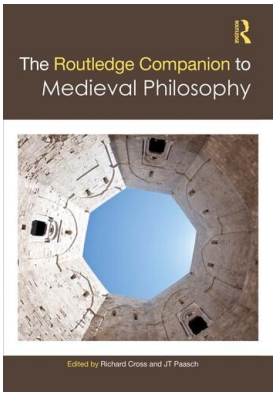


The Routledge Companion to Medieval Philosophy

Richard Cross, JT Paasch

Kinds, Essences, and Natures

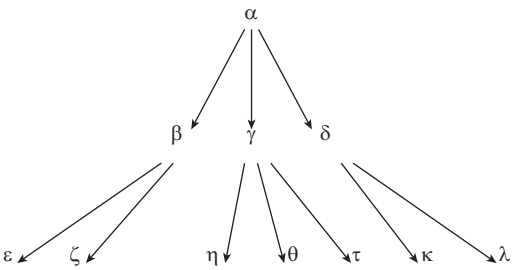
Publication details
https://www.routledgehandbooks.com/doi/10.4324/9781315709604-14
Martin Tweedale
Published online on: 13 Jan 2021

11
KINDS, ESSENCES, AND NATURES

Martin Tweedale

Classifying things into kinds or sorts was a pervasive feature of philosophy and science as it was carried out in the Platonic and Aristotelian schools of the ancient world, and it was this tradition which was relayed on to the schoolmen of medieval Europe and almost universally accepted by them as essential to rigorous thought. Understanding medieval scholastic philosophy, then, requires that we know what classification meant to them as well as what problems and disputes arose in connection with it.

In a very broad sense, any grouping of a domain of things into classes, no matter how much these classes overlap in their membership, can be called a "classification," but from Plato on the tradition we are describing here demanded a more rigorous system of classes, one which consisted of a hierarchy starting from the class of all the things in the domain, dividing that into mutually exclusive sub-classes, and each of these again into similar sub-classes, until one reached classes for which further division was not called for. It was always assumed that this series should not proceed ad infinitum. The result is a proper taxonomy of the domain with a "tree-structure" that branches from a single all-inclusive taxon into taxa of increasingly restricted extensions. At each level of branching, the taxa are mutually exclusive and jointly exhaustive of the taxon they divide. The following diagram illustrates the sort of schema that results.



α is the all-inclusive taxon which divides into three sub-taxa, β, γ, and δ, and then each of these into further sub-taxa. At each level, the taxa are mutually exclusive but jointly exhaustive of the domain. In what follows, the word "kind" will be used in a narrow sense as synonymous with the technical term "taxon."

In Greek and Latin, the same word (γένος, *genus*) designates a kind, but in the traditional taxonomy, that term has the more restricted meaning of a "genus" (pl. genera), i.e. a kind which

is divisible into sub-kinds. A kind which is the result of division of a genus is called a "species" (pl. species) of that genus. In the aforementioned diagram, α is a genus, but not a species of any genus. (Such a genus is often called a "highest" genus.) β, γ, and δ are all genera, but are also species of α. The kinds at the lowest level are all species of their respective genera, but not themselves genera. (Such species are often called "lowest" species.)

It is in principle possible that the same domain might be organized into more than one taxonomic scheme of this sort, but in the Platonic–Aristotelian tradition the scholastics inherited, it was always assumed that in a proper science only one such scheme was the correct one for the domain in question. It was also assumed by nearly everyone that any species was *definable* by giving its genus and then a characteristic, or conjunction of characteristics, which belonged to all the members of the species being defined and not to the members of any other species that fell under the same genus as did the species being defined. This feature (or conjunction of features) was called the "difference" (*differentia*) of that species. If the definition was genuinely scientific, it was required that it be impossible for something to belong to the species being defined but not possess that species' difference, or not also belong to the genus of that species.

