

## ARTICLE

# LOCKE'S THEORY OF CLASSIFICATION

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Did Locke think there are natural kinds? Did he even concede that natural kinds are possible? These questions are surprisingly vexed considering the amount of space in Locke's *Essay*<sup>1</sup> devoted to kinds, species, and genera. Recent commentators dispute whether Locke was a realist or a conventionalist about natural kinds, while some claim he was, inconsistently, both.<sup>2</sup> An adequate understanding of Locke's position can help illuminate contemporary discussions about natural kinds and related issues concerning natural-kind terms. Natural-kind realism is the prevailing view among contemporary philosophers, and Locke is often cited as one of the precursors of contemporary realism. I shall show, however, that Locke was unequivocally a conventionalist about natural kinds. To the extent that realists see themselves as following a Lockean tradition, they misunderstand what Locke was trying to do. In fact, Locke's *Essay* provides important criticism for contemporary as well as scholastic natural-kind realism.

### I

I take *natural-kind conventionalism* to be the claim that classification of the natural world is necessarily interest-based, and therefore cannot reflect real ontological kinds in nature. The conventionalist claims that the interest-relativity of classification is not due to mere ignorance of the boundaries between natural kinds, but to the fact that there are no kinds fixed into the metaphysics of the natural world. In contrast, *natural-kind realists* hold that there are such real kinds in nature for us to discover.

To best understand Locke, we ought to be clear that his foil was the Aristotelian. Indeed, Locke's primary concern in discussing natural kinds was to reject the Aristotelian system of classification of nature into species and genera. As Locke saw it, this view consisted of the 'usual supposition' that

<sup>1</sup> All references to the *Essay* are to Locke (1975).

<sup>2</sup> Mackie (1974) and (1976), Galperin (1995), and Troyer (1975) read Locke as a natural-kind realist. Ayers (1981) and (1991), Guyer (1994), Mattern (1986), and Uzgalis (1988) read Locke as a conventionalist. Kornblith (1993) thinks Locke was 'deeply ambivalent' (13).

(a) there are certain precise *Essences* or *Forms* of things, whereby all the Individuals existing are, by Nature, distinguished into *Species* (III.vi.14).

As articulated by Locke, the Aristotelian position involves at least the following three claims: First, individual things are distinguished into species *by nature* – that is, nature contains its own objective classification of the things in it, such that every natural thing belongs to a species. Second, in order to facilitate this natural classification, every individual is endowed with an essence, typically considered its ‘substantial form’, which determines to what species the individual belongs. Third, these forms or essences are precise. Natural species, on the Aristotelian account, do not have fuzzy, imprecise boundaries. If an individual belongs to a species at all, it belongs to that species unequivocally, since it cannot have a substantial form only partly, but has its form in its entirety.<sup>3</sup>

A contemporary natural-kind realist may not want to endorse all three claims. But any natural-kind realist should accept at least the first, as this just states that natural kinds are *natural*; that, somehow or other, nature contains its own division of things into kinds, quite independent of us.

Locke attacks the Aristotelean position on at least two fronts. I address the two strands of Locke’s argument in the next two sections. To fully appreciate Locke’s position, it is important to see how the two strands are working together. Commentators have typically focused on only part of Locke’s argument, taken in isolation. By treating them together, I hope to make it clear that Locke’s argument is stronger than many have thought.

## II

The argument begins at III.iii.1 with a metaphysical claim, flowing from Locke’s nominalist inclinations: ‘All things, that exist, [are] particulars.’ Despite this bold statement, Locke may not have been a thoroughgoing nominalist. Throughout the *Essay*, he speaks of individuals having properties or qualities, apparently unconcerned that these properties may be universals. I believe Locke was a realist about properties, so long as they are primary qualities. Locke speaks of primary qualities as being ‘in the things themselves’ (II.viii.23), and ‘utterly inseparable from the Body, in what estate soever it be’ (II.viii.9). Locke’s property realism together with his professed nominalism has prompted some commentators to conclude

<sup>3</sup> In calling this position ‘Aristotelian’, I do not mean to attribute it to Aristotle. The position Locke sets up to attack as ‘the usual supposition’ was one he took to be part of the Aristotelian tradition still prominent in the seventeenth century. The tradition had by then diverged in some respects from the historical Aristotle. In addition, as we will see below, there are different versions of Aristotelianism Locke wanted to refute.

that Locke was a trope theorist.<sup>4</sup> It is not obvious whether Locke wanted to insist that properties are particulars, or whether he would have accepted a modest realism about universals, limiting them to the primary qualities. Still, it is clear that Locke is inclined toward nominalism, and is concerned to eliminate or reduce at least certain kinds of universals he finds especially problematic.

