



## Historical biological essentialism

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### 1. Introduction

What is it to be a member of a particular taxon? *In virtue of what* is an organism say a *Canis lupus*? What *makes* it one? I take these to be various ways to ask about the ‘essence’, ‘nature’, or ‘identity’ of a particular taxon. The consensus answer in the philosophy of biology, particularly for taxa that are species, is that the essence is not in any way intrinsic to the members but rather is wholly relational, particularly, historical. Thus, in their excellent introduction to the philosophy of biology, *Sex and Death*, Kim Sterelny and Paul Griffiths have this to say: there is ‘close to a consensus in thinking that species are identified by their histories’ (1999, p. 8); ‘the essential properties that make a particular organism a platypus... are historical or relational’ (1999, p. 186). Samir Okasha endorses the consensus, describing it as follows: we ‘identify species in terms of evolutionary history...as particular chunks of the genealogical nexus’ (2002, p. 200).<sup>1</sup> Philosophers of biology like to emphasize just how different their historical essentialism is from the influential views of Saul Kripke (1980) and Hilary Putnam (1975).

Let us call this consensus doctrine ‘*Historical Essentialism*’. It raises two questions. (A) Why believe it? (B) What *precisely* is this wholly relational essence? I shall address these questions in turn.

In ‘Resurrecting Biological Essentialism’ (2008), I rejected the consensus.<sup>2</sup> I presented an argument that there is an intrinsic *component* to a taxon’s essence and responded to the well-known objections to such a view: that it is at odds, first, with the relational nature of species according to current ‘species concepts’<sup>3</sup>; and, second, with the variation and change that are central to Darwinism. Let us call that doctrine, ‘*Partly Intrinsic Essentialism*’.<sup>4</sup> So, my opening response to (A) is that we should *not* believe *Historical Essentialism*. Still I accepted, without argument, that there was also an historical component to a taxon’s essence. Let us call that doctrine, ‘*Partly Historical Essentialism*’. It needs an argument just as does the consensus *Historical Essentialism*. I offer an argument in section 3, analogous to my earlier one for *Partly Intrinsic Essentialism*, and drawing on the literature: the historical component is

required by historical/evolutionary explanations. Clearly, if this argument is good, and if the consensus were right in rejecting *Partly Intrinsic Essentialism*, then the argument would establish *Historical Essentialism*. That ends my discussion of (A).

But most of the paper is concerned with (B). An answer to (B) must be *complete* in that it distinguishes one taxon from another; for example, zebras (*Equus quagga*) from horses (*Equus ferus*); and a species with descendants from its descendants. (I take it that the latter issue does not arise for the higher taxa which can only end when all their descendants are extinct.) And it must be *plausible* in that it posits an essence that can bear the burden of historical/evolutionary explanations. Despite asking around, I have been surprisingly unable to find a worked out complete and plausible answer in the literature.<sup>5</sup> In sections 4–5 I argue against the two answers I have been able to find. The signs are that we should move away from the consensus *Historical Essentialism*.

In ‘Resurrecting’, in accepting that there was an historical component to a taxon’s essence, I aired the suspicion

that even historical explanations demand a partly intrinsic essence; that, for example, the explanation of how polar bears came to be white will ultimately depend on essential intrinsic properties of polar bears and of their grizzly ancestors. (2008, pp. 354–5)

In section 6, I develop this suspicion by arguing that the history relevant to the essence of a taxon is of organisms of a *certain intrinsic kind* evolving into organisms of a *certain other intrinsic kind*, until we reach the taxon in question. The consensus is right that there is an historical *component* to the essence of a taxon - *Partly Historical Essentialism* - but that component requires that there also be an intrinsic component - *Partly Intrinsic Essentialism*. So the essence is not *wholly* relational: *Historical Essentialism* is mistaken.

Why has the dependence of the historical component of the essence on an intrinsic component been missed? I suspect that it is because of the lack of attention to the details of *Historical Essentialism*.

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<sup>1</sup> For others, see Hull (1978), p. 313; Sober (1993), pp. 148–50; Matthen (1998), p. 120; Griffiths (1999), pp. 219–22; Millikan (2000), p. 19; Ereshefsky (2001), p. 209; LaPorte (2004).  
<sup>2</sup> So too do Walsh (2006), Oderberg (2007), Dumsday (2012), Boulter (2012), and Austin (2016). See also, Elder (2008), which has some lines of thought that overlap with some in this paper.

<sup>3</sup> My response emphasized Ernst Mayr’s distinction between ‘the category problem’ and the ‘the taxon problem’ (1982, pp. 253–4). I pointed out that a species concept tells us what it is for a taxon to be a species (rather than a sub-species or genus) and so answers the category problem. This tells us little about what it is for something to be a member of a certain species and hence little about the taxon problem that is our essentialism issue.

<sup>4</sup> For criticisms of this article, see Barker (2010), Ereshefsky (2010), Lewens (2012), Leslie (2013), and Slater (2013), all of whom are part of the consensus. I have responded (2018a).

<sup>5</sup> None of my critics cited in note 4 provide one, for example.