It is important to understand that this sort of definition of a species is not a mere explanation of the meaning of a word,[1] but the result of an inquiry into the best way to develop a taxonomy for the domain of things under investigation. Obviously, in some domains, this would require a good deal of careful observation of the things themselves; a mere reflection on what a certain word is understood to mean would not be enough. It was accepted by all the scholastics that if such definitions were the right ones, they would be *necessary* truths of the form: "Everything which is a β is an α with the feature Δ," where Δ is the difference of species β and α is the genus. Examples of such definitions are surprisingly rare, but one which is repeated ad nauseam is "Everything which is a human is a rational (i.e. thinking) animal" where "rational" (or sometimes "rational, mortal") designates the difference.[2] Necessarily, then, if a thing belongs to a given species, it will possess the difference of that species.

But can there be more than one definition of a species simply by having alternative differences? There might well be several characteristics each of which belongs to all members of the species, and to nothing else that falls within the genus of that species, and the possession of which is a necessary requirement for belonging to the species. The common example is the capacity for laughing (*risibilitas*), which was thought to be something that necessarily anything would have to have if it were human. On this matter, the scholastics relied heavily on Porphyry's distinction between differences and mere characteristic features (*propria*, often misleadingly translated as "property").[3] The latter were like differences in that they necessarily went along with membership in the species and they distinguished that species from all the other species of the immediately higher genus, but they were not *definitive* of that species. An example from geometry might help here: the feature of having angles that sum to two right angles applies to all triangles and to no other kind of closed, rectilinear, plane figure, but it is not what defines a triangle as a triangle. The proper *difference* is having three sides. But again, one might wonder why not make having three angles the difference. Although for the most part the scholastics assumed that for each species there was just one correct difference, and thus one correct definition, no less a figure than Ockham challenged that conception.[4]

In addition to differences and characteristic features, there could be features that belonged to anything that was a member of a species but also to other things that fell under the species' genus as well. Where it was necessarily the case that if anything was a member of the species it would have such a feature, then that feature was categorized as a *necessary accident* and opposed to features which belonged just to some members of the species and were *accidents* full stop. The five classes that Porphyry mentions, viz. species, genera, differences, characteristic features, and accidents, were classes of what the scholastics called "universals," and effectively demark what was referred to by the term "universal" in medieval philosophy.

All the above can be handled by a logician without making much in the way of ontological assumptions about the things being classified. Certainly, problems will arise for the assumption that there is a single correct taxonomy for the domain if the items in it differ merely by variation along certain *continuous* parameters, in the way colors do, and some of the scholastics were aware of this difficulty. Also, the domain has to consist of individuals clearly distinguishable from each other, and in some areas of investigation that requirement may not be met.

Another sort of question which seems to demand delving into ontology is "What exactly are these 'kinds' the logicians are constantly talking about?" Or further: "What are all these 'universals' that they mention?" The naïve answer that kinds are classes is easily refuted: when we are dealing with things that come to be and perish, since then the membership of the kind can change over time, even though we still have the same kind, but a class, properly speaking, is defined by the members and perishes when any member of it does. Likewise for the other sorts of universals mentioned.

One frequent solution to this, especially in the eleventh and twelfth centuries, was to treat all the above as words and turn logic into a discourse about words. The word "animal" (or whatever translates it in the language you want to deal with) is, on this approach, a genus as well as a species of the word "living being." Words themselves are individuated not just by their physical form, but also by the meanings language users have imposed upon them.[5] This means that there were no kinds before there was a language and, unless two languages share the same kind-words, the logicians who traffic in one of those languages will be dealing with different kinds than the logicians who traffic in the other, even though the taxonomies used are equivalent. But for the logician who is only interested in purely logical questions, these counter-intuitive consequences need to pose no insurmountable problems.

