# Hume's "law" and the ideal of value-free science

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*Abstract*: There is wide belief that Hume's "law" supports the ideal of value-free science. Hume's "law" claims that value judgments cannot logically be derived from purely factual premises. Scientific investigations are concerned with facts and in no way can scientists reach value judgments. In this paper I shall argue that Hume's "law" cannot support the ideal of value-free science. I pinpoint two possible uses of the "law" in defense of the ideal, neither of which is satisfactory. The first use makes the "law" prescriptively empty. The second use leads us in a vicious circle. Furthermore, I shall argue that Hume's "law" blinds us to the reason as to why at times scientists are wrong to derive value judgments from their empirical investigations. In this sense, Hume's "law" blocks scientific investigations.

*Keywords:* value-free science; is-ought question; Poincaré; syllogistic; enthymeme.

## 1. *Introduction*

The idea that science is in itself morally neutral appears to be strongly supported by the fact/value divide. Science is value-free for a very simple reason: there is a logical gap between scientific investigations, which concern the way things *are*, and moral evaluations, which concern the way things *should* be. Scientific research will never be able to sustain moral evaluations, since the two fields, the one concerning facts and the other concerning values, show different properties. Confusing facts with values means to commit a fallacy, which is as banal as it is serious: the naturalistic fallacy. In a concise way, this is the ideal of value-free science, which has a long and intricate history.[1]

[1] Cf. Proctor (1991), who examines the historical sources of the ideal. In modern times, the debate can be traced back to the nineteenth century. At that time, the main concern was the distinction between social and natural sciences. Today, the ideal has come under attack from many quarters, such as social constructivism, deep ecology, post-modernism, feminist epistemologies, and the like, which want to dislodge the alleged objectivity of science (a list of references would be too long). Yet some scholars maintain that science is at the same time both value-laden and objective. See, for instance, Machamer and Wolters (2004), Kincaid, Dupré, and Wylie (2007), and Douglas (2009). This paper is

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The nature of fact/value divide is both semantic (factual statements are true or false, while value judgments are neither true nor false) and based on logic (value judgments cannot logically be derived from purely factual premises). The so-called Hume's "law" concerns the latter aspect of the divide.[2] Here, it is worth elaborating on the ideal of value-free science and its connection with Hume's law.

Of course, from a psychological point of view a scientist may certainly come to sustain moral evaluations, but those evaluations do not result from the content of scientific research. It is just a mere juxtaposition, and intellectual honesty demands that we clearly distinguish moral judgements from facts resulting from scientific investigations. In an often-quoted passage, the economist Lionel Robbins defends very vividly the ideal of value-free science:

> It does not seem logically possible to associate the two studies [i.e. economics and ethics] in any form but mere juxtaposition. Economics deals with ascertainable facts; ethics with valuation and obligations. The two fields of inquiry are not on the same plane of discourse. Between the generalizations of positive and normative studies there is a logical gulf. […] Propositions involving the verb "OUGHT" are different in kind from propositions involving the verb "IS". (Robbins 1932: 148-149).

Not surprisingly, phrases such as these belong to the cultural milieu of many social scientists. Natural scientists tend to take the fact/value divide for granted, while in the social sciences the ideal of value-free science is not unanimously accepted. Nonetheless, in the history of science it is not uncommon to find analogous lines of argumentation outside the traditional social sciences. In the 1970s, Edward O. Wilson sought to extend his studies in ethology and population genetics to human society. Such an extension only concerned the last chapter of his book – *Sociobiology. The New Synthesis* – which was twenty-seven chapters long, yet the accusation of unduly mixing facts and values discredited his entire work.[3] This charge does not concern sociobiology only,

closer to the latter viewpoint, though it does not directly address the issue of the objectivity of science. Furthermore, contemporary debates are related to the role played by *epistemic values* in scientific research. Many students who emphasize the role played by epistemic values are reluctant to accept an analogous role for moral values. See, for instance, Laudan (1984) and Lacey (1999). I shall not deal with the role played by epistemic values, since here I am only concerned with moral values.

[2] Thus I shall not directly deal with the problem concerning the entanglement of facts and values appearing in some terms of our natural languages – the so-called "thick terms". Empiricism presupposes that it is possible disentangle the factual content from its evaluative counterpart. On the difficulties inherent in this "disentanglement strategy", see the seminal paper by McDowell (1981). Among the most important and often-quoted works discussing the issue, I can mention Blackburn (1992), Foot (1958), Gibbard (1992), Hare (1981), Putnam (2002), and Williams (1985).

[3] For instance, after clarifying the nature of the naturalistic fallacy, Kim Sterenly and Paul E. Griffiths interestingly introduce the section devoted to Sociobiology with the title "The fact/Value

but also some studies in evolutionary psychology.[4] Quite understandably, the temptation of charging opponents with committing a fallacy – the naturalistic fallacy – is particularly strong when scientific research is connected with problems requiring appropriate action. When Rachel Carson put forward the hypothesis that the use of DDT was threatening the balance of nature, many opponents accused her of crossing the divide between facts and values.[5]

The formidable rhetorical efficacy of charges such as these is captured by an expression coined by Max Black (1964): "Hume's guillotine". Committing the naturalistic fallacy does not involve literal beheading, but it can certainly harm someone's reputation.

