

Petter Sandstad (Rostock)

Aristotle on Exceptions to Essences in Biology

Abstract

Exceptions are often cited as a counterargument against formal causation. Against this I argue that Aristotle explicitly allows for exceptions to essences in his biological writings, and that he has a means of explaining them through formal causation – though this means that he has to slightly elaborate on his general case theory from the *Posterior Analytics*, by supplementing it with a special case application in the biological writings. Specifically for Aristotle an essential predication need not be a universal predication. Rather an essential predication is where a property belongs essentially to a species or genus. This essential predication serves a causal and explanatory role, and is not dependent on a corresponding universal predication.

1. Formal cause and predication of essence

Prima facie essence is closely associated with necessity. In *APo.* I 4, 73a21-27 Aristotle says that the object of knowledge *simpliciter* (ἐπιστήμη ἀπλῶς) must be necessary (ἀναγκαῖον), and further that it must hold for all cases (κατὰ παντός), *per se* (καθ' αὐτὸ), and universally (καθόλου). And essences are for Aristotle objects of knowledge *simpliciter*. Further, within analytic philosophy it has been widespread to identify essence with necessity. In this tradition an essential property is a property that necessarily belongs to its subject and where the object would cease to exist without that property (with possible world semantics: that the property belongs to the object in every possible world where the object exists). Kung (1977) convincingly argues that Aristotle did not identify essence with necessity. Aristotle thinks essential properties are explanatory and not all necessary properties are explanatory. Therefore necessity is not a sufficient condition for essence, but only a necessary condition. More recently Fine (1994) has argued that the notion of essence should not be understood modally, and that essence implies necessity but that necessity does not imply essence. E.g. Socrates necessarily belongs to the singleton set containing Socrates, but not essentially; while the singleton set containing Socrates necessarily and essentially contains Socrates.

But if essence entails necessity, then this would exclude the possibility of there being exceptions to essential attributes (of physical objects, not of our descriptions). It could not then be the case that it is in the essence of *a* to be *F*, but that *a* is not necessarily *F*. Yet Aristotle discusses a number of such cases, e.g. why is it that some species of birds can't fly, though it is in the essence of birds to be flyers? Why is the mole blind, though it is part of the essence of footed vivipara to see (and the mole is a footed vivipara)? Why do female deer lack horns, though it is in the essence of deer to be horn-bearing? Why do some humans lack reason, though it is in the essence of man to be rational?¹ In this paper I argue that Aristotle explicitly allows for such exceptions, and that he has a means of coping with them through his formal cause – though this means that he had to slightly elaborate on his theory from the *Posterior Analytics*.

In the *APo.* and his biological writings, as well as throughout his other works, Aristotle develops and defends a model for formal explanation centred on the notions of form (εἶδος) and essence (οὐσία). Through empirical inquiry (ἱστορία) one discovers the attributes, viz. the parts, powers, behaviour, βίος etc. of man, animals, and plants. These are the ὅτι, the *that* which is to be explained. The explanation of these, the διότι, identifies the causes, which is the formal and the teleological cause (which are closely connected),² as well as the material and the efficient. Now the διότι explains the ὅτι by identifying the cause of the ὅτι.³ In this paper I will focus on the formal cause.

The most relevant passages are the discussion in *APo.* I 4-5, and II 14-18 on essential predications and on how to make such a predication at the commensurate and primary universal (πρῶτον καθόλου).⁴ One explains (gives the διότι) of an attribute belonging to a subject (the ὅτι) by reference to a formal cause through 1) identifying the primary universal, i.e. the form where all and only the members of that form possess the attribute, or part, or disposition, etc. that is to be explained. As we will see later in this paper, Aristotle will have to elaborate on this. ‘All’ will in the final statement be ‘usually all’, and ‘universal’ will not in the final statement be ‘ \forall ’ but rather as belonging in the essence. Further, this universal must not be the species of a genus, such that all the members of that genus also possess the attribute that is to be explained. E.g. the attribute of having internal angles equal to

1 For references to Aristotle and discussion of these cases, see sections three to five.

2 Cf. *APo.* I 13 for these terms being used to refer to the *explanans* and *explanandum*. Ross translates the terms respectively as *the fact* and *the reason*.

3 Cf. Bolton (1987), Lennox (1987), and Charles (2000). Charles defends a three-stage-view of 1) an account of what it signifies, 2) its existence viz. the ὅτι, 3) its essence viz. the διότι.

4 Cf. Wilson (1926), Lennox (2001) and (2014a), and Charles (2014).

two right angles is to be predicated to the primary universal *Triangle*, and not its species *Isosceles*, nor its genus *Closed Plane Figure*.⁵ 2) The attribute is either the essence of the primary universal, or it is an essential consequent of the essence (a *proprium*). E.g. it is the essence of man to be rational, but it is an essential consequent of man's essence that he is capable of learning grammar (and this property is idiomatic to man, *Top.* I 5, 102a18-21). 3) The attribute is explained through and grounded in the essence of the primary universal. And the essential predication is itself explained and grounded in the essence, viz. form.

Take an example of this from *De Anima*, namely the tripartite division of the human soul. Note that this is a division in thought and not a division of three parts with separate existence. It is so divided because the attributes of man's soul are to be divided into three groups correlated with three separate forms – viz. three different features of the same form. 1) The nutritive form, which also contains attributes like being mortal, is common to man, animals, and plants, but to none others. The nutritive form is thus the primary universal of e.g. the attribute of being mortal. This attribute thus belongs to man *qua* being a living being (viz. being a possessor of a soul with the nutritive faculty). 2) The sensitive form, which also contains attribute like locomotion, is common to both man and animals. Thus, locomotion is explained through the sensitive form, i.e. man has locomotion *qua* this sensitive form. 3) The rational form belongs to man alone,⁶ and thus this form is the primary universal for his rational faculties, and these faculties belongs to man *qua* man.

2. Exceptions as a possible objection to Aristotelian forms

A possible objection to Aristotle's model for formal explanation is based on the presence of exceptions to essential predications. Notably, this is one of the main objections of Locke to Aristotelian forms (cf. *Essays* III, ch. 3 and 6.). I will show that such exceptions are well known to Aristotle. However, these exceptions are not to be taken as objections to his theory, but rather as clarifications and perhaps even as additional proof for his theory (*ceteris paribus* a theory able to deal with exceptions is preferable to a theory unable to deal with exceptions).

