



Essay

Changing Natures: On Theory and Practice of Breeding in the European Middle Ages

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Abstract: While throughout modern history it has been shown how thoroughly biological discourses were shaped by conceptions originating in the theory and praxis of breeding, for the medieval period similar studies are mostly absent. This paper offers a symmetrical history of theory and praxis of breeding by asking to what extent they shaped medieval conceptions of human ‘race’ and ‘ancestry’ in Europe. For scholarly knowledge of breeding, the analysis relies on Albertus Magnus’ extensive Aristotelian work *De animalibus*. For the practical knowledge of the breeders, scattered indications from the secondary literature are compiled and promising primary sources are outlined for further research. The paper finds that various concepts and practices whose origins are commonly placed in the early modern period were already present in the Middle Ages, including the concept of reproductive heredity and the view that creation diversified over time through reproductive ancestry. Breeding practices, thus, existed before the rise of genetics in modern biology. The medieval conceptions of ‘race’ and ‘ancestry’ underwent conceptual transfers from the non-human into the human sphere, collapsing the qualitative distinction of the two spheres into one quantitatively graded overarching image of nature.

Keywords: history of biology; symmetrical history; medieval breeding; race; ancestry; Aristotelianism; Albertus Magnus; practical knowledge



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1. Introduction

Breeding animals and plants is a fundamental component of modern-day agriculture. To write the history of breeding practices of the European Middle Ages, however, is by no means self-evident. Before Mendel first discovered that traits are inheritable in the 19th century and, thus, laid the foundation of genetics, interfering with the reproductive process of plants and animals to change their natures might well have seemed like an odd pursuit.

It should prick up one’s ears, then, when historians discuss the ‘agricultural domain of animal breeding that was already well known in the ancient and medieval worlds’ (Nirenberg 2009, p. 236). Was there really breeding of plants and animals before genetics? Interestingly, the context in which medievalist David Nirenberg points toward medieval breeding practices is an early instance of the conception of ‘race’. He argues that ‘[t]he topic of medieval knowledge about animal breeding is only now beginning to be studied. [. . .] The well-known contribution of knowledge about animal breeding to the development of biological discourses about evolution in the eighteenth and nineteenth century suggests that for our purposes, the topic would merit further research’ (Nirenberg 2009, p. 251).

With this paper, I aim to take up this research gap by asking to what extent conceptions of human ‘race’ and ‘ancestry’ in the European Middle Ages were influenced by the breeding of animals and plants.

Pursuing this research question is important in light of the conceptual history of the term ‘race’. The term first appeared as *raza* in Castilian sources of the early 15th century to refer to an equine hoof disease, and it was soon taken up by breeders to express what we understand today as a ‘pedigree’ or ‘genealogical table’. The etymology of ‘race’ was also

analysed in this direction—deriving from *haraz/haras*, which means ‘the breeding of horses’ or ‘the stallion’s deposit’ (Nirenberg 2009, p. 248).

Thus, embarking onto the history of theory and praxis of medieval breeding promises to shed light on how conceptions of ‘ancestry’ and ‘race’ first emerged. Additionally, it allows insights into practical agricultural knowledge that, for the most part, escapes the grasp of historical approaches. Shedding light on subaltern knowledge in medieval Europe, consequently, constitutes a significant task of this paper.

A great benefit of conducting this task lies in the fact that I can draw on research with similar approaches that cover later periods, analysing how biological discourses were shaped by conceptions originating in the theory and praxis of breeding. The literature on medieval breeding practices is extraordinarily scarce. The only contemporary historical work devoted entirely to medieval breeding covers horses alone (Gladitz 1997). Apart from that, some contributions on the medieval human–animal relationship dealt with breeding practices in passing (Epstein 2012; Aberth 2013), or at least allowed conclusions to be drawn as to where it might be fruitful to look for them (Teuscher 1998; Giese 2007, 2008, 2010, 2017). For the Early Modern period, historical research connecting knowledge on breeding practices to conceptions of ‘race’ and ‘ancestry’ is more abundant (Russell 1986; Renton 2019). It is when focusing on the 18th and 19th centuries, however, that biological discourses have been scrutinised the most in regard to thinking with ‘race’ and ‘ancestry’ (Orel and Wood 2001; Müller-Wille and Orel 2007; Ratcliff 2007; Wood 2007; Müller-Wille and Rheinberger 2012).

2. Symmetrical History of Breeding

In order to shed light on subaltern knowledge of the Middle Ages, it is crucial to engage with medieval knowledge in its own right without presupposing our own modern scientific knowledge as superior. In doing so, this paper employs the method of a symmetrical history (Arni and Teuscher 2020).

A chief prerequisite of a symmetrical history of breeding is to clarify what exactly we are searching for in the Middle Ages when we discuss ‘breeding’ from a contemporary point of view. In its modern usage, the term encompasses the raising of animals and plants by a human breeder who intervenes in the development of these respective species by interfering with their reproduction in order to optimise them according to the breeder’s needs (Duden 2023).

By applying this concept to a time before the emergence of a biology based on reproduction and heredity, four further research questions arise. First, on the conceptual level, it should be clarified whether an optimisation of creatures—or, even more fundamentally, the mutability of creatures in general—was considered possible. This leads to a second conceptual question: if mutability was conceivable, was human intervention a possible cause for it? Thirdly, it raises the question of whether this eventual mutability was linked to the reproduction of creatures or whether it was entirely different influences that were held responsible for it. Finally, on a practical level, the question arises of whether breeding in the sense of optimisation—irrespective of its conceptual possibility—was practised in the Middle Ages.

