Essentiality without Necessity

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Abstract

It is widely accepted that if a property is essential then it is necessary. Against this I present numerous counterexamples from biology and chemistry, which fall into two groups: (I) A property is essential to a genus or species, yet some instances of this genus or species do not have this essential property. (II) A property is essential to a genus, yet some species of this genus do not have this essential property. I discuss and reject four minor objections. Then I discuss in depth whether a distinction between constitutive essence and consequential essence is able to handle these counterexamples. I conclude that this distinction is better put as one between (1) the essence, which is necessary, and (2) the essential properties, which are not formally necessary. An essence of an object X is the substantial universal expressed by its real definition. An object X has a property P essentially iff the property P is explanatory and non-trivial, and P follows from the essence of X.

Keywords: *essential properties, necessary properties, essence, exceptions*

Kripke, Putnam, and others defended the tenability of essentiality as *de re* necessity, orthodoxly analysed as something that is true of a thing in all possible worlds where it exists (cf. [27] for a historical survey). According to this modal view, a property is predicated essentially if and only if it is (physically) necessary. If an object X essentially has a property P, then it must have P in all possible worlds where X exists (i.e. it must be necessary). Consequently, by losing the property P the object X would cease to exist. On the other hand, an essential property is often held to be explanatory (and as giving a definition and an account).

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However, using the example of Socrates and the singleton set {Socrates}, Kit Fine [8], [9] has argued that this does not square with the necessity view: while necessity holds in both directions (if Socrates exists then {Socrates} exists, and also if {Socrates} exists then Socrates exists), explanation only holds in one direction. It is not explanatory for Socrates to say that he is the sole member of {Socrates}. However, it is explanatory for {Socrates} to say that it contains Socrates as the sole member.

Two further points, in addition to Fine's, speaks against the modal conception of essentiality. (1) Necessity and essentiality differs linguistically. One can speak of Socrates' essence, but not of Socrates' necessity. However, one can speak of Socrates' essential properties and Socrates' necessary properties. The linguistic point is thus an argument against equating essentiality with necessity. But it leaves open a wide range of other possible relations between essentiality and necessity. (2) Necessity is generally recognized to be monotonic, e.g. if the existence of singleton {Socrates} necessitates the existence of Socrates, then the singleton will also necessitate Socrates' existence no matter which additional premises are added. In contrast, explanation is generally recognized to be non-monotonic, e.g. 'I did not buy oranges because I forgot' might be a good explanation, but 'I did not buy oranges because I forgot and a democrat is president of the US' is not. Other notions more or less distinct from essentiality, such as grounding and causation, have also been argued, based on there being exceptions, to be non-monotonic and consequently not necessary. Grounding is also taken to be a type of explanation, namely metaphysical explanation (e.g. the ball is coloured *in virtue of* being red), and the examples in [17], [32] *prima facie* indicate that grounding is non-monotonic.[1] Similarly, some [25], [30] argue that causation is non-monotonic, e.g. giving someone a lethal dose of poison causes them to die, but giving someone a lethal dose of poison and the antidote does not cause them to die. Essentiality, like explanation and causation (and perhaps grounding), is non-monotonic, and thus distinct from necessity which is monotonic. E.g. if a bird is a raven, and ravens are essentially black, then the bird will be black; but if a bird is a raven, and ravens are essentially black, and the bird is an albino, then the bird will not be black.

