors.

I suggest the following solution for it: when we generalize from Some A are B to All A are B, and then discover that Some A are not B, we particularize All A are B back to Some

A are B. That is normal procedure, which we all commonly practice.⁴⁹

On the other hand, when we obtain All A are B by generalization from Some nonB are nonA to All nonB are nonA (followed by contraposition of the latter), then when we discover that Some A are not B, we cannot merely particularize All A are B back to Some A are B, but must also retract the intermediate premise of the proposition All A are B, viz. All nonB are nonA, and return to Some nonB are nonA.

In view of the latter retraction, we in fact no longer have a basis for claiming Some A are B (this cannot be deduced from Some nonB are nonA). It would be an error of induction to forget the actual *source* of our belief in All A are B. The distinction between the inductive grounds Some A are B and Some nonB are nonA must be kept in mind, so that in the event of discovery of contradictory evidence, viz. that Some A are not B, we particularize back to our *exact same previous position* in each case.

We may thence formulate the following new law of inductive logic, which may be called *the law of commensurate retraction*: a product of generalization like All A are B cannot be treated without regard to its particular source; when if ever it is denied by new evidence, we must retreat to the same initial particular and not to *some other* particular

⁴⁹

Symbolically, $A + O = IO$.

that was implied by the generality when it seemed true but is now no longer implied by it since it is no longer true.

In other words, when and if we come upon a contradiction of the sort considered here, we must realize that this does not merely discredit the generality that was previously induced, but more deeply discredits the inductive act that gave rise to it. Thus, we should not retract by mere particularization, but carefully verify whether the remaining particular has any independent basis and if it has not we should return far back enough to the *status quo ante* to make sure no unconfirmed particular remains.

This seems like a perfectly reasonable instruction – to reverse and clean up all traces of an inductive act that was found illicit, i.e. that led us into a logical impasse.

All this means that, using ordinary procedures of logic, we would never fall into a self-contradictory situation (e.g. claiming paradoxically All ravens are black and All ravens are pink). The fact that generalizations may yield incompatible results is commonplace; we daily deal with such conflicts without difficulty. When such conflicts arise, we are logically required to harmonize. If we cannot find a specific way to resolve the conflict, the conflict is resolved in a generic manner, viz. all the generalizations involved are put in doubt.

In a situation where two or more propositions are put in doubt by mutual conflict, we would naturally give more credence to one that has some direct empirical basis (like All

ravens are black) than to one that merely emerged from indirect projection (like All ravens are pink). We need not treat all conflicting propositions with equal doubt, but may be selective with regard to their inductive genesis.

With regard to the evidence for conflicting thesis – obviously, if we have no data on black or pink ravens, we would not know which way to retract, and both generalizations would be problematic. But if we have observed some black ravens and never observed any pink ones, we would naturally opt for the generalization that All ravens are black (All A are B). On the other hand, if we have observed both black ravens and pink ravens, we would make neither generalization and simply conjoin the two particulars.

With regard to the inductive processes used – direct generalization would naturally be favored over the indirect sort envisaged by Hempel. If the conflict at hand can be resolved by ordinary means, e.g. with reference to empirical considerations, we need not bother to backtrack with reference to process. But in cases where we have no other means of decision, process would naturally be the focus of revision.

A possible objection to the law of commensurate retraction would be that in practice we rarely manage to keep track of the exact sources of our generalizations. Such ignorance could conceivably occur and cause some havoc of the type Hempel described in our knowledge.

However, we may also point out that *in practice we just about never find ourselves in the situation described by Hempel*. How often does anyone generalize from a proposition like Some nonB are nonA? The statistical answer is 'probably never' – Hempel's paradox is just *a remote formal possibility* that logicians have to consider, but its practical impact is just about nil.

Moreover, we are not likely to arrive at a proposition of the form Some nonB are nonA, except by the sort of reasoning above depicted, i.e. through some other terms like C and D. We cannot directly *observe* that Some nonB are nonA. Observation relates primarily to positive phenomena; it can be about negative phenomena but only indirectly. This suggests that if we did encounter a situation of Hempel paradox, we would likely be aware of how it arose.

Another remark worth making is that the above solution of the problem raised in Hempel's paradox can be characterized as heuristic; it is repair work by trial and error. But I have already proposed in my work *Future Logic*⁵⁰ a detailed, systematic, formal treatment of induction, by means of factorization and formula revision. I believe that is free of the Hempel's problem, since every formal possibility is included in the factorial formulas developed.

⁵⁰ First published in 1990, a few years before Hempel's death. See part VI.

With regard to solutions to Hempel's paradox offered by other logicians, e.g. those by Goodman and by Quine described in the earlier mentioned Wikipedia article:

“Nelson Goodman suggested adding restrictions to our reasoning, such as never considering an instance as support for ‘All P are Q’ if it would also support ‘No P are Q’ ... Goodman, and later another philosopher, [W.V.] Quine, used the term *projectible predicate* to describe those expressions, such as *raven* and *black*, which *do* allow inductive generalization; *non-projectible* predicates are by contrast those such as *non-black* and *non-raven* which apparently do not. Quine suggests that it is an empirical question which, if any, predicates are projectible; and notes that in an infinite domain of objects the complement of a projectible predicate ought always be non-projectible. This would have the consequence that, although “All ravens are black” and “All non-black things are non-ravens” must be equally supported, they both derive all their support from black ravens and not from non-black non-ravens.”

I find these proposals reasonable and not incompatible with my own. However, I think mine is a little more precise in pinpointing the problem at hand and its solution.

Goodman's suggestion to restrict induction from a proposition if such process yields conflicting conclusions is logically sound. Only his instruction cannot be obeyed

preemptively, but only *after* we discover that the process yields conflicting conclusions. So it is not a preventative, as he seems to consider it, but an after the fact correction. It can therefore be regarded as about the same as the law of commensurate retraction I above propose. The only difference is that he does not seem to have made a distinction between the conflict of generalities and the underlying leftover particulars.

As for “non-projectible predicates”, I would agree that negative terms (complements) present a general problem in induction. Although deductive logic makes no distinction between positive and negative terms, phenomenology does distinguish between the presence of positive phenomena and their absence. Whereas we can observe a positive phenomenon (like a black raven) without regard to its negation, we cannot mention a negative term (like non-black or non-raven) before thinking of and looking for the corresponding positive phenomenon and failing to find it.⁵¹

Thus, a truly negative term can never be truly empirical. Its content is never ‘I have seen something’, but always ‘I have diligently looked for something and not found it’. A negative is ‘empirical’ in a lesser, more derivative sense than a positive. It already involves a generalization of sorts, from ‘could not be found’ to ‘was not there to be found’.

⁵¹ See my essay on this topic in *Ruminations* (part I, chapter 9).

It follows from this insight that generalization from negative terms, such as Some nonB are nonA, can only proceed with unusual caution and skepticism. Hempel's scenario further justifies such tentativeness. We are might even be tempted as a radical solution to simply always interdict generalization for a truly negative subject. If any manner of discourse has certain likely illogical consequence, logicians are wise to formulate a preemptive law of logic of this sort.

Another temptation is to deny any meaningful content to propositions of the form Some nonB are nonA. Such a proposition is formally implied by All A are B, and compatible with Some A are B, No A are B and Some A are not B – but does it really tell us anything? Indeed, since nothing can be inferred about A or B (as subjects) from Some nonB are nonA, what information does such a proposition contain? Could one not conceivably assert such a proposition using any almost two terms taken at random? This sort of doubt could be used to further justify interdiction of generalization from such propositions.⁵²

⁵² These questions are made clearer if we consider the eventual negation of Some nonB are nonA, i.e. the form No nonB is nonA, which implies All nonB are A. In the event the latter proposition is true, we would have a negative term (nonB) included in a positive (A). This could be taken to mean that almost all the world (except things that are B) falls under A. For this to happen, A would have to be a very large concept. Such a concept would be very exceptional and almost meaningless. Whence, we can say that Some nonB are nonA is almost always true, and at the same time not very informative.

However, since a less radical solution, namely the above-proposed law of commensurate retraction is possible, we perhaps need not go so far. Rather than preemptively forbid certain doubtful processes under all conditions, I prefer to allow them in case they occasionally work, and prepare the appropriate corrective mechanism for when they fail to work.

To sum up, I believe we have convincingly shown here that Hempel's so-called paradox does not present the science of logic with any insuperable difficulty; it is made out to be a bit more daunting than it really is. Even so, it is an interesting contribution for logicians to ponder over.

9. Goodman's paradox of prediction

Nelson Goodman⁵³ proposed in 1955 a “riddle of induction” (as he called it⁵⁴) or “paradox of prediction” (as others have characterized it), which seemed to demonstrate a formal difficulty in generalization. This may be stated as follows:

“Goodman ... introduce[d] the color grue, which applies to all things examined before a certain time t just in case they are green, but also to other things just in case they are blue and not examined before time t . If we examine emeralds before time t and find that emerald a is green, emerald b is green, and so forth, each will confirm the hypothesis that all emeralds are green. However, emeralds a, b, c, \dots etc. also confirm the hypothesis that all emeralds are grue. In this case

⁵³ USA, 1906-98.

⁵⁴ Or more pretentiously, “the new problem of induction”.

emeralds a, b, c, \dots examined after time t should be grue, **and therefore blue!**" (Emphasis mine)⁵⁵

The significance of this artifice, according to its proponents, is that although green and "grue" have the same linguistic form, and so should be subject to the same logical processes (in this case, the inductive process of generalization), they are internally quite different types of concepts, since the first implies a similarity between its past and future instances, while the second suggests a change of color over time, so that the result is paradoxically quite different if we generalize with reference to the one or the other.

However, as I shall now formally demonstrate, this is merely a sleight of hand, for though the act of generalization is equally valid for green and for grue, it does not follow that we can infer any emeralds to be blue from the induced general proposition that all emeralds are grue. That is to say, the conclusion "and therefore blue" in the above presentation is an erroneous deduction.

To expose this simple error, the given scenario must be reformulated more carefully (the symbols X, A, B, C are mine):

⁵⁵ Here I'm quoting: http://en.wikipedia.org/wiki/Nelson_Goodman. Elsewhere, we are informed that "applies to all things examined before t just in case they are green but to other things just in case they are blue" is Goodman's own wording in his original presentation in *Fact, Fiction, and Forecast* (http://en.wikipedia.org/wiki/Grue_%28color%29).

- Say we examine all available emeralds (X), till a certain time (t), and finding them all to be green (A), we ordinarily conclude by generalization that All emeralds are green (All X are A), although we know [from past experience with induction in general] that the next emerald we find, after time t, might well turn out to be blue (B) [or indeed, to be some other color⁵⁶]!
- Let us now following Goodman introduce a new concept “grue” (C) to be defined as the class grouping all things that were examined before a certain time t and found to be green (A) and all things *not* examined before time t which happen to *be* blue (B) [or indeed, to be some other color].⁵⁷
- Applying this definition, all X (emeralds) examined before t were found A (green) are also C (grue); i.e. by

⁵⁶ This is my own interpolation, to make Goodman's thesis more accurate. For there is no reason to suppose a priori that only blue emeralds might eventually be found. We are only guessing the possibility of blue emeralds, not basing it on any specific observations – therefore any other color is equally probable (or improbable). Nevertheless, my refutation of Goodman works just as well without this added comment.