The analytical separation between a theoretical and a practical level of breeding implied in these questions will determine the structure of this paper. This is based on the hypothesis that medieval conceptions of ‘race’ and ‘ancestry’ were not homogeneous but rather that decisive differences existed between scholarly traditions and practical knowledge of breeders (Cohen 1993, p. 109).

Identifying these differences can, on the one hand, help to shed light on the two levels themselves—which, in the case of practical knowledge on breeding, already means entering a largely unresearched territory. On the other hand, it could manifest dynamics of knowledge transfers between scholarly and practical knowledge—a field that has proven to be particularly interesting in regard to conceptions of ‘race’ and ‘ancestry’ in later periods (Ratcliff 2007, p. 221).

3. Scholarly Theory—Albertus Magnus

To access the medieval theory of breeding, we will turn to the monumental work *De animalibus* by the Dominican universal scholar Albertus Magnus from the middle of the 13th century. '[I]n the period between Aristotle and the sixteenth century there is no other work which comes close to Albert's in its attempts to provide a descriptive and experimental approach to biological phenomena' (Shaw 1975, p. 56). Albertus Magnus was one of the most influential representatives of the medieval line of thought called 'Aristotelianism.'

This philosophy emerged in Latin Europe in the 12th and 13th centuries. Representatives of Aristotelianism were 'operating under the assumption that nature is intelligent and works towards an end or goal (*telos*)' (Kitchell and Resnick 1999, p. 28). Thus, they assumed that natural phenomena were only understandable through observing nature itself—an assumption strikingly similar to the empiricism of modern-day science.

'Albert both helped to introduce Aristotle's philosophy of science to the medieval world and challenged prevailing conceptions of nature' (Kitchell and Resnick 1999, p. 26). Moreover, Albertus Magnus' work had an enormous influence on later lines of thought both in the Middle Ages and the Renaissance (Kitchell and Resnick 1999, p. 56). With this author, therefore, we have before us an appropriate representative of the medieval scholarly tradition which should serve as an access point to theoretical knowledge about the influence of breeding animals and plants on conceptions of 'race' and 'ancestry'.

3.1. *De animalibus*—Source Criticism

Since *De animalibus* was penned by an author of whom it can be said that it was 'not exaggerate[d] [...] that Albert was in all likelihood the most prolific author of the whole of the Middle Ages' (Kitchell and Resnick 1999, p. 18), it will benefit our interpretation of the source to first acquaint ourselves more closely with his gigantic work—more than 20,000 pages of a manuscript—and the man behind it. Albertus, who is honoured with the epithet *Magnus* ('the Great'), spent his time on Earth from between 1193–1207 to the 15th of November, 1280.

We know little of his origins (which can in itself be read as an indication of the conception of 'ancestry' at the time), however, there are hints that his family belonged to the knighthood (Kitchell and Resnick 1999, p. 4). As a young man, Albertus joined the Dominican Order, which was still relatively new at the time. Under the wing of the Dominicans, he completed his theological studies in Cologne and then embarked on a steep clerical career, beginning as a *lector* in Paris and ending as Provincial of the Order's chapter in Worms. In addition to the tasks that fell to Albertus throughout these positions—for example, the sermon for participation in the last crusade—he wrote countless writings on theology, philosophy, and the contemplation of nature—to such an extent that 'he was criticized by some who claimed that his interest in natural science was excessive' (Kitchell and Resnick 1999, p. 21). One of the objectives of Albertus' extensive activity as an author which he pursued at the request of the Dominican Order was the systematic presentation and interpretation of the works of Aristotle. These had first been translated into Latin via Arabic in the 12th century. Over the course of the 13th century, Aristotelian writings that had been unknown to Latin Europe until then appeared continuously.

De animalibus represented one of Albertus' efforts to integrate such newly translated writings of Aristotle into medieval ontology. Albertus was and remained one of the only scholastics to tackle Aristotle's *De animalibus* and the pseudo-Aristotelian work *De plantis*. For this purpose, he worked with a translation from the Arabic version, which was produced approximately in 1217. In addition to this function as a commentary on Aristotle, Albertus also integrated the literary traditions of the *Physiologus* and the Bestiaries into his *De animalibus*. These different influences are also reflected in the structure of our source, which can be divided into three parts: the first and most extensive part is the commentary on Aristotle (books 1–19), the second part contains the conclusions Albertus draws from his own observation of nature (books 20–21), and the third part functions as a bestiary

(books 22–26). It is not certain when *De animalibus* was written but research suggests a date of composition between 1256 and 1268 (Kitchell and Resnick 1999, p. 35). More than 40 manuscript copies of *De animalibus* survived to this day, most likely including the well-preserved but difficult-to-read manuscript of Albertus Magnus himself. This sheer number points to the widespread reception of the work in the Middle Ages and, thus, to the importance of the author, whose ‘teaching achieved an authority in the schools of Christendom that placed him on a level equal to that of the ancients’ (Kitchell and Resnick 1999, p. 1).