As a result of Fine's work (cf. also [14]), many authors have argued that not every property that is necessary is also essential. I.e. it is false that if something is necessary then it is essential. On this broadly neo-Aristotelian view, essentiality is understood non-modally (cf. also [5], [19], [31]). Despite of the vast recent literature defending non-modal

conceptions of essentiality, there have been few attempts at a strict definition of essence and essential properties. And usually no distinction is made between essence and essential property. Both Fine [8], [9] and Lowe [19] emphasize the role of real definition, and they say that the real definition is the essence (cf. [31]). Or rather, essence is not the definition as a proposition or linguistic entity, but that which the real definition signifies. Lowe also defines it in terms of the locution 'what it is to be': "if X is something of a kind K, then we may say that X's *general* essence is what it is to be a K [...]" [19, p. 35] Others emphasize more heavily the aspect that essence is explanatory, e.g. deRosset: "the *essence* of a thing is the totality of its features that are explanatorily basic." [5, p. 266] I present my own definitions of essence and essential property on page 69, and I am hoping that my paper will justify these definitions. To place these definitions at the beginning of this paper would give the reader the false impression that these definitions are to be found in the current literature on non-modal essentiality already.

Neo-Aristotelians like Fine simply assume that if a property is essential then it is necessary. I argue that this assumption is mistaken. My paper first and foremost engages with this recent (and vast) literature of neo-Aristotelians defending a non-modal conception of essentiality. Although my argument is not without relevance for those who, like Kripke and Putnam, have a modal conception of essentiality, I will be assuming throughout the paper a non-modal conception. In the first section I will present several counterexamples to the claim that if a property is essential then it is necessary. More precisely, I present counterexamples where a property is essential to an object of a certain kind, but yet the property is not possessed by that object. After briefly discussing four minor objections in section II, I then in section III answer a major objection to my case. The major objection makes the distinction between a thin or constitutive essence (viz. the real definition constituted by the genus and differentia) and a thick or consequential essence (viz. the derivative attributes, viz. *propria*, which follows from the real definition) [9, pp. 56-61]. The possible objector admits that the exceptions hold for the consequential essence, but then claims that the constitutive essence does not admit of exceptions and that the constitutive essence is what is properly referred to as the essence. I concede this objection, although I argue that this distinction is better put as one between (1) the essence as the substantial universal expressed by its real definition, which is necessary, and (2) the essential properties that follow from the essence and are non-substantial universals, which are not formally necessary.

I Counterexamples

Surprisingly, there seem to be countless cases where we are inclined to say that a property is essential, and yet that the property is not necessary.[2] Some of these examples have been around in the literature for a long a time, some going all the way back to Aristotle [29][3], while others have been discussed by Kripke, Lowe, and Mumford. Birds essentially have the capability to fly, but penguins, ostriches, birds who has had their wings clipped, etc. do not have the capability to fly [24, p. 272]; [29, pp. 75-79]. Tigers essentially have four legs, but there are tigers missing one or more of their legs [13, pp. 119-120]; [21, p. 199]. Ravens essentially are black, but there are albino ravens [20, p. 150, pp. 188-189 & pp. 209-212]; [24]. Birds essentially are feathered, but e.g. geese are (brutally) plucked several times during their life, and disease can cause loss of feathers (e.g. Psittacine beak and feather disease). Mammals essentially give birth to live young, though male mammals do not, nor prepubertal children, nor postmenopausal females or females otherwise sterile. Mammals essentially have fur, but some mammals have very little fur (e.g. humans, hippopotamuses, elephants, and rhinoceroses), and some mammals completely lack hair (e.g. the Sphynx cat). Beer essentially contains alcohol, but then there is non-alcoholic beer where the alcohol has been removed through heating or reverse osmosis. Water essentially melts at 0°C, but heavy water melts at 3.81°C. Water essentially is H_2O, but H_3O and HO naturally occur in distilled water through autoionization.[4] There is insufficient place to defend each of these counterexamples in detail. The counterexamples cover cases from biology and chemistry, and seem to concur with our current best scientific theories. Moreover, similar counterexamples should not be too difficult to supply, in case the reader finds none of these convincing, as the counterexamples exhibit two closely related generic structures:

I) A property (dispositional or categorical) is essential to a genus or species, yet some instances of this genus or species do not have this essential property.

II) A property (dispositional or categorical) is essential to a genus, yet some species of this genus do not have this essential property.