5 Reference to universals I indicate by Capital first letters and italics.

6 This rationality is not of the same form and λόγος as the rationality of the unmoved mover. Therefore rationality belongs both to man and to the unmoved mover, but separately and not together, since they do not share form, as the rationality of the unmoved mover is only equivocally the same. E.g. the unmoved mover does not have νοῦς παθητικός. Cf. *de An.* III 5 and *Metaph.* Λ 7.

As Aristotle does not explicitly meet this objection head on, I will attempt to reconstruct the answer that Aristotle would have given. A condition of adequacy of this answer is that it must be in accordance with his account of formal causation and with what he says on the various cases of exceptions.

Prima facie one would think that exceptions should disprove an essential predication. And if by an essential predication one means a universal predication with the universal quantifier ‘ \forall ’ then this simply means that it belongs to every one without exception. An ‘essential predication’ is the predication of a property that belongs primarily and essentially to a form (καθόλου), in accordance with the model of formal explanation from *APo.* and discussed in the previous section.⁷ A ‘universal predication’ is a positive predication with the universal quantifier, and equivalent to Aristotle’s discussion of the κατὰ παντὸς in *APo.* I 5, 73a28-34. E.g. if one in Euclidean geometry were to find a triangle with internal angles not equal to two right (which is an impossibility), that would disprove both the essential and the universal predication that the internal angles of a triangle equals two right.

A universal predication obviously does not entail an essential predication. E.g. the universal predication ‘everyone in this room has a university degree’ might be true, but it would be absurd for there to be a corresponding essential predication. On the other hand, *prima facie*, an essential predication seems to entail a universal predication. Given this, an exception would refute the universal predication, and thereby since it would not be a universal predication it would also not be an essential predication.

However, Aristotle thinks that there are exceptions in biology that do not disprove an essential predication. Some of these exceptions were mentioned in section one and they are discussed in detail below. It might not prove the essential predication, but it can give further evidence in favour of the essential predication.⁸ And most importantly Aristotle does not think that they disprove the essential predication.

There are a number of kinds of exceptions that are not as problematic as the exceptions mentioned above, and to these a solution can be found more easily. Just think of cases of interference and prevention, where one removes a pre-condition, or a *stimulus*, or adds an interfering agent. E.g. the case where a bird cannot fly because its wings have been clipped, or because it is sleeping, or because it has been drugged, etc. These exceptions present no major difficulty for

7 Ferejohn (2013) suggests the term ‘cathólic predication’ from καθόλου. I find this term unsatisfactory because it is easily confused with the church of the same name.

8 Cf. the old proverb that the exception proves the rule, *exceptio probat regulam in casibus non exceptis*, Bacon (1640) VIII 3, aphorism 17.

the essential predication.⁹ It is not absurd to say that the bird still has the disposition to fly even though it has been drugged (or is asleep) and cannot currently fly, only that the disposition presently cannot be manifested. Or for that matter, that it would have had the disposition if its wings had not been clipped. And it certainly seems true to state the counterfactual ‘if it had not been drugged it could have flown’, and similarly for the other cases. And in the case of a non-permanent prevention, e.g. a drug, the bird will be able to fly again once the effects of the drug are over. Further, for these cases one could add a *ceteris paribus* clause to the essential predication, viz. ‘birds essentially have the power to fly unless that power is interfered with’. These cases do not seem to endanger Aristotle’s essentialism, and are not *prima facie* as paradoxical as the case of e.g. whole species of birds that as such (and not because of an interference) cannot fly.

The really hard cases are where the exception has developed by natural means, according to its nature (to some degree), and are present from birth. For these cases a *ceteris paribus* clause is not satisfactory, the exception endures throughout the whole life of the animal, and a counterfactual cannot be truly stated such that the member of a flightless species of birds (e.g. a penguin) would have been able to fly.

The cases that I will discuss fall into three groups (though these groups are not exclusive and can be conjoined into exceptions to exceptions¹⁰):

- 1) where the exception belongs to the whole species.
- 2) where the ‘exception’ belongs to one gender of the species.
- 3) where the exception belongs to some members of the species only.

3. Type I: Birds that can’t fly and blind moles

Aristotle tells us about species of birds¹¹ that cannot fly *simpliciter*, e.g. the Libyan ostrich¹² and domestic fowls like the chicken. Aristotle was well aware

9 Cf. Lowe (1982) for one possible way of facing such exceptions, and more recently Lowe (2013) 199. Thanks to Stephen Mumford for reminding me on Lowe’s view.

10 Cf. the discussion at the end of section IV.

11 Birds are one of the μέγιστα γένη that Aristotle discusses throughout his biological works, making this example very appropriate. As is well agreed (cf. Balme (1987) 291-312, Pellegrin (1982) and Pellegrin (1987) 313-338), Aristotle does not develop a taxonomy of animals, but instead works with a few major kinds (e.g. birds), under which the species well known to man falls (e.g. hawk, sparrow, etc.).

12 Strictly speaking Aristotle does not classify the Libyan ostrich as a bird, but as a dualizer (ἐπαμφοτερίζειν) with some features connected to the universal *Bird* and some connected to the universal *Quadruped*. Its unbirdlike attributes are not only that it cannot

of this general problem, and I think his solution is convincing. Briefly put, his answer is that exceptions like this do not disprove the essential predication, provided that the exception is explainable in terms of the form (viz. essence) that also explains the essential predication. The essence of birds is that they are flyers¹³, just as for humans it is that they are rational thinkers, and all the parts of birds, their behaviour, their dispositions, etc. are centred around, unified by, and explained by this essence of being a flyer. However, the disposition to fly varies in degrees chiefly with the environment and source of food, i.e. their βίος (way of life)¹⁴: “But some birds are not able to fly,¹⁵ but are heavy – those whose way of life is earthbound and that are fruit-eaters or are swimmers and spend their life around water.” (694a5-8)¹⁶ A βίος is an integration of the proper activities of a species, centred upon its natural habitat (e.g. earthbound), source of nutrition (e.g. fruit-eater) and mode of reproduction. Aristotle integrates and supplements this formal explanation with a material explanation, namely that the nourishment is limited, and the heavy birds use more of the nourishment on the body than on the wings – and *vice versa* for the good flyers. But this explanation is secondary to that of the formal explanation based on the bird’s βίος.