## 2. Clarifications

We need to start by clarifying two matters. First, what are the taxa in question? They are those that are thought to fall under the biological categories in the Linnaean hierarchy of kingdoms, phyla, classes, orders, families, genera, species, and even subspecies. I say ‘thought to fall’ because I sympathize with the doubts of some about this hierarchy; see, for example, Ereshefsky (1999, 2001); Mishler (1999, pp. 307–315). These doubts are often expressed as being about whether a certain Linnaean category - for example, *genus* - ‘exists’ or is ‘real’.<sup>6</sup> This strikes me as a most infelicitous way of expressing the doubts. I have argued that what is really being doubted is whether the category is *explanatory* (Devitt, 2011). But whether or not the categories are explanatory, and hence have a proper place in biological theories, it is quite clear which taxa are thought to fall under them. *Those are the groups that concern our essentialism issue.*<sup>7</sup>

There is an important further point: whether or not the *categories* are explanatory, our working assumption should be that *these taxa*, thought to fall under them, are very largely explanatory. For, these taxa are paradigm ‘natural kinds’, which are, as Philip Kitcher notes, ‘the sets that one picks out in giving explanations’ (1984, p. 132 n. 16). We know from the history of taxonomy that mistakes have been made and they are surely still being made. Still, we should assume that our taxonomy is very largely good and explanatory. Thus, we should assume that *Canis* and *Canis familiaris* are explanatory notions whether or not their being, respectively, about a *genus* and a *species* are explanatory. We are concerned with the essentialism of these presumed explanatory taxa. We need take no position on whether they are properly placed in the Linnaean hierarchy of categories.

Second, taxon essentialism is a *property* or *kind* essentialism.<sup>8</sup> A property *P* is an *essential* property of being an *F* iff anything is an *F* partly in virtue of having *P*. A property *P* is the *essence* of being an *F* iff anything is an *F* in virtue of having *P*. The essence (nature, identity) of being *F* is the sum of its essential properties.<sup>9</sup> Essences can be fully intrinsic; for example, the essence of being gold is having atomic number 79. Essences can be partly intrinsic and partly extrinsic and relational.<sup>10</sup> for example, the essence of being a pencil is partly being an instrument for writing, which an object has in virtue of its relation to human intentions, and partly having the sort of physical constitution that distinguishes it from a pen, which an object has intrinsically. Finally, essences can be fully relational and extrinsic; being Australian is probably an example because it seems that anything - Rupert Murdoch, Phar Lap (a horse), the Sydney Opera House, a bottle of Penfolds' Grange, the expression ‘no worries mate’, and so on - can have the property provided it stands in the right relation to Australia.

Our concern is with the essence of taxa thought to be in any one of the Linnaean categories but discussions of this are dominated by talk of taxa that are thought to be species. I shall go along with that practice.

I turn now to my response to (A).

<sup>6</sup> For example, Ereshefsky (1998), p. 113; Eldredge and Cracraft (1980), p. 327; Sterelny and Griffiths (1999), p. 197.

<sup>7</sup> So it is clear that the concern is *not* with some other biological groups; for example, predators, parasites, females.

<sup>8</sup> Michael Ghiselin (1974) and David Hull (1978) take their view that species are *individuals* and not *kinds* to be an antidote to essentialism. I agree with those like Okasha (2002, pp. 193-4) who think that this individualism is a red herring to the essentialism issue (2008, p. 348). Ingo Brigandt claims that ‘most biologists and philosophers favor the idea that species are individuals rather than natural kinds’ (2009, pp. 77-8). In contrast, a recent survey of the opinions of 193 biologists from over 150 biology departments at universities in the US and the EU (Pušić, Franjević, & Gregorić, 2017) found that, among biologists themselves, the position of individualism is ‘utterly marginal’, only 2.94%.

<sup>9</sup> See Oderberg (2007) for a somewhat different views of essences.

<sup>10</sup> Biological essentialism is often taken to be concerned *only* with what is intrinsic; e.g., Mayr (1963), p. 16; Sober (1993), p. 146; Wilson (1999b), p. 188. I think it more helpful to define essentialism in a more general way so that issues come down to the *sort* of essence. It is then possible that a kind has an historical essence.

## 3. An argument for *Partly Historical Essentialism*

Why believe *Partly Historical Essentialism*? I shall offer an argument, analogous to my earlier two-part argument in ‘Resurrecting’ for *Partly Intrinsic Essentialism* (2008, pp. 351-5). I shall show signs of this analogous argument in the literature.

The first part of that earlier argument concerned the biological generalizations about the phenotypic properties of species and other taxa; generalizations about what they look like, about what they eat, about where they live, about what they prey on and are prey to, about their signals, about their mating habits, and so on. I argued that these generalizations have explanations that advert to an intrinsic underlying, probably largely genetic, property that is part of the essence of the taxon. If we put together each such underlying property that similarly explains a generalization about a taxon, then we have the intrinsic part of its essence. In presenting this argument, I emphasized a distinction, made by Ernst Mayr (1961) and renamed by Philip Kitcher (1984), between ‘structural’ and ‘historical’ explanations.<sup>11</sup> The explanations that featured in the argument were *structural* ones about the underlying developmental mechanisms in members of a taxon that make the generalizations true. Consider this example: ‘Indian rhinos (*Rhinoceros unicornis*) have just one horn. I argued that there has to be something about the very nature of these rhinos that causes them, in their environment, to develop from embryos into animals with one horn. And that something is part of the essence of the rhinos.