⁵⁷ Note that the latter things are stated to be merely “not examined until time t [yet, if ever]”; this is not to be confused (as some commentators have done) with “examined after time t”, for no matter how many things we do eventually examine, we will obviously never achieve (or know we have achieved) a complete enumeration of all such things in the universe. Note also that the concept grue is here defined as a general predicate for any eventual subject (“things”), rather than specifically for emeralds.

syllogism we can infer Some X are C. As for remaining eventual cases of X, those not examined till after time t [if ever], *each will either be found to be A (green) or to be B (blue) [or indeed, to be some other color]*; in that sense, the latter X too are C. Hence, All X are C would seem a reasonable conclusion.

- But it certainly does not logically follow from the preceding that any emeralds will indeed be found to be any color other than green, i.e. that any X are B [i.e. blue, or whatever non-green color]! For, properly understood, the category C is *not* formulated as a disjunction of A or B that is bound to actualize both some cases of X-A and some cases of X-B.
- If you look closely, you will see that C includes on the one hand things already *known* to be A (green emeralds already observed) and on the other hand a palette of things of still *unknown* qualification, i.e. either A or B (blue) [or even some other color]. The latter is a disjunction of *conceivable* outcomes, not one of *inevitable* outcomes. To infer X-B as an *actual* outcome would therefore be a *non sequitur*.
- The fact that we do not know whether any future X will be found A does not allow us to infer from this disjunction of possibilities that some future X will necessarily be B. We do not yet know whether any future X will be found B, either. We may well find that All X are A (All emeralds are green) remains forever applicable

after time t as before time t (as predicted in the initial ordinary generalization).

- The premises 'All X are C' and 'All C are A or B' indeed yield the syllogistic conclusion 'All X are A or B'. But the disjunction 'A or B' here cannot be interpreted differently in the major premise and in the conclusion. The disjunction in the premise not being extensional, the disjunction in the conclusion cannot be treated as extensional⁵⁸. To do so would be to commit the fallacy of four terms.

It is thus clear from our exposition that *the introduction of the concept "grue" has changed nothing whatsoever in the inductive possibilities offered by the given data*. The correct inductive conclusion remains unaffected by Goodman's fun and games. All Goodman has succeeded in doing is artfully conceal his fallacious *deductive* reasoning (misinterpretation of the kind of disjunction involved); it is all just sophistry.

In the thick smoke of Goodman's rhetoric, it is made to appear as if blue emeralds are as easy to predict as green ones. But that is not at all the logical conclusion according to inductive logic. Why? Because in the case of the hypothesis that future emeralds observed will be found green, we have

⁵⁸ That is, a base of the given disjunction is Some C *might be* B, whereas the corresponding base of the allegedly inferred disjunction is Some X *are* B. But to imagine something happening is not proof it has to in fact happen sometimes. The conclusion does not follow from the premise.

some concrete data to support it, namely that all present and past emeralds observed have been found green.

Whereas, in the support of Goodman's hypothesis that blue emeralds will appear, we have no experiential evidence whatever so far. All we can say is that it is not inconceivable that blue emeralds might one day be found, but that does not imply that any ever will. 'Not inconceivable' does not justify actual prediction. It just means 'imaginable in the present context of knowledge'.

That is, all we have is a general epistemological principle to remain open-minded to all eventual outcomes, based on past experience relating to all sorts of objects, that novelty does appear occasionally. But such scientific open-mindedness is not equivalent to a positive prediction of specific changes. It is just a call, in the name of realism, to avoidance of prejudice and rigidity.

A question we ought to ask is whether Goodman's "grue" construct is a well-formed concept?

An ordinary concept of "grue" (or green-blue) would simply be formulated as "green and/or blue". We may well find it valuable to introduce such a concept, perhaps to stress that green and blue are close in the range of colors, or that some things are partly green and partly blue, or sometimes green and sometimes blue, or that some hues in between are hard to classify as clearly green or clearly blue. The dividing line between these colors is after all pretty arbitrary.

Given that some emeralds are green, we could then deduce that some emeralds are grue. It would be equally valid to induce thence that all emeralds are green or that all emeralds are grue. This would imply no inherent self-contradiction, because to say that all emeralds are grue does not imply (or exclude) that any emeralds are blue. All emeralds are grue is formally compatible with the eventuality that all emeralds are green. So there is no “paradox of prediction” in fact.

Goodman's “grue” construct is no different from this ordinary concept with respect to such logical implication. Its difference is not in the involvement of disjunction (green or blue), since such disjunction is quite commonplace; for example, the concept “colored” means (roughly) “red, orange, yellow, green, blue, indigo or violet”. The significant difference in Goodman's construct is its involvement of temporal-epistemic conditions. This serves the rhetoric purpose of clouding the issues.

Defining the concept “grue” as the class of all things examined before time t and found to be green and all things *not* examined before t that happen to *be* blue – involves a self-contradiction of sorts. If I have not yet examined the things after time t , how can I positively say of any of them that they are blue? I could only make such a statement *ex post facto*, after having examined some of the things after time t and found them blue.

Alternatively, it would have to be said *by a 'third party' looking on*, who has examined some of the things before time

t and found them blue, and who is observing my situation before I have done the same. But as regards all current observers taken together, they cannot logically adopt such a hypothesis, about things that happen to be blue although they have not yet been observed to be so. We can only consistently talk about things that *might yet* be found blue. For this reason, Goodman's grue concept is not well-formed.

Grue is primarily defined as the union of green things and blue things; but it does not follow from such definition that if some things (such as emeralds) are green, then other *such* things (i.e. other emeralds) must be blue. To say that a kind of thing (emeralds) is grue is not to intend that its instances must cover the whole range of possibilities included under grue. The concept of grue remains legitimate provided we find the predicates it collects together (green, blue) scattered in various kinds of thing (emeralds, the sea, etc).

Thus, every ordinary predicate involves some uncertainty as to its application to specific subjects. Moreover, this applicability may vary with time: according to our context of knowledge, and according to changes occurring in the objects observed. Therefore, there is no need to involve such epistemic and temporal factors in the definition of any of the concepts we propose. Such factors are inherent to conceptualization.

The reason Goodman introduced such complications in his definition of "grue" was because he wanted to refute (or give the impression he was refuting) the process of generalization

we commonly use to develop our knowledge on the basis of limited observation.

According to inductive logic, observing that some X are A, and so far seeking and not finding any X that are not A, we may generalize and say All X are A. This remains effectively true for us so long as we have no evidence of any X that is not A. Generalization involves prediction, i.e. saying something about cases of X we have not yet observed and maybe never will.

Goodman wished to demonstrate that we are equally justified in predicting a negative outcome (i.e. not A, e.g. B) as a positive outcome (i.e. A)⁵⁹. He did not realize the logical *justification* of our generalizations⁶⁰. We are not arbitrarily predicting that the cases of X we observe in the future will be A rather than not A. We are just sticking to *the same polarity* (A), because it is the only polarity we have any empirical evidence for so far. Comparatively, to predict *the opposite polarity* (not A, in this context) would be purely arbitrary – a wild assertion. Specifically for X, the first move has some empirical support, whereas the second has none at all.

⁵⁹ To do so, he needed to construct a concept that would include both A and notA, so that generalization could be formally shown to be able to go either way. However, since a concept including contradictories is non-informative, he included contraries, viz. 'A or B' (where B is not A). This slightly conceals the issue, but does not in fact change it.

⁶⁰ See my *Future Logic*, chapter 50.

Goodman simply did not realize this difference in justification between the two courses, though it is obvious to anyone who takes the time to reflect. He thus failed to apply the inductive principle that a confirmed hypothesis is always to be preferred to an unconfirmed one. Moreover, as we saw, in his eagerness to invalidate inductive reasoning, he committed one of the most elementary errors of deductive reasoning!

Underlying Goodman's riddle is another important question for inductive logic: how far up any scale of classification can generalizations legitimately be taken? Having for a given subject generalized a certain predicate, why not generalize further up the scale to a larger predicate?⁶¹

Consider a subject X and any two predicates S and G, related as *species and genus*, i.e. such that all S are G but not all G are S (i.e. some nonS are also G). Here, note well, S and G are both ordinary concepts, like green and colored.

- If all cases of X that we have observed so far are found to be S, and we have looked out for and not encountered any X that are not S, we may inductively infer that All X are S. This generalization remains valid so long as no cases of X that are *not* S are found; but if any X-nonS eventually do appear, we are required by inductive logic to revise our previous judgment, and particularize it to

⁶¹ I have touched upon this topic (indirectly, with regard to ethical logic) in my *Judaic Logic*, chapter 13.3.

Some X are S and some X are not S. For induction proceeds conditionally⁶².

- The same reasoning applies to G⁶³. Alternatively, granting that All S are G, we can from All X are S *deductively* infer that All X are G, by syllogism (1st Figure, AAA). Thus, we might postulate, if we are justified to generalize, for a given subject X, as far as the specific predicate S, we are also justified to do so higher still on the scale of classification, as far as the more general predicate G. This is logically okay if properly understood and applied.
- However, it would be a gross error of judgment⁶⁴ to *infer* from such valid generalization that there might be some X that are G but not S (even if we know there are *things other than X* that are G but not S). At this stage, the actual content All X are G is identical (in extension and implicitly in intension) to the All X are S from which it

⁶² For adduction or generalization is justified by *two* essential principles: (1) confirmation of a hypothesis by a positive instance, and (2) the non-rejection of the same hypothesis by any negative instance, and *both* principles must be equally obeyed for it to proceed logically. There are of course many other conditions involved – see my essay “Principles of Adduction” in *Phenomenology* (chapter VII.1).

⁶³ That is, given Some X are G (or deducing this from Some X are S), we can generalize to All X are G, provided there is no known negative instance (X-nonG) to belie it.

⁶⁴ This is as we saw one of the errors Goodman committed in formulating his “riddle”. This error is of a deductive rather than inductive nature.

was derived⁶⁵. How the two statements differ is only with regard to eventual corrective *particularization*...

- Suppose tomorrow we discover *an X that though still G is not S* (for example, an emerald of some color other than green). In such event, we would have to particularize the first (more specific) statement to 'Some X are S and some X are not S'; but the second (more generic) statement 'All X are G' would remain unchanged.⁶⁶
- But as a result of such particularization All X are G has a *vaguer meaning*, since G no longer for us refers only to the S species of G but equally to some other (nonS) species of it. Thus, though the inductive rule would be to generalize as far up the scale as we indeed can go, we must keep in mind that the further up the scale we go, the more we dilute the eventual significance of our generalization.⁶⁷

⁶⁵ This is obvious if we consider that we may equally well obtain All X are G: (a) by generalization from Some X are G, which we deduce from Some X are S, or (b) by deduction from All X are S, which we generalize from Some X are S. In truth, it could be argued that these two are slightly different, since (a) requires that we make sure that there are no instances of X that are not G, whereas (b) requires that we make sure that there are no instances of X that are not S. This difference is however brought out in the ensuing stage of eventual particularization.

⁶⁶ Note that if we discover an X that is not G, it is necessarily also not S, given All S are G. In that event, both general propositions would of course have to be particularized.

⁶⁷ In this context, we could compare Goodman's "grue" concept to Feynman's concept of "oomph". The latter, defined

Thus, although in principle generalization up the scale is unfettered, in practice we proceed relatively slowly so as to maintain the noetic utility of our ideas and statements. To give a formal example: the proposition All X are S might be used as minor premise in a syllogism where S is the middle term, whereas the proposition All X are G – even if still identical in extension and intension to the preceding – would be useless in that same context (i.e. with S as middle term).

Moreover, to regard All X are G as a more profitable generalization than All X are S, in the sense of providing us with information about more things for the same price in terms of given data, signals a confusion⁶⁸ between generalization for a given subject from a narrower predicate to a wider predicate, and generalization of a given predicate from a narrower subject to a wider subject.