Several other attributes co-vary with that of flying, not surprisingly so since flying is part of the essence of birds. 1) In *HA* I 1, 487b24-31, it is said that good flyers generally tend to have poor feet, and the reader can infer that *pari passu* poor flyers (both swimmers and non-swimmers) have good feet. 2) In *IA* 710a1-710b4 the importance of the tail for directing the flight is emphasized. So that “those birds whose tails are ill-adapted for the purpose just mentioned, peacocks, for example, and domestic fowls and, generally, those birds which are not adapted for flight, cannot keep a straight course.” (710a5-8) Further, some birds com-

fly, but also that it has cloven feet, upper eyelashes, and bald head. However, it has wings and feathers. Cf. *PA* IV 14. Charles (2000) 324 argues that the group of dualizers are merely provisional, and to be eliminated through further study and clarification of definitions, but the orthodox interpretation is that the group of dualizers are not provisional, cf. Preus (1975) and Witt (2012). Provided one is not of the opinion that Aristotle thinks the ostrich to be only a quadruped and not a bird at all, it should not be problematic to take the ostrich as a case of a bird which cannot fly.

13 Cf. *PA* IV 12, 693b12-13 “the ability to fly is in the substantial being of the bird”, as well as *IA* 15, 712b24-29.

14 Cf. Lennox (2001a) 205-223; Lennox (2010a) and (2010b), and Leunissen (2010) 129ff.

15 The Greek here is equivocal, as ‘not able to fly’ (πτητικός) refers both to birds that can’t fly as well as those that fly poorly, cf. Lennox (2001b) 332f.

16 All translations of Aristotle are from the Loeb Library, with exception of *PA*, where I use Lennox (2001b). Also, I use the translation by Platt of the *GA* in *Complete Works* (ed. Barnes).

pensate by using their legs to direct the flight. “The tail is useless in such birds as are not adapted to flight, the porphyrio, for example, and the heron and waterfowls in general; these fly stretching out their feet in place of a tail and use their legs instead of a tail to direct their flight.” (710a12-15) And 3) in *PA* II 13, 657b24-29 he says that poor flyers tend to have poor sight, and *vice versa*: “the crook-taloned birds have sharp vision (for they search for their food from above, which is also why these most of all soar to the heights), while those which are terrestrial and incapable of flight, such as domestic fowl and the like, do not have sharp vision. For nothing related to their way of life requires them to have it.” These passages show us not only the breadth of Aristotle’s discussion of flightless birds, but also his emphasis that the ability to fly as well as *propria* following from this essence varies in degrees. They show conclusively that Aristotle discusses the great variance in bird’s flying-ability, and other attributes dependent on their degree of flying-ability.

In fact, it is central to his biological project that instances of a species under a common genus varies in all their attributes by degree, i.e. by ‘the more and the less’ or by ‘excess and deficiency’.¹⁷ E.g. the beak of a hawk is short and powerful for the eating of flesh, while the beak of a pelican is long and narrow with a pouch for the eating of fish. But they are both bird-beaks or take the case of two shades of red. In contrast if the difference between an instance of one species and another is greater, varying in kind (e.g. the gills of a cod and the lungs of a cow), the similarities are analogical and they will have different essences. On the other hand, accompanying this is also the view that a difference in degree can easily become a difference in kind, e.g. a shade of red and a shade of orange.¹⁸ At some point it becomes a difference in kind, specifically in biology when it goes from being a difference characterized by more and less, to one characterized by analogy. They then differ in kind, and do not share form and essence.

Applying this to our example of non-flying birds, one must argue that non-flying birds are fundamentally different from non-flying four-footed animals, or insects etc. In this respect, non-flying birds are similar to other terrestrial animals, but only analogically so. Now if the disposition varies from the maximum (e.g. being the most excellent flyer) to the minimum (being so poor at flying that one is unable to fly), then the minimum of the disposition is pre-

17 Cf. Lennox (2001a) 160-181.

18 Cf. Wilson (1926) 369-371. Schulz/Johansson (2007) also discusses differences in degree becoming differences in kind, but limit themselves to differences by *fiat*.

cisely the lack of this disposition.¹⁹ But this minimum point of flying is separate from everything else that cannot fly, e.g. a cow. The explanation of a cow not being able to fly is *that it is a cow* (and cows don't fly *qua* cows). In contrast, the explanation of why the ostrich doesn't fly cannot be explained in a similar manner. Rather it is to be explained through the ostrich being a bird, and bird being flyers, as well as the lack of predators and the availability of prey on the ground, viz. by its βίος. Thus the essential predication that birds fly is explained by the form of *Birdness*, viz. the definition of birds as flyers (more precisely as being feather-winged, πτερόν, 490a5-8), yet that form also explains the exception viz. why some species of birds cannot fly. For given its βίος, it would be superfluous for a particular flightless bird to use its limited nourishment for developing stronger wings capable of flight.

Aristotle does discuss a few other cases of exceptions in his biological writings. One case that he is quite fond of is the blind mole:²⁰

Now man and the footed Vivipara, and in addition the blooded Ovipara, all plainly possess all the five [i.e. senses], though there may exceptionally be a single kind which has become stunted, the mole, for example. This animal lacks the sense of sight: it has no visible eyes, but if the skin (which is thick) be removed from the head at the external place where eyes are normally, the eyes are found in an impaired condition, complete with all the parts belonging to genuine eyes: they have the "black," and that which is inside the black, the pupil as it is called, and the fatty part which surrounds it, but these are all smaller than in visible eyes. There is no external sign of these owing to the thickness of the skin, which suggests that in the course of development the natural process was stunted. (HA IV 8, 532b34-533a12.)

Thus, it follows from the form that the footed vivipara have all five senses, yet the mole is a footed vivipara and the mole is blind. But the way that the mole is blind is separate from e.g. the way that plants are blind. It is not in the form of plants to see, and thus it requires no specific explanation. Further, Aristotle notes that the mole has eyes, only that they are underdeveloped and hidden under a thick layer of skin – and this also requires an explanation. I.e. one has the *explanandum* 'why doesn't the mole as a footed vivipara have fully developed eyes', and in addition one has the *explanandum* 'why does the mole have under-

19 My terminology of the 'minimum disposition' is inspired by Barbara Vetter (she prefers 'minimal'). Pace Vetter the minimum disposition is the lack of the disposition, in cases where the disposition still belongs essentially to it. E.g. ostriches still have wings, but wings that are not strong enough for flight (and Aristotle uses the same term, πτηνός, for the wing and for flying). The term 'minimum disposition' allows one to separate the case of the ostrich not being able to fly (it has it as a minimum disposition) from the case of a cow not being able to fly (it has no disposition to fly).