As has been seen, the fact/value divide may take on different meanings. In this paper, I shall only deal with the logical meaning, since, as noted by Karl Popper (1948), who was an upholder of the divide, the simplest and most incontrovertible meaning of the divide appears to be logical in kind: value judgments cannot be derived from purely factual premises.[6]

Such a logical impossibility has been elevated to the dignity of a "law", the so-called Hume's "law" in honor of the philosopher who seemed to have first established it. Its prestige among scientists and philosophers of science is such that sometimes the "law" is presented as if it had the same status as Gödel's impossibility theorem, in this way transferring all its prestige to the ideal of value-free science.

It is worth stating the scope of this paper carefully. In the paper I shall focus on two theses. It will be seen that Hume's "law" – supposing that it has the same status as a law – is totally *irrelevant* to the ideal of value-free science. Its *use* in defense of the ideal may take on two different forms. First, Hume's "law" leads us to the embarrassing (and perhaps surprising) result that *no* value judgment put forward in a scientific investigation will ever commit the naturalistic fallacy. Following such a use, Hume's "law" would become prescriptively empty and thus useless in defense of the ideal. The second case would allow the desired result to be attained: *all* value judgments are unacceptable in scientific research. However,

Swamp: Danger – Keep out!". See Sterelny and Griffiths (1999: 4 and 317).

[4] Cf. Gaulin and McBurney (2001: 16): "Evolutionary Psychology explains behavior; it does not justify it. Imagining that it offers a justification is known as the naturalistic fallacy. In a nutshell, the naturalistic fallacy confuses 'is' with 'ought'".

[5] See for instance List (2008).

[6] Thus I shall not directly deal with the problem concerning the entanglement of facts and values appearing in some terms of our natural languages – the so-called "thick terms". Empiricism presupposes that it is possible disentangle the factual content from its evaluative counterpart. On the difficulties inherent in this "disentanglement strategy", see the seminal paper by McDowell (1981). Among the most important and often-quoted works discussing the issue, I can mention Blackburn (1992), Foot (1958), Gibbard (1992), Hare (1981), Putnam (2002), and Williams (1985).

following this second use, Hume's "law" turns out to be only a convoluted and redundant way to express the very same ideal the "law" was supposed to justify. Since they are conceptually equivalent, it is misleading to think of Hume's "law" as a foundation of or justification for the ideal.

There is another important thesis I set out to defend. The abovementioned two uses of Hume's "law" tend to block scientific research. Together they prevent the following (legitimate, as we shall see) question from being raised: *Under what circumstances can scientific research sustain judgements the nature of which is evaluative?* My point is that Hume's "law" obscures why *at times* we should sensibly reject the passage from facts to values in scientific investigation. Far from improving scientific rigor, Hume's "law" actually impoverishes the scope of critical discussions concerning the fallacies scientists might commit when they try to derive value judgments from empirical research.

Before broaching the subject however, I should provide at least a brief historical reconstruction, which will also highlight the difficulty of defending the value-free ideal through the use of Hume's "law".

## 2. *Henri Poincaré and the distinction between* la science *and* la morale

As is well-known, it was George Edward Moore who coined the term "naturalistic fallacy".[7] Since then, the term has been used to include Hume's position as well, even though their views are not exactly the same. Moore set out to criticize the metaphysical and naturalistic *definitions* of the good. Therefore, Moore's naturalistic fallacy might better be defined as a "definist fallacy".[8] Instead Hume, following the standard interpretation, meant an *inferential* fallacy, since he argued that ought-sentences cannot be deduced by is-sentences. This is the famous passage where Hume introduced the logical divide:

> In every system of morality, which I have hitherto met with, I have always remarked, that the author proceeds for some time in the ordinary way of reasoning, and establishes the being of a God, or makes observations concerning human affairs; when of a sudden I am surprised to find, that instead of the usual copulations of propositions, is, and is not, I meet with no proposition that is not connected with an ought, or an ought not. This change is imperceptible; but is, however, of the last consequence. For as this ought, or ought not, expresses some new relation or affirmation, it is necessary that it should be observed and explained; and at the same time that a reason should be

[7] For an excellent historical and analytical overview of the naturalistic fallacy, see Calcaterra (1969).

[8] On Moore and the "definist fallacy", see Frankena (1939).

given, for what seems altogether inconceivable, how this new relation can be a deduction from others, which are entirely different from it. (Hume 1964, book III, part I, sec. I: 245-246).

When speaking about the "naturalistic fallacy", scientists and philosophers of science have in mind Hume, not Moore, and thus in what follows I shall limit myself to the Humean version of the fallacy,[9] which, to reiterate, in philosophy textbooks is stated in the following way: a value judgment cannot logically be derived from purely factual premises.

From a historical viewpoint, it was in fact a scientist, Henri Poincaré, who offered the most elegant interpretation of Hume's argument. In his essay, *La science et la morale,* Poincaré tries to defend the ideal of value-free science, and in so doing offers a reconstruction of Hume's "law" which is both simple and precise. Poincaré argues that science and ethics belong to two different domains for reasons which he defines *purement grammaticales.* As he writes: "If the premises of a syllogism are both in the indicative, the conclusion will also be in the indicative. For the conclusion to have been stated in the imperative, at least one of the premises must itself have been in the imperative" (Poincaré 1917: 225; Eng. tr. 103).

Poincaré does not mention Hume, but his approach to the relationship between science and moral values is typically Humean. For instance, through a beautiful analogy he claims that reason is *inert*. For Poincaré, only moral sentiments can push human beings to act, since reason is like an engine which needs fuel to work, and the fuel can only be provided by human passions and sentiments.[10]

Poincaré indicates several ways by which science is useful to moral discourse without breaking Hume's "law". Science can certainly help humankind by showing the means necessary to achieve a given goal or, in the case of a number of goals, by showing their mutual compatibility.[11] As he argues,

[9] It is not surprising that scientists find Hume more interesting than Moore. Moore aimed at defending a specific ethical thesis, which appears far from scientists' fields of interest. Hume's empiricism must appear to them more familiar and relevant to scientific enquiry.