But now consider the other side of Mayr’s distinction, *historical* explanations. They tell us how there came to be that taxon in the first place, how it evolved. What *led* to there being taxa with the phenotypic properties that are the subject of the generalizations? In light of the argument from structural explanations to an intrinsic component in a taxon’s essence, we might expect to find an analogous argument from historical explanations to an historical component in the essence. How did it come about that there are Indian rhinos? What explains the existence of these organisms with developmental mechanisms that cause them to have one horn? There has to be something about the rhinos’ evolutionary history that explains this. The ancestors of the rhinos, in their environment, caused the rhinos to evolve with one horn. Having that history is part of the very nature of Indian rhinos, part of their essence. Having a different history caused Black African rhinos (*Diceros bicornis*) to grow two horns and is part of their essence. What is it in these histories, precisely, that constitutes these historical essences? This is question (B), to be considered in the sections to follow.

Why do Indian rhinos have one horn? The question is ambiguous. Understood structurally, it demands an explanation of what it is about each rhino that causes it, in its environment, to grow one horn. Understood historically, it demands an explanation of what caused there to be any animals of this sort, with their one horn, in the first place. The structural explanation yields the intrinsic component of the essence, the historical, the historical.<sup>12</sup>

I take it that Griffiths (1999, pp. 209–228) has an historical explanation in mind when he argues as follows for *Historical Essentialism*. Quoting Darwin’s claim (1859) that ‘unity of type is explained by unity of descent’, Griffiths points out that

there is a well-known Darwinian ground for expecting groups defined by common descent to share morphological and physiological characters...The principle of heredity acts as a sort of inertial force, maintaining organisms in their existing form until some adaptive

<sup>11</sup> Mayr named the first sort of explanation ‘proximate’, the second, ‘ultimate’. Andre Ariew (2003), in a helpful critical discussion of the nature of this distinction, stays with ‘proximate’ for the first sort of explanation but argues persuasively that ‘evolutionary’ is appropriate for the latter. Still, I’m sticking with ‘historical’.

<sup>12</sup> Note that the point is not that a ‘robust explanation’ of why the rhinos have one horn requires both the structural and the historical but that there are two distinct explananda; cf. Ereshefsky (2010), p. 680.

force acts to change that form. This *phylogenetic inertia* is what licenses inductions and explanation of a wide range of properties... using kinds defined purely by common ancestry. (1999, pp. 219–20)

In the second, related, part of my argument for *Partly Intrinsic Essentialism*, I claimed that a taxon's intrinsic essence explains *why* being in the taxon is explanatory:

the generalizations we have been discussing reflect the fact that it is *informative* to know that an organism is a member of a certain species or other taxon: these classifications are 'information stores' (Sterelny & Griffiths, 1999, p. 195). But being a member of a certain taxon is more than informative, it is *explanatory*. Matthen points out that 'many biologists seem committed to the idea that something is striped *because* it is a tiger' (1998, p. 115). And so they should be: the fact that an individual organism is a tiger, an Indian rhino, an ivy plant, or whatever, explains a whole lot about its morphology, physiology, and behavior. (2008, p. 352)

*Why does it?* Because the essential nature of a taxon, to be discovered by biologists, causes its members, in their environment, to have those phenotypic properties. What nature? I argued that if our concerns are structural, so they are with a nature that causes a tiger's development into an organism with those properties, the nature must be intrinsic. But now our concerns are historical, with the nature that led to there being organisms with those developmental mechanisms. The nature that explains that must be historical. For an organism to be a tiger (*Panthera tigris*) is for it to have the historical essence of tigers. Some aspect of the history of tigers, constituting that historical component of their essence, in combination with the environment, brought it about that there are tigers with their stripes and other phenotypic features. That's why being a tiger is explanatory.

In sum, the same historical nature or essence that (partly) makes something a tiger (partly) explains both why tigers are striped and why being a tiger is explanatory.

I take it that Joseph LaPorte is suggesting just that in arguing as follows for *Historical Essentialism*:

A lot is explained by an object's being a polar bear. That it is a polar bear explains why it raises cubs as it does, or why it has extremely dense fur, or why it swims long distances through icy water in search of ice floes .... The polar bear kind is a useful one for providing significant explanations. (2004, p. 19)

I take LaPorte to be claiming that the historical essence of polar bears (*Ursus maritimus*) explains how they came, in their environment, to have their phenotypic features. For objects to be polar bears, they must have a certain history and that history brought it about that these objects have the phenotype properties that they have. That's why being a polar bear is explanatory.

If this two-part argument for *Partly Historical Essentialism* is good, and the consensus were right in rejecting *Partly Intrinsic Essentialism*, then we would have established that the essence of a taxon is *wholly* relational and historical: we would have established *Historical Essentialism*. But if this argument, based on the needs of historical explanations, is good, then how could the earlier argument, based on the needs of structural explanations, not be good? For, the present historical argument, of which we have just seen signs in the consensus literature, is analogous to the earlier intrinsic argument. And if that earlier argument is good, the consensus is not right in rejecting *Partly Intrinsic Essentialism*: *Historical Essentialism* is false.

Sarah-Jane Leslie points out that the traditional argument for biological essentialism 'makes critical use of intuitions' (2013, p. 109). In contrast, the arguments I have just given make critical use of *biological explanations*. Underlying this methodology is the following metaphysics.