20 Aristotle also discusses the blind mole in HA I 9, 491b27-35 and DA III.1, 425a9-11.

developed eyes covered by thick skin'. Now it is in the form of the mole *qua* footed vivipara to see, but because of its βίος of living under-ground, the nourishment is instead diverted elsewhere and the eyes are underdeveloped. At some point in the development of the mole, its eyes stop developing, and the form (*qua* mole and not *qua* footed vivipara) instead develops a thick layer of skin to cover the eyes. It would be in vain for nature to use nourishment on developing the eyes as they would be of no help to the mole, but instead they would mostly likely be of hindrance. Here the form of the mole does the best possible with the genus *Footed Vivipara*, by stunting the development of the eyes so that the mole is better suited to its βίος.²¹

4. Type II: horn-less female deer

A case where there is an exception belonging to one gender of the species²², is that of the female deer that does not have horns, yet has the essence of horn-bearing:²³

Female deer do not have horns, yet with respect to teeth [i.e. lack of upper front teeth] they are like the males. This is because they are both the same nature, i.e. horn-bearing; but the horns have been taken away from the females because, while they are also useless to the males, the males are harmed less owing to their strength. (*PA* III 2, 664a3-8)

And since the male is stronger and more spirited, in some cases he alone has such parts [e.g. horns], in other cases he more than the female. For those parts which it is necessary for females to have as well, e.g. parts related to nourishment, they *have*, but they have *less*; while those related to none of the necessities, they do not have. It is also on account of this that among the deer, the males have horns, while the females do not. (*PA* III 1, 661b32-662a2)

Thus, the female deer has the form *Horn-Bearer*, yet lacks horns. The explanation is that the female is weaker and has less nourishment than the male, and therefore does not develop horns. Still, like the male deer it has a digestive system suited to its βίος, which means that it does not require its upper front teeth. In the males, the nourishment that would have been used to develop the upper front teeth is instead used to develop the horns. But the female does not have

21 Cf. Lennox (2001a) 167ff. where he discusses the tendency of Aristotle to treat genus as matter. This will be important in our discussion in part VI.

22 Here I mean an exception to the essence of the species, and not any exception – there are many gender-differences that are not exceptions to essence. E.g. male deer having testicles, female deer having ovaries.

23 Cf. Lennox (2001a) 264f. who thinks this case forces “us into *aporia* about teleology” (265), as teleology at best can explain the shedding of the horns, rather than the presence of horns. But I think the presence of horns, and the females lack of horns, can be successfully explained formally (although the teleological explanation might be less successful).

enough nourishment to develop horns, and in addition the female is generally weaker and thus the horns would be more of a hindrance than what they are for the male deer. Here we have the case of an exception to an exception. First it is an exception that four-legged animals lack the upper front teeth, yet this exception allows for the development of horns for the horn-bearing animals. Second, it is an *exception to this exception* that the female deer lacks horns. But this exception to the exception is to be explained by the form *Horn-Bearing*, and the exception of the teeth is again to be explained by the form *Four-Legged Animal* (which for the horn-bearers means that they lack upper front teeth because of their form and βίος). Thus this case illustrates both type I and type II essential exceptions.

5. Type III: Naturals/monsters, viz. humans that lacks reason

Lastly there is the exception among some members of the species. Aristotle in several places (rather offensively) discusses monsters (τέραξ), viz. deformed individuals.²⁴ Among monsters there are the types that are human though they are intellectually deformed, or using the terminology of Locke as he argues against Aristotle's essentialism, the case of 'naturals'. "There are naturals amongst us, that have perfectly our shape, but want reason, and some of them language too." (*Essays*, Book III, Ch. VI, §22) Now the essence of man is reason. Yet there are men with little or no reason. So they lack the disposition to be rational, but they are still humans and still have the essence of humanity. Again, the lack of reason in a stone requires no explanation, at least beyond the fact that it is a stone. On the other hand, the case of naturals requires an explanation, e.g. modification of the essence (viz. the instantiation of the essence) through some deficiency the matter. Or alternatively, it can be

24 Aristotle briefly mentions the problem in *PA* IV 10, 686b21-31, explaining it by being dwarf-like (νανῶδες), i.e. overdevelopment of the upper half of the body, this ill-proportion being caused by lack of heat and too much earthen material. But the account is much abbreviated, and it is not raised as a problem to his theory of forms and formal explanation. Another passage, *GA* IV 3-4, 767b5-773a31, discusses monsters, but what he is here focusing on are physical deformations, without any discussion of potential intellectual deficiencies following from these deformations. Yet it seems there that the monsters still are of the same species as the parents: "For following what has been said, it remains to give the reason for such monsters. If the movement relapse and the material is not controlled, at last there remains what is most universal, that is to say the animal. Then people say that the child has the head of a ram or a bull [...] but they are none of the things they are said to be [...] it is impossible for such a monstrosity to come into existence – I mean one animal in another [...]" (769b11-23) Monsters are also discussed two places in the Peripatetic *Problemata*. First in *Pr.* IV 13, 878a19-22, saying that they "should not be called offspring", *prima facie* contradicting the discussion in *GA*. Second in *Pr.* X 61, a parallel to 770a7-10, saying that monsters are more frequent among animals that give birth to many offspring at once.

explained through reason varying in degrees, from the maximum (e.g. Einstein) to the minimum (the naturals that Locke speaks of).²⁵ And there is nothing problematic about this, as this picture is as we have seen normal for the biological realm.

A different example of this type of essential exceptions, which Aristotle does not discuss, is the case of an eagle born with deformed wings. In nature this eagle would die, but in captivity it could survive. In addition to a material explanation giving the mechanism of the development of the deformation, a formal explanation could be given similar to the explanation of naturals. This formal explanation is that the ability to fly comes in degrees, and although it is essential for the βίος of an eagle to be able to fly well, this essentiality is conditional and not strictly necessary.²⁶ It is necessary if the eagle is to survive as an eagle in nature. But it is not necessary for it to fly well if it is to be an eagle in captivity.