Inevitably, however, for the scholastic philosopher who is trying to develop sciences of the real world, the logical schema of taxonomy described earlier will invite ontological questions, for that schema was taken to be a sort of classification requisite for a properly objective and scientific treatment. For example, the assumption that the domain being classified admits of just one correct taxonomy becomes the view that in many domains the things themselves divide themselves up in a taxonomic way and the philosopher's job is to uncover just where those already existent divisions lie and how to make them explicit in the definitions of species. In the case of natural things (as opposed to artifacts), the investigator must try to divide nature "at the joints," to use Plato's memorable metaphor.[6] All the scholastics accept that in the most important areas of natural science, these "natural joints" exist, so that kinds are in a way already there in the natural world before we begin to think about it. It is a short step from this position to claiming that the natural kinds which we are trying to define must themselves be things that exist in the world independently of thought and language. This is the general claim that all *realists* about kinds make, and is definitive of realist positions in the dispute about the ontological status of universals, where a universal is, as was said, any member of one of Porphyry's five classes, and especially any kind. The opposed position is the *nominalist* one which claims that something can only be a universal by having a signification, and hence the existence of universals is dependent on the existence of minds which bestow signification on things like physical sounds and thereby turn them into words.

It is important to note that neither side in this dispute doubted the existence of universals; to doubt that would have been tantamount to destroying the science of logic. What is at stake here is whether the things that are universals are such independently of and prior to the thinking which develops the taxonomies and definitions in which universals appear. It is a question about universality, not so much about the things that are universals. When Peter Abelard, for example, argues against various views which treat universals as things and also holds that universals are words of certain sorts, he is not implicitly claiming that some words are not things, but rather that no thing is universal unless that status is bestowed on it by thought and language. Nor is he claiming that

the business of defining a kind is just a matter of reflecting on the common usage of a certain noun; one has to empirically investigate and uncover a certain *status* or nature which certain things have independently of our thought about them. But, as he notoriously says, this *status* or nature is not one of the things in the world we are investigating; in fact, it is not a thing at all.[7]

Part of the ancient tradition was to think of universals, especially kinds, as wholes having parts, and the scholastics continue to use this metaphor. The parts of a lowest species are just the individual members of the species, while a genus has as its immediate parts its species. Following the mereological principle that a part of a part of a whole is also a part of that whole, ultimately any genus also has the individual members of its species as parts.[8] This suggests a kind of realist position in which the universal is the whole collection of such parts, but of itself it provides no answer to the question of why we continue to have the same universal after some of the parts have perished and others come into existence, for in that case we definitely seem to have a different whole.

Another question that naturally arises for the sort of taxonomical method we have been describing is whether it applies to the whole of reality, or at least to all the things that are natural creations. Here, Aristotle's treatise *Categories* was taken by some to offer a schema for such an all-embracing taxonomy. There would be ten highest genera, the ten categories of substance, quantity, quality, relation, etc., and these would be broken down into species and sub-species in the required way. It was recognized that mere *entity* [*ens*] could not be an all-inclusive genus, since then there would have to be differences distinguishing under it each of the ten categories, but a difference is itself an entity and no difference of a species can be something that falls under the genus of that species. Hence, *entity* is not a genus. The argument here relies on a principle implicit in the tree-structure taxonomy we have been discussing, viz. that any member of a genus must be a member of one of its species. The taxonomy does not admit of a genus which immediately divides into both species and individuals.[9] But the difference of a species cannot be a member of that species, nor a member of any of the other species that fall under the genus. (For example, the feature of having three sides cannot itself be an instance of a triangle nor of any of the other closed, rectilinear, plane figures like quadrangle.) Hence, the difference cannot be a member of the genus either.

But in fact it is very difficult to fit this taxonomic scheme onto the categories as Aristotle described them, and most scholastics were wary of such an interpretation. The logicians who were happy to see logic as a discourse about words interpreted Aristotle's treatise as part of that endeavor, and then the categories themselves became the words usually taken to name the categories. Some later thinkers interpreted some (like *substance*) but not all of the categories as genera of things in nature, and dispute about the correct way to interpret Aristotle's treatise continued throughout the medieval period.