Any organism in taxon *T* has certain phenotypic properties *because* it is in *T*; it is *because* an animal is an Indian rhino that it has one horn. So the property that *makes* something an Indian rhino, whether we call

that property an 'essence', 'nature', or whatever, must *cause* that rhino, in its environment, to have one horn; the essence of Indian rhinos must explain the place that certain organisms have in the causal nexus *just because they are Indian rhinos*.<sup>13</sup> Elliott Sober is getting at this with the following demand: an essence 'must be *explanatory*... A species essence will be a causal mechanism that acts on each member of the species, making it the kind of thing that it is'; the essence must explain why the members 'are the way they are' (1980, p. 250). The essence of *T* is whatever property, as a matter of actual fact, plays that causal role in an environment.<sup>14</sup>

That concludes my discussion of question (A). I turn now to (B): What precisely is *Historical Essentialism*? Okasha tells us that species are 'particular chunks of the genealogical nexus' (2002, p. 200). But what exactly does this amount to? I shall start with two hypotheses I have found in the literature. But it is striking how little question (B) has been addressed effectively.

It follows from our answer to question (A), that a *good* answer to question (B) must posit a taxon essence that can carry the burden of historical explanation. That is the crucial 'Sober demand'. We shall see that the wholly relational essences posited by the two hypotheses do not meet the demand. To meet that demand, we need a partly intrinsic essence. *Historical Essentialism* should be abandoned.

#### 4. Hypothesis (1): descended from certain particular actual organisms

We seek an account of the historical essence of a taxon *T*, of the historical properties in virtue of which an organism is a member of *T*. Now, when we think of the history of, say, England or the wheel, we think of a series of particular events involving actual entities, one event leading to another. This leads naturally to the thought that the relevant history of a taxon *T* is a certain part of the history of all actual organisms in 'the tree of life', one organism leading to another in particular reproductive events. Which part of the tree? Here's a suggestion. It's the part that includes the actual organisms that led to *T*: the taxon is identified by its historical origin *in those particular ancestors*, the organisms that constituted its *founder population*. Such an hypothesis certainly seems to be embraced by some philosophers of biology. Thus Mohan Matthen takes an organism to be a member of a particular species in virtue of standing 'in a certain relation (*belonging to the same extended reproductive community*) as the originally ostended individual' (1998, p. 120). And consider the following passages:

if we suppose that humans first appeared about a half million years ago, *Homo sapiens* is the name for the group that descended from the original organisms' (Ruse, 1987, p. 344).

we cannot produce any...*purely qualitative* specification of the essence of a kind like the tiger or the lion. However, if we are allowed to directly refer to particular individuals—e.g. a particular founding population—then we can provide such necessary and sufficient conditions (e.g. to be a tiger is to be descended from *this* ancestral population prior to any further speciation events occurring among the population's descendants). (Leslie, 2013, p. 140 n. 24)

to be of a certain species is to be [diachronically and developmentally continuous] with a stock of creatures from which the species actually evolved (McGinn, 1976, p. 135, p. 135)

<sup>13</sup> This view of essences generalizes to nonbiological kinds. Thus, the essence of gold causes instances of it in its normal environment to be malleable.

<sup>14</sup> This claim should not be confused with the following alternative view: the essence of *T* is the property of causing members of *T* to have their shared phenotypic properties in an environment. Thus, suppose that the property that causes the shared properties in the actual world is *P1* but in another possible world *P2* causes a lot of organisms to share those properties. Then, according to the claim, those organisms with *P2* are not members of *T*; according to the alternative, they would be.

What organisms go into the founder population of a species? In thinking about this we need to keep in mind that there is no precise moment at which one taxon evolves into another. At one time in a lineage there are organisms that are determinately *T1s*, at a later time there are organisms that are determinately *T2s*, and in between there are organisms that are not determinately *T1s* or *T2s*; as Hull says, ‘Obviously...there must have been instances in which non-horses (or borderline horses) gave rise to horses’ (1978, p. 306). I take it that the founder population of *T2* must include, at least, those ancestors of *T2* that are the last determinate members of *T1* among *T2*’s ancestors. Thus, in a common situation, a geographic development isolates some members of *T1* which results, over time, in speciation and *T2*. The founder population of *T2* starts with those isolated members of *T1*. Perhaps it finishes with them? Or perhaps it includes all the intermediate organisms up to and including the first organisms that are determinately members of *T2*? We need take no stand on this.

The following hypothesis captures the core idea we are considering:

**Hypothesis (1).** The essence of *T* is the property of being an organism descended from the particular actual organisms in *T*’s founder population.<sup>15</sup>

Is **Hypothesis (1)** complete? It nicely distinguishes zebras from horses: their founder populations are different. Still, where *T* is a species with a descendant species, more work has to be done to distinguish it from that descendant, for all its organisms are descended from *T*’s founder population. What then marks out the *end of T*? Leslie’s remark about ‘further speciation events’ indicates the way to answer the question. We shall consider this in section 5. Meanwhile, we need not fuss about the incompleteness of **Hypothesis (1)** because it has many other problems.