The latter case is the truly profitable form of generalization. Suppose All X are P, and Y is an overclass of X (i.e. All X are Y, though not all Y are X), then this would consist in inducing that All Y are P — of course, unless or until some Y that is not P is discovered. The rules of such generalization are dealt with fully in my work *Future Logic* under the heading of Factorial Induction (Part VI).

(tongue-in-cheek) as “a kind of tendency for movement” might seem useful to “explain” various phenomena, but it is so vague that it cannot predict anything and is therefore worthless (p. 19).

⁶⁸ Which Goodman was guilty of in formulating his “riddle”, incidentally.

10. The induction of induction

The above two recent attempts to emulate Hume were both by renowned writers and professors in prestigious universities. Looking at their messy treatment of induction, one may well wonder why⁶⁹. In truth, they were just following a modern trend. After David Hume in the 18th Century, on the basis of a very fragmentary appreciation of induction, put in doubt various aspects of human knowledge, many have tried to expand and intensify that skeptical

⁶⁹ I am being a bit sarcastic here, for the sake of argument. These men did of course make significant contributions. For instance, Carl Hempel was at one time a member of the Vienna Circle; later on, he wrote an essay refuting the “verifiability” theory of meaning (a pet theory of that group) by pointing out the theory itself could not be “verified” empirically as it demanded, and so had to be considered as meaningless (see Yourgrau, p. 166). Regarding Nelson Goodman, see for instance his valuable comments on Hempel’s paradox.

assault. He was immensely influential on subsequent philosophy, starting with Kant's⁷⁰.

The myth that Hume's reasoning against induction, causation and many other basic human beliefs was unassailable persists to this day, perpetuated by many philosophers and teachers who do not make enough effort to reflect, or maybe lack the requisite intelligence. In this manner, philosophy is held back generation after generation, weighed down by people who unthinkingly cling to what they were taught and in turn mutter the same mantras in pursuit of dubious cleverness and reflected glory.

a. My first reaction (perhaps somewhat emotional) to this modern trend is the following sermon on professional ethics for philosophers.

The role of the responsible philosopher or logician would, one would think, be to give methodological support to the enterprise of human knowledge, and justify, increase and improve available means. But such a constructive role requires a lot of careful thought, a lot of tiring work, and most people find it easier to tear down than build up.

⁷⁰ Although Kant is not ordinarily regarded as a skeptic, because he tried to build an elaborate system of philosophy, the unbridgeable gulf between things in themselves and things as they appear that he set up is in fact a sort of skepticism, for it denies us access to reality and limits us to mere appearances. Kant effectively took Hume's skeptical analysis of knowledge for granted.

Skepticism is thought by many to be modern-minded, but I rather detect a resistance to progress in it.

That is not to say that the writings of skeptics like Hume have been without value to the development of logic and philosophy. To the contrary, they have often stirred up more thought and discovery than more apologetic writers could have done. By creating epistemological insecurity, however fallaciously, the skeptics have stimulated more imaginative and profound counter-arguments than were hitherto needed. Thus, many of them deserve their prominent place in history, even if not for their own effort.

Of course, too, it would be unfair to characterize them as *only* skeptical. Many of them have made considerable or even great positive contributions to human understanding in general and philosophy in particular. They had great intelligence, deserving of our admiration, respect and gratitude. Credit must be given where it is due.

I am not, needless to say, advocating that their works be thrown away. Every philosopher – even one with many errors, even one who deliberately misleads – is philosophically interesting as one possible expression of the human mind, and historically important to keep and study as such. The history of philosophy is, and has always been, an integral part of the philosophical enterprise⁷¹. That is because

⁷¹ Much more than, say, the history of biology is a part of the science of biology.

the history of philosophy provides us with raw data on actual philosophizing.

Nevertheless, they are guilty of having sown considerable confusion in many ordinary people's minds. To be sure, an uncritical mind is epistemologically undesirable; discursive knowledge cannot progress in a trusting simpleton, questions must be asked before answers are proposed. But equally undesirable, is a mind prone to excessive doubt; this is a sort of mental illness, a neurosis. A healthy mind finds a middle ground between these extremes: it looks for intelligent questions to ask, but it also seeks to find intelligent answers to them.

An important component of the scientific method of thinking is to look for holes or difficulties in any proposed theory about anything. Criticism is a cognitive virtue, and is what makes thought progress⁷². So the point here being made is not that the skeptics are viciously destabilizing us all, but only that their spirit in doing so is not scientific. For if it were so, they would make a lot more effort to check the formal validity and empirical ground of their own thinking. They are quick to criticize others, but do not readily turn the same sharp sword on their own ideas.

As I have again and again demonstrated, when one looks closely at the ideas and criticisms of prominent skeptics, one finds rather obvious faults in their reasoning and

⁷² See for instance: Feynman's comments to the same effect, p. 27.

observations. The impression one gets is that they were so eager to find fault with common reasoning, that they made no effort to double-check the validity of their own discourse. They asked questions, but did not sufficiently try to answer them. Their curiosity did not stretch far enough; they quickly got proud or lazy, and missed out on valuable new insights.

This raises the suspicion that some of them had some destructive motives in mind: they *wanted* to invalidate human knowledge. Some people feel resentment towards people or society or life or the world or God, and want to hit back. Some people yearn for nonsense and nihilism, ultimately because they wanted to justify their freedom from moral restraint or compulsion; if reason is shown to be baseless, they reason, then anything goes, we can do as we like!

In other cases, the motive was perhaps less sickly, a mere desire for fame or even notoriety. For in view of Hume's success, skepticism has become fashionable in many intellectual circles. Many people think it is proof of intelligence, whereas it is in fact evidence of intellectual weakness. Many people are conformists, and allow a person's praise in the media and so on to affect their judgment of him.⁷³

⁷³ What perhaps is most astonishing and annoying is that once a philosopher has acquired sufficient fame, then no matter how thoroughly and often his work is discredited, people continue to admire him. He is taught in universities, made the subject of laudatory documentaries, and so forth. Unfortunately, it is so that

Many philosophers and logicians have, of course, more healthy motives and goals. My own writings, by the way, constitute a constant attempt to inaugurate a new, constructive attitude.

Human knowledge can indeed be understood, validated in principle, and further developed, if philosophers and logicians adopt a more healthy-minded, positive attitude. Just as doctors or engineers are not rewarded merely for diagnosing problems, but for proposing solutions, so should it be for philosophers and logicians. The real test of intelligence and respectability ought to be constructive rather than destructive abilities.

b. Upon further reflection, my reaction to the anti-inductive trend set by Hume is more muted, as follows.

Deductive logic was largely the discovery and production of one man, Aristotle (who, of course, had a great teacher, Plato). It has grown considerably since then, thanks to the contribution of many, but its founder's work is still very present at its foundation. Of course, people engaged in deduction before him, but he brought an enormous amount of self-consciousness and precision to such logical thought. Under his direct influence, many people made fewer errors of deduction.

people's credulity too often relates more to appearances than to substance. This is especially true in philosophy.

On the other hand, what *the history of the logic of induction* makes clear is that this basic discipline was not born long ago and in one go. Retrospectively, we can of course say that induction has always been used by humans, and even in a sense by their animal forbears and cousins. We have always practiced induction, with more or less effectiveness, without need of logicians and philosophers to describe and explain it.

Aristotle and his successors were of course conscious of induction to some extent, but not sufficiently to develop a systematic theory of it. The theory of induction dawned in more modern times, with (I would say) Francis Bacon. The latter's work was more important than many realize. After him, whether under his influence or independently, physical scientists like Galileo, Newton, and many more till this day, both used and understood induction with increasing clarity.

On the other hand, the direct philosophical successors of Bacon, like Locke, Hume, and many others till today, never quite succeeded in bringing the logic of induction he had started up to date⁷⁴. In some respects they even regressed, rather than progressed. It is really surprising just how widespread skepticism about induction remains. Hume seems

⁷⁴ While scientists were showing enormous ingenuity in the design of experiments and more broadly in the formulation and selection of theories in their respective fields, the general understanding and justification of induction by philosophers and logic specialists have often lagged far behind. In modern times, the likes of Karl Popper have of course brought greater balance between the theory and the practice of induction.

to have permanently impressed his disbelief to a great many later thinkers.

To give you one modern example, two hundred years after Hume – A. J. Ayer reports that Bertrand Russell thought that the assumptions of scientific thought had to be taken on faith, and that (in Ayer's words):

*... there is no necessity other than logical necessity, so that there is no such thing as causal necessity. Causality is just a matter of what Hume originally said it was, namely constant conjunction, and is something purely contingent.*⁷⁵

Ayer agrees with him. Many other philosophers and logicians similarly assume induction to be without any solid logical basis, and express surprise that it works at all. It is not that they have some bias against inductive reasoning; they would dearly love to prove it, because they are empiricists at heart and supporters of modern science. What the example of Russell makes evident is that they are sincerely baffled.

All this teaches us an important lesson. It is that *the induction of a theory of induction* has taken time, a lot more time than anyone would have thought it would take. And this is quite normal and okay – the question is not simple, so we should not be too surprised that many have failed to answer it satisfactorily. After all, induction is a trial *and error* process.

⁷⁵

See Magee, pp. 313 and 315.

It allows for error, and for long spells of blindness and incomprehension.

The history of science is replete with similar situations⁷⁶. Certain facts were (it seems to us, retrospectively) glaringly obvious, yet scientists went through great pains till they saw them. Many facts were for long periods devoid of explanation. Similarly, in the history of logic, although Bacon had well specified and stressed the importance of the negative instance in induction, Hume just ignored the advice in his formulations on induction and causation.⁷⁷

Thus, after due consideration, we should look upon Hume and similar skeptics without bad feelings, with compassion. The modern discovery of induction and the attempts to formulate a theoretical description and justification of it – were all part of a learning process. If many found it difficult, and drew hasty defeatist conclusions, they ought not be

⁷⁶ Stephen Jay Gould documents many such stories and gives us illuminating methodological comments on them, in a set of essays I strongly recommend. See for instance his comments on pp. 96 and 97, on the “long struggles to think and see in new ways” and on “shining a light of logic into the most twisted corners of old conceptual prisons, into the most tangled masses of confusing observations”.

⁷⁷ It is a bit shocking to discover, upon close scrutiny, just how often errors of reasoning and plain ignorance occur in Hume’s work – and indeed in the work of many other great and lesser princes of Western (and for that matter, Eastern) philosophy. I remember my similar surprise and disappointment when, after completing *The Logic of Causation*, I revised my analysis of J. S. Mill’s “methods of experimental inquiry”, and discovered how many mistakes a very educated and intelligent man like him could make.

blamed. They did their best, albeit without too much success. We are all fallible and none of us all-knowing.

Letting bygones be bygones, now the task is to educate people, to teach the principle of induction and all the methods that derive from it. Enough of negativity, skepticism and pessimism; let us not perpetuate these historical faults. Instead, let us inaugurate a new era of general mental health and good intentions.

11. Descartes' mind-body dichotomy

David Hume's skepticism was in part due to the 'mind *versus* body' dualism that Descartes' philosophy produced in Western thinking more than a century earlier. Indeed, its roots are much deeper than that, traceable to Christian thought and earlier still to Greek thought. But within modern philosophy, Descartes was certainly a source of much (unintended) confusion and contention, as well as of (intended) enlightenment in a true sense.

René Descartes⁷⁸ considered his mind to be the most knowable of his beliefs, and sought to infer an external world including matter from such introspection. Using reasoning similar to St. Anselm's ontological argument, he first inferred God from his own mental existence; and then inferred the rest of the apparent world from God. God, being necessarily an honest broker, was to be the guarantor that human knowledge could extend out to the external material world.

⁷⁸ France, 1596-1650.