However that dispute is to be settled, it was still evident that Aristotle's treatise recognized a difference in things between "substances," i.e. things which do not *logically* depend on something else for their existence (plants and animals are obvious instances), and other things that exist only by belonging to substances, like shapes and colors, and that the substances had some sort of ontological priority over those other things. This was accepted by all the scholastics, and hence it was thought by them to be particularly important that a taxonomic scheme be applicable to substances, whatever those substances might prove to be. As Aristotle's non-logical works became available from the mid-twelfth century onward, it became apparent that Aristotle accepted that natural organisms were examples of substances, and thus it seemed that they should admit of taxonomic classification and of definitions of their species. This, of course, involves numerous problems when it comes to handling the facts that organisms change dramatically in the course of their genesis, that they are subject to very disabling accidents while alive, and that there are things such as monstrous births. Aristotelian science can handle these only by focusing on the adult normal forms for creatures of each lowest species and basing classification on those forms.

So far as our topic is concerned, the most significant thesis forced on the scholastics by the acceptance of Aristotelian science was that natural kinds were such that whatever belongs to a kind cannot cease to belong to it without ceasing to exist. This is the doctrine known as "essentialism" in contemporary philosophy of the analytic school.[10] Nothing in the logic of taxonomy as described earlier implies this. It is perfectly compatible with the taxonomic idea that we are confronted with isolable things which undergo changes that carry them from one species of a certain genus to another species of that genus, or indeed perhaps from one genus to a different genus.

In the early twelfth century, it was widely thought that the material world was composed of conglomerations of atoms, and that each such conglomeration was a thing that could undergo all sorts of transformations which might well mean that it ceased to be of a certain kind while not ceasing to exist. Also, it was accepted that some of the material entities that persist through change in their material constituents were at a fundamental level a succession of distinct things unified by a property that they all continued to possess. In other words, the familiar "things," which we take to be members of the kinds ordinarily recognized, find their unity through change not by being a single basic persistent *thing*, but by the continued instantiation of the characteristics which make them be members of those kinds. But for Aristotle, who rejected atomism, the material constituents of the familiar things we say are animals, for example, are less substances than what they compose, and delving into material constituents does not lead to any ultimate basic things. Consequently, in the material world, the most basic things are the familiar ones and they cannot cease to be members of their kind, i.e. lose the features which make them be of a certain kind, without ceasing to exist.

Aristotle's essentialism emerges from the following line of thought. Material substances that underwent processes of coming-to-be and ceasing-to-be (as well as the non-material ones that do not undergo such processes) had to admit of an answer to the question of *what* they were, and the answer was always a specification of a kind of thing they were, especially the lowest species to which they belonged. Now, since a thing cannot exist without being *what* it is, it cannot exist without being a member of whatever kind it in fact belongs to. This doctrine is often expressed by saying that kinds are *prior to* the individuals that belong to them, and it was extended beyond the realm of material substances to the entire realm of substance in general. Indeed, it carries over into the ontology of things which are not substances, but merely belong to them. In the realm of organisms, this essentialism of Aristotle's rests on his teleological theory that there is an adult normal form which we describe in defining a lowest species and which the organism's growth aims at attaining. Reaching that form and maintaining it manifests the "nature" (*natura*) of that organism, so that its nature and its kind are intimately related.

This use of the term "nature" occurs rarely if at all in the early twelfth century, when a nature could be either just any real basic thing or the character which something had to have to be of a certain kind. But by the thirteenth century, the new meaning became standard. Another term which shifts its meaning on account of the introduction of Aristotelian science is "essence" (*essentia*). Before 1250 among the scholastics, this word was a synonym for "thing" (*res*), but by the thirteenth century, it always meant whatever it is which makes a thing be *what* it is,[11] i.e. be of a certain kind, and whose possession by the thing is necessary and sufficient for its continued existence. To specify a thing's essence is to say *what it is to be that thing*, and this, in Aristotelian philosophy, is just to give the definition of the thing's lowest species.

The significance of this shift is brought home by noting that propositions that earlier had only a *de dicto*[12] necessity now have a *de re*[13] necessity as well. For example, when we say by way of definition that a human is necessarily a rational animal, earlier all that this implied was that it is *necessarily* true that if something is a human, it is a rational animal. But now, given we are defining a kind, it implies as well that if something is a human, then that thing is *necessarily* a rational animal, in the sense that it cannot exist without being a rational animal. The necessity now belongs to the individual thing and not just to the truth of the definition of being human.