Given, then, at least a scarcity of universals in the world, Locke must explain why so many of our words are general terms, and how general terms work. He argues that we are able to form general ideas through the mental power of *abstraction*. When abstracting, we start with an idea of a particular. Such ideas are complex, since they incorporate a large number of properties we discern in the particular.<sup>5</sup> By separating from that complex idea those ideas peculiar only to it, and retaining those we find in several objects, or expect to find in others, we can form an abstract, general idea 'capable of representing more Individuals than one' (III.iii.6). A general term, then, is simply a word we associate with a general idea. Among the general terms of our language are the names of *species*: horse, human, gold, etc.

Locke concludes that

(b) . . .this whole *mystery* of *Genera* and *Species*, which make such a noise in the Schools, and are, with Justice, so little regarded out of them, is nothing else but abstract *Ideas*, more or less comprehensive, with names annexed to them (III.iii.9)

and that

(c) . . .*General and Universal*, belong not to the real existence of Things; but are the *Inventions and Creatures of the Understanding*, made by it for its own use, and concern only *Signs*, whether Words or *Ideas* (III.iii.11).

What is the force of Locke's conclusion? Paul Guyer (1994) argues that Locke's rejection of natural kinds flows entirely from his nominalism. For if there are only particulars in nature, then we have nothing but similarities and resemblances between particulars as a natural basis for classification. But nature, Guyer writes, 'cannot tell us which [similarities] to mark off with our abstract ideas' (129). That is up to us, a matter of decision 'constrained only by the ultimate limits of irreducible simple ideas' (128). In other words, we are at liberty to construct any abstract idea we please down to the

<sup>4</sup> Armstrong (1989) says that Lockean qualities 'ought to be tropes' (64). Martin (1980) insists that for Locke, properties are particulars rather than universals (7).

<sup>5</sup> Locke may have been willing to allow that we can also abstract from a simple idea. For example, we may be able to frame the abstract idea of *color* starting with the ideas of particular shades. I do not wish to commit Locke one way or the other to this view. I only note here that at least one of the roles of abstraction is to allow us to form general ideas of kinds from our complex ideas of particulars.

simplest idea from which nothing else may be separated. Hence, according to the argument, there is nothing in nature that can tell us which divisions to make or where to stop when framing our general ideas of species. So given just the nominalist premise, Guyer claims it follows that species are mind-dependent in the sense that classification of nature can only be a matter of decision, and we could decide to classify things in any number of ways. He writes: ‘the abstract idea itself must be a reflection of our own individual choice of important similarities among individual objects’ (129). If this argument is correct, then given an ontology limited to particulars with similarities between them, there couldn’t be any natural kinds.

Guyer’s argument is unpersuasive, and it is not Locke’s. The claim that nature cannot tell us which similarities we ought to mark off with our abstract ideas is independent of the nominalist premise. Locke draws the anti-realist conclusion, certainly, but as I will show, he does not do so from the nominalist premise alone. The further argument required is not given until III.vi, where the discussion focuses on the names of substances. In III.iii, Locke only rules out the possibility that species and genera are universals. His position is that since there are only particulars, there are no naturally occurring *universal* species, though they may be invented by us as abstract ideas.<sup>6</sup> If Aristotelian species and genera must themselves be universals, then Locke has indeed denied that they could exist in nature, and claims that they are produced by us in the formation of abstract ideas.

But there is still room to maneuver within Aristotelianism. We could admit that nominalism rules out the view that natural kinds are individuated by substantial forms taken as universals, such that the natural world is divided into kinds as individuals partake in these universal forms. We might think of the view Locke is rejecting here as a Platonist view, which maintains that the substantial form of a horse, for example, is the universal *horseness*. Individuals are horses in virtue of their relationship to this universal form. However, an Aristotelian need not take this approach to natural kinds. To see what moves are available, it will be helpful to look more closely at Locke.