[10] Cf. Poincaré (1917: 217; Eng. tr. 103-104): "All dogmatic ethics, all demonstrative ethics are therefore doomed in advance to certain failure ; it is like a machine with only transmission of motion, but without motor energy. The moral motor, the one which can set in motion all the apparatus of rods and gears, can only be something felt". Hume is explicit on this point as well. For instance, just to quote a couple of famous sentences, he writes: "Morals excite passions, and produce or prevent actions. Reason of itself is utterly impotent", […] "reason is perfectly inert, and can never either prevent or produce any action or affection" Hume (1964, book III, part I, sec I: 235).

[11] Cfr. Poincaré (1917: 237; Eng. tr. 108): "If science proves to us that […] one of these goals cannot be obtained without aiming at the other (and this is within the scope of science), it will have performed useful work; it will have rendered valuable assistance to the moralists". Hume himself is

these kinds of judgements are within scientific enterprise. For example, sentences like: "If you want to achieve goal *x*, then you must do *y*", do not commit the scientist to accept the given goal, since they only claim that *x* is a necessary condition for achieving *y*, and this can be done through empirical analysis.[12] Such interactions between science and ethics are doubtless acceptable. Here, the only concern is with the interpretation of Hume's "law" provided by Poincaré.

Poincaré's line of argument is very simple. As any textbook in logic tells us, valid deductive inferences are *nonampliative*, meaning that the content of the conclusion must be present in the premises. If in the premises we only have "is-statements" (in the grammatical form of the indicative) in no way can we deductively derive "ought-sentences" (in the grammatical form of the imperative), since the content of the conclusion blatantly exceeds the content of the premises. No doubt Poincare's argument appears cogent precisely because it is as simple as the elementary logic upon which it is based.

Yet, a more accurate analysis easily shows where its weakness lies. Poincare's argument would be convincing if we could reduce moral discourse to prescriptions, but this is not the case. Very simple moral judgments – such as "This is a bad boy" – are in the indicative. When referring to "Hume's law" scientists would also like to exclude judgments like these from scientific investigations, and unfortunately the criterion provided by Poincaré is inadequate for the purpose. From a logical viewpoint, prescriptions require a modal logic, while value judgments use the same predicative logic that is used by any scientific statement. Through an elegant and simple interpretation of Hume's law, Poincaré aimed to establish a clear-cut demarcation between science and ethics, but unfortunately he drew the line in the wrong place.

Neither could we improve Poincare's argument by noting that value judgments trigger prescriptions. Obviously evaluations and prescriptions are connected, since the former fairly often trigger the latter. Yet they are not the same from both a logical and conceptual viewpoint. We could state a moral judgment such as "This is a bad boy" without stating the prescription "This boy ought to be punished". Prescriptions are "all-things-considered" sentences,

far from denying possible and legitimate interactions. For instance, he writes: "reason, in a strict and philosophical sense, can have influence on our conduct only in only two ways: Either when it excites a passion by informing us of the existence of something which is a proper object of it; or when it discovers the connexion of causes and effects, so as to afford us means of exerting any passion" (Hume 1964, Book III, part I, sec. I.: 236-237). Hume devotes to this issue the whole Sec.3, part III, book II, of his *Treatise.*

[12] As Poinacaré (1908: 2-3; Eng. tr. 2001: 190) writes elsewhere: "Ethics and science have their own domains, which touch but do not interpenetrate. The one shows us to what goal we should aspire, the other, given the goal, teaches us how to attain it".

which single out the *best* possible action. In other words, we need to consider *all* relevant factors. For instance, following our example, we need to take into consideration if punishment is morally acceptable or the psychology of the boy is such that punishment is self-defeating (of course, the former is moral in kind, while the latter is factual). Therefore, however connected they might be, prescriptions and value judgments are inherently different and identification would be inaccurate.

It was previously mentioned that Poincaré provided an elegant interpretation of "Hume's law". Now the word "interpretation" needs to be stressed, since Poincaré has actually considerably narrowed the scope of David Hume'st philosophy. The latters analyses are far from being *purement grammaticales.* When reading his body of work we find a complex set of moral terms and distinctions, such as "virtues" and "vices", "right" and "wrong", "ought" and "ought not". Furthermore, he clearly takes into consideration both value judgments and prescriptions. He speaks about both "judgments by which we distinguish moral good and evil" and "multitude of rules and precepts, with which all moralists abound" (Hume 1964, book III, part I, sec. I: 234 and 235).

Poincaré's attempt is ingenuous. It provides scientists with an elegant argument which is probably still quite common nowadays. However, it is clearly inadequate for the defense of value-free science. As a consequence, we still have to find a way to justify the ideal through Hume's "law".

## 3. *Two uses of Hume's "law" in defense of value-free science*

We have seen that Hume's "law" is understood to be an inferential fallacy in which the concept of derivation needs to be clarified. Once more, Poincaré provides us with a clear answer: by "derivation" we should mean a *syllogistic* derivation. Once again, Poincare's admirable clarity enables us to understand the limitations of the answer easily. Why should we use syllogistic? As soon as we move from syllogistic to elementary propositional calculus, the impossibility of deriving not only value judgments, but even prescriptions from factual sentences becomes less obvious. Many philosophers and logicians let their imaginations run wild in order to find counterexamples. Prior (1960) suggested the following: "Tea-drinking is common in England; therefore either tea-drinking is common in England or all new Zealanders ought to be shot". Following Poincaré's grammatical criterion, we should claim that the conclusion is ethical in kind (an ought-sentence occurs in the conclusion). Since the inference is formally valid in propositional calculus, we thus have an example showing that ethical conclusions can be derived from factual premises.