3.2. The Genealogy of Creation?

In order to identify influences of breeding animals and plants concerning the scholar’s conceptions of ‘race’ and ‘ancestry’ in his substantial *De animalibus*, we shall be guided by my four sub-questions. As a first step, this leads us to the hierarchical character of creation. For Albertus Magnus not only wrote *de animalibus* (on animals) in the narrow sense but rather on ‘the body of everything generated.’¹ He presented this body as arranged in a strictly hierarchical manner according to the criterion of ‘perfection’: ‘From these things, then, it is clear that there can be no more perfect animal than a human’² [...] ‘Every other animal, however, lacks something according to more or less, and a defect arises from the lack of something pertaining to perfection.’³

The human that we find here not only implicitly mentioned as one creature among many but moreover explicitly counted as an animal stood at the upper end of the hierarchy of creation. That Albertus granted perfection only to humans is remarkable, for he thereby portrayed the rest of ‘God’s work’ as imperfect.⁴ At this point, the question arises of whether an eventual optimisation of animals and plants in this ontology would mean bringing them closer to human beings. Albertus’ depiction of the creatures following directly after humans in the hierarchy of creation could speak in favour of this: ‘Some, moreover, flourish so much in the instruction of hearing that they even seem to signify their intentions to one another, as does the pygmy, which speaks, although it is an irrational animal, nevertheless. For this reason the pygmy seems to be the most perfect animal, in terms of animal virtues, after the human.’⁵ [...] ‘Still, monkeys more than other animals seem to have this sagacity: they are capable of instruction from sensibles.’⁶ [...] ‘And this is the reason that these genres of animals are called ‘human likenesses’.’⁷

The high rank of the pygmies (which today we credit to fables rather than to creation (Friedrich 2009)) and the monkeys were granted to them due to their capacity to be disciplined by humans. We can understand this form of optimisation as a non-reproductive form of breeding, which started only after the birth of a creature and was an explicitly feasible practice for humans. The question of whether in addition to this non-reproductive optimisation, reproductive optimisation was also considered possible, becomes clearer if we follow the hierarchy to its lowest end: ‘Those animals, however, which seem to be imperfect throughout their genus [...] are certain genres of vermin, like those which we call earthworms [...] Avicenna opines that eels are generated from these [...] And if this is true, then it is necessary that these creatures are the material seeds and eggs, as it were, for the generation of eels.’⁸

Here, we are confronted with a conception of ‘ancestry’ that clearly implies the mutability of creatures: Eels originated from earthworms. Remarkably, to integrate this view of Avicenna into his ontology, Albertus invoked the theme of reproduction. This conceptual linking of reproductive ancestry with the hierarchy of creation urges us to reflect on the temporal dimension of creation: Was it a singular act that could be taxonomically represented in its completeness, or rather an ongoing process that could be read as a genealogy? For eels, at least, Albertus seems to have tended towards the latter. This is remarkable because the translation of the order of species into a sequence and, thus, into the dimension of time is regarded by current research as the essential conceptual innovation of the 18th century toward modern biology (Klapisch-Zuber 1991, p. 122f.; Weigel 2006, p. 212; Ratcliff

2007, p. 221). To verify this finding, it is crucial to check whether Albertus' other taxonomic units were presented as stable over time.

By focusing on his taxonomic units, the author's conception of 'race' comes into play. The terms he uses to order creation are 'genus' and 'species': 'We must now understand that these powers, divided from each other according to being and subject, constitute the *differentia* of genus and species among those beings which are animate. [. . .] we see that the bodies of plants [. . .] belong to an entirely different genus than that of animals [. . .] In the same way it is also clear that animals differ from one another in species.'⁹

Following medievalist David Nirenberg in the assumption that we can analyse any division ascribed to biology and reproduction as 'race', we could settle these lines as Albertus' conception of 'race' (Nirenberg 2009, p. 235). However, he added a few thoughts, specifically in regard to the taxonomic order of human beings: 'He therefore differs in more than species from the brutes and he seems to have a certain difference in kind [*genus*] over them [. . .] If, however, someone should object that a genus encompasses many species and that thus a human ought to have many species, it will carry no weight.'¹⁰

Even if we accept 'species' as a medieval conception of 'race', Albertus Magnus explicitly excluded humans from any further taxonomic subdivision. Interestingly, he justified the special position of humans by classifying them as a genus (rather than a species). Consequently, our results on the mutability of creatures through breeding can only be applied to human beings if not only species but also entire genera are found to be unstable over time.

3.3. Monstrous Inheritance

Since Albertus Magnus linked the question of the stability of species and genera over time with the theme of reproduction, we should take into account a concept usually only considered relevant for conceptions of 'ancestry' as of the 18th century: heredity (Müller-Wille and Rheinberger 2012, p. 41). Contrary to this conventional view of research, the 13th-century scholar actually reflected extensively on the relationship between 'ancestry' and 'heredity': 'The cause of resemblance of the young to its father or mother or to one of its ancestors, as well as the cause of any lack of resemblance to them, is also derived from these causes. [. . .] The reason for all these things is taken from the harmonic proportion of the complexion of the sperm to the nature of the conceived and vice versa'.¹¹

Albertus assumed here that genera and species remained stable over time if it was the case that, at the time of reproduction, the sperm 'prevails and bounds perfectly, due either to the power of the sperm considered in and of itself, or because it is reduced through age to a tempered state, or for some other reason.'¹²

In regard to my question on the possibility of human intervention in the reproductive mutability of animals and plants, these lines open up the interesting perspective that under different conditions, sperm produced offspring with a different degree of resemblance to the father. These conditions—such as the age of the father at the time of reproduction mentioned here—were controllable by humans and could, thus, have represented a practice of breeding.

Important in light of an eventual optimisation of species and genera is that in the above statement, Albertus perceived these practices of breeding as positive only if they brought about the greatest possible resemblance to the parents. In this ontology, therefore, breeding practices that brought about change represented less of an 'optimisation' as opposed to a degeneration.