Admittedly, my examples are exclusively drawn from biology and chemistry. Even if my examples are defendable, it might still hold for other fields and sciences that if a property is essential then it is also necessary. Take e.g. non-applied mathematics: it is true that one speaks about

special cases in mathematics, e.g. that the equilateral is a special case of triangle in that all its sides are equal. But even though the equilateral is in this aspect distinct from all other triangles, this is not an aspect that is essential to triangles (viz. that its sides are not all equal), and thus special cases in mathematics do not show that essential properties can be non-necessary. And on the other hand, it is easy to find cases of essential and necessary properties in mathematics. Take Fine's example of Socrates and the singleton set {Socrates}. While it is not essential (yet necessary) for Socrates that he is the sole member of {Socrates}, it is essential and necessary for {Socrates} that it has Socrates as its sole member.

Then there are some of the properties that have been much discussed in the modal essentialist literature. E.g. being self-identical and being distinct from everything else are necessary properties; however they are also trivial properties [22, p. 20], and therefore arguably non-essential properties. Less trivial are cases like Cicero being identical to Tully, or even more cases like Hesperus being identical to Venus (or more precisely, Hesperus being a phase of Venus). Perhaps some of these properties can be argued to be both essential and necessary. E.g. Kripke's thesis of the necessity of origin; this is a controversial thesis in the literature (cf. [22] for a recent discussion), and suffice it to say that if the thesis is defendable, then this would be a case where a property (e.g. being the son of Rabbi Myer and Dorothy) would be both essential and necessary to an individual (viz. Kripke).

My suggestion is that the connection between essentiality and necessity, such that essential properties are also necessary, cannot be a formal property of essentiality. Instead it must be a material property, viz. that the subject-matter determines whether essentiality will imply necessity or not.

II Four Minor Objections

My counterexamples can be met by four objections, but I argue that these 'minor' objections are unsatisfactory, and that most are unable to deal with all of my counterexamples.

First, one might object for each of the essential properties featuring in the counterexamples that they are not in fact essential properties. E.g. that birds do not essentially fly, or that beer does not essentially contain alcohol, or that heavy water is not water even though it is H_2O,

or that female fertile mammals essentially give birth to live young, etc. It is certainly possible that some of my cases are not in fact essential properties, but it is implausible that all are not. And such a strategy would have to be on a case by case basis, but it is highly implausible that a separate reason can be found for any possible such counterexample. However, if the reason for denying that these are essential properties is solely that they allow for counterexamples, then that is precisely the point at issue. Some further argument must be offered by the objector. The most plausible argument might claim that without the connection to necessity, essentiality is simply inapplicable. More precisely, how is one to separate an exception disproving an essential predication from an exception which does not disprove an essential predication? In contrast, given the thesis that if a property is essential then it is necessary, then any exception falsifies the essential predication. In response one must certainly value the simplicity resulting from this view, but one must also remark that it is oversimplistic. It too easily falsifies well-proven scientific theorems. E.g. a featherless bird will then falsify that birds essentially are feathered.

Second, one might restrict essentiality to chemical elements and microphysical particles (or constituents at an even more fine-grained granularity). Thus one would eliminate at least most of the exceptions, if not all. All other existents would be reducible to these fundamental existents. For instance Bird seems to subscribe to such a reductive view (cf. also [6], [7] although Ellis is vulnerable to the objections concerning water):

> The Laws of nature will explain why—*necessarily*—there are no members of chemical and microphysical kinds that lack certain properties, why of necessity certain properties cluster together in a partially or fully precise manner. [2, p. 211]

But this reductive approach has received much criticism and scepticism (cf. [31, pp. 120-150] for an up-to-date presentation), and can be said to be a minority position. The majority position is towards a more commonsensical and Aristotelian approach, where things of widely different granularities, not least our normal-sized objects, have essential properties. Note that this view of Bird and Ellis is separate from Kripke's and Putnam's view that the internal constitution of a thing is its essence, because Bird and Ellis argues that normal-sized objects do not have essences and essential properties. A more in-depth criticism of this reductive view is beyond the scope of this paper.