This development in the talk of natures and essences leads to ontological difficulties, and a good deal of scholastic metaphysics from the mid-thirteenth century onward is given over to differing attempts to resolve these problems. For example, is the essence of an individual just the same as the individual itself? But since the essence certainly does not include features accidental to the individual, it seems not to include what distinguishes that individual from others in the same species. Aristotle himself denied that an individual was definable in the sense that a proper difference could be found which would distinguish it from the fellow members of its species.[14] This led most thinkers to believe that an individual was merely distinguishable at any given time by the accidents it had at that time. It follows that the *essence* of an individual of a given species would be indistinguishable from the *essence* of any other member of that species.

That, in turn, suggests that there is just one essence for all the members of a given lowest species, and this sounds very much like a realist theory of kinds or universals. But unfortunately, it also seems to imply that all members of the same species are really the same thing! It's just that the thing they are occurs simultaneously in different locations with different accidents attached to it depending on where and when it is.[15] Not only is there something quite bizarre about this idea, but it seems to relegate the individual to a very meager status as the mere product of differing spatio-temporal locations. Nearly all the scholastics rejected this proposal, but the alternatives are frequently quite obscure, or involve problems of their own that opponents were quick to point out.

One of the most influential and subtle theories in this area was introduced to the West by the writings of the tenth-century Persian polymath Ibn-Sina, known as Avicenna to the scholastics. He theorized that there were three ways of talking about essences or natures: (1) as they are in and of themselves apart from any consideration of how they might actually exist; (2) as they exist in the mind; and (3) as they exist in things.[16] So far as (1) is concerned, an essence is neither existent nor non-existent, neither a single thing nor many things, for the essence *of itself* does not favor either of the alternatives. This is not really a denial of the law of excluded middle, for what it amounts to is denying propositions prefaced by the phrase "Of itself," for example, the propositions "Of itself the essence exists," "Of itself the essence does not exist." These are not contradictory propositions, and hence both can be denied without offending classical logic. The point is really just this: it does not follow from the definition of a species that that species actually has any sort of existence, nor does it follow that it has no sort of existence.

But (2) an essence can be an object of thought and have what was called "objective being" (*esse objectivum*); in fact, philosophers spend much of their thinking hours thinking about them. In this way, the essence takes on the accident of indeterminacy, i.e. it is now definitely none of the individuals that might or might not belong to the species being defined. In the first way of thinking, it could not be said that the essence was not such and such an individual, nor could it be said that it was. But as an object of thought, it is something that any individual of the species in question must relate to as what stands as a single thing *over and above* the many particulars. In this accidental mode, the essence becomes a universal.

Finally, the essence can have real existence as the many individuals belonging to the species it defines. Here, we encounter the idea of something that is many things rather than one thing, a notion that the scholastics already knew from their reading of Boethius. By being drawn into material embodiment, the essence forsakes the unity it had as an object of thought, and also forsakes the neutrality between unity and multiplicity it had as being just itself, and becomes numerically many things. The core of Avicenna's proposal, then, is that anything that is true of an essence but is not entailed by the very definition of the species is *accidental* to the essence itself, and included in these possible accidents are real existence (*esse formale*, *reale*, *subjectivum*), existence as an object of thought (*esse objectivum*), universality, singleness, and multiplicity.

Avicenna's treatment of essences is close to what we would now call a theory of *types and tokens*. When we distinguish the letter "A" from all its physical occurrences, we are treating it as a type

and the occurrences as its tokens. Here, the letter "A" is very much like Avicenna's essence when it is an object of thought. However, when we say that a certain token of "A" is that type, Avicenna would interpret this as meaning that it is *that which happens to be* a type, and that is the essence considered simply in itself. That many occurrences of "A" can be the essence of "A" does not mean that all those occurrences are some one thing and thus identical to each other, for the essence is not considered in itself a numerically single thing.