Descartes' motive in this tortuous construct was primarily epistemological: he wished to establish the validity in principle of human cognition. However, this particular way of looking at things became a problem for subsequent philosophers – for it seemed to imply an ontological radical chasm between mind and body. One could know mind directly and certainly, but body only indirectly and uncertainly. Some philosophers began to doubt that mind and body could be claimed to have any causal relation whatever. 'Being so substantially different, how could either domain be said to cause changes in the other?' – so they argued.

Now, this whole problem, or set of problems, is a figment of these philosophers' imaginations. It is a mystification, a fanciful complication. It is safe to say that it was not Descartes intention to set up a dichotomy between mind and body; he was on the contrary attempting to harmonize them, first epistemologically and thence ontologically. His presentation of the issues was not perfect; but it was an honest try that can be improved.

Phenomenology. Descartes first mistake was to effectively *start with* the common sense distinction between mind and body, or a mental domain and a bodily one. The mind-body distinction cannot reasonably be used as a starting point, for it is only an assumption, a construct. Armed with this awareness, the apparent difficulty is easily resolved...

If we take a phenomenological approach to the issues involved, we realize that to begin with we have a mass of appearances, some of which may *seem* essentially different from others. We may then, as a hypothetical way of ordering the data, well assume that the seeming difference is significant, and label one set of appearances 'mental' and the other 'material' (or 'physical').

This is not done arbitrarily – but so as to organize our experiences, and explain why some are clearer than others, or why some behave somewhat more erratically than others, or why some seem to us more under our control than others, and so forth. So long as this hypothesis of substantial difference serves its useful purposes, it is maintained; but were it found logically or experientially inadequate, it would soon be replaced.

Such cognitive behavior is in accord with the *principle of induction*, which allows us, and indeed enjoins us, to rely on the suggestions of appearance unless or until they are specifically shown to be illusory.

Had Descartes proceeded thus, in a more phenomenological manner than he did, he would not have given *ab initio* precedence to mind over matter, or alternatively to matter over mind, but he would have treated both domains as appearances of equal initial status to be later sorted out, and no dichotomy would have arisen in the first place. Descartes was in fact trying to proceed in a phenomenological manner; but his meditation did not begin far back enough.

Were it not for this natural, *inductive* approach, the opponents of Descartes would have a hard time explaining how come they manage to at all discuss both mind and body. How do those who believe only in the mind know about or understand claims to the body? How do those who believe only in the body know about or understand claims to the mind? Obviously, both groups start with *the appearances of* both body and mind, and it is due to this that they can communicate and debate.

The self. Moreover, to speak of a mind-body dichotomy is inaccurate and misleading in other respects. Our experience apparently covers *three* domains, not two. In addition to the physical phenomena we seem to outwardly perceive through the senses, and the mental phenomena we seem to inwardly perceive, which we call memories and imaginations (the latter being reshuffled memories), we believe in a third factor.

This is the self – that within us which perceives and thinks about the other two domains. This self – which we most identify with, rather than the mental and physical phenomena that surround it – is also experienced. It is known not merely by conceptual means, but primarily by a direct cognitive means we call *intuition* (or self-knowledge – i.e. knowledge of the self by the self).

The self (or soul or spirit) may be defined as that which is conscious in various ways, exercises will and makes value

judgments. Such acts or functions of the self are also known by intuition. The difference between objects of intuition (i.e. the self and its functions) and all mental and material objects of perception is that the latter are phenomenal (they have phenomenal appearances like color, shape, sound, touch, smell, taste), whereas the former are non-phenomenal.

We do colloquially lump together the soul and its functions (spiritual appearances⁷⁹), mental phenomena (memories, imaginations – and derivatively, conceptual constructs), and some bodily phenomena (the nervous system, including the brain and all sensory and motor functions) – as “the mind” (or, I prefer to say: “the psyche”). But such unification is a simplification and should not be taken literally in the present context.

Indeed, if we go back to Descartes' “I think, therefore I am” statement, we find in it three factors: “I” (the self), “think” (mental phenomena, supposedly observed by the self) and “am” (the inferred existence). Logically, the “being” inferred is just that of the self (and, though he does not say it, the mental phenomena of thought); but Descartes' tacitly intended implication is that there is a physical substratum to

⁷⁹ I use the word ‘spiritual’ in a very simple sense, meaning ‘pertaining to the spirit’. Note also that the terms self, soul and spirit are to me identical – although some people believe in a self without a soul or spirit, namely Buddhists (on the one hand, who regard the self as ‘empty’) and Behaviorists (on the other hand, who identify the self entirely with the perceptible phenomena that most people consider as its mere effects).

such existence, i.e. a body and more broadly a physical world.

Anyway, this is how the argument is usually understood, as an inference of body and matter from self and thought (mind). The reason being that only such physical existence is regarded as 'true' existence, while mental and all the more so spiritual existence are regarded as a merely 'virtual' sorts of being. At least, this is the opinion implied by the proponents of a dichotomy between mind and body who have a materialist preference.

Those with more mentalist or spiritual propensities interpret the dichotomy as disproof of a material world. That is, they point out that Descartes' premise ("I think") does not logically imply any conclusion other than "I and my thought exist" – so that the usual inference that body and matter therefore exist is a *non sequitur* (it does not follow). Their error, of course, is to accept Descartes' approach – whereas, as already shown above, the correct phenomenological procedure is not quite as he proposed.

Causality. As for the "law of causality" which some critics propose, that the domains of mind and body are so 'substantially' different that they cannot conceivably impinge on each other – this too is a figment of biased imagination. What do they base this alleged law of causality on? If we consider the concepts of causation (deterministic causality)

and volition (causality through will)⁸⁰, we find no basis for a 'law' that the substances of cause and effect must be the same. Such a law might conceivably be proposed as a hypothesis; but why do so, if such a hypothesis gives rise to intractable difficulties?

Causation can be formally defined with reference to terms of unspecified substance. For instance, the strongest form of causation between two items C and E can be defined as "if C, then E; and if not C, then not E". Such a formal statement can be applied to any pair of items, even if one is mental and the other is material or vice versa. There is no justification refusing to apply the definition to cases where the terms refer to different substances.

With regard to volition, it is important to clarify the issues and not lump everything together. We can (in a first phase, at least) refer to our common sense beliefs for guidance, again on the basis of the earlier mentioned principle of induction.

These include that the self (soul) can will some mental events (e.g. some imaginations) and some material events (e.g. some physical movements of the body)⁸¹. It can do so (as

⁸⁰ See my works *The Logic of Causation and Volition and Allied Causal Concepts* for detailed treatments of those concepts.

⁸¹ I say 'some' mental and physical events, to stress that some (other) mental events are not caused by volition but by the brain (or whatever other means), and likewise for some (other) bodily events. The 'mind' and 'body' are domains affected by various causalities, and not by volition only or by causation only. There is no reserved domain either way.

introspectively evident) in its own mind and body – and also indirectly, in other minds and bodies (at least through its physical acts, if not in some cases through its mental acts).

Conversely, the self might be *influenced* in such mental or physical acts of will by mental and/or physical things *of which it is conscious*, or it might be *causatively* affected by such things (i.e. they might deterministically limit or widen its power to act).

An 'influence' functions through consciousness, and increases or decreases the ease or difficulty of a volitional act, but does not determine it; the act remains free, if the agent of it (the willing self) puts sufficient energy (will) into it. A 'causative', on the other hand, functions even if unbeknownst to the self, and does not affect the volition as such, but either delimits or enlarges its scope. All this is quite consistent, and no logical objection can be raised against it as an aetiological hypothesis.

Thus, in the direction from body to mind, we believe that mental objects (like sensations and memories) can arise from material causes; and that either (in some cases) through the influence of those objects when perceived or (in other cases) more directly through causation, the self's acts of will and other aspects of behavior may be affected.

Conversely, in the direction from mind to body, we believe that the self has a power we call 'will' that can affect the body, either indirectly via events it produces in the mind that in turn causatively affect the body, or directly by producing

changes in the body. Such effects of the will can in turn affect other bodies and minds.

We certainly have much introspective data on which to base these beliefs. These have the phenomenological status of appearances, i.e. the minimal credibility granted to all appearances initially. We are free, according to inductive logic, to use this database to build up a consistent intelligent theory of what is going on, provided we do not thereby create unsolvable problems.

Inversely, critics of this commonsense view of events must provide equally or more credible evidence and arguments in support of their contention. They must not only, as they tend to do, merely deny – but must also explain by what means and on what basis they are able to at all discuss the issue and take the intellectual positions they take.

Materialism. Now, there is one problem that some consider especially unsolvable. It is that the commonsense theory of a self, with consciousness and volition, interacting with a world of matter, is inconsistent with the *exclusively materialist thesis* that there is nothing but matter in the world and that matter can only move within a deterministic framework.

People who adhere to the latter thesis, who flatteringly call themselves scientists, are willing to accept indeterminism to some extent, in the sense that this is understood within quantum mechanics or in the Big Bang theory – but they

refuse any possible impact of a non-material soul on material processes. That, to them, would imply a breach in the universality of modern physical laws.

This problem is easily solved. The solution is simply that all the so-called 'laws' of physics are known by inductive means – through generalizations or through theories based on adductive arguments. Such general propositions or ideas are undoubtedly based on empirical observations; but they also *add to* these observations, and such additions might well in time turn out to be unjustified by further observations. True scientific propositions are not exclusively empirical – they also depend on reasoning.

This being the case, it is absurd to argue that, since these 'laws' do not allow for non-physical things having any impact on physical things, any suggestion of volition is invalid. That is simply *a circular argument* – *it begs the question*. They do not prove in any way that spiritual entities (our self or soul) cannot affect (not even via mental events) physical events; they *just assert* that it is so.

It is not a conclusion of theirs; it is a premise. It is not a conclusion of any experimental or mathematical proof, but a prejudice (proposed so as to simplify the world for their simple minds). It is a modern dogma, as closed-minded as past religious dogmas that science was supposed to replace.

What is evident to any lucid observer and honest thinker is that the apparent universality of all these physical laws is made possible because their proponents *do not address* the

introspective data at all. They ignore (i.e. discard, refuse to even consider) data that does not fit into their materialist way of looking at the world, and they call this 'science'.

But science strictly means *using stringent cognitive methodology*: i.e. logic, inductive and deductive; it is not reserved to a materialist thesis. No such dogmatic reservation is philosophically ever justified or justifiable.

12. Some further remarks on causal logic

The following notes are intended to amplify my past writings on causality.

The fallacy of reductionism. In my research on the logic of causation, I established that “a cause of a cause of something is not necessarily itself a cause of that thing” (see list of valid and invalid causative syllogisms for the precise conditions when this applies and when it does not).

It occurs to me that this result can be interpreted as *a formal proof that “reductionism” does not always apply.*

When we try to ‘reduce’ something to its constituent parts, we are saying that the laws that apply to the parts ultimately apply to the whole; i.e. we are saying that the whole is no more than the sum of its parts. This is sometimes true, but it

is not always be true. It is true when the following syllogism is valid, and untrue when it is not.

Y causes Z, and
X causes Y,
therefore, X causes Z.

In some cases, I say, though the whole (Y) have a certain property (Z), it does not follow that the part (X) has that same property (Z). In such cases, the whole may logically be said to be more than the parts. For example, though the whole of a live human organism has consciousness and volition, it does not follow that any of its parts has these powers.⁸²

It should be added that this insight of causal logic is valid for all modes of causation. That is, it can be equally said of natural, extensional, spatial, temporal, or logical causation. Thus, reduction or irreducibility has as many senses as there are modes of modality. It follows that something may be reducible in one sense, but irreducible in another.