Third, one might restrict essentiality to *infimae species* like penguins and ostriches, and deny essentiality to the higher genus like birds. The argument for this restriction could parallel the argument for only allowing maximally determinate universals or properties [1, pp. 117-118]; [11, p. 152]. Namely, it is because this particular is a penguin that it is a bird, in parallel with the claim that it is because this particular is scarlet that it is red. This objection would eliminate the second type of counterexamples, because the essential properties of the species could not then be in conflict with the essential properties of the genus, as there would be no essential properties of the genus. However, the first type of counterexamples would remain as potent as before. Ravens are essentially black, and raven is an *infima species*, but there are albino ravens.

Fourth, one might restrict essentiality to individuals, such that all essences are individual essences viz. haecceities. This objection would eliminate all my counterexamples. However, even though a few authors have defended a minimal haecceitism [10], [22], [28], only Leibniz's monadology seems a case of extreme haecceitism where essentiality is restricted to individuals (viz. the monads). Not only is the mere existence of individual essences highly controversial. In addition, there are serious objections against extreme haecceitism [22], e.g. it has the *prima facie* undesirable consequence that "not only could Napoleon have been a poached egg, the world could have been qualitatively just as it actually is but such that a poached egg and Napoleon swap their respective qualitative roles." [4] Further, the individual essence would be highly restricted (perhaps to a this-ness and an origin). For instance Tabby the tiger cannot have an individual essence of being quadrupedal, since Tabby could lose a leg. The thesis that all essences are individual essences (i.e. extreme haecceitism) thus admittedly eliminates all my counterexamples, but the philosophical drawbacks of this thesis seem to far outweigh the benefits.

III Major Objection: Essence as Real Definition

The major objection makes use of Fine's distinction between a thin or constitutive essence (viz. the real definition constituted by the genus and differentia) and a thick or consequential essence (viz. the derivative *propria*) [9, pp. 56-61]. The possible objector admits that the consequential essence admits of exceptions, but then claims that the constitutive essence does not admit of exceptions and that the constitutive essence

is what is properly referred to as the essence. There is a long tradition for this view dating back to Aristotle's view that the essence is what the real definition signifies, and where the real definition is composed of the genus and differentia, while the derivative *propria* do not signify the essence (*Topics* I 8, 103b9-11). Fine himself stresses the connection between essence and real definition [8], and he says that his "distinction corresponds roughly to the traditional distinction between essence and propria." [9, p. 57]

Applying Fine's distinction, I admit that an essence will hold necessarily of an object – if a tiger ceases to be a feline, then *ipso facto* it ceases to be. On the other hand, does it make sense to say that the essence of tiger essentially belongs to the tiger? Such a predication is redundant – it does not essentially have the essence, instead it simply is its essence. Otherwise, there would loom an infinite regress, for it could also be essential, that the essence holds essentially, and so on ad infinitum. And besides, what would it mean to be the contrary, namely to accidentally have the essence?

Fine's own distinction focuses on the difference between the constitutive essence (what I will simply call the essence), and the essential properties that follows as a consequence from the essence. This is largely a logical distinction focused on derivability. In the literature there is also the ontological distinction, from *Categories* 2 (1a20-1b9), between substantial and non-substantial universals, viz. Strawson's sortal universals and characterizing universals [26], viz. Mulligan/Simons/Smith's second substances and non-substantial universals [23], viz. Lowe's kinds and attributes/properties [18]. For instance 'Socrates is a man' says what he is (i.e. his essence), while 'Socrates is white' says how he is (i.e. that he has a certain quality). *Man* is a substantial universal, *White* is a non-substantial universal. To fall under a substantial universal is transitive, such that from adding the premise 'Man is an animal' one can conclude that 'Socrates is an animal' (this would be a mediate essence). However to fall under a non-substantial universal is intransitive, such that from adding the premise 'White is a colour' one cannot conclude that 'Socrates is a colour'. To mark this distinction I will refer to substantial universals as essences, and to non-substantial universals as properties. If one assumes that this is a categorical distinction, then nothing will be both a substantial and a non-substantial universal; in other words nothing will both be an essence and a property. The question then is whether the differentia, which together with the genus constitutes the essence, belongs to a substantial or a non-substantial universal? The

