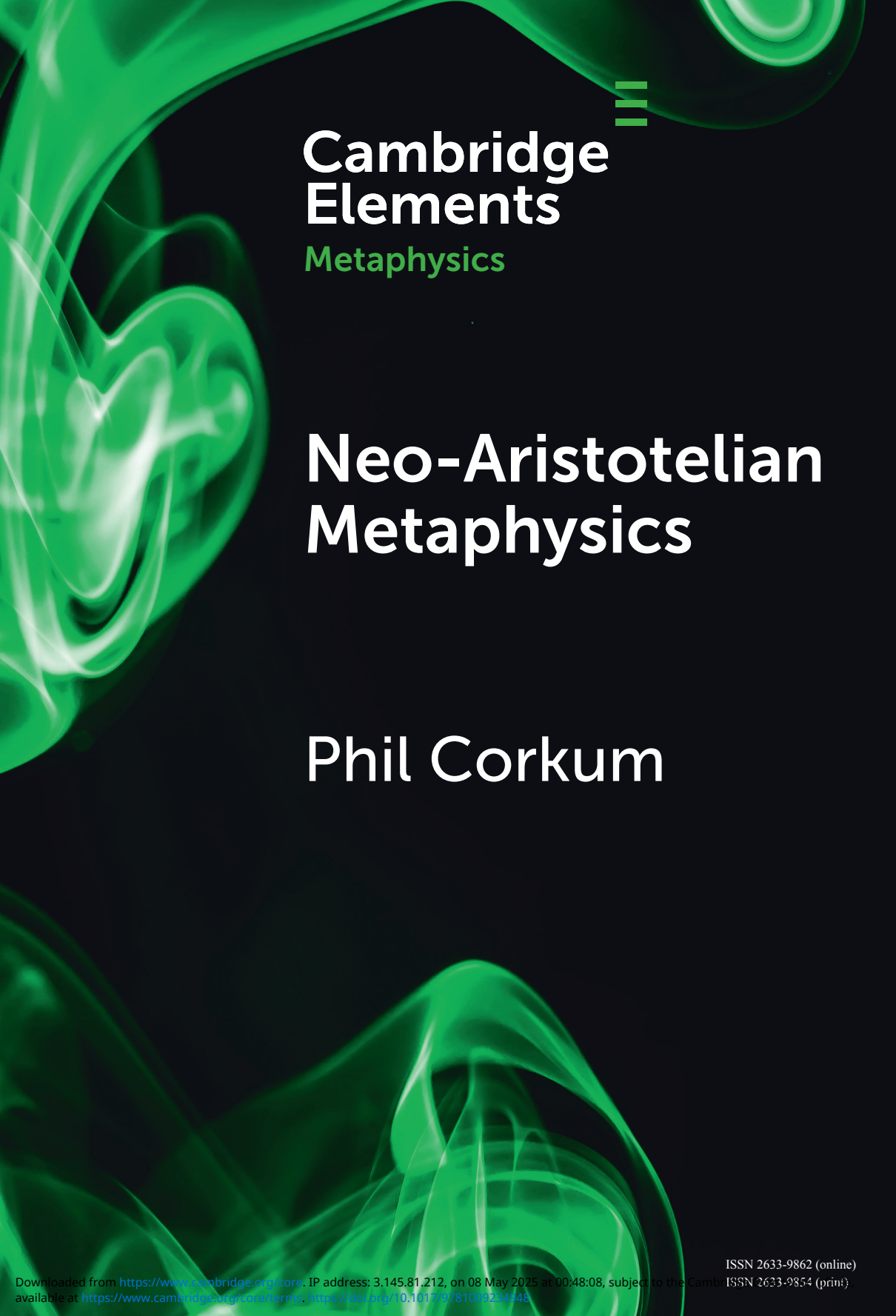

Cambridge Elements

Metaphysics

Neo-Aristotelian Metaphysics

Phil Corkum

ISSN 2633-9862 (online)
ISSN 2633-9854 (print)

Cambridge Elements

Elements in Metaphysics
edited by
Tuomas E. Tahko
University of Bristol

NEO-ARISTOTELIAN METAPHYSICS

Phil Corkum
University of Alberta

CAMBRIDGE UNIVERSITY PRESS

Shaftesbury Road, Cambridge CB2 8EA, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre,
New Delhi – 110025, India

103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of Cambridge University Press & Assessment,
a department of the University of Cambridge.