I do not want to attach much weight to Prior's counterexample. Inferences such as these would strike scientists as being too abstract and far from scientific practice. Furthermore, counterexamples like Prior's might rightly disconcert those readers who are not accustomed to the shortcomings of standard logic when it is used to reconstruct the way people argue (one could legitimately wonder what is the relevance of the premise – which concerns an innocuous tradition in a country – to the conclusion – which is about the slaughter of a whole population in another country). Yet, it is still worth delving deeper into the topic, since this will introduce my general thesis: Hume's "law" does not provide any justification for the ideal of value-free science, and furthermore its use in defense of the ideal works in such a way as to block scientific investigations.

These counterexamples raise a legitimate question: if we drop the idea that only a single system of logic exists, how can we pinpoint when the naturalistic fallacy has been committed? When proposing his argumentation theory, Stephen Toulmin (1958) argued that appropriate inferential rules are dependent on the context – on what he called the "fields of argument". Toulmin does not critically discuss the naturalistic fallacy, but it is apparent that in his model it is logically possible to derive moral judgments from factual premises. Elsewhere he himself speaks about "a form of inference peculiar to ethical arguments by which we pass from factual reasons to an ethical conclusion – what we might naturally call 'evaluative' inference" (Toulmin 1950: 38). Thus, for instance, we might legitimately claim that the following inference is perfectly sound: "*F* is false, therefore do not say *F"*, where the inference rule is "Do not say anything which is false". Here, we have a rule allowing us to infer a moral conclusion from factual premises.

Those who are used to formal logic would immediately object that the argument is actually an *enthymeme*. In their view, "Do not say anything which is false" is not an inference rule, but the *missing premise* which makes that argument valid through the use of the standard inference rules of formal logic. After making the missing premise explicit, the inference does not violate Hume's "law" anymore, for we now have an ethical norm in the premises.

In the history of the debate on the naturalistic fallacy the enthymematic stratagem is frequently referred to in order to save Hume's "law",[13] and in fact this line of reasoning has actually been developed against Toulmin, as well.[14]

[13] Cf. Calcaterra (1969: 160 ff.).

[14] Cf. Kerner: (1966: 103-104): "Toulmin has not […] shown us that the connexion between a moral judgment and its reasons is a logical one. He will not be able to show this unless he is willing to say that a moral code is a kind of logical organon. But to say this would be extremely problematic. It would tend to eradicate the difference between the logical tools by which a subject-matter is inves-

In the philosophy of logic the enthymematic strategy is, however, looked upon with suspicion, since it leads us to a questionable conservatism. As Massey (1976: 89-90) nicely puts it: "Contemporary students of logic sometimes express amazement at the obstinacy of traditional logicians who did not immediately renounce their impoverished logic when the incomparably richer logic of Frege and Whitehead-Russell appeared. There is little to marvel at; their resort to the enthymematic ploy made them oblivious to the limitations of their logic, just as it makes modern logicians oblivious to the shortcomings of theirs. The enthymematic ploy is a panacea, not for remedying a logic's deficiencies, but for rendering them invisible. […] *Enthymeme* and *suppressed premiss* [sic] are psychological notions, not logical ones". Thus, the enthymematic stratagem amounts to blocking research in logic.

At this point in the paper attention must be drawn to the question of the blocking of research. For the sake of argument, let us accept that we live in a world where we have only one kind of logic, namely the syllogistic which Poincaré referred to. In this world, the problem raised by Massey (and Toulmin) would not be posed, since we have assumed (as Kant did) that logic has been completed. This concession is rather strong, but it leads us to the thesis I want to defend*: the enthymematic stratagem would continue to act as a research stopper*, even though it would block research in science and ethics, but not in logic.

It is quite obvious that through the enthymematic stratagem we could validate any kind of argument,[15] even those arguments which intuitively represent the most blatant cases of naturalistic fallacy. Let us take what we might call *naturalistic optimism*, meaning by that the axiological approval of *faits accomplis*. If we unreasonably accepted this kind of naturalism we would be entitled to claim that the following argument is sound: "Hitler invaded Poland in 1939. Therefore Hitler was right to invade Poland in 1939". John Dewey, who throughout his life defended the idea of a scientific, empirically founded, ethics, would find this kind of "optimism" simply outrageous.[16] Yet, naturalistic optimism would provide the "missing premise" which makes the argument free from the charge of naturalistic fallacy. I shall call any sentence which sup-

tigated and the subject matter itself. […] It may be claimed that what Toulmin took to be the form of the most simple sort of moral argument is really an enthymeme. […] When viewed in this manner, moral argument does not seem to exhibit any special form of inference".

[15] We only need a logic incorporating *modus ponens* (traditional logic incorporated *modus ponens* by means of the so-called hypothetical syllogism). Given any argument "*p* therefore *q*", we could validate the argument by adding the missing premise "if *p* then *q*".

[16] Dewey clearly rejects naturalistic optimism, though he does not use this terminology. In fact, he is very careful not to make the fact/value distinction collapse entirely: "To say that something is enjoyed is to make a statement about a fact, something already in existence; it is not to judge the value of that fact" (Dewey 1984: 207).

plies the missing premise from which we are allowed to validly infer a value judgment from factual premises the *bridge-principle*.