6. A developmental account of exceptions in general

We have seen how exceptions to essential predications can be explained through the form, not only when the exception belongs to the whole species, but also both when it belongs to one gender of the species and when it belongs to some members of the species. All these have been discussed through particular examples. However, a general account is also given in *GA* IV 3:²⁷

Now the peculiar and individual has always more force in generation. Coriscus is both a man and an animal, but his manhood is nearer to what is peculiar to him than is his animal-hood. In generation both the individual and the class are operative, but the individual is the more so of the two, for this is the substance. [...] Now since everything changes not into anything haphazard but into its opposite, therefore also that which is not prevailed over in generation must change and become the opposite, in respect of that particular force in which the generative and moving element has not prevailed. If then it has not prevailed in so far as it is male, the offspring becomes female; if in so far as it is Coriscus or Socrates, the offspring does not resemble the father but the mother. (767b29-768a7)

The reason why the movements relapse is this. The agent is itself acted upon by that on which it acts [...] Sometimes it is altogether more acted upon than acting, so that what is

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- 25 Aristotle discusses rationality among humans varying in degrees, and rather misguidedly thinks the natural slave, the woman, and the child to have rationality of a lower degree than the adult male: “the slave has no deliberative faculty at all; the woman has, but it is without authority, and the child has, but it is immature.” (*Pol.* I 13, 1260a12-15)
- 26 Aristotle discusses conditional necessity (ἀνάγκη ἐξ ὑποθέσεως) in *PA* I 1 639b21-640a10, 642a1-13 and 31-b4, and in *Ph.* II. 9, cf. Cooper (1987) for a discussion.
- 27 In the reading of this chapter I largely follow the interpretation of Balme (1987), Cooper (1988), and Pellegrin (1985). Viz. that only the male transmits form, and that the individual father, e.g. Coriscus, transmits his individual form. For alternative interpretations, challenging one or both of these conclusions, cf. Witt (1985), Henry (2006a), and Gelber (2010).

heating or cooling something else is itself cooled or heated, sometimes having produced no effect, sometimes less than it has itself received. (768b15-23)

This account is hylomorphic, where the matter is a material cause and a partial explanation of the exception (e.g. being female, or in general not having the full form of the father), through the form failing to prevail over the matter. But the most important and active force is the form itself. Here the form acts not only as a formal cause, but also as an efficient cause (it is the active part), as a teleological cause (the form shapes the matter so that it will develop into a fully shaped offspring), and analogously as a partial material cause (if it does not completely prevail over the matter, the form will also be affected – and also, in addition to its individual form (with such properties as the colour of the hair and the shape of the nose) the father also contributes the form male, *Human*, and *Animal*, and Aristotle has a tendency to treat genus as analogous to matter).²⁸ Coriscus gives his form and essence (the primary essence *contra* the secondary essences *Man*, *Animal*, etc.), but unless this form completely prevails over the matter the form itself will change and the son of Coriscus will resemble his mother, or his father's father (or mother's mother), or in the case of monsters the son of Coriscus will resemble an animal (cf. 769b11-23). I.e. if the father's form prevails completely over the matter, then the son will be like the father in every respect (and thus inherit his father's form). If the form, *qua* male, fails to prevail, the offspring will be female. If the form *qua* Coriscus fails to prevail, then it can revert to resemble Coriscus' father, or it can resemble its mother, or its mother's mother (or presumably also its father's mother or its mother's father). Or the form *qua* Coriscus can fail to prevail to such a great extent that it will resemble none of the family, but still it will be a normal human, in which case the form *qua* human still prevails over the matter. Or lastly even the form *qua* human can fail to prevail, in which case the offspring will be a monster.²⁹ In sum, the less the form of the father prevails over the matter, the more the form of the offspring will change. But it will change in a very specific way, namely either by taking up parts of the mother's form, or by becoming less particular and more general – i.e. many of the individual attributes predicated to the form of Coriscus will be changed and what will remain in

28 The form *Animal* is shaped during the process of generation similar to the way that bronze is shaped by the sculptor. Both *Animal* and bronze have what Lennox (2001a), 170 calls “the potential for a number of distinct realizations.” Aristotle discusses genus as matter in *Metaph.* D.6, 8 and 28, I.3 and 7-8, and Z.1. For a discussion of these passages cf. Lennox (2001a), 167-171. See also the debate between Rorty and Grene in Rorty (1973), Grene (1974) and Rorty (1974).

29 Cf. Cooper (1988), 20 for the division of the movement of the form into that of the father, the male, the human, and the animal.

common are the more general, secondary forms. And the more the matter prevails over the form, the more general and universal the form will become.

The mechanism underlying these processes should be understood along the interpretation of Henry (2006b). For each developmental step, there is one potential coming from the father, and another potential coming from the mother. Each of these can again revert to the father's father, etc. *Pace* Henry, I think that one should interpret Aristotle to be saying that the potential coming from the father is the active, the potential from the mother the passive. The answer to why the potential coming from the father is the active is that the $\pi\nu\epsilon\delta\mu\alpha$, a type of heat, which transmits the potential from the father to the offspring, is warmer than the corresponding $\pi\nu\epsilon\delta\mu\alpha$ from the mother. And in *Meteor.* IV heat and cold are the active principles (cf. Lennox 2014b), and thus the more heat the more active it is. Now these potentials are only attempted actualized at the specific time when the embryo develops its appropriate part (e.g. when the eyes are to develop), and all potentials are not actualized from the beginning (with the development of flesh and a heart). The development of the parts proceeds in distinct (but partly overlapping) stages. And at the beginning of each step either a potential from the father or a potential from the mother can be actualized. They are thus rather potentials; and first potentials (e.g. knower of Greek) rather than second potentials (capable of learning Greek). But the movements from the father is more active and therefore the first to be attempted actualized – and if that is unsuccessful it will either revert to the corresponding potential of the father's father, or to the corresponding potential of the mother.

7. Objections to this developmental account

Several objections have been raised against this reading of *GA* IV 3. 1) There is an objection to individual forms, amounting to the objection that it erases the distinction between essential and accidental properties.³⁰ However, Aristotle thinks that properties are essential or accidental *in relation to a form*.³¹ Thus for Coriscus *qua* human properties like eye-colour will be accidental, as it is only in the form *Human* that one has eyes with a colour, and it is not essential that the colour be brown, or blue, or green. But for Coriscus *qua* Coriscus, it might still be in his form that his eyes be blue.

30 Cf. Witt (1985). Cooper (1988), 33-37 is also concerned with this problem, and Cooper excludes the possibility that e.g. eye-colour belongs to the individual form, since Aristotle provides a material explanation of eye-colour in *GA* V.1. Balme (1987) responds to this by saying that the particular eye-colour excludes a teleological explanation and is not in the essence, but still is in the form and can be given a formal explanation.