First, suppose that the founder population for tigers includes a particular animal, Benji, perhaps a tiger. So, according to **Hypothesis (1)**, there would have been no tigers if there had been no Benji. This is not plausible. And the hypothesis gets more implausible if Kripke’s (1980, pp. 112–15) ‘origin essentialism’ is right, as I argue it is (2018b). For, according to Kripke, Benji would not have existed had his actual ancestors not existed. So the hypothesis makes the existence and reproductive role of every one of those ancestors, ‘back to the beginning’, essential to the identity of *Panthera tigris*.

(a) Consider a species *S* that has an organism *O* as a member. As Alex Levine remarks, ‘having *O* as a member isn’t constitutive of *S*’s identity’ (2001, p. 333). LaPorte agrees: ‘a *species* could exist even if many of the particular organisms that happen in fact to belong to that species did not belong to it’ (2003, p. 584). The point is that no one actual organism is essential to a species. And this includes any organism in the founder population (and hence in its ancestry). (b) Furthermore, *S*, including its founder population, could have had members that it did not actually have. Suppose, for example, that an organism, *O1*, that was a member of that founder population but died pregnant. Had *O1* survived just long enough to give birth, there would have been another organism *O2* which might have been part of the founder population of *S*.

These objections to the hypothesis are intuitive but it is important to see that their support is stronger than intuition. Our working assumption is that the identification and naming of taxa in biology is successful in that it serves the purposes of historical and structural explanations

<sup>15</sup> Remarks like the following, arising out of the biological practice of introducing a new species term using a ‘type specimen’, suggested to me (2008, p. 362) that some philosophers of biology might tie an essence to a type specimen: ‘Any organism related to [the type specimen] in the appropriate ways belongs to its species, regardless of how aberrant the type specimen might turn out to be or how dissimilar other organisms may be.’ (Hull, 1978, pp. 311–12). ‘Specify some individual, say Brigham Young, as your reference point, and then members of the same taxon are potential and actual interbreeders ...’ (Ruse, 1987, p. 344, p. 344). But such an essentialism cannot be right because many, presumably most, species don’t have type specimens. So this hypothesis could not be a general account of a species’ essence.

(sec 2). Now suppose that objection (a) was not correct. So, for example, if Benji had not existed there would have been no tigers *even if his absence would have made no evolutionary difference*. All of the other members of the founder population would still have existed and led to a species indistinguishable from *Panthera tigris* but, according to **Hypothesis (1)**, that species would not have been *Panthera tigris*. Suppose next that objection (b) was not correct. Then if the pregnant *O1* had survived and given birth to *O2* which was then part of the founder population of a species, that species would not have been *S* even if it was indistinguishable from *S*. There is surely no explanatory point to identifying species, or indeed any taxa, in this way.

In sum, the founder population of a species might not have had organisms that it actually had and it might have had organisms that it did not actually have.

Second, an essence must be explanatory, as emphasized in section 2. I have argued that an essence of this historical and relational sort is ‘explanatorily hopeless’ in that it could not carry the burden of *structural* explanations (2008, pp. 362–3).<sup>16</sup> Such explanations must show how the essence, along with the environment, cause a tiger to develop stripes. It is no help to be told that it is striped because it is descended from some ur-tiger, Benji, and his associates. That does not tell us why any tiger, including perhaps Benji, is striped. So the essence cannot be *wholly* historical and relational in this way: we need an intrinsic component for structural explanations. But an analogous argument shows that such an historical essence could not carry the burden of *historical* explanations either. So this sort of historical property could not even be the historical *component* of the essence.

The historical explanation sketched in section 3 requires us to show that it is *because of* the historical essence of tigers, because of their history that they evolved to have stripes. That is the crucial Sober demand. Simply being in a population descended from certain animals could not alone explain this. What is the causal relevance to having stripes of simply being descended from Benji and company?<sup>17</sup> In the next section we shall explore the idea that the needed explanation must advert to the fact that tigers evolved from a *particular kind of organism*. That idea seems promising. But there is no promise in the idea that they must have evolved from *any particular organism* of that kind. If this is right, then we should not suppose that biologists, in their drive for explanation, have identified taxa that require descent from particular organisms rather than from particular kinds of organisms. **Hypothesis (1)** is not a good answer to our question (B).

## 5. Hypothesis (2): descended from a certain kind of organism (which itself has a wholly relational essence)

The promising idea is that the historical essence of *T* is its having descended from a certain *kind* of organism not, as in **Hypothesis (1)**, from certain ancestral *individuals*. Consider the following:

‘*Panthera tigris* = df the lineage descending from ancestral population P and terminating in speciation or extinction,’ P being...an appropriate population in the lineage that gave rise to today’s tigers. (LaPorte, 2004, p. 54, p. 54)

a domestic cat...is necessarily a member of the genealogical nexus between the speciation event in which the taxon originated and the speciation event at which it will cease to exist. (Griffiths, 1999, p. 219, p. 219)

You and I are members of *Homo Sapiens*, therefore, because we both

<sup>16</sup> Also, ‘metaphysically’ hopeless in contrast to its possible epistemic utility (2008, 362).

<sup>17</sup> One might argue, and I do (2018b), that Benji has a partly intrinsic individual essence that explains why he is striped (if he is). But how could this explain why Benji’s descendants are striped? Only if that intrinsic property is essential to all tigers. But to suppose this is to abandon *Historical Essentialism*.

belong to the segment of the genealogical nexus which originated in Africa some 300,000 [years] ago (on current estimates), and which has not budded off any daughter species since that point. (Okasha, 2002, pp. 200-1).