Of course, I am not concerned here with the elementary distinction between sound arguments (arguments whose premises are accepted, at least provisionally) and formally valid arguments, a distinction we can find in any textbook. The problem, which I am concerned with is that it is impossible to find a solution to the abuse of the enthymematic stratagem *from the point of view of those who defend the ideal of value-free science*.

Scientists and philosophers who use Hume's "law" to defend the ideal overlook the consequences of the enthymematic stratagem, even though from time to time they surface in discussions about the real scope of the naturalistic fallacy. For instance, in the journal *Biology and Philosophy* I found this defence of Herbert Spencer (D. S. Wilson *et al.* 2003: 672): "however much we might disagree with Spencer, he is not committing the fallacy attributed to him. Spencer is not justifying these social practices because they are natural, but because they benefit society in the long run. [By supplying the relevant missing premise] his argument can be stated more formally as follows: The incapable become impoverished […], and the weak are shouldered aside by the strong (factual premise); A society of capable […] and strong individuals is ethically better than a society of incapable […] and weak individuals (ethical premise); [Therefore] [T]he processes that create a society of capable […] and strong individuals are ethically benevolent (ethical conclusion). […] Of course, this does not mean that Spencer is correct. […] What we cannot do is dismiss the argument on the grounds that it commits some sort of elementary fallacy". In the paper, the authors argue that the factual investigations carried out in evolutionary psychology are relevant to ethics (which is a reasonable claim), but they unintentionally end up with something different: the defence of Spencer through the use of the enthymematic stratagem. If not even Spencer committed the naturalistic fallacy, I wonder who might have ever committed it. Along a very similar line of reasoning, we could defend E. O. Wilson, sociobiology, and whomever we are willing to defend. Through the use (or rather the abuse) of the enthymematic stratagem, Hume's "law" would become *prescriptively empty* and consequently useless in the defense of the ideal of value-free science.

There are only two ways to reject the enthymematic ploy, neither of which is satisfactory for the defense of the ideal of value-free science. The first option for scientists is to critically discuss the missing premises of the argument moving from facts to values. Yet this move would imply that scientists are bound to discuss moral statements, since missing premises are moral in nature (this is why, as in the examples mentioned above, missing premises work as bridge-principles, allowing the deduction of moral conclusions).

Although this option is incompatible with the ideal of value-free science, it is the most plausible choice. It claims that some bridge-principles are acceptable, while others are not. Let us take the case of E. O. Wilson and sociobiology. In this case we should not reject the passage from facts to values because sociobiology breaks a simple inferential rule – Hume's "law". In itself the objection could easily be met thanks to the enthymematic stratagem. We should reject the derivation of values from facts because in the work by Wilson we do not find any bridge-principle, which has been precisely stated and defended. This point is clarified by Philip Kitcher, who is the author of one of the most incisive critiques of sociobiology: "[…] sociobiology makes no serious attempt to face up to the naturalistic fallacy – to pinpoint the conditions under which normative assertions can be garnered from biological premises and to show that moral principles of the new scientific ethics really do stand in proper relation to the biological findings. (If the naturalistic fallacy is not a fallacy, then there will be *some* good arguments from factual premises to normative conclusions. That does not mean that *every* argument from fact to value compels our assent). All we have been offered is a stark juxtaposition of a biological commonplace […] with a statement allegedly encapsulating a 'cardinal value' […]. The connection is left as an exercise for the reader". (Kitcher 1985: 430). To repeat once more, sociobiology commits the naturalistic fallacy not because of an inferential law, but because we find no bridge-principle, which is seriously elaborated and defended.

By contrast, the second option lies fully in the spirit of ideal. It could be argued that the enthymematic stratagem is illegitimate precisely because it uses bridge-principles whose nature is moral in kind, while all moral premises should not be admitted in scientific discourse. After all, this is precisely why Hume's "law" is so important.

It is obvious as to why this answer is inadequate. This option is the same as claiming: "We should not accept any value judgments in the language of science, thus no bridge-principle may be accepted!". This is hardly anything different from reiterating the very same ideal of value-free science. In slightly different terms, we are facing a vicious circle. We started with the attempt to justify the ideal of value-free science through the use of Hume's "law" and eventually we end up with using the ideal of value-free science in order to prevent Hume's "law" from becoming prescriptively empty, since, thanks to the enthymematic stratagem, we could resort to arbitrary bridge-principles which would allow us to derive any value judgment from factual premises.

Hume's "law" was supposed to provide a logical foundation for the ideal. This was the intention of both Poincaré and many scientists who have followed him. Now, Hume's "law" has become just a convoluted way to claim that moral values must be foreign to science. It no longer points to a logical fallacy, it has

simply become another way to reiterate the very same ideal that it was supposed to establish.

To sum up, the enthymematic stratagem raises the issue that in principle *all* arguments could be saved from the charge of committing the naturalistic fallacy. In fact, it is sufficient to introduce a bridge-principle, however arbitrary it might be, connecting factual premises and moral conclusions. There are two solutions. The first option is incompatible with the ideal of value-free science, since it suggests scientists should critically discuss bridge-principles. Scientists should accept *some* bridge-principles and reject others. The second option is instead compatible with the ideal, but the use of Hume's "law" becomes redundant. This option claims that *no* bridge-principles should be accepted precisely because they are moral in nature; and this is only a quite convoluted way to reassert the ideal that Hume's "law" was supposed to justify.