31 Cf. Henry (2006a), 264.

2) Another objection to individual forms is that they violate Aristotle's definition of the universal and the particular: "I call universal that which is by its nature predicated of a number of things, and particular that which is not; man, for instance, is a universal, Callias a particular." (*Int.* 7, 17a38-b1) However, *GA* IV 3 does in fact offer a way that the individual form of Coriscus can be predicated of a number of things, namely of Coriscus and of the mature son of Coriscus (if the form prevails completely over the matter). And this is what is natural, even though it is uncommon. By nature, the form of Coriscus can be predicated of several (though not at the same time since there will be a generation between them), though it need not in fact be predicated of several.

3) *Prima facie* it is problematic that the form of the father can account for the offspring resembling the mother. Henry (2006a) argues that the mother also contributes form to the offspring, and refers to the discussion of wind-eggs in *GA* II where the mother is said to contribute a vegetative form. But the case of the wind-eggs is one where there is no male contribution of form. I find it highly difficult to see how the female form could fuse with the male form into a third form, and rather than simplifying the passage I find it to be overcomplicating it. Possibly, given Aristotle's tendency to treat genus as analogous to matter, a case could be made that the mother, following the case of wind-eggs, contribute a vegetative form – but a vegetative form analogous to matter. But the offspring's similarity to its mother cannot be explained through a genus (*viz.* *Living Being* as the primary universal or genus to which the vegetative form is essentially predicated), but must be explained through some individual form. And if both the mother and the father each contribute their individual form, then the problem of how these two forms are fused into one seems an insurmountable obstacle. At the same time, Cooper also seems to overcomplicate the issue with his second possibility: "So perhaps Aristotle is thinking that there is in the semen some physically realized representation of the movements of the females he can copulate successfully with (and their ancestors)" (Cooper (1988) 28). His first possibility seems favourable, which amounts to the claim that the male form has a potentiality to be affected by female movements in the matter, in cases where the male form fails to prevail over the matter. This affection changes the form, so that the form goes from male to the opposite *viz.* female, or that the blue eyes of the father change to the brown eyes of the mother. On this reading there is only the one form (transmitted from the father), and it does not posit any mechanism external to the text.

4) Gelber (2010) suggests that individual characteristics are accounted for and caused by movements (*κινήσεις*) from the father and mother, while the form transmitted from the father only accounts for general characteristics. She argues

that these movements are analogous to the tools of the sculptor, while the generic form from the father is the sculptor and the matter from the mother is the bronze. Admittedly, this is a possible reading, but I do not find it a very plausible reading. Her argument assumes that the form of Coriscus is not the cause of the son of Coriscus, but only the cause of an indeterminate man. But this assumption is implausible. And secondly, Gelber only shows that we need not follow the reading of Cooper, as her reading is a possibility, but she does not show that we cannot follow the reading of Cooper. And because Cooper's reading (with some modifications) is more plausible than Gelber's, one should reject the reading of Gelber.

8. Applications of this developmental account to exceptions

Now let us speculatively apply this developmental account to our four cases of exceptions, attempting to integrate Aristotle's discussion of generation in *GA* with his discussion of exceptions.

In the case of the birds that can't fly and the blind mole, what happens is exactly that the form does prevail – the form of the species is the dominating, such that the offspring resembles the father more than it resembles the genus viz. any bird or any footed vivipara. I.e. the offspring of an ostrich has wings that are too small compared to its body, but the genus *Bird* allows a great variance of degree in the size of wings. And similarly, the genus *Footed Vivipara* allows for great variance as to the eyes, but the offspring of the mole resembles the father in having underdeveloped eyes covered by skin.

Remember that this is explained by Aristotle developmentally (and not evolutionary). Aristotle has something like von Baer's law:³² “For e.g. an animal does not become at the same time an animal and a man or a horse or any other particular animal. For the end is developed last, and the peculiar character of the species is the end of the generation in each individual.” (*GA* II 3, 736b2-4) “In generation things are opposed to the way they are in substantial being; for things posterior in generation are prior in nature, and the final stage in generation is

32 Cf. Russell (1916), 14. Von Baer's law states: “1) That the general characters of the big group to which the embryo belongs appear in development earlier than the special characters. [...] 2) The less general structural relations are formed after the more general, and so on until the most special appear. 3) The embryo of any given form, instead of passing through the state of other definite forms, on the contrary separates itself from them. 4) Fundamentally the embryo of a higher animal form never resembles the adult of another animal form, but only its embryo.” (Quoted in Russell (1916) 125f.) The law is a development and strong improvement of the Meckel-Serres law. Von Baer's law was later integrated with the fact of evolution by Haeckel (although in many ways Haeckel is closer to the Meckel-Serres law) giving ‘the biogenetic law’.

primary in nature.” (PA II 1, 646a24-26) The form transmitted from the mole to its offspring contains a step-by-step program whereby the embryo is to develop, much like an automaton that by itself performs a series of complicated movements. At first it develops much like any animal, beginning with the flesh (a uniform material made from the egg-cell) and then the heart (the first non-uniform matter and the first organ). With the heart developed the foetus is said to be the source of its further development, and to have a soul (of a kind). Then it follows a program distinct for footed vivipara, prevailing over the form *Animal*, *inter alia* developing feet and sensory organs including the eyes. However, at some time during the development of the eyes, the form *Mole* prevails over *Footed Vivipara*, and imposes a more specific developmental program on the foetus. Instead of fully developing the eyes, like the other footed vivipara, the mole instead stunts the development of eyes and grows a thick layer of skin to cover the underdeveloped eyes. The mole adapts the matter, viz. the genus *Footed Vivipara*, as well as is possible for it. As it is a footed vivipara it is not possible for it to not develop eyes at all, but the best possible for it is to stunt the development and to cover the eyes with a layer of skin. Within the range of possibilities open for it, this is the best (viz. nature does nothing in vain). In large, this is an explanation like that of a modern evolutionary developmental biologist. This is what is best for it given its βίος and specific form. The same account can be given for the ostrich. In these cases it is explained through the formal and teleological cause, by that form (with the exception) being better for the animal’s βίος.