We thus have, precisely listed in my work *The Logic of Causation*, the formal rules for impartially settling debates about reduction in specific cases. Reductionism is sometimes applicable and sometimes not; and we have a way to tell just when it is and when it is not. Reductionism is a fallacy, note well, not because all reduction is fallacious, but because reduction is in some cases fallacious.

⁸²

See also for example, Gould, p. 283.

Incomplete listings of causes. It should be added that the above schema is not the only way reduction occurs fallaciously. Sometimes, reduction consists simply in declaring a number of things to be partial or alternative causes of a phenomenon. The possible fallacy in such cases consists in *incomplete listing of partial or possible (i.e. contingent) causes*. Even though the things proposed as causes are indeed causes – the list proposed is incomplete. The effect of such too-short listing is to narrow our vision and multiply our wrong causal judgments. That is why we must call it a fallacy: because it makes us reason wrongly.

For example, the expression “nature or nurture” is usually understood as signifying that the causes of physiological and psychological phenomena are genetic and/or environmental⁸³. But there is a *third* possibility or partial determinant: viz. volition. Volition signifies personal choice and effort, self-generated change; it is quite distinct from and even antithetical to physical and mental causations. To omit it from the list is to bias judgment away from it, towards more deterministic biological and psychological forms of explanation.

This missing disjunct might be generously understood as implicit in the others, but in truth it is not so. Often, when people speak of nurture, they have in mind the influence of

⁸³ See for example, Gould, p. 288.

other people – for instance, parents and teachers in the learning process. This is indeed ‘nurture’, though we must keep in mind that it refers to acts of volition by other people, which influence the volition of the subject. However, to think in such terms alone puts insufficient emphasis on the subject’s will – in this instance, the subject’s will to learn. To classify this too as ‘nurture’ would be inappropriate. It is definitely a third factor, viz. personal choice and effort. Thus, we should always speak of “nature and/or nurture *and/or volition*” when explaining human behavior.

Note that the disjunction “genetics and/or environment” is even worse than “nature or nurture”, because the word ‘environment’ need not imply any human interference at all, whether that of others or one’s own. It connotes the effects of the weather, food composition, agents of disease – anything but human action. The choice of this word is rarely accidental. There is a tendency among many modern scientists (biologists, physicians, psychologists, etc.) to deliberately avoid any explicit mention of volition in their explanations. They think that mention of volition would make their discourse unscientific, and are afraid to lose credibility among their peers. So even if they think of volition as a relevant factor, they keep all references to it tacit. Such discursive behavior is not honest or intelligent.

A common causal argument. Quite incidentally here, while on the topic of causal logic, when we say that something (X) is the causative of something else (Y) *in an individual case*, we mean that from all the possible causes of Y *in general*, the cause X is in this case the one applicable. For example, to say that John died of a heart attack, we need only verify that John's heart had a serious enough problem, and no other possible cause of death occurred in this instance; and thus, by demonstration and elimination, we conclude that John died of a heart attack.

This is stated in support of the claim already made that causation always relates to *kinds*, not to individuals. When we identify causatives in individual cases, we are not identifying the general fact of causation, but its particular *application* to a given instance. Thus, in our example, we know from general scientific studies that a human being can die from a variety of causes. When a particular human being dies, and we wish to know "the cause of death", we use our general knowledge in disjunctive form as the major premise in an apodosis with an appropriate minor premise concerning the individual case.

The argument runs as follows:

Death in a human being may be caused by heart failure, or cancer, or... etc.

In John's case, we found some evidence of heart failure, and no evidence of any other possible cause of death.

Therefore, John (probably) died of heart failure.

Of course, this argument may be found erroneous, if it turns out that the list of causes of death is incomplete, or if it is found that certain other problems in John had not been spotted. For this reason, it is wise to qualify the conclusion as only probable, in the way of reminder of the inductive assumptions behind the deduction.

Positivism may be viewed as a thesis going in the opposite direction to reductionism, or putting a stop to the urge to reduce. It is a (sometimes arbitrary, sometimes wise) refusal to dig any deeper or look any further for underlying causes or explanations.

An example is the Heisenberg principle of uncertainty. This is regarded by some philosophers (notably Neils Bohr), somewhat arbitrarily (in the way of a concession to the 20th Century's *zeitgeist*), as an epistemological principle (implying doubt in our very ability to know, since our antennas of knowledge are limited in scope), whereas it is really no more than a principle of physics.

The wave-particle duality is often presented as an empirical refutation of the law of non-contradiction. But this is an unfair interpretation of events. The facts of the case are that

an ongoing physical phenomenon may *in some circumstances* behave with the mathematical properties of a particle and *in other circumstances* behave with those of a wave. *The circumstances involved are certainly not one and the same.*

There is empirically no *actual superimposition* or ‘interbeing’ of wave and particle in the same respect, in the same place, at the same time, in the same perspective of the onlooker. The two states are clearly separated by space, time or other circumstances. Therefore, the law of non-contradiction is in fact never breached. Therefore, no epistemological or metaphysical difficulty arises.

The problem raised by the wave-particle duality is at worst merely rational: it is a surprising inability of our *theoretical* instruments, i.e. physics theory and experiment as well as mathematics, to fully predict and explain such goings-on of material phenomena.

Thus, we could say in rebuttal to the positivists of uncertainty that what prevents us from full knowledge at the quantum level is one or all of the following:

- Perhaps as they claim the physical world is really so roughly constituted that there are no finer levels of matter in this world than what we observe. In that case, our cognitive faculties are not to blame; the world is like that. But then, how can we know it for sure?
- Perhaps the world in fact has finer, deeper levels, but our sensory faculties and experimental instruments are

inadequate to the task of detecting and measuring them. In that case, it is not inconceivable that more sensitive experiments be devised someday that do make physical detection possible, directly or (granting certain physics hypotheses) indirectly.

- Perhaps the mathematical tools currently at our disposal are inadequate. In that case, it is not inconceivable that someday we develop a mathematics sufficiently sophisticated to seamlessly unify the quantum phenomena observed.

Our faculties of perception and our intelligence are, it is true, *limited*. We might conceivably have had a sensory faculty strong enough to allow us to differentiate particles from waves, but we unfortunately do not. We might have found some indirect way to do so, but we did not – so far, at least. We might have developed a mathematical theory capable of dealing with the problems encountered, but we did not – so far, at least. In that sense at most, the uncertainty principle might be viewed as an epistemological statement.

But people who think thus forget that their conceptual faculties (though also not unlimited) have compensated this sensory and technical limitation, if only enough to realize the (currently apparent) truth of the uncertainty principle. Therefore, the problem is essentially factual rather than epistemological. It does not put in doubt human knowledge as such, but is an expression of it. Our knowledge is limited in scope, but not for that reason necessarily false.

It is important to emphasize in this context the modern tendency to infer an “is” from a “might be”. This fallacy is evident in Bohr’s inference from an uncertainty (as to what lies at a deeper level of matter than what we are ‘on principle’ – at the present development of physics, at least – able to observe) to a certainty of negation (i.e. to a certainty that there is nothing beyond). The same fallacy is found in Goodman’s inference of blue (a specific color) from ‘grue’ (a range of possible colors).

The causation in ‘fields of force’. Someone looking at the definitions and analyses of causation in my book *The Logic of Causation* might well wonder what all that has to do with the ‘fields of force’, like gravity, electricity and magnetism (to name just the more widely known), which are at the core of modern Physics theory. The answer to that question is already proposed in my *Judaic Logic*, Appendix 1.3.

We describe *the force at each point in a field*, around some central ‘particle’ or ‘body’ (collection of many and varied interacting particles), by means of if-then statements. These have roughly the form: “another body with such and such characteristics (e.g. mass, electric charge or whatever appropriate) placed at this point in that field (i.e. at a certain position relative to the central body concerned) will be subject to a force of magnitude and direction so and so, calculated using a certain quantitative formula (a hypothesis previously developed by inductive logic, e.g. an inverse

square law)”. Needless to say, this proposition is *merely descriptive*: it does not tell us why or how such (invisible and remote) force occurs at all – I leave this difficult question for physicists to answer!

Such if-then statements, which are *natural or extensional conditional propositions* in formal logic, are the underlying causal (or more specifically, causative) propositions analyzed in my causative logic work. It is important to realize that the causative propositions corresponding to fields of force generally relate to *partial and contingent causation*, since forces may amplify or diminish each other (and in some instances cancel each other out). That is to say, the relation of force operative between two bodies, calculated by means of the pertinent algebraic formula, is applicable to them as is only granting that no other bodies are in their vicinity. It goes without saying that if more forces are involved at the same time, their net effect has to be calculated before we can correctly predict the subsequent motion (if any) of the body or bodies concerned.

Speaking of motion, can the motion emerging from fields of force be described as motion arising from rest? In my *Volition and Allied Causal Concepts*, chapter 8.1, I suggest that the generation of motion from rest is a distinctive characteristic of volition.

On the surface at least⁸⁴, fields of force would seem to belie this claim of mine. For example, hold a stone above the ground, then let it fall; or again, place two light magnets next to each other well at rest, and when you let them go they will either attract or repel. In such cases, acceleration from rest evidently occurs. Yet this is clearly different from what we suppose volition to do. In the case of gravity or magnetism (or other sorts of field-forces), the movement is preprogrammed, i.e. in the same circumstances it will always be the same in magnitude and direction. Whereas in the case of freewill, the same agent may in the same circumstances choose a different magnitude and direction of will. In the latter sense, volition truly initiates motion from rest.

Notice, too, that in the examples above given, volition was involved in bringing the stone or the magnets in their starting positions, and they were held momentarily stationary there by volition. The motion in these objects is as it were artificially held in abeyance; whence the physics concept of ‘potential’ energy. Motion is the main configuration of the natural world (the domain of deterministic causality, or causation), while immobility in it is due to a temporary balance of opposite forces. In the spiritual world (i.e. the domain of personal causality, or volition), in contradistinction, motion emerges

⁸⁴ Physicists might eventually, or maybe already have, come up with a more dynamic vision of the workings of fields. Some theories seem to suggest they involve particles or waves of some sort in motion (e.g. gravitons). But here, let us take fields at their face value, so to speak.

occasionally and somewhat voluntarily from something essentially at rest.

Liebniz's 'pre-established harmony'. Hume's attempt to weaken the bond of causation can be rooted to some degree to the doctrine of 'pre-established harmony' found in the philosophy of Gottfried Leibniz⁸⁵. This idea substitutes a sort of *parallelism* for the common concept of causation. That is to say, according to this doctrine, the putative cause and effect *just happen to* regularly occur together or in sequence.

The observable regularity is, according to Leibniz, not due to a causal relation or connection between the two phenomena (here labeled putative cause and effect). Rather, each functions independently according to its own nature, yet they happen to (or were programmed by God to) be in phase. This can be illustrated by reference to two clocks that happen to always show the same time, though their mechanisms are not linked.

I mention this doctrine here so as to refute it, for it may have a semblance of truth in it due to common misunderstanding of the nature of causation. For after all, what is what we call the nature of things but the *happenstance* of their various observed characteristics? But the concept of causation is not based on mere actualities; it relies on modal concepts, i.e. on the concepts of possibility and necessity. And in particular,

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Germany, 1646-1716.

natural causation is based on the corresponding natural modalities. The concept goes beyond perceptual data, though we try to base it on such data.

That is to say, to claim that (for instance, using the strongest determination of causation as our example) P is a ‘complete and necessary cause’ of Q is not merely a claim that presences of P are accompanied by presences of Q and that absences of P are accompanied by absences of Q. No – it is a claim such togetherness or sequence of events does not merely not-vary, but is invariable. It is necessary; i.e. in the case of natural modality: it is a natural necessity. Or in other words: its negation is impossible by the nature of the things concerned. If no such claim is being made, we cannot truly say that we are discussing causation.