An additional contrast to the 18th-century concept of optimisation can be found in Albertus' ideas on ancestry encompassing heredity. The optimisation of the 18th century, which was 'known as 'grading' or 'grading up', was based on a *proportionate* concept of heredity, as a fraction of the blood. It probably had a long history' (Wood 2007, p. 231). Certainly, this long history does not go back to Albertus Magnus, who argued against the view that heredity resulted from a proportional mixing of paternal and maternal predispositions and instead advocated a competition between the sexes for heredity.¹³

Which parent would win the competition was unpredictable in this logic. However, through the choice of a strong father and a weak mother, human beings could, again, potentially promote the conditions favouring the preferred ancestry.

Yet, another factor of heredity remained standing: ‘Sometimes, it will not only be male like the father [. . .] but it has a resemblance with respect to genealogy. In this way, some resemble their near parents and some their remote. This generation of resemblance occurs when generation is accomplished in an essential and not in an accidental way. [. . .] For the power of the ancestors is in the members of the great grandchildren up to the fourth generation and occasionally further. [. . .] The power of the ancestors is thus present potentially in the bodies of those generating and when it is helped by resemblance either of food or of place, it functions in actuality.’¹⁴

These lines provide us with answers to several of my questions: First, they clearly show that the conception of ‘ancestry’ encompassing heredity linked creatures to their genealogy. Secondly, it clarifies the third sub-question of whether the mutability of creatures was linked to their reproduction or whether it was entirely different influences that were held responsible for it; it was not a question of either-or but of both-and. For our scholar, reproduction created a potential for stable offspring through heredity. However, this potential could only be fully realised if, in addition to ancestry encompassing heredity, the food and locality of the offspring remained the same. Soil—as the common denominator of food and locality—did not produce stable species over time per se (an idea we will encounter in the section on practical knowledge) but only if, additionally, ancestry encompassing heredity was in place.

Strange and all the more fascinating about this ontology, which appears modern in so many respects, is the finding that, for Albertus, in contrast to the 18th century, it was precisely *not* this ancestry encompassing heredity that represented the origin of the diversity of creation. Nor was it the Christian God whom the scholar named as its origin. Instead, he located the origin of the diversity of creation in ancestry *without* heredity: ‘Perhaps that which has been stated is the only cause of diversity, namely, that that which is generated by something else does not take on a likeness of one of its ancestors due to being related to it.’¹⁵

The most fundamental conclusion that this sentence allows us to draw is simultaneously the answer to my first sub-question: a mutability of creatures was considered possible. The fact that it was mentioned here by Albertus as the *sole* cause of diversity suggests that we are indeed dealing with a genealogy of creation. However, as stated above, he did not conceptualise this change as an optimisation but as a degeneration.

It was nature that he placed as the origin of the diversity of creation. For nature acted as the creator of those beings that exhibited an ancestry *without* heredity: ‘Sometimes too they resemble neither of their parents but still preserve the shape of the species in that they are humans. But at other times they do not even retain a human shape or that of those that generated them, but take on instead a monstrous and wondrous form. An offspring which is in no way like its parent, either in the nature of the species or individual shape, is monstrous and is called a wonder of nature.’¹⁶

Thus, it was monsters that through the non-existence of an inheritance contributed to the (degenerative) diversification of creation over time. With regard to practices of breeding, this means: Mutability should have been possible, but always resulted in monsters. Such a breeding of monsters was hardly predictable because change did not result from rules but from exceptions.

Whether these results imply that human beings disposed over mutability through a lack of ancestry as well—perhaps allowing for breeding into different ‘races’—must be examined in light of the mutability of genera rather than species, as seen above. Albertus had a clear answer to this: ‘At still other times it is not to the species, but is only to the genus of animal. It keeps this resemblance at a minimum, for no animal is found which has ever given birth to a plant or a stone, but at a minimum the genus is preserved in all things

which are generated.¹⁷ Since human beings were conceptualised as a genus in their own right, a stable ancestry of humanity was sacrosanct.

3.4. *The Lesson of the Hawks*

Turning towards breeding practices in which human interventions were possible, leads us, finally, to Albertus' bestiary. We will approach this bestiary through Albertus' reflections on hawks, which are the most frequently translated part of *De animalibus*, for they were used as a manual on falconry throughout the remainder of the Middle Ages (Kitchell and Resnick 1999, p. 33).

These practically applied pages of Albertus are interesting with regard to our results on the theoretical knowledge of the scholarly tradition, because they seem to contradict all the statements given above. For example, as he tried to explain the variety of hawk species (of which he distinguished 17)¹⁸: 'Since any one of these genuses can be interbred with any other, many genuses of falcons are created. [. . .] The peregrine falcon often interbreeds with the one with hyacinth-blue feet [. . .] The young which is produced reflects the father, although a bit of the azure color is scattered over its feet. [. . .] Their seeds become mixed and they move, change, and complete each other.'¹⁹

In these few lines, Albertus Magnus contradicted, on the one hand, his previously lengthy differentiation between species and genera, on the other hand, his view, defended at length against other authors, that offspring can only ever inherit the dispositions of *one* parent and, finally, even his fundamental view that the origin of the diversity of creatures lies precisely *not* in heredity.