Elaborating on Avicenna's idea, John Duns Scotus (1265–1308) said that of itself the essence had a "less than numerical unity," and this allowed it to be the "common nature" of all the individuals belonging to the species in question.[17] In fact, each such individual was ontologically constituted by the common nature plus whatever differentiates that individual from other individuals of the same species. It was at this point that Scotus radically diverged from his predecessors, for, instead of seeing an individual as distinguished by its accidents or its spatio-temporal location or the matter embodying it, he proposed that it had an "individuating difference" which functioned for the individual just as did the specific difference for the species.[18] But in contrast to the specific difference, this individuating difference, he said, was inherently unknowable. An individual's common nature was, on his theory, distinguished from its individuating difference with a distinction "grounded in the nature of the thing" (*ex natura rei*), i.e. not based merely in thought about the realities in question, but not an "absolute real distinction," since it was not at all possible, even by divine power, for the individuating difference of that individual to exist without that common nature.

Scotus's proposals mark a high-water mark in the sophisticated defense of realism, but they also engendered a nominalist reaction which in effect jettisoned the whole Avicennian approach. The chief proponent of nominalism in the fourteenth century was William of Ockham (1285–1347/9),[19] who saw no point in making a distinction between an individual and its essence, discarded the idea of "objective being," and held that there was no distinction grounded in the nature of things unless it was between two things which could exist independently of each other, even if only by divine power.[20] This last ruled out the kind of distinction Scotus had made between an individual's common nature and its individuating difference. For Ockham, universals were no more than the mental concepts which composed a mental language and grounded the significance of spoken and written languages. The basic thesis of nominalism that universality depends on having signification was preserved, but in Ockham's case, the basic signifiers were mental entities rather than the terms of overt languages.

Does this mean that the taxonomy so important to Aristotelian science is not the result of a discovery of the way things themselves are organized in the world prior to thought about them? In other words, did Ockham's view demolish the idea that a scientific and correct taxonomy divides nature "at its joints"? It seems that Ockham himself did not think that any such radical conclusion followed from his nominalism. Rather, he claimed that identity in species is a relation which holds between many pairs of individuals independently of how we think about them.[21] Relations themselves, he held, were not things existing *in addition* to the things they related; rather, the distinction between a relation and its relata was found only at the conceptual level. Nevertheless, things can be related to each other in reality prior to any thought about them, and such is the case when they are related as identical in species. Although his proposal was not elaborated by him in any detail, it seems Ockham thought that there are "joints" in nature but that they are created by these relational facts of identity in species which hold independently of taxonomic efforts. A realist can, and no doubt would, complain that Ockham has not explained how such relational facts are possible. To the realist, such relations between things are to be *explained by* the fact of belonging to some species, not something which *explains* that fact.

This debate between realists and nominalists was never resolved by the late scholastics and only receded in the renaissance as science moved away from the Aristotelian paradigm. However,

echoes of it can be heard in recent discussions of cladistics and species in the philosophy of biology, of the source of the necessity of laws of nature in the philosophy of science, and of natural kinds in metaphysics. The medieval disputes are likely best seen as the manifestation in that period of Western thought of a more general problem arising from the necessity for both ordinary and scientific languages to see various terms as referring to many real and very different things without becoming equivocal. The question then has to arise as to what maintains the unity of the term's meaning, and answering that leads to proposals and difficulties with which the scholastics would have been familiar.