The argument of III.iii goes as follows: to belong to a certain species is ‘to have a right to the name of that Species’ (III.iii.12). How we apply the name of a species is just a function of the abstract idea we have constructed and attached to the general name. (Hence, the abstract idea is the ‘nominal essence’ of the species.) While in this sense ‘species’ are ‘the workmanship of the understanding’, that is, the product of our voluntary formation of abstract ideas, it does not follow that there is no objective division of particulars, inherent in nature, which we can at least hope to imitate with

<sup>6</sup> Officially, this makes Locke a *conceptualist* rather than a nominalist. That is, Locke does not think that universals are merely names; he takes them to be abstract ideas or concepts. However, this is still essentially an anti-realist position, since there is no extra abstract entity which is the universal.

our abstract ideas. Particulars may naturally divide into discrete groups in virtue of the fact that they are *significantly* (in a sense which must be fleshed out by the realist) more similar to certain objects than to others. Moreover, the thought goes, these significant similarities can be objective in the sense that they are independent of the possibility that we happen to find them more salient than others. Such significant similarities can mark things off into discrete groups, which are at least in principle discoverable. Guyer seems to ignore this possibility when he argues from Locke's claim that nature only provides us with similarities between particulars to the conclusion that there are no natural kinds.<sup>7</sup>

How can we flesh out the idea that similarities can be objectively significant? What Locke has told us so far is that there are only particulars: individual horses and pieces of gold. There are no universals *horseness* and *gold* in addition. The individuals have qualities, and they may resemble each other with respect to their qualities. It is in virtue of their resemblances that we are able to form abstract ideas that refer to many individuals. If certain of an individual's qualities are in some way special or significant, then there can be significance to the fact that the individual resembles others with respect to those qualities.

What might make some qualities special? Suppose some of an individual's qualities are essential to it in the sense that it could not exist without them. These essential qualities collectively constitute the individual's *essence*. Now we can say that it is in virtue of resembling each other with respect to their individual essences that objects have naturally significant similarities. A natural kind is a set of individuals that have the same essence. The essence of an individual on this account is a collection of essential properties, not something (e.g. a universal or substantial form) over and above those properties. For there to be natural kinds, therefore, it is sufficient that individual things have essential properties, and that distinct things can have the same set of essential properties. There is a basis in nature for the similarities we ought to mark off with our abstract ideas. Even though we can form our species concepts in a variety of ways, and must form them based on our decisions, nature still has intrinsic groupings for us to follow, if we can find them.

Locke must foreclose this Aristotelian maneuver, and I will show how he addresses it in the next section. For the purpose of understanding the structure of Locke's attack on natural kinds, however, the most important point of III.iii is a claim about the nature of general and specific ideas. Our ideas of species and genera are collections of simple ideas formed by abstraction, which refer to objects which have those qualities retained in the abstract ideas. This account is meant to explain how general terms work. It tells us what general terms refer to and how they do this via their association

<sup>7</sup> See, for example, p. 145, note 4, where Guyer emphasizes that Locke's conclusions are 'not logically dependent on' further considerations.

with general ideas. The only alternative account of general terms Locke sees in the vicinity is that general terms refer to universals. This is an account he rejects, and not merely for ontological reasons: We simply have no idea of any universal or substantial form ‘horse’ over and above those simple ideas that make up the complex idea. That our ideas of species and genera are collections is an important claim, which is crucial for understanding the significance of the attack on essential properties in III.vi.

### III

In III.vi, Locke argues that essential properties pertain only to sorts; that is, individual substances do not have essential properties unless considered under a sortal concept. There is nothing essential to a particular *per se*. In section II, I suggested that essential properties could provide a basis for determining which similarities are to count in determining natural boundaries – members of a natural kind resemble each other with respect to their essential properties. If individuals do not have essential properties, then we no longer have a viable account of the special status of certain similarities. In the absence of some principled account of important similarities, any property an individual substance could share with another would be fair game for determining it to a kind.

According to Locke, if we consider a particular thing merely as an individual and not as a member of any kind, we can conceive of nothing that is essential to it. He writes:

(d) take but away the abstract *Ideas*, by which we sort Individuals, and rank them under common Names, and then the thought of any thing *essential* to any of them, instantly vanishes (III.vi.4).