Instead of all this, he introduced a completely new concept: *permiscere*, to mix, which was translated into English as 'to interbreed', and which we could interpret in the passive form *permiscetur* used here as the source term for 'to breed'. Albertus made it particularly clear, that he regarded this newly introduced concept of mixing as the main cause of the diversity of the hawks, and not the influences of locality that he had previously mentioned: 'Although we have said that four genuses of such interbreedings of falcons have come down to us, reason demands that there are many and that more genuses of falcons can be formed on a daily basis. We think this is why such diverse genuses of falcons are found in diverse regions. For while climata can diversify the behaviors and colors of animals, it is the interbreeding of which we spoke that especially causes the diversity among species so similar. This is just as we have seen happen in the genuses of geese, dogs, and horses in our time.'²⁰

These words of Albertus seem as if his empirical observations of real hawks had taught him to deviate from his theoretical knowledge as a scholar and to replace it with knowledge that could be experienced practically. This was all the more so as he extended the application of these lessons of the hawks to geese, dogs, and horses, the diversification of which he himself had witnessed 'in his time'. It does not seem implausible that this statement by Albertus Magnus points to a direct influence of practical knowledge from breeders (Wood 2007, p. 230)—a possible transfer of knowledge, whose starting point deserves a closer evaluation.

4. Breeders' Practice—A Research Outlook

Should we interpret the possible influence of practical knowledge from breeders on Albertus Magnus in the direction that the medieval theory and praxis of breeding were not so different after all? Whether these two forms of knowledge stood in an exchange with each other or were decisively distinct—which would hardly be directly reflected in the scholarly sources but might surface in descriptions of concrete practices (Teuscher 1998, p. 359)—it is clear in any case that the practices of breeding themselves are largely unknown to contemporary research. In the following, I aim to compile the scattered information on medieval breeding practices, specifically in light of connections to conceptions of 'race' and 'ancestry'. In particular, I will propose promising sources for further research in the field.

4.1. The Identity of the Breeders

The first step in our search for medieval practices of breeding must be to consider *who* practised the breeding of animals and plants in the first place. The most obvious guess from today's point of view is the farmers: 'how for thousands of years rural people outside books had found another way to make like produce like' (Epstein 2012, p. 25).

It is, thus, surprising to learn of incidents such as the revolt of the secret peasants' league *Armer Konrad*, which started out in certain villages as a peasant plundering campaign against so-called 'dog houses' (Teuscher 1998, p. 363). These dog houses—which present likely spaces of breeding practices—were not under the control of the peasant population until the late Middle Ages and the early modern period (Giese 2010, p. 117). Instead, we encounter the two estates of the clergy and the nobles as actors in breeding and keeping dogs.

For instance, the so-called *Hundsaußstockung* (dog increasing)—a source term worthy of follow-up research—was subordinate to monasteries and *Stifte* from the 8th century onwards by the decree of Charlemagne (Giese 2010, p. 114). The medievalist Martina Giese points out the remarkability of encountering the keeping and breeding of dogs in monasteries of all places (Giese 2010, p. 110). Just as remarkable is the fact that legal regulation of breeding was apparently of interest to medieval authorities. In the 12th century still 'planned breeding policies of the French kings' were being developed (Gladitz 1997, p. 141).

What is intriguing about this revised perspective on the identity of the breeders is the implied shift of source material to a field more promising for finding breeding practices. The focus now lies on the service law of cathedrals (Giese 2010, p. 115f.), correspondences between clergymen (Giese 2017, p. 234), and treatises of monastery dog and sow servants (Giese 2010, p. 119). This is a genre, where we find, for instance, a manual titled *Wie man jûng laithûndt sol ziechen* (How to breed/raise young lead dogs) by a Peter Zaler discussing the mating of dogs, which suggests specialisation of dog and sow servants specifically in breeding (opposed to one in educating) and provides us with the interesting source term *ziechen* (to breed/raise) as worthy of further investigation (Giese 2010). Furthermore, urban histories hold good prospects for future research, as, in some cases, local dog keeping was recorded quantitatively (Giese 2010, p. 115). In addition, legislation on breeding practices and the resulting surveys of royal and knightly studs (Gladitz 1997, p. 165ff.) might prove fruitful sources. An interesting starting point for further investigation might be found in *The Chronicles of the Royal Borough of Woodstock*, published in the 19th century (Ballard 1896). For the Anglo-Saxon area, so-called 'administrative rolls' are an interesting prospect in general. For Prussia, the archives of the studs of the Teutonic Order should be revisited for questions on medieval breeding (Rûnger 1925).

Furthermore, our revised notion of the identity of medieval breeders is significant regarding the finding that the actors of practical and theoretical knowledge of breeding do not seem to have been so far apart from each other—certainly not spatially, if not socially, either. This could imply a direct influence of breeding practices on the conceptions of 'race' and 'ancestry' of the nobles.

That a conceptual link existed between the breeding of animals and plants and the 'breeding' of humans, is suggested by several findings. For example, '[t]he Teutonic knights attached great importance to heredity and line-breeding' (Gladitz 1997, p. 201f.) of their horses. Furthermore, the advocates of the principle of 'nobility by blood' (the view that nobility was acquirable solely by inheritance through blood) based their argumentation on the 'literature on the breeding of dogs and falcons' (Müller-Wille and Rheinberger 2012, p. 48). An interesting source for further investigating this conceptual link can be found in a popular manual on equine care from approximately 1430 by Manuel Dies that was later taken up by Alonso de Cartagena as an argument for a 'deep heritability' of nobility (Nirenberg 2009, p. 259).

On this basis, the process of ennoblement (as well as its opposite) can be analysed as 'mutability': in the sense of a mobility contingent to ancestry allowing for advancement

(or descent) on the hierarchy of creation, which at its upper end merged into the social hierarchy of the order of estates (Freedman 2002, p. 38f.).