We share the University's mission to contribute to society through the pursuit of
education, learning and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781009619202

DOI: 10.1017/9781009234948

When citing this work, please include a reference to the DOI 10.1017/9781009234948

First published 2025

A catalogue record for this publication is available from the British Library

ISBN 978-1-009-61920-2 Hardback
ISBN 978-1-009-23491-7 Paperback
ISSN 2633-9862 (online)
ISSN 2633-9854 (print)

Neo-Aristotelian Metaphysics

Elements in Metaphysics

DOI: 10.1017/9781009234948
First published online: April 2025

Phil Corkum
University of Alberta

Author for correspondence: Phil Corkum, phil.corkum@ualberta.ca

Abstract: Contemporary metaphysicians who might be classified as 'neo-Aristotelian' tend towards positions reminiscent of Aristotle's metaphysics – such as category theory, trope theory, substance ontology, endurantism, hylomorphism, essentialism, and agent causation. However, prima facie it seems that one might hold any one of these positions while rejecting the others. What perhaps unifies a neo-Aristotelian approach in metaphysics, then, is not a shared collection of positions so much as a willingness to engage with Aristotle and to view this historical figure as providing a fruitful way of initially framing certain philosophical issues. This Element will begin with a methodological reflection on the contribution historical scholarship on Aristotle might make to contemporary metaphysics. It will then discuss as case studies category theory, properties, substance theory, and hylomorphism. The aim of the Element is to make the relevant exegetical questions accessible to contemporary metaphysicians, and the corresponding contemporary topics accessible to historians.

Keywords: Aristotle, neo-Aristotelian metaphysics, hylomorphism, substance theory, category theory

ISBNs: 9781009619202 (HB), 9781009234917 (PB), 9781009234948 (OC)
ISSNs: 2633-9862 (online), 2633-9854 (print)

Contents

1 Introduction

1.1 Preliminaries

Neo-Aristotelian metaphysics comprises topics in contemporary metaphysics which bear similarity to the interests, commitments, positions, and general approaches found in Aristotle and the scholastic tradition – topics such as category theory, substance ontology, trope theory, Aristotelian property realism, hylomorphism, non-modal construals of essence, causal powers, presentism, endurantism, and agent causation. That's quite the grab-bag, and it seems that one could hold any one of these positions while rejecting the others. What holds all these topics together under one heading? How ought we to delineate neo-Aristotelian metaphysics? There are similarities between neo-Aristotelian metaphysics and Aristotle, but also dissimilarities. What is the relation between neo-Aristotelian metaphysics and Aristotle's own metaphysics? And how might contemporary metaphysics and historical scholarship each benefit from interaction?

My aims are to guide metaphysicians and students of metaphysics through some of the congruent historical topics and interpretive debates, and to guide historians and students of ancient philosophy through some of the corresponding contemporary discussion. I do not aim to provide anything like a comprehensive survey. Rather, we will make a selective survey, covering just a few topics. But the selection will illustrate that the study of contemporary topics can be enriched by appreciation of the relevant historical issues, and that historical scholarship benefits from facility with relevant contemporary debates.

Comparisons between contemporary and historical topics, however, run risks. Such comparisons can make for a facile discussion of only vaguely similar topics. Worse, such comparisons can undermine the goals of both contemporary metaphysics and historical scholarship. In the one direction, the introduction of a contemporary topic into historical research can impose anachronistic views, assumptions, question sets, or methodologies on a historical period. In the other direction, the introduction of historical topics into a contemporary debate can juxtapose a historical precedent which is idle in the contemporary discussion, and so the introduction lacks a clear payoff.