answer is that the differentia belongs to a substantial universal, but the essential properties which the differentia refers to are non-substantial universals. For instance 'Tawny-coloured and black-striped' is part of the differentia of tiger, is a differentiation of the substantial universal *Feline*, and is itself part of a substantial universal (viz. tiger). This corresponds to the constitutive essence, and says what the tiger is. However the essential properties of being tawny-coloured and being black-striped are non-substantial universal. They say something about how the tiger is, what kind of properties it has. One might call this the consequential essence provided that one accepts that it is not a necessary consequence.

At this point I think all the elements of my definition of essence and of essential property have been sufficiently presented, and thus I present my definitions:

> **Essence**$_{df}$: An essence of an object X is the substantial universal expressed by its real definition.
>
> **Essential property**$_{df}$: An object X has a property P essentially iff the property P is explanatory and non-trivial, and P follows from the essence of X.

My definition of essence largely follows the definitions of Fine and Lowe [8], [9], [19]. My definition of essential property incorporates some elements from deRosset [5]. Both definitions are non-modal. Essence is definitionally prior to essential property, since the definition of essential property involves essence. The force of 'follows from' must be taken as a conditional that is weaker than the material conditional, and as somewhere in between logical consequence and causal consequence. The requirement that an essential property be explanatory and non-trivial excludes trivial properties like being self-identical. The requirement that an essential property of an object must follow from that very object's essence excludes the case of the existence of {Socrates} from being essential to Socrates, since the existence of {Socrates} follows from the essence of {Socrates} rather than from the essence of Socrates.

However, let us take a closer look at the connection between the essence and the essential properties that follows from the essence. Remember, the objector grants the case that consequential essence does not entail necessity.

Let us begin with the genus, which together with the differentia composes the real definition, e.g. that the genus of tiger is *Feline*. I take it to be uncontroversial that Tabby the tiger is necessarily a feline. However, it is not uncontroversial that Tabby the tiger necessarily is a tiger.

Cladism, following its founder Willi Hennig, is the theory that a splitting of a species (a speciation event) marks the beginning of two (or more) new species and the 'extinction' of the original species. Cladism might be a reason for denying that Tabby the tiger necessarily is a tiger (i.e. *Panthera tigris*), since the species *Tiger* might at any point split into two separate new species – and thus Tabby could (while retaining all intrinsic properties) cease being a tiger and instead become a tiger-descendant.[5] However, cladism would not preclude Tabby from necessarily being a feline or a mammal, since Tabby would be a descendant of feline and mammal (and belong to the clade of descendants from these) [15, pp. 50-62]. Briefly put, an essentialist and cladist like LaPorte would deny that Tabby necessarily is a member of any species (viz. tiger), but he would not deny that Tabby necessarily is a member of a kind (feline or mammal). For simplicity ignoring cladism, one can say that Tabby necessarily is a tiger. Then feline would be the immediate genus featuring in the definition of tiger. Thus Tabby is also necessarily feline. One can further say that Tabby is necessarily a mammal. Mammal is here a mediate genus [9, pp. 61-62] of Tabby (i.e. a genus of the immediate genus), illustrating that genus/species and constitutive essence is transitive. To conclude, I take it that the genus is on its own sufficient to yield necessary membership to a kind or sort, viz. immediately the genus and mediately the genus of the genus etc. But genus on its own is not sufficient to yield Kripke's other cases of essentiality and necessity, e.g. 'Water is H_2O'.