Now perhaps these passages should be taken as proposing Hypothesis (1) but I think that they are more charitably understood as proposing that what is essential to a species is that it descended from a certain *kind* of organism rather than from certain individuals. The kind is of those organisms in the prior species that partly, perhaps completely, constitute the founder population.

In thinking about this proposal, we need to keep in mind that, according to the consensus view that we are trying to elucidate, the essences of all taxa are *wholly* relational: *Partly Intrinsic Essentialism* is rejected. So this relational view applies not only to the domestic cat but also to its ancestor species, to the ancestor of that species, and so on back to the beginning of life. Nothing intrinsic about any taxon in that tree of life, or any part of it forming a founder population, is essential; 'it's relations all the way down'. So the core proposal is the following hypothesis:

**Hypothesis (2).** The essence of *T* is the property of being an organism descended from members of a certain different taxon *T\** (where *T\** itself has a wholly relational essence).

Like Hypothesis (1), Hypothesis (2) needs an addition to mark out the end of a species that has a descendant species, and hence to move (2) toward completeness. Set that aside for a moment. Hypothesis (2) fails the completeness test on other grounds as I have, in effect, pointed out in 'Resurrecting':

suppose that species *A* splits into species *B* and *C*, then *B* splits into *D* and *E* and *C* splits into *F* and *G* .... What does [Hypothesis (2)] tell us about the nature of *B*? That *B* is descended from *A* and that *B* is distinct from *C*. And that's what [Hypothesis (2)] tells us ... about the nature of *C* too. So that clearly does not distinguish *B* from *C*. No more does it distinguish *D* and *E* to know that each is descended from *B*, and *F* and *G* to know that each is descended from *C*. Furthermore, since [Hypothesis (2)] does not distinguish *B* from *C* it does nothing to distinguish *D* and *E*, descended from *B*, from *F* and *G*, descended from *C*. (2008, pp. 367-8)

In brief, the hypothesis fails to distinguish zebras from horses.

Related to this incompleteness, Hypothesis (2) is another one that is explanatorily hopeless. It provides nothing that could explain the phenotypic differences between species, nothing that could meet the crucial Sober demand. Partly because of the way a taxon is, partly because of its essence, it has *evolved* to have its phenotypic properties, and each of its members *develops* those properties (in its 'normal' environment). Historical explanations of those evolutionary facts, and structural explanations of those developmental facts, must advert to that essence. But, on Hypothesis (2)'s wholly relational view, there is nothing in the essence that could carry this explanatory burden. Why did tigers evolve to have stripes? It is no answer to say that they descended from *T\**, which has no nature beyond having descended from *T\*\**, which has no nature beyond having descended from *T\*\*\**, and so on. There is nothing in such purely relational natures that has any causal relevance to having stripes or to having any other phenotypic property. Similarly, what explains the development of a striped mature tiger from this unstriped zygote, of a one-horned rhino from that hornless zygote, and so on? A purely relational nature cannot explain that because it does not advert to anything that could cause stripes or horns.<sup>18</sup>

<sup>18</sup> Kevin de Queiroz (1992, 1995) has a suggestion that may appear to add more substance to the historical essence of *T*, but the appearance is an illusion. His proposal for the essence of *Mammalia* is: 'it is logically necessary for an organism to be part of the clade stemming from the most recent common ancestor of horses and echidnas to be a

The demonstrated incompleteness and explanatory inadequacy of Hypothesis (2) are the decisive objections to it. But the hypothesis also has the other completeness problem we mentioned. What addition could be made to mark out effectively the end of a species (with a descendant species)? Suppose that there is a group of organisms *G1* that are all the members of a species *S* at a certain time *t* and *G2* is a group of immediate descendants of *G1* (though not necessarily *all* of its immediate descendants). Now if *G2*'s members are also members of *S* then *S* did not end at *t*. So what has to be the case for *G2*'s members *not* to be members of *S* and hence for *S* to end? Clearly, as some of the quoted passages note, there has to be a *speciation event* between *G1* and *G2*. But then what constitutes a speciation event? I shall explore this vexed question briefly, as it bears on *Historical Essentialism*.

An appealing part of an answer, given by *Partly Intrinsic Essentialism*, is that a speciation event is a change in intrinsic natures: the members of *G2* are *intrinsically different* from the members of *G1*. But *Historical Essentialism* must reject that, giving a wholly relational answer.

A popular relational answer, stemming from Willi Hennig (1966, pp. 207-11) and reflecting the influence of cladism, is that a speciation is a *split of an old species into two new species*. The members of *G2* are not in the same species as the members of *G1* in virtue of *G1* having another group of immediate descendants, *G3*, that is a distinct species from *G2*. In virtue of what are *G2* and *G3* distinct species? We look to a 'species concept' for an answer: perhaps *G2* and *G3* are reproductively isolated; perhaps they occupy different niches.

So the view is that a split of this sort is both necessary and sufficient for a species (with a descendant species) to end. And this seems to be the only somewhat plausible way for *Historical Essentialism* to explain the end of a species in relational terms. Yet it is not that plausible. And it is certainly 'contentious...in evolutionary theory' (Pedroso, 2012, p. 186).