This can be made clearer if we look at the matricial analysis for the determination in question, i.e. the following simple table (drawn from my book *The Logic of Causation*):

Matrix of “P is a complete and necessary cause of Q”.

Items		Relation
P	Q	mn
1	1	1
1	0	0
0	1	0
0	0	1

In this macroanalytic table, the “1” and “0” under the items P and Q signify respectively presence and absence of those items in different combinations. But the “1” and “0” under the relation “**mn**” (symbolizing complete and necessary causation) mean respectively “possible” and “impossible”. That is to say, in the latter case, mere continued non-occurrence of the PQ combination concerned is not sufficient to prove the stated causation, there has to be an assumption that such combination will never occur, because it cannot occur. Such proof is logically possible thanks to the principle of induction, and it is possible only by this means.

Liebniz's doctrine effectively accepts temporal causation, spatial causation, extensional causation, and even logical causation, but arbitrarily rejects natural causation. These various modes of modality and thence of causation are all identical in principle, differing only in the basis of generalization (and if need be particularization) they involve. Temporal necessity ('is always') requires generalization from some to all times of some existent; spatial necessity ('is everywhere'), from some to all places of it; extensional necessity ('is in all cases'), from some to all instances of some concept; logical necessity (however expressed), from some to all contexts for some knowledge.

The only distinction of natural necessity (again, however verbally expressed) is its requirement of generalization from some to all circumstances surrounding some event. If one sort

of generalization is admitted, there is no technical justification for rejecting any other sort; the epistemological process and inductive argument is identical in every case. As already explained, individual acts of generalization may turn out untrue, but the process cannot be denied in principle without self-contradiction. Hume makes the same error, as earlier shown.

It should be added that Leibniz concocted this non-modal (i.e. exclusive of natural necessity) causal theory to buttress his bizarre theory of “monads”, according to which the world is populated by entities (called monads) existing and functioning entirely independently of each other. To explain how come, despite their claimed mutual independence, we can observe seemingly coordinated behavior patterns among things, he postulated the idea of pre-established harmony.

Moreover, this was not, in his view, mere coincidence, but an illusory order deliberately programmed by God. It apparently did not occur to Leibniz that the concepts of independence and Divine programming of the monads required a modal understanding of causality for their formulation. He was effectively saying that worldly events do not cause each other, but do have as common cause God; that is still an admission of causality as such. He was thus tacitly involved in concept-stealing or self-contradiction - unless we consider that he was not like Hume denying causality *de jure* (in principle), but only *de facto* (in a limited field).

The deeper problem with Leibniz's theory of independent monads is its imposition of a grand 'purely rational' construct on reality, irrespective of experience. This is an example of what Boorstin has aptly called "the German *a priori* method" (p. 237). We find the same psycho-epistemology in Kant and Hegel, and many other (though not all) German philosophers – a propensity to build massive intellectual systems (based on a few tendentious observations and insights, and blithely ignoring contrary empirical data and logical limitations). This is not only a failure of due empiricism, but more broadly of understanding the many demands of objective human induction. These thinkers – for all their intelligence and valuable contributions – get romantically carried away by their arcane conceptions, without regard for their obscurities and anti-empirical aspects. They are emotionally driven by the ambition to be the Big Genius who solved all the problems in one sweep, and so easily enthused by apparent panaceas.

13. Addenda (2009)

1. Concerning **the principle of uniformity**, discussed in chapter 2. It should be added that this principle is not a generalization because it is not a generality! It is a particular proposition, which can be stated as “some things (whether elements of experience or products of abstraction) have some characteristics in common”. It is merely an admission that the world we face seems to have some repetitiveness in it, without any prejudice as to the extent of such repetition.

And as to how this particular proposition is known to be true – it is not so much by experience as by logic. For if we tried to affirm the contradictory, i.e. that “nothing has any characteristic in common with anything else”, we would be guilty of self-contradiction, since the use of any concept whatsoever (like “thing”, “characteristic”, “in common”, etc.) relies on a claim to two or more things having certain characteristics in common, thanks to which we may give them a common name. And it cannot be said things have

nothing in common other than the name we conventionally apply to them (Nominalism), since even appeal to a common name implies that the two or more instances of the name concerned are recognizably “the same” name, so that is an inconsistent objection.

Thus, the principle of uniformity is a logically necessary particular proposition.

2. In the discussion of sensory perception in chapter 4, I forgot to mention **Thomas Reid** (Scotland, 1710-96). Although modern histories of philosophy tend to ignore him or gloss over him, this contemporary and fellow countryman of David Hume's was during his lifetime more respected than the latter, because of his common sense approach to philosophy. Reid rejected Hume's (and others') skeptical claim that what man perceives are internal impressions, i.e. mental products of the physiological process of sensation, and ably defended the direct realist view that what man perceives are outer physical causes of the sensations. Hume was aware of Reid's criticism of his work, but remained indifferent to his arguments although they were more perspicacious and reasonable than his own. Later, too, Immanuel Kant (a younger contemporary of Reid's) paid little heed to Reid's arguments.

It should be noted that direct realism is sometimes wrongly confused with naïve realism. These are in truth not identical philosophical concepts, though they may on occasion

overlap. Naïve realism essentially refers to the worldview of the common man, who takes for granted the reality and materiality of the world apparently around him without asking questions as to the veracity and substantiality of such appearance. Direct realism is perhaps logically implied by naïve realism, but certainly does not reciprocate such implication. Direct realism is the view, as already stated, that we perceive the world itself and not alleged mental representations of the world.

Opponents of direct realism claim that advocacy of this philosophy can only be arbitrary say-so or circular argument. However, this accusation is untrue. The main justification of direct realism is the manifest logical inconsistency of the opposite view, advocated by Hume, and John Locke before him and Kant after him. Impressions, ideas, representations divorced in principle from external objects lead inevitably to self-contradiction – and are therefore far more flawed methodologically. One cannot claim ideas or impressions to represent (i.e. give indirect access to) anything beyond representation if one first claims to have no direct access to anything beyond them. As of the moment the advocate of direct realism has thus (and in many other ways) argued his case, he can no longer accurately be accused of naïve realism. His realism must be labeled (relatively) subtle, instead.

However, the most important and precise distinction between naïve realism and subtle realism lies not in the self-contradiction of the antithesis of direct realism, but with

reference to phenomenology. If the direct realist is content to claim that sensory perception is perception of physical reality (as against representations of it), he is still functioning on a relatively naïve level. His understanding is fully subtle only when he comes to understand that the preceding is an inductive hypothesis (better than any other) that admits the phenomena perceived as *ab initio* mere appearances (i.e. not as necessarily realities or necessarily illusions, but as possibly realities and possibly illusions).

Thus, though Reid's common sense approach to direct realism was logically preferable to Locke's, Hume's and Kant's absurd representational cognitive philosophies, it was perhaps not the final word on the subject, since phenomenology was still not very developed. That is not to say there was no phenomenology in Reid's approach, but only that it was not a thoroughgoing phenomenology. Reid, in any case, did not claim to have answered all questions regarding direct realism, and indeed to date many crucial problems have remained unsolved (as explained my main text).

3. In the discussion of the ethical means and ends in chapter 7, I pointed out that, for instances, life and soul were two things that could logically be affirmed to be natural and absolute standards of value, since they are preconditions of any ethical discourse, i.e. since ethical discourse is only applicable to beings with life and more specifically with soul,

i.e. beings with powers of consciousness, volition and valuation like us humans.

As I have suggested in my work *Volition and Allied Causal Concepts*, the term “life” in this context does not just mean bodily life – though this is doubtless its primary meaning. The term can also legitimately be taken to refer to spiritual life, i.e. the life of the soul. Indeed, in the last analysis ethics is concerned with bodily welfare rather accessorially: its main concern is with the soul’s welfare.

An obvious consequence of such extension of meaning is that those who believe in life after death (as in Judaism, Christianity and Islam) or in reincarnation (as in Buddhism and Hinduism) can construct an ethics without committing a logical error. That is to say, ethics is not necessarily limited to this life and this world.

Clearly, if we assume that our life goes on or returns in some form even after our body has died, it is logically quite okay (though at first sight it might seem paradoxical) to build an ethics in which the body might be deliberately risked or sacrificed in favor of the soul’s longer-term interest.

Those who view their life on earth as a mere visit in a longer journey naturally and quite logically evaluate their thoughts, words and deeds with reference to that broader context rather than in the narrow sense of physical survival. Although such survival is important to ethics, it can on occasion be overridden by more abstract, wider or higher considerations. Such occasions provide one with a test of one’s true values.

Of course, such self-sacrifice can easily be wrongly based on fantasy and illusion, since we do not know of the hereafter except by hearsay or presupposition. In most circumstances, it is wise to assume that one's continued survival is the most beneficial course of action. But in special circumstances one might well judge that to accept some present evil would endanger one's future life or lives. For example, some saintly persons have preferred to die rather than to be forced to kill an innocent person.

People can conceivably and sometimes do risk or give their physical lives in defense of their family, their people or nation, humanity as a whole, life as such, or in God's service, because they perceive themselves, not as delimited bodies and independent individuals, but as parts of a larger whole – a group of people or of living things or the collective or root soul that is God. The value of one's life is in such case a function of the value of the larger unit.

In sum, though we may use the term "life" as a short and sweet standard of ethical discourse, the term should not exclusively be understood in its simplest, material sense, but may logically be widened to admit more spiritual goals, whether this-worldly and other-worldly.

Supplements

A. From *Phenomenology*, chapter 2:5.

A phenomenological approach to causality would begin with consideration of events or things of any sort as ‘happenstance,’ before deciding *whether or how* they are ‘caused’⁸⁶. I myself use the term ‘causality’ in its widest possible sense, as applicable to any answer to this question. I thus accept, as at least conceivable, spontaneity, causation, volition and influence. Whether these philosophical concepts relating to ‘causality’ all have expression in our world is an issue open to debate; but we may and must first try to elucidate and interrelate them. The issue is to be resolved without prejudice, by due consideration of experience and how to convincingly organize it. Thus, if physicists (such as Niels Bohr) considered that some subatomic events could not credibly be assumed to have causes, we may concede the hypothesis of ‘spontaneity’ in the physical domain at the levels concerned as an explanation.

Causality, then, is not to be equated at the outset (as it has been by some in the past) to causation, meaning physical and (by extension) psychological determinism. The negation of

86 This ‘first things first’ attitude is equivalent to that of taking appearances at face value before deciding whether they are reality or illusion.

causation may also be considered as a 'causal' explanation. Similarly, volition cannot be simply waved-off, but must be granted due consideration. And indeed, we need to persevere in this open-minded attitude, for whereas causation and with it spontaneity are relatively easy to define with reference to *frequencies of conjunction* of phenomenal events or abstracts about them, defining volition or 'free will' is very difficult. No one to my knowledge has succeeded so far, let alone proving that volition exists, i.e. that people and animals have this power. The concept of influence is subsidiary, since we can define it as 'making it easier or more difficult' to will something.

Phenomenology may take as experiential data of sorts the anthropological fact that most or all people in practice if not in theory consider that they have powers of choice, of decision, of initiation of mental thoughts and physical movements. Such beliefs do not prove volition, but constitute corroborative evidence in an inductive hypothesis. Another public sector fact to consider is that the concept of volition precedes that of causation in mankind's history (and still does so today, I believe, in the personal development of individuals). Long before we reached an understanding of things as having 'natural causes,' we were explaining the movements of stars or stones or our own fate or moods with reference to 'spirits' or 'gods' or later (with the advent of monotheism) to God.