Historicity, not currency, is the concern of the historian. The Aristotle scholar cares about historically accurate interpretation, not relevance to contemporary interests. And truth, not fidelity, is the concern of the metaphysician. Contemporary philosophers care whether positions falling under the umbrella of neo-Aristotelian metaphysics are true, not whether they are faithful to Aristotle.

So some care is needed in going forward. In the remainder of this Introduction, I will sketch some of the topics characteristic of neo-Aristotelian metaphysics. Since I will be toggling between contemporary and historical issues throughout the rest of the Element, I then will make an aside on the contribution historical scholarship can bring to contemporary philosophy. Finally, I will return to the more specific questions concerning the delineation of neo-Aristotelian metaphysics, and the relation between neo-Aristotelian metaphysics and Aristotle.

Let me unpack in just a bit more detail some of the topics falling under the umbrella of neo-Aristotelian metaphysics. Some of these we will discuss further in the following sections. Section 2 discusses category theory. Category theorists aim to articulate highest ontological kinds. A wide variety of classifications have been proposed. We will take a look at just a few examples, and consider some questions: for example, what are the motivations for providing a categorical classification? And can necessary and sufficient conditions be given for a class of objects to be a category? Category theorists might find inspiration in Aristotle's own category theory, in which there are categories of substance, quality, quantity, relation, and others, and a distinction between universals and individuals within each category. We will take special interest in a contemporary category theory that bears superficial resemblance to Aristotle's category theory. However, it will emerge that the motivation and structure of Aristotle's ontological classification is notably different from most contemporary category theories.

Section 3 discusses properties. Concrete particulars exhibit attribute agreement: this dove and this flag of surrender resemble each other in a respect. How explain this resemblance? Theories of attribute agreement include nominalism, realism, and trope theory. Nominalists hold that the extension of property terms are sets of concrete particulars exhibiting resemblance *simpliciter* to an exemplar, or pairwise resemblance *simpliciter*. Arguments against nominalism include the co-extension problem and the imperfect community. Realists hold that concrete particulars resemble each other in a respect due to each instantiating a universal. In addition to this dove and flag of surrender there is a shared whiteness. Realists accept this inflation of ontology in the conviction that their theory has explanatory power nominalism lacks. Unlike nominalists, trope theorists hold that there are properties; but unlike realists, trope theorists hold that properties are individuals. This dove and flag resemble each other since the dove's whiteness resembles the flag's whiteness. Trope theorists can skirt the objections raised against nominalists, while avoiding the ontological inflationism of realists. Both trope theorists and realists might look to Aristotle for precedent, since in the *Categories*, Aristotle appears to hold that there are both universals and individual qualities. The interpretive issues here are complex,

however. For example, it is unclear whether Aristotle views individual qualities as tropes. We will look at Aristotle's discussion of individuals in categories other than substance, to bring out these complexities. We will consider whether relations are reducible to properties in both the historical and contemporary settings. And we will consider how concrete particulars instantiate properties by comparing three theories of particulars, bare particular theory, bundle theory, and substance theory.

Section 4 discusses substance ontology. Aristotle privileges individuals within the category of substance over other kinds of entities. Contemporary substance theorists view substances as playing a variety of roles. In addition to being the bearers of properties, substances exhibit reference magnetism, individuality, unity and integrity, and fundamentality. We will unpack these features and consider the criticism that no one kind of entity can play all these roles. And we will examine some of the interpretive difficulties raised by Aristotle's own discussion of substance.