The same applies with the horn-less female deer – there the matter prevails over the form, changing into a female. I.e. the form of the father deer *qua* male does not prevail over the matter, and the form is changed into the female. And this includes that the male form’s possession of horns changes into the opposite, viz. the female form’s non-possession of horns. Rather than develop horns as a male deer should, this process is stopped by it being female. But still, the aspect of the male form responsible for teeth and the digestive system does prevail over the matter, so that the female deer still lacks upper front teeth. These properties do not depend on the deer *qua* male, but instead *qua* deer, and therefore is not prevented from developing due to the form changing into the female. Likewise, footed vivipara would naturally (as this is what happens with the majority of species) develop upper front teeth, but the form *Horned Animal* prevails over the genus *Footed Vivipara* and stunts the development of the teeth. For the female deer, this is the best possible adaption to its βίος, given that it is a deer and a horned animal.

And lastly in the case of naturals, the matter in so high a degree prevails over the form, that the offspring’s form is changed by it lacking reason, and in-

stead resembling the animal in that regard (while in other regards having human form, and being a human). Here the form of its father and the form *Human*, to some extent, fails to prevail over the matter and the form *Animal*. Rather than develop in the way that a human embryo should, it instead develops some deformation. At the stage of development when faculties of reason should develop, the human form fails to prevail over the matter, and as a result the offspring is a natural. This deformation is within the possible range of the form *Animal*, and in that sense natural rather than supernatural, but at the same time it is most according to nature for the offspring to resemble its father and inherit the form of its father. In all these cases, the explanation is mainly the form (or rather its primary form and secondary forms) itself, though in its interaction with the matter. The cause of the exceptions is mainly internal, not external, through inability of the form to prevail over the matter.

9. Interpreting Aristotle's concept of deformation

This discussion also allows us to understand Aristotle's concept of deformation and deformed species (πεπηρωμένος or ἀνάπηρος).³³ Aristotle tends to view dualizers³⁴ as deformed³⁵; he says the mole is deformed, that the female is deformed, and that monsters are deformed. One interpretation of deformed animals is what Witt calls the cultural interpretation: "it was the result of the intermixing of popular belief with Aristotle's biological theory." (Witt (2012) 88) Following Witt I find this interpretation unsatisfactory. A second interpretation is what Witt calls the numerical/statistical interpretation: "According to Gotthelf, Aristotle calls a kind deformed only relative to a *wider* kind. In other words, the parts, or some of the parts, of the deformed kind do not function as they should, and that just means that the parts do not function as they do in most members of a wider kind to which the deformed kind belongs." (Witt (2012) 89) The third interpretation, suggested by Witt, is the normative/functional interpretation: "(i) the kind does not fully or optimally develop the functional parts that it ought to

33 The concept of deformation is also connected to the concept of species that are warped (διστραμμένος) and species that are incomplete (ἀτελής).

34 Dualizer (ἐπαμφοτερίζειν) e.g. lobsters (*PA* IV 8, 684a32-b1), seals and bats (*PA* IV 13, 697a29-b13, apes (*PA* IV 10, 689b31-34). Also cf. *HA* VIII 2, 589a17-b29 for a general discussion. Cf. also Granger (1987).

35 But not necessarily all dualizers, according to Witt (2012). However, absence of proof that Aristotle calls some dualizers deformed is not proof that Aristotle thought they are not deformed.

have (the mole); or (ii) it does not use the organ or part for its proper function (the lobster).” (Witt (2012) 104) In contrast to Gotthelf, “what is key is not that they are *wider* kinds but that they are exemplary kinds.” (Witt (2012) 105)

I do not think the interpretation of Witt really differs from Gotthelf’s as greatly as Witt herself thinks. Gotthelf says that monsters and females “are defined of course relative to the normal (male) members of their kinds.” (Gotthelf (1985) 39) And one of the points that Gotthelf emphasizes is that “deformity occurs in generation.” (Gotthelf (1985) 40) More precisely, lobsters and other claw-possessors are “out of roughly the same material and follow sufficiently the same plan so that they pass through the same early stages.” (Gotthelf (1985) 40) But Gotthelf says that in the later stages it develops its claws differently, just as the development of the mole’s eyes is stunted. And that is what connects our developmental account of exceptions to the case of deformation.

What I want to suggest as an interpretation, which also connects together Gotthelf with Witt, is that deformation is defined relative to the individual form transmitted by the father to the offspring, and more specifically, to one of the forms be it male, or species or a genus. That which is according to nature is that the offspring should resemble its father, and in so far as it does not resemble its father *qua* Coriscus, or *qua* male, or *qua* human, or *qua* animal, then in that regard and relative to that form it is a deformation. Thus, the ostrich *qua* bird is a deformation because it cannot fly unlike most birds (but *qua* quadruped it is also deformed because it has wings and feathers). The mole *qua* footed vivipara is deformed because it does not have fully developed eyes unlike other footed vivipara, while the mole *qua* mole is not deformed. The female deer, *qua* the form of its father, is deformed because its father is male and has horns. And the natural is deformed *qua* human, because its father is human and has reason. And likewise for other cases of deformation; thus the seal is deformed *qua* quadruped because its feet are fin-like unlike most other quadrupeds, while it is also deformed *qua* sea-animal in e.g. having toes. And the lobster, *qua* claw-possessor, is deformed because unlike other claw-possessors it uses its claws for locomotion or alternatively it is deformed because unlike other claw-possessors its right claw is not in all cases larger than its left.³⁶ But *qua* lobster it is not deformed.

36 Both Gotthelf and Witt take as explanation of the lobster being deformed the fact that it uses its claws for locomotion and not for grasping (which presumably is their natural use). It is not evident that this is the correct interpretation, since the conjunctive *καὶ* might simply indicate that this is an additional idiomatic attribute of the lobster without thereby implying that it is the reason why the lobster is deformed. The emphasis earlier in Aristotle’s discussion is that the lobster, unlike the other species of the claw-possess-

These above-mentioned deformations all refer to stages where a more specific form either prevails or fails to prevail over matter/genus, and where the part concerned is in the essence of the individual form, or species, or a genus. This is why, even though it is in the form of the mole to have underdeveloped eyes, the mole *qua* footed vivipara is deformed, because sight is in the essence of *Footed Vivipara* and the form *Mole* has prevailed over the genus *Footed Vivipara*. This is what makes the cases of exceptions to essence into deformations for Aristotle, even though they are to be explained by the form.