This outlook brings the question of whether not only noble conceptions of ‘ancestry’ were merging from the non-human into the human tier of creation but also noble conceptions of ‘race’. For the non-human tier, so-called ‘dog taxonomies,’ can be named as representative of noble conceptions of ‘race’ (Teuscher 1998, p. 354). If these conceptions merged into the upper tier of creation, should we—taking the perspective of the nobles—understand ‘estates’ as human ‘pseudo species’ (Schlee 2007, p. 270) and, thus, as a conception of ‘race’?

Interestingly, for the early modern period, we know of similar conceptual transfers between human and non-human spheres: The conception of ‘race’ was first introduced into early modern breeding practices by a nobleman, who ‘used many words derived from the language of noble genealogies, such as ‘offspring’ (*postérité*), ‘head of the tree’, ‘branches of the same house’, and ‘genealogical tree’ (Ratcliff 2007, p. 218).

For the Middle Ages, the existence of such a conceptual transfer of the conception of ‘race’ could cast a quite different light on academic debates explicitly comparing the classification of nobles to one of dogs: ‘At the university of Paris, for example, a number of satirical arguments pursued the question of whether noblemen, like the races of some dogs, were characterized by long ears’ (Müller-Wille and Rheinberger 2012, p. 58).

4.2. Practices of Breeding

To finally turn to the concrete breeding practices that are likely to have shaped medieval conceptions of ‘race’ and ‘ancestry’, we first have to answer my fourth sub-question: was breeding in the sense of optimisation—irrespective of its conceptual possibility—actually practiced in the Middle Ages?

According to Charles Gladitz, the answer is relatively simple: ‘In the periods with which the present work is concerned [the Middle Ages] there was, at least sporadically, an intentional application of controlled breeding for a variety of purposes’ (Gladitz 1997, p. 21f.).

Such purposes will have mainly included the functions of animals and plants in regard to human usage because the functions for human usage presented the main criterion for subdividing animals and plants into ‘species’ (Atran 1990, p. 33; Teuscher 1998, p. 354). However, phenotypes as well seem to have been considered normative goals of breeding selection (Teuscher 1998, p. 355). This is evidenced by a certificate recording the obligation of a monastery to deliver two phenotypically identical dogs to the authorities (Giese 2010, p. 119).

It is misguided, however, to infer on this basis that breeding practices depended on the reproductive heredity of external features. Even though phenotypes, as already noted for Albertus Magnus, seem to have been associated with the act of procreation during mating, it was mostly the circumstances of this act that were considered relevant: the age of the parents, as well as their health or even their emotional state (Gladitz 1997, p. 178ff.).

In addition, phenotypes were not conceptualised as stable but rather as malleable by external influences during the lifespan of an individual.²¹ Thus, medieval breeding practices should rather be searched in the provision of optimal conditions—both for expecting parents and for the offspring themselves—rather than in human manipulation of reproduction.

Given that the existence of breeding for phenotypes implied no reference to the ‘ancestry’ or ‘race’ of those being bred, we should finally turn to breeding practices where an influence on conceptions of ‘race’ and ‘ancestry’ seems more likely. This brings us back to a view we have already encountered regarding the theoretical knowledge of breeding: over time, shared soil leads to stable species through uniform food and locality.

Similar views have been accounted for by anthropology for various ontologies: in the case of the Hagen people of Papua New Guinea, for instance, ‘[t]erritory is soil upon which people are grown and a common source of sustenance produces in people a common social

identity' (Strathern 1980, p. 195). Similar views have been attested for the Amerindian indigenous peoples of the Amazon (Viveiros de Castro 2013) and for the Rofaifo of Papua New Guinea (Atran 1990, p. 75). 'Comparable views were probably expressed in the Middle Ages, since they were rigorously refuted by academics such as Thomas Aquinas' (Teuscher 2013, p. 86).

Against this background, I will point to three groups of breeding practices that I consider likely to provide us with promising sources for my research question. The first group consists of practises of commensality. The diet of animals, demonstrably, played a major role in medieval breeding (Gladitz 1997, p. 179; Giese 2010, p. 128). Consequently, it seems quite possible that these views on breeding may have shaped conceptions of 'race' and 'ancestry' to include an understanding of shared food as building a common substance. The establishment of 'race' and 'ancestry' would, thus, not be restricted to the reproductive act but would happen gradually and cumulatively through a common diet (Schlee and Trillmich 2007, p. 386).

The second group encompasses practices of sharing a common land. Commons might have had a crucial impact on conceptions of 'ancestry' and 'race': 'uncertainties could arise about the siring of the offspring in the absence of adequate controls, and disputes about the ownership of stock where several owners were involved' (Gladitz 1997, p. 170). Questioning sources of such disputes as to whether argumentations relied on conceptions of 'ancestry' seems like a very promising endeavour. In particular, the question of whether some form of testing was practised to check the ancestry of animals kept on common land could be extremely fruitful for an investigation of conceptions of 'ancestry' (Lane 1980, p. 20; Gladitz 1997, p. 169f.; Orel and Wood 2001, p. 36).