We should thus conclude that Hume's "law" does not provide a foundation or justification for the ideal of the moral neutrality of science. Yet what has been argued so far leads us to a second thesis: Hume's "law" tends to block scientific research. In fact, if the enthymematic stratagem is not rejected then, as we have seen, *all* bridge-principles become legitimate. This is a conclusion which is definitely too liberal, since we could save even Spencer and sociobiology from the charge of naturalistic fallacy. Instead, if we reject the enthymematic stratagem by claiming that *no* bridge-principle is acceptable then we could not even ask the following question, "*what* bridge-principles are acceptable, why, and under what circumstances?". The only option that allows us to ask the question is claiming that *some* bridge-principles are acceptable and others are not. This is the only option that does not block research, since we avoid arguing in an a priori fashion that *all* or *no* bridge-principles can be accepted. Unfortunately, it is also incompatible with the ideal of value-free science. Finally, it is worth noting that this option leads us to define the naturalistic fallacy differently. In scientific inquiry, the naturalistic fallacy is a misnomer if it is understood as an *inferential* fallacy. Rather, it should be understood as an *argumentative* fallacy, namely as an argument which uses ill-conceived bridge-principles.

I have previously mentioned two cases – those of Spencer and Wilson – where the derivation of moral conclusions has been almost unanimously rejected. To strengthen the thesis that only some bridge-principles are defensible and science plays a role in discussing them critically, I shall propose an example drawn from ecology. We shall see why a bridge-principle was initially accepted as plausible and subsequently rejected thanks to scientific research.

## 4. *An example: the balance of nature*

The idea that nature exhibits a balance among both animal populations and plant communities traces back to antiquity. Nature was viewed as a beneficent force, a view which was deeply intertwined with broader cosmological and theological concepts (Egerton 1973). Evidence for a divine design was seen in celestial phenomena and natural history, as well as in the relationships among organisms, organisms and their environment, and even among human beings themselves (McIntosh 1985). Herodotus believed that predators and preys were providentially endowed with different reproductive capabilities in order to maintain their number unchanged (Egerton 1973). As is well known, Charles Darwin rejected the idea of Divine Providence, but in his work the concept of a balance of nature continues to play an important role. As Darwin (2004, Ch. 3: 86) claimed in an often-quoted passage: "Battle within battle must ever be recurring with varying success; and yet in the long-run the forces are so nicely balanced, that the face of nature remain uniform for long periods of time, though assuredly the merest trifle would often give the victory to one organic being over another".

Thus it is not surprising that the concept has continued to exert its influence today. Environmental movements have developed also thanks to the belief that nature is endowed with a feedback system which ought to be left working undisturbed. In the 1960s, Rachel Carson skillfully used it to defend nature against human arrogance and the indiscriminate use of pesticides. As she wrote: "The balance of nature is not the same today as in Pleistocene times, but it is still there: a complex, precise, and highly integrated system of relationships between living things which cannot safely be ignored any more than the law of gravity can be defied with impunity by a man perched on the edge of a cliff. […] The 'control' of nature is a phrase conceived in arrogance, born of the Neanderthal age of biology and philosophy, when it was supposed that nature exists for the convenience of man" (Carson 2000: 215 and 257).

The presence of facts and values in passages like this has understandably alarmed the upholders of the ideal of value-free science. We have already noticed that Carson was hastily accused of inaccurate science because she rashly crossed the line between scientific facts and moral values (List, 2008). It should come as no surprise that Dieter Birnbacher (1980) has more recently accused environmental movements of committing the naturalistic fallacy when referring to the concept of a balance of nature. For him, the balance-of-nature concept is the main cause of the confusion between facts and moral evaluations. Science and value judgments are divided by a logical gulf, which no one is allowed to ignore. He is rather trenchant in his claim: "The 'naturalistic fal-

lacy‘ is primarily prompted by a concept as ‘balance of nature‘, which in itself is purely descriptive, but is too often interpreted as normative by laypeople of ecology, as if ‘balance‘ were *eo ipso* the only desirable, true optimal state of a system, which should be maintained as long as possible or implemented as quickly as possible” (Birnbacher 1980: 108; Eng. tr. is mine).

Criticisms like this, however, overlook the fact that Carson and environmentalists have proposed bridge-principles connecting facts (the stability of populations) and values (the respect for nature). Consider for instance the following passages:

> It took hundreds of millions of years to produce the life that now inhabits the earth […]. Given time – time not in years but in millennia – life adjusts, and a balance has been reached. For time is the essential ingredient; but in the modern world there is no time […]. Sometimes we have no choice but disturb these relationships, but we should do so thoughtfully, with full awareness that what we do may have consequences remote in time and space. (Carson 2000: 24 and 69).

Carson is telling us that so complex a balance, which has required adjustments taking a very long span of time, cannot be disturbed without *unintended* and *unforeseeable* consequences. Therefore it is better for us to respect the balance of nature and to disturb it as little as possible. These are strong arguments, which allow us to move from facts to values. It would be pedantic to reconstruct Carson’s argument formally (the “bridge-principle” would very probably be: “Thanks to a system of complex interaction nature tends towards a harmonious balance which should be left undisturbed as much as possible, since the size of each population is perfectly adapted to the environment and the size of the other populations”). The basic point here is that we do not have just a juxtaposition of factual statements and value judgments. Carson’s rhetoric was persuasive thanks to a careful *data* collection which showed why//gave evidence as to why humankind *should* be very cautious about interfering with an equilibrium obtained through a slow and complex evolution.