In III.vi.5 Locke claims that when comparing two individual substances, it is unintelligible to suppose that there could be an essential or specific difference between them, ‘without reference to general *Ideas* and Names’. This is because

(e) particular Beings, considered barely in themselves, will be found to have all their Qualities equally essential; and every thing, in each Individual, will be essential to it, or, which is more true, nothing at all (III.vi.5).

In defense of these claims, Locke notes, apparently as an empirical matter, that all of his qualities are liable to change due to various diseases and injuries, including his shape and rationality, properties that were typically thought to constitute his essence (III.vi.4). Bear in mind that in this context we are considering Locke as a particular thing, not under any sortal concept such as *man*, *person*, or whatever. Locke’s claim is that he would still be the

same individual thing despite the loss of any of his properties, so none of them is essential to him. The important point is that if essential properties emerge only in relation to our sortal concepts, then we cannot appeal to essential properties as a basis for *framing* our sortal concepts. And this is just what is required for essential properties to ground natural kinds.

One may complain here that there is something illicit in Locke's thought experiments. Is it really possible to consider a particular object in the absence of any sortal concept? If we abstain from sortal concepts altogether, how do we know what object we are talking about? It is precisely because sortal concepts are linked to essences that they provide *identity conditions* for objects, which allow us to individuate them. But even if this is right, Locke's central point still stands: essential properties cannot be gauged *prior* to, and as basis for, sortal concepts. It may be that essential properties, sortals, and identity conditions are mutually dependent. But if so, they may also be equally baseless. The appeal to one to support the other two is unsatisfying, unless we have some independent support for the one. What the essentialist needs here is independent support for all three.<sup>8</sup>

Locke offers a second argument against essential properties. According to Locke,

(f) . . . in all the visible corporeal World, we see no Chasms, or Gaps. All quite down from us, the descent is by easy steps, and a continued series of Things, that in each remove, differ very little one from the other. There are Fishes that have Wings, and are not Strangers to the airy Region: and there are some Birds, that are Inhabitants of the Water; whose Blood is cold as Fishes, and their Flesh so like in taste, that the scrupulous are allow'd them on Fish-days. There are animals so near of kin both to Birds and Beasts, that they are in the middle between both: Amphibious Animals link the Terrestrial and Aquatique together; Seals live at Land and Sea, and Porpoises have the warm Blood and entrails of a Hog . . . There are some Brutes, that seem to have as much Knowledge as some that are called Men . . . we shall find everywhere, that the several *Species* are linked together, and differ but in almost insensible degrees.

(III.vi.12)

These observations suggest to Locke that the individuals we encounter do not fall naturally into discrete groups. None of the qualities we are able to discern in them are able to guide us in establishing a unique classificatory system because something will always cut across our classificatory boundaries. The argument expressed here focuses on observable surface qualities we might use to individuate species, but it becomes more forceful when extended to unobservable qualities of underlying structure. Underlying structural qualities, some may think, would enable us to determine the

<sup>8</sup> Michael Rea (2000) gives a compelling account of the interdependence of essential properties, sortals and identity conditions.

natural boundaries between species. They would seem to be the important properties of an individual, for it is the structure from which observable properties emanate. For this reason, the strength of Locke's argument only becomes apparent in its extension to underlying structural properties. I will explain below exactly how I think Locke's argument is intended to work at both the surface and structural levels. But first it will be helpful to see an alternative account.

According to Michael Ayers (1981), (1991), Locke argues that even at the level of underlying corpuscular structure, there are no 'chasms or gaps' by which we may discover natural boundaries. Ayers argues that for the seventeenth century mechanist (Locke being one of them) individual substances are very complex 'machines', which are indefinitely mutable, as their constituent corpuscles can always be rearranged. Consequently, all change is structural rather than substantial – however underlying corpuscular structure is altered, nothing essential is lost. So even if we were to discover the underlying structures of substances, this would not lead to the discovery of real natural boundaries between kinds. Structural properties would not reveal 'chasms' and 'gaps' which would mark the boundaries between species, because the indefinite mutability of matter entails a continuum of properties even at the structural level. We would still have to decide arbitrarily where to draw lines between kinds.