The third group, finally, is made up of practices of delocalisation and mobility of animals and plants. Should it be true 'that an animal's own nature and 'external' nature were somehow interconnected' (Wood 2007, p. 230), the question arises of what transregional mobility conceptually meant for the 'race' of a creature. The prevailing view of research that such delocalisation of animals and plants became a common practice only from the 17th century onward must be challenged at this point (Orel and Wood 2001, p. 44). There are plenty of practices providing ample evidence for the mobility of animals and plants in the Middle Ages. For instance, the practice of circulating dogs as gifts (Teuscher 1998, p. 361), the geographically dispersed housing of dogs belonging to a single owner (Giese 2010, p. 115), the periodic exchange of stock between studs (Gladitz 1997, p. 169), and the import of animals from distant countries (Gladitz 1997, p. 211; Teuscher 1998, p. 360). Whether such mobility was accompanied by a shift in the appreciation of the creatures concerned, as was often the case for delocalised human groups, would be worth examining with regard to medieval concepts of 'race'. It would also be interesting to see in future research whether such practices—especially for nobles, who could often be classified as delocalised themselves—represented a shift away from the conceptual importance of locality for identity formation toward an emphasis on 'ancestry'.

5. Conclusions

The theory and praxis of breeding in medieval Europe proved to be interconnected with the early history of the conceptions of 'ancestry' and 'race' in several ways. By approaching both scholarly and practical knowledge on breeding symmetrically through a set of four sub-questions, I was able to carve out a form of breeding inspiring a biological discourse quite different from the modern scientific one.

We learned that the mutability of creatures was theoretically considered possible through reproductive ancestry over time. However, it was conceived rather as a degeneration than as an optimisation. Alongside reproduction—which only involved the potential, not the necessity for heredity—other logics were always employed to explain mutability: for instance, the conditions at the time of conception (age, health, emotional state of the parents), or the soil from which the creatures descended via food and locality. These external conditions, thus, represent the most likely access for human intervention in the form of

practices of breeding. Breeding seems to have been practiced primarily with the objective to achieve certain specific functions of animals and plants for human usage. Nevertheless, phenotypes were targeted by medieval breeding practices as well.

Remarkably, the history of medieval breeding revealed various concepts and practices whose origins are usually situated by researchers in the early modern period: the existence of the extensive mobility of animals and plants; the concept of reproductive heredity; the view that ancestry (*without* heredity) was the only cause of the diversity of creation—not the Christian God; and the implied temporal dimension of creation.

The extent to which medieval biological discourses were influenced by the breeding of animals and plants is significant. Even though in theory a conceptual transfer of ‘mutability’ from non-human ‘species’ to the human ‘genus’ was illicit, in praxis similar transfers existed. The significance of commensality, for instance, is evident not just for breeding animals but for Christian religious practices too, and delocalisation is known in the context of animals and plants as well as nobles.

As a result of such conceptual transfers of the conceptions of ‘race’ and ‘ancestry’ from the non-human into the human sphere, we should question the qualitative distinction of these two spheres for the European Middle Ages. What we encountered instead was a quantitatively graded hierarchy of creation featuring earthworms at its lowest end and, at its upper end, the social hierarchy of the three estates. The image of nature depicted by medieval breeding is, thus, overarching the modern dichotomy between ‘nature’ and ‘culture’.²²

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Notes

- ¹ Albertus Magnus: On Animals, p. 1358. Cf. Albertus Magnus: *De animalibus*, p. 1273.—‘omne generatorum corpus’.
- ² Albertus Magnus: On Animals, p. 1410. Cf. Albertus Magnus: *De animalibus*, p. 1322.—‘Ex hiis igitur patet non posse esse perfectius animal homine’.
- ³ Albertus Magnus: On Animals, p. 1413. Cf. Albertus Magnus: *De animalibus*, p. 1325.—‘omne autem aliud animal deficit secundum plus vel minus, et defectus est ex carentia alicuius ad perfectionem pertinentis’.
- ⁴ Albertus’ treatment of the Christian God in *de animalibus* is generally remarkable, as he mentions him only in a few places in the entire work (Atran 1990, p. 147; Kitchell and Resnick 1999, p. 1439).
- ⁵ Albertus Magnus: On Animals, p. 1416. Cf. Albertus Magnus: *De animalibus*, p. 1328.—‘Quaedam autem in tantum vigent in disciplina auditus quod etiam sibi mutuo suas intentiones significant, sicut pigmeus qui loquitur, cum tamen sit irrationabile animal: et ideo quantum ad animales virtutes, post hominem videtur pigmeus esse perfectius animal’.
- ⁶ Albertus Magnus: On Animals, p. 1419. Cf. Albertus Magnus: *De animalibus*, p. 1329f.—‘videntur symiae prae ceteris animalibus sagacitate habere eam quod disciplinabiles sunt sensibilibus’.
- ⁷ Albertus Magnus: On Animals, p. 1422. Cf. Albertus Magnus: *De animalibus*, p. 1332.—‘Et haec est causa quod haec genera animalium similitudines hominis vocantur’.
- ⁸ Albertus Magnus: On Animals, p. 1438. Cf. Albertus Magnus: *De animalibus*, p. 1347f.—‘Ea autem quae secundum suum genus imperfecta esse videntur [...] sunt vermium quaedam genera sicut ea quae lumbrici terrae vocantur [...] Ex hiis autem aestimat Avicenna cum iuxta aquas limosas sunt, anguillas generari: et si hoc est verum, tunc oportet ista quasi materialia semina et ovalia esse ad anguillarum generationem’.
- ⁹ Albertus Magnus: On Animals, p. 1407. Cf. Albertus Magnus: *De animalibus*, p. 1319.—‘Est autem adhuc intelligendum quod istae potestates divisae ab invicem secundum esse et subiectum, constituunt differentiam generum et specierum eorum quae sunt

animata. [. . .] nos videmus corpora plantarum [. . .] esse omnino alterius generis quam animalium [. . .] Per hoc idem autem patet quod etiam animalia a se invicem specie sunt differentia.’