Although Carson’s arguments were persuasive, they need further in-depth study. Her bridge-principle (no matter how it could be specified) uses a key notion: “tendency toward a balance”. The problem is that the real meaning of balance-of-nature concept was left ambiguous for centuries. What does the claim that a feedback system allows nature to achieve a “balance” mean exactly? Without a clear definition of the concept, it is difficult to understand whether equilibrium points really exist and nature shows a spontaneous tendency towards them.

There are, no doubt, many observations that seem to cogently support the existence of a balance. When visiting a wood after many years, if traumatic events

generally caused by human action have not occurred in the meantime, we shall find the relative size animal populations unchanged, as well as the composition of vegetable kingdom. It appears that ecosystems clearly show a remarkable stability. A place where an oak wood dominates has obviously different characteristics than a cactus desert, and such differences persist well beyond the life of any human being. Yet, these are not rigorous observations, since they adopt the spans of time which human beings are used to: hours, days, or even decades. If we go beyond these observations and we do not embrace an anthropocentric perspective any longer, can we still claim that nature shows a tendency towards some kind of equilibrium? It is necessary to be rigorous about the real meaning of "balance of nature". Only in this way could we gauge the distance of an ecosystem from its equilibrium point and its alleged tendency to reach it.

Unhappy with these ambiguities, ecologists have made it clear that 'balance' of nature may have different meanings. For instance, Redfearn and Pimm (1987) distinguish between stability (when the species densities tend to return to their equilibrium values following disturbances), resilience (how fast a population returns to equilibrium), persistence (how long a system endures), resistance (the tendency of a system to remain unchanged), and variability (which includes measurements concerning variance, standard deviation, etc. of populations over time). Through analyses like this, the scientific consensus has dramatically changed. Thanks to both conceptual and empirical investigations, the scientific community today maintains that the uniqueness of historical evolution prevails over the alleged existence of non-historical equilibria.[17] In other words, nature exhibits no tendency towards a balance.

The bridge-principle suggested by Carson was legitimate, since it was supported by a millenary tradition and countless everyday observations available to everyone. Eventually it was rejected. Yet, this did not happen through the use of Hume's "law", but due to scientific investigations which have had consequences in both ecology and the political and moral sphere. Today, we know more about the way nature works and, as has been noted, the concept of biodiversity is more suitable for justifying the respect of nature, along with, it is hardly necessary to say, a better understanding of the ways such respect should be implemented.[18]

[17] In this regard, the controversy between Nicholson, on the one hand, and Andrewartha and Birch, on the other, is both historically and conceptually insightful. For a philosophical discussion of the controversy, see Cooper (2003), especially Ch. 2 and 3. For a more popular analysis of the empirical and conceptual weakness of the notion of a balance of nature see Kricher (2009).

[18] Cf. Kritcher (2009), cap. 13 and Sarkar (2005)

## 5. *Conclusions*

Hume's "law" provides a formidable rhetoric (a veritable "guillotine") by which we would be entitled to defend the ideal of value-free science. Science is value-free for an apparently cogent reason: there is a logical gap between scientific investigations, which concern the way things are, and moral evaluations, which concern the way things should be. The latter cannot legitimately be derived from the former. Whoever, knowingly or unknowingly, ignores Hume's "law" commits a serious inferential fallacy: the naturalistic fallacy.

First we have examined Poincare's ingenious attempt to use Hume's "law" in order to demarcate science from ethics. Yet, we have seen why his grammatical criterion is unfit for the purpose. Subsequently, we have examined the problems posed by the enthymematic stratagem. Such a stratagem leads us to a hardly acceptable dogmatism in logic, and above all (at least from my perspective) it requires an embarrassing choice for those who want to use Hume's "law" to justify the ideal of value-free science. It is a real dilemma where neither of the two horns is satisfactory from their viewpoint. If they provide no constraint to the enthymematic stratagem then Hume's "law" appears useless in the defense of the ideal, since it has now become prescriptively empty. Through the introduction of bridge-principles, however arbitrary they might appear, we could save anyone we wish from the charge of committing the naturalistic fallacy.

If, however, we reject all bridge-principles simply because they have a moral import then this second use of Hume's "law" presupposes what it should warrant: the ideal of moral neutrality of science. As has been argued, this second option leads to a vicious circle, since it reiterates the very same ideal it is assumed to justify.

There is a third option. We should not a priori claim that either *all* or *no* bridge-principles are acceptable. Rather we should say that only *some* bridge-principle are to be accepted, and it is within the scope of scientific investigations to establish which of them are satisfactory. This third option is also the only one that does not block research by a priori reasoning. Yet, this option is incompatible with the ideal of value-free science.

What should we conclude about the status of the naturalistic fallacy? In scientific inquiry, the naturalistic fallacy is a misnomer if it is understood as an inferential fallacy. Rather, it should be understood as an argument that uses ill-conceived bridge-principles.

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## *References*


Birnbacher, D., 1980, "Sind wir für die Natur verantwortlich?", in *Ökologie und Ethik*, D. Birnbacher ed. Phillip Reclam, Stuttgart: 103-139.

Blackburn, S., 1992, "Morality and Thick Concepts II – Through Thick and Thin", in *Proceedings of the Aristotelian Society*, Supplement vol. 66: 284-299.

Calcaterra, G., 1969, *Il problema della fallacia naturalistic*a, Giuffré, Milan.

Carson, R., 2000, *Silent Spring*, 1st ed. 1962, Penguin Books, London.

Cooper, G.J., 2003, *The Science of the Struggle for Existence. On the Foundations of Ecology*, Cambridge University Press, Cambridge.

Darwin, C., 2004, *The Origin of Species*, 1st ed. 1859. Collector's Library, London.