One role for a substance is as the substratum enduring through qualitative change. Endurantists hold that we persist by remaining numerically identical over time. Endurantism arguably strikes us as the intuitive, pre-theoretic or commonsensical view. That this is so may well be a result of the influence the Aristotelian tradition has had – not only over philosophy but over our ordinary views of the world. Perdurantists, by contrast, hold that ordinary objects persist in virtue of possessing temporal parts, and so are not wholly present at any one time. Perdurantists and other theorists often accept the dialectic that their view must be argued for against the presupposition of, or bias towards, endurantism, and raise objections, such as coincidence puzzles and the argument from temporary intrinsics, to challenge endurantists. We will sketch some of this discussion, and consider Aristotle's endurantism.

Section 5 discusses hylomorphism. Aristotle appears to view substances as compounds of form and matter. Explicitly inspired by this tradition, contemporary hylomorphic theorists hold that certain objects not only have material constituents, but also have a component analogous to a form, which unifies these material constituents. Hylomorphism provides an answer to the question when some objects compose a composite, and gives a response to certain constitution puzzles. We will survey a variety of choice points for contemporary hylomorphists, including: what objects have hylomorphic structure? What is a form and how does it unify the material constituents? Is the composite mereological? And we will discuss Aristotle's views on form and matter to bring out Aristotle's distinctive hylomorphism.

There are also topics falling under the heading of neo-Aristotelian metaphysics that we will not discuss at length. Here are just a few examples. One such

topic is essentialism. Essentialists hold that there are properties that I instantiate in virtue of what I am. A dominant trend in twentieth-century analytic metaphysics is to characterize essential properties modally: on this line, an object's essential properties are those the object has necessarily or has in every possible world in which the object exists. Essential features, however, are connected with notions of identity, nature, and definition. Fine (1994) influentially argues that necessary properties are distinct from, and derivative on, essential properties. The singleton whose sole member is Socrates necessarily exists if and only if Socrates exists, but it is essential to the singleton that it contains Socrates, and not essential to Socrates that he be a member of that singleton. Aristotle also distinguishes essential and accidental properties: I am essentially human and accidentally musical. The distinction does not overlap the distinction between necessary and contingent properties. There are necessary accidental properties, and among these are those properties subsequently labelled *propria*; the classic example, not Aristotle's own case, is risibility. I am necessarily risible, possessing a sense of humour, but I am not essentially risible. Although Aristotle's view of necessity and possibility are not straightforward, he seems to hold that *propria* flow from the essential properties: it is in virtue of my being human that I am risible.

Another topic which we will not discuss at length is agent causation. We appear to act with free will: for many of our actions, we might have acted otherwise. Yet the world appears at the macro level to be determinate: a full description of the state of the world at a given time, along with a complete account of the natural laws, would allow one to determine a full description of the world at any later time. Libertarians accept free will and reject determinism; determinists accept determinism and reject free will. Agent causal theorists such as Chisholm distinguish between determinate event causation and non-determinate agent causation. Although events cause – the neural firing in my brain causes my pinkie to wiggle – it is also correct to say that agents cause – I cause my pinkie to wiggle. Agent causal theorists face certain challenges. For example, if my pinkie wiggling is determined by an event, it is unclear how the distinct causal role of an agent does not overdetermine the effect. However, agent causal theorists might find inspiration in the broader range of causal relata in Aristotle's own causal theories. Aristotle's causes appear to include agents and objects, along with events.

1.2 The Contribution of Historical Scholarship

What is the instrumental value of historical scholarship to contemporary philosophical practice? Philosophy's history is a repository of ideas, positions, debates, and methods. So looking to philosophy's past might enrich a contemporary

discussion. But does approaching this repository as a history, and not a synchronic list of views, offer advantages?