Our concept of 'force' is obtained by abstraction from the introspected physical sensations of pushing, pulling and squeezing. This notion is then used to help us understand *by analogy* the determinism of events we (today, at least) consider as natural and not as involving any volition. Thus, Newton conceived gravity as a "field of force," and this

terminology has remained with us for other fields. Even in our modern statistical concept of causation, we explain the constant conjunction observed as being symptomatic of a “causal connection,” i.e. an underlying (natural) ‘force.’ Similarly, we would imagine spontaneous generation as a sort of ‘forcible’ gushing forth!

The 18th Century Scottish philosopher David Hume acknowledged this subtext in his critical discussion of alleged causal ‘connection.’ For him, such a ‘tie’ between events was dubious, first because we never perceive instances of connections, but only instances of mere conjunction.

“All events seem entirely loose and separate. One event follows another; but we never can observe any tie between them. They seem conjoined but never connected.” (P. 360.)⁸⁷

This argument of Hume’s is, note incidentally, based on an observation relative to (and which assumes) human will, a form of causality more difficult to conceive than causation! In the human (volitional) domain, we do distinguish between (a) conjunctions of events that occurred accidentally relative to human will, i.e. coincidences, and (b) conjunctions of events that were deliberately intended. It is significant that Hume’s ‘mere conjunction’ is intelligible to us due to our experience of (a), while it is (b) that makes his discussion of contrasting ‘connection’ meaningful to us. Hume does not define what ‘connection’ would be in the natural (i.e. non-volitional) domain, before rejecting it. At best, then, his

87 In An Enquiry Concerning Human Understanding, Part II.

argument amounts to saying that the notion is too *vague* to be scientific.

Moreover, Hume explains away our belief in connection as due to a mental habit produced in us by repetition.

“But there is nothing in a number of instances, different from every single instance, which is supposed to be exactly similar; except only, that after a repetition of similar instances, the mind is carried by habit, upon the appearance of one event, to expect its usual attendant, and to believe that it will exist. This connection, therefore, which we feel in the mind, this customary transition of the imagination from one object to its usual attendant is the sentiment or impression from which we form the idea of power or necessary connection.” (P. 361.)

We could retort, for a start, that his thesis is internally inconsistent, if it is understood as a denial of methodological validity to generalization. For it is clear that Hume's own statement about human habits is a generalization from his own observations. He generalizes from some moments of his experience to all moments, and from his own experience to everyone else's. Moreover, his statement is presented as an *explanatory* thesis, regarding what 'causes' us to (erroneously, according to him) infer a fact of causation from such mental association. He thus implicitly lays claim to some knowledge of some sort of causality, that of the force of habit. Is his thesis, then, that causation is more knowable in the psychological domain than in the physical? I doubt it; rather he did not notice the inconsistency.

“The appearance of a cause always conveys the mind, by a customary transition, to the idea of the effect. We may, therefore, suitably to this experience, form another definition of cause, and call it, an object followed by another, and whose appearance always conveys the thought to that other.” (P. 362.)

For Hume, then, what we call causation is only an association of ideas. That is, we think events to be causally connected because they happen to be constantly conjoined in our memory. Whence, he effectively ‘infers’ that causation is a figment of the imagination. But his thesis is a result of his imprecise thinking. What he seems to refer to are situations like the following: e.g. a man first met his wife-to-be when a certain musical tune was playing; since then, whenever he hears (or remembers) that tune, he is *reminded* of his wife⁸⁸. But we would not regard such a situation as indicative of causation, since in fact he does *not* physically see his wife again every time he hears the tune again! For this reason, we would call this conjunction through mental association of wife and musical tune coincidental (although the mental sequence of *memory* of tune and *memory* of wife might well be called a causal relation of sorts). On the other hand, if every time someone played the tune his wife was physically conjured, we would suspect a causal connection.⁸⁹

88 The converse is unlikely, i.e. that whenever he sees or remembers his wife, he is reminded of the tune. Unless the poor man is obsessed!

89 Here is a more common example of association. I glimpse a person, who faintly reminds me of Miss X, say. But it turns out on closer inspection that it was not Miss X which I just saw. Notwithstanding, given this occasion I start incidentally reflecting on Miss X, thinking of our last contact together, what we said, etc.

If we put all this in clear, formal language, all doubt is easily dissolved. Four forms may be distinguished:

- a. X causes Y
- b. X causes *the thought of* Y
- c. *The thought of* X causes Y
- d. *The thought of* X causes *the thought of* Y.

These four forms refer to very different relations, but all four have in common the relation “causes”. The terms differ, but the copula remains the same. To prefer (as Hume does) one of these forms to the others, as the appropriate description of the events at hand, does not succeed in discrediting the common factor of causation, but on the contrary supports it. Hume’s reasoning is self-defeating!

In my view, apparent causal relations may be real or illusory. Unlike Hume, I do not see the *fallibility* of our judgments about causal connection as proof of our *inability* to establish causal connection. In this context as with all other conceptual judgments, processes of generalization and particularization are involved. There are *two generalizations* involved, we might say. The first is *from observed particular conjunction to general conjunction* (including unobserved instances). The second is a generalization *from such constant conjunction of events to a presumed ‘connection’ between them* (i.e. something deeper and more forceful than mere conjunction). If we admit the (occasional, so long as empirically confirmed) validity of the first generalization, we may not

These reminiscences may in turn give rise to new thoughts logically unrelated to Miss X, such as the present philosophical analysis of ‘association’. And so forth, till I manage to change the subject.

deny it of the second process, which is *in principle* no different. We could only at best deny it *in specific cases*, as a particularization; though I do not see how we might justify such a discrimination or partial particularization.

In other words, how does Hume himself know (granting that ‘connection’ is meaningful, though difficult to define in words) that ‘constant conjunction’ does not imply some deeper ‘connection’? He can only consistently claim that it *sometimes* might not. But *in that case, his argument loses all its force*, which depends on generality. Nothing precludes us from formulating hypotheses about constant conjunction and about causal connection, provided we validate our theories in each case in accord with the rules of adduction, testing our propositions with reference to consistency and experience, and by comparison to alternative theses.

In addition to the above-mentioned physical sensations, our introspection suggests that ‘we’ have *some* degree of control over *some* of the physical movements of our body (and through it of other bodies) and over *some* of our mental imaginations. It is at this level, that of intuition (and not that of sensation), that the concept of volition arises. This inner cognition of self as actor in the mental and physical world may well ultimately turn out to be an illusion, but it must be granted credence at least to begin with as raw data. Any sincere claim like this has to be respectfully acknowledged, as an appearance to be taken into consideration in the overall arrangement of data. There is no methodological justification in outright denial (as indulged in by some dogmatic modern Mechanists).

Many experiences and abstractions, as well as intuitions, suggest volition. For instance, certain sensations depend on movement, be it movement of an object in the mouth, of

one's skin against an object to feel its texture or mobility, torsion of one's body parts in different directions like the eyes for seeing or head for hearing, of a part of our body relative to the others such as an arm, walking through space to experience depth, or even speaking out to produce sound. Also, attention towards present phenomena, looking at the past or trying to forecast the future, all seem like acts of volition. Similarly, imagination, concept formation and logical insight are experienced as often calling for effort, or at least as acts of choice. Consequently, the concepts of time and space may be said to be dependent on volition. Similarly, volition seems involved in verbal thinking.

We undeniably have some sort of personal awareness that we have a certain power of action in the phenomenal environment. It is not an absolute and unlimited power, but it is 'felt' as there all the same. No sensible qualities can be said to *be* volitional acts; but many may be considered as *signs of* volition. Rather, we 'know' internally and directly whether or not our volition was involved, at least most of the time; it is an object of intuition. Indeed, this function is, together with cognition and affection, regarded by us as essential aspects of our identity. Volition is certainly an integral part of our logical discourse in sorting out other experiences, as for instance when we correlate different sense modalities. I may for example formulate a proposition about perspective: 'if I turn around this object, it will change shape thusly and thusly,' projecting a volitional series (turning around object) and predicting a certain phenomenal sequence (visual and other changes).

B. From *Ruminations*, chapter 1:9.

Descartes' "*cogito, ergo sum*"⁹⁰ is composed of two self-evident propositions: "I think" (in the sense, I am conscious) and "I am" (I exist). For the contradictory of each of these propositions is self-contradictory, i.e. involves a stolen concept and gives rise to a paradox. Thus, "I am not conscious" could not be thought or said (or for that matter heard or understood) without being conscious. Similarly, "I am not" could not be expressed (or observed) without existing. Thus, Descartes was quite right in regarding these propositions as axioms; i.e. as first principles, which do not depend on prior principles.

Note moreover that these two clauses are axiomatically true independently of each other – So what about the *ergo*, which suggests that the *sum* follows from the *cogito*? Is the "therefore" perhaps meant to imply an order of knowledge, rather than an inference? One could formally deduce existence from consciousness, in the sense that a conscious being is a fortiori an existent being; but one would never in practice resort to such inference.

In practice, in my opinion, we are conscious of other things before we become conscious that we are conscious of them – so it would not be correct to place the "I think" before the "I am". It could be argued that a baby may first experience inner states, but I would reply that such states are results of prior

⁹⁰ See Hamlyn, p. 137. The comments made here are not intended as an exhaustive analysis of the *cogito* statement, needless to say.

sensations. We may however support Descartes' order, by considering it a logical one, in the sense that if the Subject did not have the power of consciousness, he or she would not be aware of existence. That is, it perhaps means: "I can think, therefore I can know that I am".

But I think the correct interpretation is the following: when we are aware of something, any thing, this provides *an occasion to become aware of oneself*, i.e. that there is a Subject who is being conscious of that thing, whatever it is. Thus, the first clause of the sentence is not strictly: "*I think*", but: "consciousness of things is taking place" (or "thought is occurring"). Whence the second clause is truly *inductively* inferred, i.e. we may well hypothesize that "there is something being conscious of things", i.e. "thought has a Subject as well as an Object", i.e. "there is an I" (or "I exist").

It is *the self* that is inferred from the appearance of objects – reason argues: they must appear before someone. This is what distinguishes appearance from mere existence: it occurs *through* 'cognition' *by* 'someone'. Thus, Descartes is justifying our habitual assumption of a cognizing Subject from the fact of cognition. It is not mere grammatical convention, he tells us, but "think" *implies* "I".

C. From *Ruminations*, chapter 8:4-7.

David Hume denies the very concept of causality – but in the same breath offers us an explanation of our belief in it, viz. that causal argument proceeds by association of ideas. I have criticized this claim elsewhere⁹¹, but here wish to stress that offering an explanation is claiming to know a cause – therefore, Hume’s thesis is self-contradictory.

Nevertheless, there are some grains of truth in his thesis, which by the way explains why it has seemed credible to so many people since he stated it. To see these undercurrents of truth, it is important to distinguish between the issues of how to define causality in general and of how to get to know particular instances of causality.

Clearly, before we can deny causality, we must have some idea what it is we want to deny. Hume admits a simple definition of causality (or rather causation, to be exact) as “constant conjunction”. This definition has some truth, but is debatable and ultimately inadequate. Thereafter, the issue arises, can we establish contents fitting this definition. Hume denies it, but (as just pointed out) his denial turns out to be self-defeating.