Ayers' version of the argument has the weakness that it relies heavily on the outdated theory of corpuscles, and a conception of matter as indefinitely mutable. Ayers (1981) thinks the conception of matter embodied in modern chemistry and atomic theory has made plausible the idea that real 'chasms and gaps' exist between kinds of chemical substances, giving us natural boundaries between kinds.<sup>9</sup> Modern atomic theory does, he thinks, give us a basis for discerning discrete kinds without annoying borderline cases. We can appeal to atomic number to distinguish kinds of atoms, and kinds of atoms give us a basis for discerning precise kinds of molecular structures.

The problem with this response is that Locke never maintained that we are *unable* to find discrete chasms and gaps in nature based on certain properties we decide to use for classification. Indeed, in order to construct and use nominal essences we must appeal (arbitrarily) to certain properties that we can use to divide the world into discrete kinds. I take Locke to be arguing rather differently: given a set of observable qualities  $p_1 \dots p_n$  that belong to an individual substance  $S$ , for each  $p_i$  in  $p_1 \dots p_n$  there could be objects that differ from  $S$  only in respect of  $p_i$ . Observation has shown this to be true for very many individual properties, and there seems no reason why it could not be true for all of them. *This* is the point of the passage quoted at (f). The conclusion is that it is impossible to isolate a subset of  $p_1$

<sup>9</sup> Ayers (1991) appears to have reconsidered his earlier position, and may be less certain that he can save natural kinds. However, in the later work he is less forthcoming about what his final view is, so I have chosen to focus on the position articulated in Ayers (1981).



...  $p_n$  which we could claim constitutes the essence of an individual such that this would be the only 'correct' basis for classification. Locke's claim was never that, for any one of  $p_1 \dots p_n$ , say four-leggedness, there is no discrete gap between that and another property, say three-leggedness. Locke is maintaining that there is no reason to fix on leg number over some other observable quality as essential.

At the level of underlying structure, the argument works the same way. Locke uses the analogy of a watch, since there is a sense in which the underlying structures of watches are known by some experts. He notes that a watchmaker who knows the inner workings of watches might use various qualities to classify different sorts of watches. But, Locke asks,

(g) what is sufficient in the inward Contrivance, to make a new *Species*? There are some *Watches*, that are made with four Wheels, others with five: Is this a specifick difference to the Workman? Some have Strings and Physies, and others none; some have the Balance loose, and others regulated by a spiral Spring, and others by Hogs and Bristles (III.vi.39).

The qualities mentioned (whatever exactly they are) are all discrete qualities between which there are clear 'chasms and gaps'. The realist is still left to explain why we ought to fix on the number of wheels, say, and ignore other features in classifying watches. At both the underlying structure level and the observable level, there are no doubt very many qualities we might choose from, whatever our theory of underlying structure. But for Locke it is not clear what reasons there could be for choosing one type of quality rather than another. Certainly we can find 'chasms and gaps' if we look for them, and indeed we must find such gaps in order to classify at all. But given the variety of qualities we could choose from, a realist must explain why, in picking out certain features of underlying structure, we are discovering natural boundaries between kinds. The only proposal so far is that we are picking out essential properties. But then we need a persuasive account of why the properties are essential which does not presuppose a sortal concept, and hence beg the question.

Guyer locates the force of Locke's argument against natural kinds in the nominalist claim. Ayers views the attack on essential properties as its center. But neither strand alone is as strong as their conjunction. I showed in Section II why Locke's nominalism alone is inadequate. The attack on essential properties cannot be the whole argument either, because it is not an attack on substantial form as such. The anti-essentialist argument of III.vi considers properties *in isolation* as candidates for essential properties. Locke considers his shape and rationality individually in arguing that he could lose either of them. In passages (f) and (g) quoted above, Locke notes that for any property  $p$  of an individual, other individuals can and often do differ in just that respect. Considered separately in this way, it begins to seem implausible that any of an individual's properties is essential to it. This

strategy of argument is persuasive given a conception of essence as a bundle or collection of essential properties. For then we must find individual essential properties to bundle together as its essence. If no particular property is essential, then the individual has no essence.

The difficulty with arguing in this fashion is that an Aristotelian may think there is more to an essence than a bundle of essential properties.<sup>10</sup> What makes a collection of properties essential is that they all flow from the same substantial form, and it is the form which is the essence of an individual. Hence the import of Locke's arguments of III.iii. Locke there rejects the claim that there is any universal form over and above the properties of an individual. Moreover, he aims to establish that our general ideas are merely collections of simple ideas. As we have no idea of anything over and above these simple ideas, the notion that there is something else is unintelligible. So there is nothing left for an essence to be but a collection of essential properties – essential because they are necessary properties of the individual.