10. Exceptions in biology v. mathematics

We have seen that in biology the complexity of the forms involved allows for exceptions, because the exception itself is explained by this form. In addition, the matter of the substance adds further complexity, by in some cases degenerating and changing the form (viz. the instantiation of the form). In contrast, for Aristotle mathematical objects do not have both form and matter.³⁷ The form is a result of abstraction from the matter and form of particular substances, and mathematical objects only have form. Or alternatively following *Metaph.* N mathematical objects only have intellectual matter. Thus their forms are not subject to degeneration and change of the form through its interaction with matter. Put a different way, the mathematical properties does not include the material (e.g. that the isosceles is made of bronze) nor does it include the changes to the material, and is in this regard unchanging and eternal. For there is no development of mathematical objects, no generation of mathematical objects, no efficient, teleological or material (alternatively formal) cause of mathematical objects. An isosceles no less begets an isosceles than it begets a scalene. Also, since mathematics is the result of abstraction, much of the complexity found in substances perceived is abstracted away.

An argument might be put that mathematics operates with special cases, and that these can be seen as exceptions. E.g. the equilateral triangle is an exception

ing kind which have the right claw largest, randomly has the left or the right largest (independent of gender). Cf. Lennox (2001b), 310 who also notes that the passage is ambiguous. Also cf. *HA* IV 526a11-30.

37 “Thus, for Aristotle, one can say truly that separable objects and mathematical objects exist, but all this statement amounts to – when properly analyzed – is that mathematical properties are truly instantiated in physical objects and, by applying a predicate filter, we can consider these objects as solely instantiating the appropriate properties.” Cf. Lear (1982) 170. Mathematical objects are thus physical objects under a certain intension, allowing one to focus on the physical object’s mathematical properties. But the mathematical object does not exist separate from the physical object.

from every other triangle, in that the sides of an equilateral are all equal. For all other types of triangles this is not the case. Thus the equilateral is a special case. However, the equilateral does not lack any essential attribute belonging to *Triangle*. It has three sides etc., only that for the equilateral these three sides are equal. But everything that applies essentially to an instantiation of *Triangle* applies to an equilateral. Here the essential predication overlaps with the universal predication. What makes special cases in mathematics *special* is that some attribute belongs *in addition* to these cases – it is not that some essential attribute is lacking.

Thus mathematics does not leave room for exceptions, since exceptions require a wide and complex range of variations and differences. Therefore, mathematics does not operate with exceptions to essential predications, and essential predications are therefore in mathematics also universal predications.

11. Conclusion

In summary even though the attribute is essentially predicated, variances in degrees of this attribute within the forms of the kind (the species of the genus) even allow for the form to completely lack the attribute (e.g. flying and the ostrich). This has been shown 1) when the exception belongs to the whole species, 2) when it belongs to one gender of the species, and 3) when it belongs to some members of the species. These exceptions arise through the interaction of the individual form and the matter, as well as the generic forms. With Aristotle's ontological and scientific framework, such exceptions can be explained in a manner not alien to a modern evolutionary developmental biologist.

Finally, a conclusion to be drawn from this is that Aristotle developed and modified his account of essential predication in the *APo.*, specifically for commensurate and primary universals. However, it is not evident how this modification is to be understood. 1) One possibility is to understand it as an historical development of view, where the account in the *APo.* is taken as the more immature view while the account in the biological writings is taken as the more mature view. Thus, as Aristotle became acquainted with exotic animals such as the ostrich through Alexander's campaign or through explorers and travellers, he had to modify his theory in order to explain these animals. Although, this possibility is somewhat implausible given that some flightless birds were readily available to any Grecian, e.g. the domestic chicken. In addition, it is hard to see what evidence could either prove or disprove this thesis. A defence of this historical developmental thesis would therefore be immodest and unconvincing.

2) Another possibility is that the account of essential predication in the *APo.* and the account in the biological writings are two distinct special cases of essential predication, where these two are related through sharing the same structure. I.e. there is one account in mathematics which is exceptionless, and a related but different account in biology which is not exceptionless. This possibility is implausible because of the wide variance of cases discussed in the *APo.* Aristotle discusses cases from not only mathematics (e.g. 2R and triangles), but also subjects such as astronomy (e.g. eclipses in II.8), physics (e.g. thunder in II.8), music (concord in II.2), biology (e.g. breathing in I.13, and horned animals in II.14, and broad-leaved trees in II.16), history (e.g. the Persians going to war against the Athenians in II.11) and medicine (e.g. walking after a meal for digestion in II.11). The *APo.* cannot therefore be presenting an account of essential predication distinct from the exception-prone essential predications found in biology, because the *APo.* explicitly discusses biological cases. It is further implausible that there should be two distinct accounts of essential predication within a single science such as biology.

3) The third and most plausible possibility is that the exception-prone account of essential predication in the biological writings is a special case application, with two modifications, of the general case account in the *APo.* This possibility is not in conflict with the historical developmental thesis, but at the same time it does not assume the historical claim that the account in the *APo.* is earlier and more immature and that the account in the biological writings is later and more mature. A special case application does not have to imply a development and a change of view. E.g. the equilateral is a special case of triangle in that all its sides are equal, but no developmental thesis follows from this special case. Likewise the exception-prone account of essential predication is a special case application of the general account, and not a development of the general account. The general account in the *APo.* is still held to be sound, but it is supplemented by a special case account in the biological writings which is exception-prone.

The two modifications are: 1) The requirement that all ($\pi\acute{\alpha}\nu\tau\omega\varsigma$) the members of the primary universal must have the attribute is modified such that it only requires that all members of the universal *qua* members of the universal should have it, but that they still may lack it *qua* being members of a species of that universal where the form of the species explains the exception (e.g. through its $\beta\acute{\iota}\omicron\varsigma$). They only lack it in a certain sense, while in a different sense they do not lack it: Ostriches still have wings of a sort, moles have underdeveloped eyes, the female deer still lack upper front teeth and possess multiple stomachs, and naturals still can be said to have some reason. Further 2) that the requirement that the attribute must be held essentially ($\kappa\alpha\theta\acute{\omicron}\lambda\omicron\upsilon$) cannot be analyzed by means of

the universal quantifier. Instead, an attribute held essentially should belong primarily to the universal, i.e. to the form (individual, species or genus).

Concluding, exceptions to essence are thus to be explained through the essence itself – or through contravening essences – as not only presupposing the essence but taking the essence as the central *explanans* in explaining the exception. That is why in such cases the exception does not disprove the essential predication.³⁸

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