- 10 Albertus Magnus: On Animals, p. 1407. Cf. Albertus Magnus: *De animalibus*, p. 1319f.—‘Plus igitur quam specie differt a brutis, et videtur ad ipsa quamdam habere generis differentiam [. . .] Si quis autem opponat quod genus plures ambit species et sic homo plures deberet habere species, non valet’.
- 11 Albertus Magnus: On Animals, p. 1295. Cf. Albertus Magnus: *De animalibus*, p. 1205f.—‘Ex hiis etiam causis accipitur causa similitudinis nati cum patre vel matre vel aliquo avorum et causa dissimilitudinis. [. . .] Causa autem omnium istorum accipitur ex armonica proportionem complexionis spermatis ad naturam concepti et e contrario.’
- 12 Albertus Magnus: On Animals, p. 1295. Cf. Albertus Magnus: *De animalibus*, p. 1206.—‘est perfecte vincens et terminans aut propter virtutem spermatis in se consideratam, aut quia per aetatem reducitur ad temperamentum aut propter aliam aliquam causam’.
- 13 Cf. Albertus Magnus: On Animals, p. 1298. Cf. Albertus Magnus: *De animalibus*, p. 1209.
- 14 Albertus Magnus: On Animals, p. 1296. Cf. Albertus Magnus: *De animalibus*, p. 1207.—‘Aliquando enim non tantum non erit mas sicut est pater [. . .] sed habet similitudinem ad genealogiam et secundum hunc modum quidam sunt similes parentibus propinquis et quidam remotis. Et haec generatio similitudinis fit quando generatio fit modo essentiali et non accidentali [. . .] Virtus enim avorum est in membris pronepotum usque ad quartam generationem, et aliquando amplius [. . .] et sic virtus avorum est in potentia in corporibus generantium: et quando aut per similitudinem eibi aut temporis adiuvatur, agit secundum actum’.
- 15 Albertus Magnus: On Animals, p. 1300. Cf. Albertus Magnus: *De animalibus*, p. 1211.—‘Et forte tanta causa diversitatis haec quae dieta est, quod id quod generatur ab aliquo, non accipit similitudinem alieuius avorum de cognatione illa.’
- 16 Albertus Magnus: On Animals, p. 1295. Cf. Albertus Magnus: *De animalibus*, p. 1205f.—‘Aliquando etiam nulli parentum assimilantur, sed tamen retinent figuram speciei, ita quod sunt homines. Aliquando etiam non retinent formam humanam sive speciei generantium, sed accipiunt formam monstruosam et mirabilem. Filius enim qui in nullo similis est parentibus nec secundum speciei naturam neque secundum individui figuram, est monstrum et mirabile naturae vocatum.’
- 17 Albertus Magnus: On Animals, p. 1303. Cf. Albertus Magnus: *De animalibus*, p. 1214.—‘aliquando autem non ad speciem, sed ad genus tantum animalis: et hanc ad minus retinet similitudinem: quoniam non invenitur animal quod in partu plantam vel lapidem enixum umquam fuerit, sed genus in omnibus generatis ad minus est salvatum.’
- 18 Cf. Albertus Magnus: On Animals, p. 1577. Cf. Albertus Magnus: *De animalibus*, p. 1457.
- 19 Albertus Magnus: On Animals, p. 1592. Cf. Albertus Magnus: *De animalibus*, p. 1470.—‘Dum autem quodlibet horum generum cuilibet permiscetur, multa fiunt falconum genera. [. . .] falco enim peregrinus frequenter permiscetur ei qui est pedum iaccinctinorum [. . .] et efficitur partus patrem imitans, licet parum coloris azurini respargatur in pedibus. [. . .] semina permixta se invicem movent et convertunt et complent.’
- 20 Albertus Magnus: On Animals, p. 1592. Cf. Albertus Magnus: *De animalibus*, p. 1470.—‘et licet dixerimus quatuor genera taliter permixtorum falconum ad nos devenisse, ratio tamen exigit multa esse et plura cotidie posse fieri talia falconum genera: et hanc putamus esse causam quod tam diversa genera falconum in diversis regionibus inveniuntur. Quamvis enim climata mores et colores animalium diversificent. tamen specierum tam similium diversitatem causat praecipue permixtio quam diximus. sicut et in generibus anserum et generibus canum et equorum fieri vidimus temporibus nostris.’
- 21 Cf. Albertus Magnus: On Animals, p. 1300. Cf. Albertus Magnus: *De animalibus*, p. 1211.
- 22 Concluding a symmetrical history of medieval breeding must involve taking the principle of symmetry to heart and, thus, allowing the past to question the present at last. Both the conception of ‘race’ and the conception of ‘species’ scrutinised for their medieval implications in this paper, represent concepts that legitimise ongoing discriminatory practises in our modern scientific ontology. In the Middle Ages, both ‘human’ and ‘estate’ exceptionalism were based in a quantitative grading, rather than in a qualitative difference characteristic for modern discriminations on the basis of ‘species’ and ‘race’. While we should not aspire to adopt medieval ontologies, we should allow them to show us the specificities of how our own conceptions are flawed. In doing so, we learn that one great challenge for of our time has to be overcoming thinking with modern concepts such as ‘species’ and ‘race’ that build qualitative differences into our view of the world.

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