First, the claim that a split is necessary for speciation rules out anagenesis. This is worryingly extreme. Suppose that *Homo sapiens* had evolved from protists without any splits. Then, given the rejection of anagenesis, all the organisms in this lineage would be in the same species. Kitcher aptly notes that 'this strikes many people as counter-intuitive (even insane)' (1989, p. 151). More importantly, the rejection seems at odds with actual taxonomic practice. Taxonomists seem quite ready to contemplate anagenesis (e.g. Heaton, 2016; Kimbel et al., 2006; Strotz & Allen, 2013).

So it seems doubtful that a split is necessary for a species with descendants to go extinct. But, looking at actual taxonomic practices again, it seems doubtful that it is sufficient either. Thus Sterelny remarks: 'Some, perhaps most, evolutionary biologists take speciation to occur only when there have been intrinsic changes' (1999, p. 130). (Sterelny is puzzled by this, given the consensus on *Historical Essentialism*, conjecturing that biologists are influenced by the folk!) And what about the practice of non-evolutionary biologists?<sup>19</sup>

We saw earlier that Hypothesis (2), the most promising wholly relational view of a taxon's essence, fails to distinguish species and,

(footnote continued)

mammal' (1995, p. 224.). LaPorte develops this idea, taking account of the fact that there could have been mammals even if there had not been any horses or echidnas. He gives the name '*G*' to 'the group that happens, as a matter of contingent fact, to be the most recent ancestor common to both the horse and echidna'. The essence of *Mammalia* is then to be 'in *G*, or descended from *G*' (2004, p. 12). The extra substance may seem to come from anchoring *Mammalia* in actual taxa, the horse and the echidna. But the extra depends on the essences of the horse and the echidna. Can the pattern of explanation for *Mammalia* be extended to them? Perhaps, but not much further. Thus, echidnas are a family (*Tachyglossidae*) made up of three genera. So the pattern could explain the essence of echidnas in terms of the genera it led to; and then we could explain each genus, for example the long-beaked echidna (*Zaglossus*), in terms of the species that it led to, for example, the Eastern long-beaked echidna (*Zaglossus bartoni*). But what then? The pattern of explanation for *Mammalia* has no answer. So all the explanations that rest on such an answer fail. We need a new approach to explain the essence of the Eastern long-beaked echidna. And if we had that approach, de Queiroz's proposal would be redundant.

<sup>19</sup> On these practices, see Dupré (2002), p. 82.

relatedly, is explanatorily hopeless. Furthermore, the hypothesis needs an addition to explain how a species (with a descendant species) can end. We have just seen that the popular view that a split is necessary and sufficient for this end is dubious at best.

The signs are that there is no good answer to our question (B): that there is no plausible wholly relational essence that could carry the burden of historical explanation. It looks as if we should abandon *Historical Essentialism*.

### 6. Hypothesis (3): descended from a certain kind of organism with a partly intrinsic essence

The problem with *Hypothesis (2)* is that an historical component to a taxon's essence *requires* an intrinsic component; it needs that component to make the hypothesis complete and plausible. As John Dupré, who rejects essentialism altogether, has aptly remarked,

the phylogenetic criterion must be parasitic on some other, synchronic, principle of taxonomy; (1981, p. 89)

being descended from one of the members of a particular set is no criterion at all unless there is some way of picking out the members of the set. (1993, p. 57)

We must go against the consensus and combine *Partly Historical Essentialism* with *Partly Intrinsic Essentialism*.

The promising idea underlying *Hypothesis (2)* was that the relevant history of taxon *T* is of organisms of one kind evolving into organisms of another kind, until we finally reach *T*. We need to incorporate into this the view that these kinds have partly intrinsic essences<sup>20</sup>

**Hypothesis (3).** The historical component of the essence of *T* is the property of being an organism descended from members of a certain different taxon *T\** where *T\** has certain essential intrinsic underlying properties.

What about the end of *T*? If we allow anagenesis, then that end is marked out solely by the intrinsic component of the essence and so we need say nothing about it in characterizing the historical component. If, on the other hand, and implausibly, anagenesis is rejected, then *Hypothesis (3)* would require an addition capturing that the end of a species that has descendant species is marked out not only intrinsically but also by a split. I shall continue without the addition.

Why believe *Hypothesis (3)*? Why do we have to suppose that *T\**, from which *T* evolved, has a partly intrinsic essence? Because the essence of *T\** must feature in the historical explanation of how *T* evolved, via its founder population, to have the properties it has. We have seen that the mere fact that *T* evolved from *T\**, which in turn evolved from *T\*\**, and so on, does not provide any 'substance' that could carry the explanatory burden of *T*'s essence. It could not meet the crucial Sober demand. We meet that demand with intrinsic properties. Consider the polar bear, for example. As LaPorte points out, its historical essence is supposed to explain how it came to have extremely dense fur (sec 3). That it evolved from *T\** will only explain that if there is something that its founder population inherited from *T\** that is central to the explanation of its having that fur. That something has to have played a crucial role in *causing* the bear's fur. And that something *has to be something intrinsic*. Think also of Stephen J. Gould's lovely story, 'The Panda's Thumb', about another *Carnivora*, the Giant Panda (*Ailuropeda melanoleuca*): the panda's ancestor had a sesamoid bone that evolved into the thumb of the panda. So the crucial feature of the founder population is the part of its intrinsic underlying nature that produced its sesamoid bone and that the panda inherited. The historical explanation of the thumb demands a history that includes an ancestor with that essential feature.