Notes

1 The scholastics frequently distinguished "nominal" definitions from "real" ones, the latter being what science requires.
2 Where a conjunction of characteristics is used to differentiate the species, each conjunct is sometimes called a "difference" in a looser sense of the term.
3 Porphyry was a third-century neo-Platonic philosopher whose introduction to Aristotle's *Categories* was translated into Latin by Boethius and known to the scholastics from the eleventh century onward. Porphyry's discussion can be found in English in Spade (1994: 1–19) and Bosley and Tweedale (2006: 331–336).
4 See Ockham's *Summa Logicae*, pt. I, ch.26, translated in Loux (1974b: 105–108).
5 There exists in a modern edition a logical treatise (*Dialectica*) from the late eleventh century once ascribed to Garlandus Compotista (1959), but whose authorship is uncertain, which goes so far as to identify universals with the vocally produced sounds (*voces*) that words (*sermones*) are realized in. Its author may have been Roscelin of Compeigne, or someone from his school, since the doctrines resemble those ascribed to Roscelin. A portion of this work is translated in Bosley and Tweedale (2006: 340–348). See also Iwakuma (1992) and Marenbon (1992).
6 *Phaedrus* 265e.
7 The remark is made in his commentary (1919) on Porphyry's *Introduction* and elsewhere. See the translations in Spade (1994: 26–56), and in Bosley and Tweedale (2006: 349–362).
8 Such parts are called "subjective" parts to distinguish them from "quantitative" parts. Medieval mereology is discussed in Arlig (2012).
9 A species, however, might contain just a single individual member.
10 A modern defense of the view can be found in Wiggins (1980).
11 Also used in this sense is the term "quiddity" (*quiditas*). *Quid* in Latin means "what?"
12 The phrase means "about the proposition," i.e. in this case, the necessity attaches to the proposition that a human is a rational animal.
13 The phrase means "about the thing," i.e. in this case, the necessity of being a rational animal attaches to the thing which is a human.
14 This is one implication of his discussion in *Metaphysics* VII, ch. 15.
15 For example, Thomas Aquinas in his short treatise *On Being and Essence* (*De Ente et Essentia*), ch. 5 (1954) attributes the "multiplication of individuals within a single species" to "signate matter," by which he means matter found at different definite places, the implication being that this gives the individuals accidents that distinguish them from other individuals within the species. See the translation of this work in Klima (2007: 227–249).
16 A full explanation of Avicenna's theory can be found in Tweedale (2013). See also Marmura (2005). For the Latin edition of Avicenna's texts, see (1977–1980).
17 Scotus's theory can be found in his *Questions of Book VII on Aristotle's Metaphysics* (1997), qu. 18. This is translated in Tweedale (1999: vol. 1, pp. 141–163), and commented on in vol. 2, pp. 589–625. Also partially translated in Bosley and Tweedale (2006: 382–386).
18 Scotus's theory of individuation can be found in his *Commentary on the Sentences*, the *Ordinatio* (1950–1973), Book II, dist. 3, pt. 1, qu. 6. This is translated in Tweedale (1999: vol. 1, pp. 226–254), and commented on in vol. 2, pp. 691–723. Also partially translated in Bosley and Tweedale (2006: 378–382). Another translation is in Spade (1994: 96–113). For more on individuation in the scholastic period, see Gracia (1984, 1994).
19 Ockham's arguments occur in two places: *Summa Logicae* (1974a), pt. 1, chs. 14–17, translated in Loux (1974b: 79–88), and in his *Commentary on the Sentences*, the *Ordinatio* (1967–1979), Book I, dist. 2, qu. 3–6,

translated in part in Tweedale (1999: vol. 1, pp. 320–392), and commented on in vol. 2, pp. 786–872. Qu. 3 is translated in Bosley and Tweedale (2006: 387–393), and qus. 4–8 are translated in Spade (1994: 114–231). See also Adams (1987: 13–69) and Panaccio (1992, 1999).

20 Whatever does not involve a contradiction is something possible for God to bring about, even if it is not possible in the established order of nature.

21 The relation of identity in species will divide its domain of entities into mutually exclusive classes, since it is an equivalence relation, i.e. reflexive, transitive and symmetric. But to get a taxonomy with multiple levels, it will be necessary to have in addition relations of identity in genus with different degrees of generality. Whether Ockham would have countenanced these is unclear.

References

Abelard, Peter (1919) *Logica Ingredientibus, Glossae super Porphyrium*. In *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, 21.1. Munster: Aschendorff.

Adams, M. M. (1987) *William Ockham*, 2 vols. Notre Dame, IN: University of Notre Dame Press.

Aquinas, Thomas (1954) *Opuscula Philosophica*, ed. P. Raymund and M. Spiazzi. Turin and Rome: Marietti.