To conclude: Locke clearly rejects the Aristotelian theory of classification and its picture of natural kinds. The 'real species' of the Aristotelians are, he thinks, a fiction. The fact that there are similarities between individuals, which we use to classify them, does not entail that nature divides itself into kinds.<sup>11</sup> Further, Locke's argument poses a significant challenge for the contemporary natural-kind realist. It does this by making clear what options are available to the realist, whether scholastic or contemporary. One option is to acknowledge that natural kinds are universals. Some contemporary realists, when pressed to say what natural-kind terms refer to, explicitly admit that they refer to universals or abstract entities.<sup>12</sup> Alternatively, one can insist that individuals have essential properties, and that it is in virtue of their essential properties that they belong to natural kinds. This is a tempting option, but one must defend it without begging the question by presupposing sortal concepts. Any other defense of natural kinds must establish the privileged nature of the properties used for classification by some other means.<sup>13</sup>

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<sup>10</sup> Des Chene (1996) argues that in Aristotelian philosophy, essences are not mere bundles of essential properties. 'Only if essential properties have a common ground or *ratio* in a single form do they comprise an essence' (55).

<sup>11</sup> Commentators who read Locke as a natural-kind realist often make this mistake. See Mackie (1974), (1976) and Galperin (1995).

<sup>12</sup> See Donnellan (1983), Forbes (1981), and Salmon (1981).

<sup>13</sup> For comments on earlier drafts of this paper, I thank Bruce Brower, Graeme Forbes, Christian Kanzian, Kathrin Koslicki, Edmund Runggaldier, and Bruce Thomas. Special thanks to Jim Stone.

## REFERENCES

- Armstrong, D. M. (1989) *Universals: An Opinionated Introduction*, Westview Press.
- Ayers, Michael R. (1981) 'Locke Versus Aristotle on Natural Kinds', *Journal of Philosophy*, 78, 247–72.
- (1991) *Locke: Epistemology and Ontology*, Routledge.
- Chappell, V. (ed.) (1994) *The Cambridge Companion to Locke*, Cambridge University Press.
- Craig, W. L. and Moreland, J. P. (eds.) (2000) *Naturalism: A Critical Analysis*, Routledge.
- Des Chene, D. (1996) *Physiologia*, Cornell University Press.
- Donnellan, K. S. (1983) 'Kripke and Putnam on Natural Kind Terms', in Ginet (1983), 84–104.
- Forbes, G. (1981) 'An Anti-Essentialist Note on Substances', *Analysis*, 32–7.
- Galperin, D. (1995) 'Locke as Anticipator of Putnam Rather than Kripke on Natural Kinds', *History of Philosophy Quarterly*, 12, 367–85.
- Ginet, C. (ed.) (1983) *Knowledge and Mind: Philosophical Essays in Honor of Norman Malcolm*, Oxford University Press.
- Guyer, P. (1994) 'Locke's Philosophy of Language', in Chappell (1994), 115–45.
- Kornblith, H. (1993) *Inductive Inference and Its Natural Ground*, MIT Press.
- Locke, J. (1975) *An Essay Concerning Human Understanding*, ed. by P. H. Nidditch, Oxford University Press.
- Mackie, J. L. (1974) 'Locke's Anticipation of Kripke', *Analysis*, 34, 177–80.
- (1976) *Problems from Locke*, Oxford University Press.
- Martin, C. B. (1980) 'Substance Substantiated', *Australasian Journal of Philosophy*, 58, 3–10.
- Mattern, R. (1986) 'Locke on Natural Kinds as the "Workmanship of the Understanding"', *The Locke Newsletter*, 17, 45–92.
- Rea, M. C. (2000) 'Naturalism and Material Objects', in Craig and Moreland (2000).
- Salmon, N. (1981) *Reference and Essence*, Princeton University Press.
- Troyer, J. (1975) 'Locke on the Names of Substances', *The Locke Newsletter*, 6, 27–39.
- Uzgalis, W. L. (1988) 'The Anti-Essential Locke and Natural Kinds', *Philosophical Quarterly*, 38, 330–8.