We can lay aside a few possible positions on the relation between contemporary philosophy and historical scholarship. According to *ahistoricists*, the history of philosophy is a field of study wholly distinct from philosophy and the study of philosophy's history provides no advantage to the contemporary practice of philosophy. According to some *historicists*, philosophy is to be identified with its history – or a little more carefully, the correct contemporary philosophical methodology is to be identified with a certain kind of historical scholarship. On either view, the question of the instrumental value of historical scholarship does not arise. The ahistoricist sees the history of philosophy as irrelevant and lacking value, even for those working within a traditions such as neo-Aristotelian metaphysics. The historicist holds that merely working within a tradition is insufficient, since one must do philosophy through the methods of the historian.

Among authors who see historical scholarship as having instrumental value, some view historical work as exposing vestiges whose influence on contemporary philosophy might otherwise go unnoticed. For example, Glock (2008) perhaps views the exposure of vestiges as a role for the history of philosophy that could not be provided by a repository of synchronic positions. Wilson (1992) illustrates a similar view by arguing that the contemporary discussion of perception can incorporate unawares inappropriate vestiges from a wholly different historical discussion of perception. Modern philosophers explain the relation between sense experience and physical reality as a rival to scholasticism, with science and philosophy seamlessly combined. Wilson worries that appropriating aspects of the modern discussion can bring into the contemporary discussion assumptions about the relation between science and philosophy with which we no longer agree. Historical scholarship can correct this misappropriation.

Others view historical work as useful for overcoming contemporary prejudices, not by exposing historical vestiges but by bringing in historical rivals to challenge contemporary views. For example, Della Rocca (2013) criticizes the contemporary use of intuitions in philosophical arguments. How can we break away from this methodology? Della Rocca suggests: look to philosophers working before the 'veil of intuitions.' Della Rocca holds that historical figures typically do not aim to accommodate intuitions: as an example, he notes that Spinoza follows the Principle of Sufficient Reason to counterintuitive consequences. Historical scholarship can in this way offer alternative theories or illustrate alternative methodologies.

McDaniel (2014) takes a distinctive approach, and one which does not require that there be vestiges or unattractive contemporary views for historical

scholarship to be useful to contemporary philosophical practice. McDaniel views the history of philosophy as calibrating intuitions and confronting groupthink by exposure to philosophical traditions unlike our own. We calibrate our intuitions by coordinating our intuitions with others. McDaniel notes that coordination with historical figures is especially useful since, because their philosophical setting is unlike our own, we enrich our philosophical community by widening it.

Appreciation of the history of philosophy can benefit its contemporary practice in all these ways. But these envisioned roles for historical scholarship are attenuated, in at least two ways. The roles are *dispensable*, since they can be replaced by nonhistorical considerations. And the roles are often available to be filled only *contingently* – only if there are indeed vestiges or contemporary assumptions which can be helpfully contrasted with their historical antecedents, or historical views suitable for the calibration of contemporary intuitions.

Historical scholarship can also contribute to the assessment of theories in terms of certain cognitive or non-epistemic values. The discussion of values in the context of scientific practice arose in response to the observation that evidence underdetermines theory choice. To adjudicate among rival scientific theories with equivalent conformity to empirical evidence and predictive power, philosophers of science have appealed to a wide variety of features. For example, Kuhn (2012) cites accuracy, simplicity, internal and external consistency, breadth of scope, and fruitfulness. Quine and Ullian (1978) list conservatism, modesty, simplicity, generality, and refutability. Longino (1990) cites among traditional virtues empirical adequacy or accuracy, simplicity, and explanatory power or breadth of scope. Douglas (2009, 89) lists predictive accuracy, explanatory power, scope, and simplicity or economy. However, a host of alternatives to these traditional values also have been proposed. Laudan (1984) includes prediction of surprising results, and variety of evidence among virtues. Longino (1996) cites novelty and ontological heterogeneity. And Douglas (2009) includes concern for human life, reduction of suffering, promotion of political freedoms, and social mores.