<sup>20</sup> Since there is no precise moment at which one taxon evolves into another, there is some indeterminacy about the intrinsic essence of a taxon (Devitt, 2008, pp. 242-3).

According to *Hypothesis (3)*, an organism is a member of *T* in virtue of having a certain intrinsic underlying property, *P*, as a result of a history of the following sort: *T* evolved from *T\** with a certain different intrinsic underlying property, *Q*, which evolved from *T\*\** with a certain other different intrinsic underlying property, *R*, which evolved...and so on back to the beginning of the tree of life.

*Hypothesis (3)* provides an account of *Partly Historical Essentialism's* historical component, an account that presupposes *Partly Intrinsic Essentialism's* intrinsic component. This yields an account of a taxon's essence that is *complete* in that it distinguishes one taxon from another and plausible in that it can carry the explanatory burden. And *Hypothesis (3)* entails that the wholly relational view urged by the consensus, *Historical Essentialism*, is false.

There are, of course, well-known objections to any sort of intrinsic biological essentialism. I have responded to these (2008, 2018a). If, nonetheless, these objections were effective, then I think we would be left with no complete and plausible account of *Historical Essentialism*.

**Objection:** What about Twin Earth? Suppose that there were a Twin Earth with a qualitatively identical tree of life to that on Earth. So there would be a species on Twin Earth that would be intrinsically identical to our tigers and would have evolved from ancestors and a founder population that were intrinsically identical to the ancestors of our tigers. So they would have the same essence as tigers. Yet, the objection runs, they would not *be* tigers. So *Hypothesis (3)* is not complete after all.

**Reply:** I suggest that there is no matter of fact about whether those Twin-Earth animals are really tigers. Our present taxonomic practices are not geared to yield a determinate answer about such a bizarre possibility. Nor is it clear whether we should modify our taxonomic practices in the face of such a possibility. Although there would probably be a *practical* reason for distinguishing those Twin-Earth animals from our tigers simply because of their different location, it seems doubtful that there would be an *explanatory* reason. But if there were, we should of course distinguish them yielding two species each with an essence tied to its planet. That *Hypothesis (3)* might have to be modified in this way to accommodate this philosophical fantasy strikes me of no interest.

## 7. Conclusion

The consensus view is *Historical Essentialism*: the essence of a taxon, particularly a species, is wholly relational, particularly historical. This raised two questions: (A) Why believe this doctrine? (B) What precisely is this essence?

In addressing (A), I argued that the historical explanation of the phenotypic properties of a taxon demand an essence that has an historical component (sec 3). So, this is an argument for *Partly Historical Essentialism*. The argument draws on the literature and is analogous to one I have given earlier (2008) for the doctrine, rejected by the consensus, that the essence has an intrinsic component. If the consensus were right to reject that doctrine, *Partly Intrinsic Essentialism*, then the argument from historical explanation would be an argument for *Historical Essentialism*. But we should wonder how that argument could be good and yet the analogous one for *Partly Intrinsic Essentialism* not be.

An answer to (B) must be complete in that it distinguishes one taxon from another; for example, zebras from horses. And it must be plausible in that it meets Sober's explanatory demand: the essence must bear the burden of historical explanations of phenotypic properties.

*Hypothesis (1)* is certainly embraced by some philosophers of biology. It is the view that the essence of *T* is the property of being an organism descended from the particular actual organisms in *T*'s founder population (sec 4). But *T* might have evolved from a founder population made up of different particular organisms: that population could have lacked any of the organisms it had and might have had organisms it did not have. Furthermore, the hypothesis fails to satisfy Sober's explanatory demand.

**Hypothesis (2)** is a more promising hypothesis signs of which are to be found in the literature: the essence of *T* is the property of being an organism descended from members of a certain different taxon *T\** (where *T\** itself has a wholly relational essence) (sec 5). But this hypothesis does not pass the completeness test: it fails to distinguish one species from another. Relatedly, it is explanatorily hopeless. Why did tigers evolve to have stripes? It is no answer to say that they descended from *T\**, which has no nature beyond having descended from *T\*\**, which has no nature beyond having descended from *T\*\*\**, and so on. Furthermore, the hypothesis needs an addition to explain how a species (with a descendant species) can end. The popular view that a split is necessary and sufficient for this end is dubious at best.

I conclude that there is no good answer to our question (B) and we should abandon *Historical Essentialism*. Our answer to (A) gives us reason to believe in an essence that has an historical component but it also has an intrinsic one. We should adopt **Hypothesis (3)**: the historical component of the essence of *T* is the property of being an organism descended from members of a certain different taxon *T\** where *T\** has certain essential intrinsic underlying properties (sec 6). The history that constitutes the essence of *T* is of organisms of one underlying intrinsic kind evolving into organisms of another underlying intrinsic kind, via founder populations, until we finally reach *T*. We should combine *Partly Intrinsic Essentialism* with *Partly Historical Essentialism*.

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