Hume focused on *our incapacity to apprehend causes immediately*, and suggested that in allegedly ‘reasoning’ from a cause to an effect (or backwards, from effect to cause) we were merely expressing our mental habit of *ideating certain things together*. Notwithstanding Hume’s errors, I would

⁹¹ See *Phenomenology*, chapter 2.5; and *The Logic of Causation*, chapter 16.2.

suggest the following to be the undercurrents of truth he was perhaps (though unsuccessfully) trying to bring out:

- a. ***Ab initio, nothing has any apparent cause.*** That is to say: causality is not something one can directly observe. 'Objectivity' requires that we do not begin our search for knowledge with a prejudice concerning causality in general and about specific causal propositions. Causality and particular cases of it have to be established gradually over time, because the facts logically point us in this direction. We cannot at first sight make such claims with certainty – but (*contra* Hume) this does not exclude the possibility that we can eventually arrive at such conclusions through appropriate logical efforts.
- b. ***Indeed, causes can be found through induction.*** The method appropriate for finding causes is not deductive – nor for that matter Hume's 'association of ideas' – but inductive. Practical ways to attain such knowledge were first elucidated by Francis Bacon (1605), a century and a half before Hume's comments. (I have further clarified and developed these methods in my *The Logic of Causation*.) Hume's thesis rang true in some ears, because he raised awareness that a process was involved. He identified that process as merely psychological; but in fact, it was logical – using inductive logic.

We should, to be precise in the present discussion, refer to volition by others and our less conscious own volitions, as well as to causation, noting that most of our own volitions are known directly and immediately, in the way of self-experience – i.e. 'intuition'. It is worth pointing out that Hume tacitly admits this last claim when he tries to explain knowledge of causation through 'association of ideas' – since *this implies he and the rest of us can look into our mental*

activities and directly obtain that insight. Thus, Hume's attempted critique applies specifically to causation and not to volition, note well.

It should be stressed that the present rejection of Hume's identification of causal reasoning with mere association of ideas does not imply a denial that we do engage in association of ideas. This mental process does occur. Indeed, it sometimes occurs on the basis of assumed causal connection – but it also, and more often, concerns objects *known to be without* any such connection. The objects of thought may be mentally associated merely because they happened to coexist in our sight *once* for a moment – even if they have *at all other times* been visibly separate. Moreover, mental association does not require any coexistence *at all ever*, but may occur for quite incidental or accidental reasons. Two things may be mentally associated because of some tiny or vague resemblance, or even simply because we happen to have given them names that sound somewhat the same.

Indeed, Hume's critique depends on these very facts concerning association of ideas for its (illusory) force. If association of ideas was always based on constant conjunction, it would not seem so loose a relation but would indeed suggest underlying causal connection. Thus, Hume on the one hand pretends to equate those two concepts, but on the other hand cunningly exploits their difference, in order to cast doubt on causal reasoning.

Furthermore, he does not explain the distinction we all make between cause and effect, considering that the idea of the effect sometimes (and in some cases, always) mentally precedes that of the cause, even if materially the cause always precede the effect. Clearly, this opacity is just one aspect of his deliberate confusion between an idea and it

object. But such a subjectivist notion is anti-rational, since Hume obviously considers (or wants us to consider) his own sceptical doctrine as objectively true.

Hume's Mentalism.

It should be pointed out that Hume's position on causation is '*consistent*' with his position on sensory perception. Given his belief that our apparent perceptions of matter are in fact perceptions of the mental images ("impressions", or "ideas") produced by sensations, and not perceptions of the things that triggered the sensations, it is not strange that he should advocate an "association of ideas" view of causation.

Hume is apparently unaware that this position on perception is logically self-contradictory, because it starts with a belief in matter (including a human body with sense organs, receiving sensory signals and passing them on to the mind), and ends with a denial of it (i.e. an affirmation that all we are able to know are mental impressions or ideas). Moreover, Hume leaves unanswered the question as to *who* has these 'ideas'; i.e. he ignores the Subject.

Hume's concept of association of ideas can also be applied to the other type of causality, namely volition, by effectively denying the existence of a willing self. If volition is *identified with* sequences of mental phenomena like desires, aversions, etc. and perceptible actions of mind and 'body', then there is no need for or place for a concept of a 'self' engaged in willing. Thus, in this view, attitudes, affections and appetites are 'ideas' of sorts, and apparent 'volition' is simply causation at the purely mental level between such ideas and certain 'actions'.

Here, the antinomy consists in leaving unexplained who it is that is associating ideas. If there is no Agent in volition, and

no Subject in cognition, no cognitive processes can be depicted as ‘in error’. So, how is it that Hume is wiser than the rest of us, and can spot these errors of thought? And moreover, if we have no choice about our mental behavior, what is the purpose of his indicating our errors?

As I have explained elsewhere⁹², volition is not a causative relation between *influences* (apprehended conditions) and apparent actions (physical or mental events), but a totally different kind of causal relation, between a soul and its intentions and acts of will. The latter are not phenomenal, but intuited by the Subject. Attitudes, affections and appetites are not substances, but essentially intentions of the self. They influence its acts of will, making them easier or harder; but they are not causatives of them, they are incapable of producing them. The acts of will are caused by the soul, using a causal relation fundamentally different from causation, namely volition.

In both domains, whether through apparent bodily sensations or directly in the mind, Hume seems to consider the arising of ‘ideas’ (which are thereafter mentally associated) as spontaneous: he is effectively denying all causality. His skeptical view of causality is not based on a thoroughgoing psychology, but is filled with inconsistencies.

Hume, like many philosophers before him and since, approached the issue of causality and other topics in the way of a ‘spin doctor’. He was not scientifically minded, but intent on justifying his philosophical slant of skepticism. I submit: he *wanted* to invalidate our knowledge, and sought pretexts with this goal in mind.

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See *Volition and Allied Causal Concepts*, chapters 5-7.

He perhaps only wanted to shock his peers; or maybe he had a perverse wish to destroy human knowledge or to hurt people's minds.

It is legitimate for logic to admonish: such twisted motives are unworthy of philosophers. Philosophers should not bring their personal problems into the public arena in that way. They should approach the subject in a responsible, mentally healthy way, with benevolent intentions. And perhaps the best way to insure such balanced behavior is to lead a pure life....

I should stress that Hume's "**constant conjunction**" is a vague expression.

I have generally taken it to mean "the constant conjunction of the effect with the cause", and thus to refer to the positive side of causation, namely "if C, then E" (i.e. "the conjunction C + not-E is impossible") – and I believe that is what Hume had in mind when he used that expression.

I have also considered the inverse or negative side of causation, namely "if not C, then not E" (i.e. "the conjunction not-C + E is impossible"), to be not explicitly intended but still tacitly included in the preceding statement *by way of analogy*. That is, one can likewise refer to "the *constant conjunction* of the absence of the effect with the absence of the cause".

But it occurs to me that, taken literally, the expression "constant conjunction" could intend "C and E are always together", which more neutrally includes both "E is always with C" and "C is always with E". That is, it could be taken to also imply "if E, then C" (i.e. "the conjunction E + not-C is impossible"), which by contraposition means "if not C, then not E".

Thus, the expression could mean not just the positive aspect (complete causation), but also the negative aspect (necessary causation). So, it may be my accusation that Hume missed out on the negative aspect of causation was not very fair!⁹³

With regard to interpreting constant conjunction, note also that when two items occur together invariably, one is either the cause or the effect of the other – *or both are effects of a common cause*, i.e. of some third item yet to be identified of which they are parallel effects⁹⁴. Thus, constant conjunction is not always taken to imply a direct causative relation between the items concerned, but is sometimes interpreted more obliquely (perhaps somewhat conventionally, because the formal relation is identical).

Constant conjunction leaves us with a doubt, then, whether one of the two items is before or after the other in time, or they are simultaneous; for causes and effects may be simultaneous or in orderly sequence, and effects of a common cause may be simultaneous or either one precede the other. The only rule we can lay down at the outset (according to our traditional understanding of causation) is that a cause cannot be after its effects; or conversely, an effect cannot precede its causes; this may be called the rule of ‘orderly sequence’.

Note that this concept of “effects of a common cause”, though most evident in relation to strong causation, can be extended to the weaker determinations, too.

⁹³ This needs to be checked out again in his works, to be sure one way or the other. Note that it could be that he usually meant one aspect, but occasionally meant both.

⁹⁴ See *The Logic of Causation*, chapter 2.2.

Hume claims (in his more materialist phases, i.e. ignoring his 'association of ideas' discourse) that causation is based on observed reoccurrence of a sequence of events, giving the **example of a billiard ball** impacting another billiard ball.

But Newtonian Physics in this context appeals not merely to a generalization of happenstances, but to *larger adductive hypotheses*, such as the Law of Conservation of Matter and Energy⁹⁵, which affect a broad spectrum of phenomena – and not only the specific billiard balls at hand – in tried and consistent ways. On that basis, causation is viewed as an actual *transfer* of 'energy'.

This 'energy', though initially defined with reference to 'work' ('force' times distance), is ultimately taken to imply a 'substance' of sorts (e.g. the energy of light). In this perspective, the first billiard ball has on impact sent energy to the second – we thus *substantiate* the causal relation involved.

There are other situations of apparent causation for which a substratum is similarly conceived, and justified by reference to larger considerations. Thus, causation does not for us consist of mere repetition, but we imagine an underlying 'connection' of which the repetitions are but a symptom.

Underlying the idea of causation (and many other ideas of ours) is the postulate of *continuity* of phenomena. If I pass a ball to my friend, we could regard the ball as abruptly

⁹⁵ Quite incidentally: speaking of energy, is the Big Bang considered costless in terms of energy? If all that motion is not free of charge, does that mean the Big Crunch is inevitable? Do such questions suggest the Law of Conservation is open to doubt? As for Creationism, it is not only concerned with the cause of the Big Bang starting, but more radically with the surprising very existence of matter/energy *to bang!*

disappearing from my hands and spontaneously appearing in his. But this is empirically less justified, since the fact that continuity *appears* to us cannot simply be ignored without justification. We prefer to regard the two balls as *one and the same*, for we seem to ‘see’ the ball passing from hand to hand.

The continuity is thus reasonably evident. It is a general assumption applicable to such cases (provided the particular phenomena at hand do not suggest another assumption). So, causation rests on larger theses than Hume claims.

This insight is important, because it suggests that we can presume a *singular* causative relation without referring to *general* ones. In which case, general causative propositions are, as their formal quantity implies, sets of singular causative propositions. Even if in practice we may be epistemologically unable to discover singular causations *except through* eduction from generalizations, it remains conceivable that the latter generalities are ontologically mere groups of singular cases.

In this manner, we show that, contrary to Hume, causative ‘connection’ is based not only on observation and statistics, on direct generalization, but also on wider considerations and adductive postulates that suggest causative events to be primarily individual. Constancies of conjunction are seen as mere repetitions of individual connections. This justifies (or adds justification to) the concept of Causation.

See also mentions of or relevant to Hume in:

Future Logic, chapters 65 and 67.

Phenomenology, chapters 1, 5, 6, 7.

Judaic Logic, chapter 2.

Buddhist Illogic, chapter 7.

The Logic of Causation, chapters 3, 10, 16, and appendix 1.

Volition and Allied Causal Concepts, chapter 2.

Ruminations, part I, chapter 9, and part II, chapters 1, 6, 7.

Meditations, chapter 32.

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All these works may be consulted on the Internet, at
www.TheLogician.net

⁹⁶ First published by author in Vancouver, B.C., 1990.

⁹⁷ First published by author in Geneva, 1995.

⁹⁸ First published by author in Geneva, 2003.

⁹⁹ First published by author in Geneva, 1999. The first edition comprised only Phase I (Macroanalysis), whereas this edition also includes Phase II (Microanalysis).

¹⁰⁰ First published by author in Geneva, earlier 2005.

¹⁰¹ First published by author in Geneva, earlier 2008.