Prima facie, the differentia seems to give us this. Let us define water as a chemical compound or molecule (i.e. the genus) of two parts hydrogen to one part oxygen (i.e. the differentia). 'Water is H_2O', or more precisely 'Water is essentially composed of H_2O', then simply refers to the differentia. Namely, water necessarily has H_2O as differentia. So far everything is good, and my counterexamples cannot object to this being necessary (assuming that this is the correct definition of water). However, a problem arises if one in addition says that water has the property of being composed of, or reducible to, or identical with H_2O. At least if this is taken to imply that any sample of water will be H_2O – although it seems to be true that most samples of water are in large part composed of H_2O. If one interprets 'Water is H_2O' strictly, then there arise one of the counterexamples mentioned above. Water is essentially H_2O, but even purified water will not only contain H_2O but also H_3O and HO (resulting from autoionization). In addition, normal drinking water will also contain other ions, salts, molecules, etc. It is by no means

necessary that any arbitrary molecule from a portion of water will be H_2O. But I think it is correct to say that water is essentially composed of H_2O.

Similar cases abound in biology. From these cases it is evident that while an animal cannot lose its genus or differentia and yet continue existing, it can lose some of its essential attributes and yet continue existing. Perhaps, as with the case of water, this even includes the essential properties featuring in the differentia. There is a multitude of ways in which the differentia of a species may be conceptualized. One might think that the differentia should be a single constitutive essential property, and that all consequential essential properties are derivative from this single constitutive essential property. Already Aristotle seems to have realized that this is impossible, viz. that more than a single essential property is needed in order to explain all consequential essential properties. For instance for fish there is no single attribute which can count as the differentia [3, pp. 333ff.]. Their mode of locomotion (viz. swimmers) explains some consequential essential properties; their mode of reproduction explains others; and their source of nutrition explains yet others. As a result Aristotle introduced the concept of *bios*, which is an integration of all these various properties [16]. A similar view is found in the contemporary literature; e.g. DeRosset [5] thinks that essence is a totality of the explanatory basic properties, and this seems similar to Aristotle's concept of *bios*.

An approximation to this would be the linguistic practice common in dictionaries of 'defining' by giving a list of properties. E.g. one can 'define' tiger as a large, carnivorous, tawny-coloured and black-striped feline. But a newly born tiger is not large, and an albino-tiger is not tawny-coloured and black-striped. There is no non-carnivorous tiger, but lion is also a carnivorous feline. It might be thought that 'descendent of Panthera' would work as differentia, but this is merely a restatement of the genus and could not differentiate the tiger from the lion. Another option is to give the differentia as 'disposed to interbreed with other tigers', however there are fertile hybrids of tigers and lions [12, pp. 104-114]. Finally, one might suggest that the differentia is 'having genetic makeup x', however the genetic makeup differs considerably among the individuals of a species.[6] There simply are no necessary and sufficient criteria for biological species. In practice the biologist favours the use of a type specimen, which is an arbitrarily chosen individual to which all other members of the species bears a relation of similarity or sameness (for further discussion of this topic [12, pp. 104-114]. To sum up, a

single or a list of essential properties will not do as a real definition of the essence as there will be exceptions.

This discussion indicates that the constitutive essence on its own has a more limited application and interest than what much recent literature has taken it to have. One could say what the essence of e.g. a tiger is, by giving the differentia and the genus, and one can also say what its mediate essence is (e.g. mammal). One could also argue that the essence gives its identity and persistence conditions, viz. it is partly identified in virtue of this essence and it only persists provided it retains this essence. And this will be necessary, and as a consequence also monotonic. However, one cannot say that it will necessarily have any single property – for this one would have to know more than the essence. For instance, to know that it has the attribute of being striped one would have to add that it is not an albino.