Arlig, A. (2012) "Parts, Wholes, and Identity." In Marenbon (2012), pp. 445–467.

Avicenna (Ibn-Sina) (1977–1980) *Avicenna Latinus: Liber de Philosophia Prima sive Scientia Divina*, 2 vols., ed. S. Van Riet. Louvain and Leiden: E. Peeters and E. J. Brill.

Bolyard, C. and R. Keele, eds. (2013) *Later Medieval Metaphysics: Ontology, Language, and Logic*. New York: Fordham University Press.

Bosley, R. and M. Tweedale (2006) *Basic Issues in Medieval Philosophy*, 2nd ed. Peterborough, ON: Broadview Press.

Compotista, Garlandus (1959) *Dialectica*, ed. L. M. de Rijk. Assen: Van Gorcum.

Gracia, J. (1984) *Introduction to the Problem of Individuation in the Early Middle Ages* (2nd ed. 1988). Munich and Washington, DC, Philosophia Verlag and Catholic University of America Press.

———, ed. (1994) *Individuation in Scholasticism: The Later Middle Ages and the Counter-Reformation*. Albany: State University of New York Press.

Iwakuma, Y. (1992) "'Vocales,' or Early Nominalists." *Traditio* 47: 37–111.

Klima, G., ed. (2007) *Medieval Philosophy: Essential Readings with Commentary*. Oxford: Blackwell Publishers.

Marenbon, J. (1992) "Vocalism, Nominalism, and the Commentaries on the Categories from the Earlier Twelfth Century." *Vivarium* 30: 111–126.

———, ed. (2012) *The Oxford Handbook of Medieval Philosophy*. Oxford: Oxford University Press.

Marmura, M. (2005) "Quiddity and Universality in Avicenna." In *Probing in Islamic Philosophy: Studies in the History of Ibn-Sina, al-Ghazālī, and Other Major Muslim Thinkers*, ed. M. Marmura. Binghamton, NY: Global Academic Publishing, pp. 61–70.

Ockham, William (1967–1979) *Scriptum in librum primum Sententiarum Ordinatio*. In *Opera Theologica*, ed. S. Brown, vols. I–IV. St. Bonaventure, NY: The Franciscan Institute.

———. (1974a) *Summa Logicae*. In *Opera Philosophica*, vol. 1, ed. P. Boehner, et al. St. Bonaventure, NY: The Franciscan Institute.

———. (1974b) *Ockham's Theory of Terms: Part I of the Summa Logicae*, trans. M. Loux. Notre Dame, IN: University of Notre Dame Press.

Panaccio, C. (1992) *Les mots, les concepts et les choses. La sémantique de Guillaume d'Occam et le nominalisme d'aujourd'hui*. Montreal and Paris, Bellarmin and Vrin.

———. (1999) "Le nominalisme au xiie siècle." In *Signs and Signification*, vol. 1, ed. H. Gill and G. Manetti. New Delhi: Bahri Publications, pp. 17–33.

Scotus, John Duns (1950–1973) *Ordinatio*. In *Opera Omnia*, vol. I–VII, ed. P. Balic. Vatican City: Typis Polyglottis Vaticanis.

———. (1997) *Quaestiones super Libros Metaphysicorum Aristotelis Libri VI–IX*, ed. R. Andrews, et al. St. Bonaventure, NY: The Franciscan Institute.

Spade, P., trans. and ed. (1994) *Five Texts on the Mediaeval Problem of Universals: Porphyry, Boethius, Abelard, Duns Scotus, Ockham*. Indianapolis, IN: Hackett Publishing Company.

Tweedale, M. (1999) *Scotus vs. Ockham: A Medieval Dispute Over Universals*, 2 vols. Lewiston, NY: The Edwin Mellen Press.

———. (2013) "Avicenna Latinus on the Ontology of Types and Tokens." In Bolyard and Keele (2013), pp. 103–136.

Wiggins, D. (1980) *Sameness and Substance*. Oxford: Basil Blackwell.