Dewey, J., 1984, *The Quest for Certainty*: *A Study of the Relation Between Knowledge and Action*, 1st ed. 1929, in *John Dewey. The Later Works*, vol 4., J. A. Boydston ed.,Southern Illinois University Press, Carbondale and Edwardsville.

Douglas, H., 2009, *Science, Policy, and the Value-Free Ideal*, Pittsburgh University Press, Pittsburgh.

Egerton, F.N., 1973, "Changing Concepts of the Balance of Nature", in *The Quarterly Review of Biology*, 48-2: 322-350.

Foot, P., 1958, "Moral Arguments", in *Mind*, reprinted in *Virtues and Vices*, Blackwell, Oxford: 96-109.

Frankena, W.K., 1939, "The Naturalistic Fallacy", in *Mind*, 48-192: 464-477.

Gaulin, S., D.H. McBurney, 2001, *Psychology: An Evolutionary Approach*, Prentice Hall, Upper Saddle River NJ.

Gibbard, A., 1992, "Morality and Thick Concepts. I", in *Proceedings of the Aristotelian Society*, Supplementary volumes, 66: 267-283.

Hare, R.M., 1981, *Moral Thinking*, Clarendon Press, Oxford.

Hume, D., 1964, *A Treatise of Human Nature*, reprinted of the new edition London 1886, T.H. Green and T.H. Grose eds., Scientia Verlag, Aalen.

Hume, D., 2007, *An Enquiry Concerning Human Understanding*, 1777, P. Millican ed., Oxford University Press, Oxford.

Kerner, G.C., 1966, *The Revolution in Ethical Theory*, Clarendon Press, Oxford.

Kincaid H., J. Dupré, A. Wylie, 2007, eds., *Value-Free Science? Ideals and Illusions*, Oxford University Press, Oxford.

Kitcher, P., 1985, *Vaulting Ambition. Sociobiology and the Quest for Human Nature*, The MIT Press, Cambridge MA.

Kricher, J., 2009, *The Balance of Nature. Ecology's Enduring Myth*, Princeton University Press, Princeton and Oxford.

Lacey, H., 1999, *Is Science Value Free? Values and Scientific Understanding*, Routledge, London and New York.

Laudan, L., 1984, *Science and Values*, University of California Press Berkeley CA.

List, P.C., 2008, "Rachel Carson and George J. Wallace: Why Public Environmental Scientists Should Advocates for Nature", in *Rachel Carson. Legacy and Challenge*, L.H. Sideris and D. Moore Katheleen eds., State University of New York Press, Albany: 41-57.

Machamer, P., G. Wolters, 2004, *Science, Values, and Objectivity*, University of Pittsburgh Press, Pittsburgh.

Massey, G., 1976, "Tom, Dick, and Harry, and all the King's Men", in *American Philosophical Quarterly*, 13-2: 89-107.

McDowell, J., 1981, "Non-Cognitivism and Rule-Following", in *Wittgenstein: To Follow a Rule*, S. Holtzman and M.C. Leich eds., Routledge & Kegan Paul, London: 141-162.

McIntosh, R.P., 1985, *The Background of Ecology. Concepts and Theory*, Cambridge University Press, Cambridge.

Poincaré, H., 1908, *Le valeur de la science*, 1° ed. 1905, E. Flammarion éditeur, Paris ; Eng. tr. *The Value of Science. Essential Writings of Henri Poincaré*, The Modern Library, New York 2001.

Poincaré, H., 1917, "La Morale et la Science", in *Dernières Pensées*, 1ª éd. 1913, *Bibliothèque de Philosophie Scientifique*, Chapter VIII : 223-47; Eng. tr. "Ethics and Science" in *Mathematics and Science: Last Essays*, Dover Publications, New York 1963.

Prior, A.N., 1960, "The Autonomy of Ethics", in *The Australasian Journal of Philosophy*, 38-3: 199-206.

Proctor, R.N., 1991, *Value-Free Science? Purity and Power in Modern Knowledge,* Harvard University Press, Cambridge MA.

Putnam, H., 2002, *The Collapse of the Fact/Value Dichotomy, and Other Essays*, Harvard University Press, Cambridge MA.

Redfearn, A.R., S.L. Pimm, 1987, "Stability in Ecological Community", in *Insect Outbreaks*, Barbosa P. and J.C. Schulz eds.,Academic Press, New York; reprinted in *The Philosophy of Ecology*, Keller, David R. and Frank B. Golley eds., The University of Georgia Press, Athens and London: 124-131.

Robbins, L., 1932, *An Essay on the Nature and Significance of Economics Science*, 2nd edition 1935, Macmillan, London.

Sarkar, S., 2005, *Biodiversity and Environmental Philosophy. An Introduction*, Cambridge University Press, Cambridge.

Sterelny, K., P.E. Griffiths, 1999, *Sex and Death. An Introduction to Philosophy of Biology*, The University of Chicago Press, Chicago and London.

Toulmin, S., 1950, *The Place of Reason in Ethics*, Cambridge University Press, Cambridge.

Toulmin, S., 1958, *The Uses of Argument*, Cambridge University Press, Cambridge.

Williams, B., 1985, *Ethics and the Limits of Philosophy*, Harvard University Press, Cambridge MA.

Wilson, D.S., E. Dietrich, A.B. Clark, 2003, "On the inappropriate use of the natu-

ralistic fallacy in evolutionary psychology", in *Biology and Philosophy*, 18: 669-682.
Wilson, E.O., 1975, *Sociobiology. The New Synthesis*, Harvard University Press, Cambridge MA.