Of course, one does not have to take the constitutive essence on its own. One can add the consequential essence, or as I prefer to put it, one can add the essential properties. But these will not hold by necessity solely because they are essential. There is nothing in the essence, no formal trait, which ensures necessity for the essential properties. But through identification of the essential properties one can not only say what qualities a thing has, but one can further say why it has these qualities (viz. as a consequence of a certain essence).

IV Conclusion

In this paper I have, based upon several *prima facie* counterexamples, argued that a property can hold by essentiality and at the same time not hold by necessity. Further, I have applied this point to Fine's distinction between the essence (viz. constitutive essence) and the essential properties (viz. consequential essence).

An essence hold necessarily of an object – if a tiger ceases to be a feline, then *ipso facto* it ceases to be. But, on pain of a regress, the essence will not hold essentially.

Essential properties, in contrast, are not part of the essence, but caused by and explained by reference to the essence. These properties could, as properties, also be held accidentally. Hence it is informative to say that they are in a certain case essential, i.e. a consequence of an essence. Taken in this way, essential properties may or may not be necessary.[7]

Notes

1 Even though there is a close affinity between essence and grounding in recent neo-Aristotelian literature, my counterexamples differ greatly from the counterexamples in the literature against the thesis that grounding is necessary. E.g. the fact that Xanthippe became a widow is grounded in the fact that Socrates died. But Xanthippe could have married someone else. First, the relata for the counterexamples on grounding are all apparently facts, and there is no straightforward translation into talks about essences and essential properties. Second, the grounding-counterexamples say either that further facts must be added if the ground is to necessitate the grounded (e.g. the fact that Xanthippe was Socrates' wife), or that further facts may obtain in other possible worlds such that the grounded fact would not obtain [17, p. 165]. The first type of grounding-counterexamples is vulnerable to the objection that it is then only a partial ground, while the full ground would include the added fact and be necessary [32, p. 478]. The second type is vulnerable to the objection that its possible world is too distinct from the actual world. My counterexamples are not vulnerable to parallel objections, because no addition of extra facts seems to make the essential properties necessary, and because my counterexamples concern the actual world (or one very close to it).

2 An anonymous reviewer suggested to me that what I call 'essential properties' are what Kripke calls 'important properties', which "need not be essential" [13, p. 77]. Kripke's example is that it is an important property of Aristotle that he wrote his philosophical works, but Aristotle could instead have had a different career (say as a doctor). In that case there would be a mere terminological difference between (1) important properties that need not be modally essential, and (2) essential properties that need not be necessary. Kripke's term 'important' leads to the question, important for whom? This subjective implication sits poorly with the examples from biology and chemistry, and therefore I prefer my own terminology (although I do not think the terminology makes for too much of a difference). Besides, the recent non-modal essentialist literature does not make use of Kripke's notion of important properties either, and thus it does not impact my subsequent argumentation.

3 Ellis also attributes such cases to Aristotle [7, p. 10 & p. 14], but he replies that "modern essentialists would not accept such looseness" [7, p.14]. In order to avoid this looseness, viz. the view that essentiality does not imply necessity, Ellis is willing to restrict essences to the, in his view, most basic substances such as atoms, molecules, and subatomic particles. I trust that this is too heavy a price to pay for most modern essentialists.

4 An anonymous reviewer suggested to me that some of these cases build upon vagueness. E.g. featherless and furless are similar to baldness. E.g. Non-alcoholic beer is typically allowed to contain up to 0,5% alcohol. E.g. how high a proportion of H_2O is sufficient for a liquid to be water? However, in all these cases there is a real possibility to be absolutely featherless, furless, to contain no alcohol, and to contain solely H_3O and HO, and in those cases vagueness is a non-issue.

5 The picture is a bit more complex, since the speciation event where one species is split into two new species is gradual. There is no exact moment where this speciation event takes place; rather it is a gradual process taking place over a long time and without any clear boundaries.

6 In fact, Ellis [6, p. 21] draws from this the, to me, absurd conclusion that e.g. humans are not of a single kind with a single essence.

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