Values allow evaluation and preferential ranking among theories, positions, hypotheses, methodologies, frameworks, problem sets, and research agendas. Evaluations and rankings can be in terms of different goals and so values are of different kinds. Some evaluations are in terms of likelihood of truth for theories, positions and hypotheses, and of likelihood of producing results for methodologies, frameworks, and problem sets. And so some values are epistemic or conducive to truth. Truth conducive features include internal consistency, empirical adequacy, and predictive competence.

Other evaluations are in terms of ease of understanding the positions, assessing the arguments for the positions or otherwise following the reasoning, agreeing with the intuitions or other data supporting the theory, appreciating the significance of the issue for other areas of research, and so on. And so some values are cognitive. Such values aid cognition. For example, all else being equal, an ideologically simpler theory facilitates understanding. It is easier to grasp a theory with fewer primitive concepts than one with more, easier to follow the reasoning from those primitives to derived theorems, easier to apply the concepts so to classify the data, easier thereby to assess the classified data to confirm or disconfirm hypotheses, and so easier to appreciate the results of the theory.

Understudied are the values of novelty and conservativeness. These values are paradigmatically used in assessments of proposed theories relative to current alternatives: conservative proposals are consistent with presently accepted theories; novel proposals, inconsistent. But these evaluations can reflect conformity with, or difference from, contemporary views in a variety of ways. Novel theories, for example, can deviate from present theories by postulating different entities and processes, adopting different principles of explanation, incorporating alternative metaphors, or by attempting to explain phenomena not previously the subject of investigation.

But values such as novelty and conservativeness also can lend support for a position. Much of this support is cognitive. A view that is conservative gains cognitive accessibility from familiarity, at least to those working in the tradition. A theory that is novel might be less immediately accessible but may prove fecund, and yield the benefit of new insights. Moreover, values such as novelty and conservativeness contribute to philosophical progress in other ways. These values attach not only to positions but also to frameworks, sets of problems, sets of assumptions, the bases on which we weigh some considerations over others, the methodological proclivities of practitioners, the divisions by which we carve up a field into areas of specialization, and the *déformation professionelle* that influences our views on the place of philosophy within society. Locating these features within a historical context, and evaluating their novelty or conservativeness, moves philosophical inquiry forward. Indeed, it is here that these values perhaps play their most prominent role. For example, the influence of a traditional set of questions, orthodox way of framing these questions, or received way of going about answering the questions, can last long after the initial contenders for answers have fallen by the wayside.

There is no straightforward application of these features in assessments. Novelty and conservativeness are not all-or-nothing affairs. A theory may be orthodox in some respects, and radical in others. Moreover, these valences pull in different directions. For example, conservativeness and novelty are in

tension. Should we prefer the more conservative theory or the more novel? There is no one-size-fits-all answer. Generally, an optimal theory might exhibit a balance among these values. But where the equipoise lies will vary by case, and overall assessment requires careful judgement.

Notice that conservativeness and novelty are relative to a contrast class. Longino (1996) takes the appropriate contrast set to comprise just the current theories. But the contrast classes also must include historical theories, in order that assessments of conservativeness and novelty meet minimal standards of adequacy. Consider an assessment of novelty that looked to a restricted group of merely concurrent theories. If the proposed theory were identical to a theory that fell outside this group of concurrent theories, but was nonetheless relatively recently advocated, then few would conclude that the proposed theory is novel.

So a diachronic chronology plays a role which a synchronic repository of positions could not play. But moreover, not all positions are equally relevant to assessing conservativeness and novelty. We would not view a theory as conservative on the basis of its similarity to an esoteric position, advocated in the remote past, and lacking subsequent influence. This is not to say that there is an easy correlation between time and relevance. On the one hand, a more distal theory might be less relevant for assessing conservativeness and novelty. But on the other hand, a more distal position might exhibit greater influence on delineating the orthodoxy than a more proximate position. For these reasons, a mere chronology is insufficient.

The history should play a role *as* history: we need not a mere list of positions, nor even a chronology, but a historical narrative, tracing the context in which debates played out, positions were floated, objections raised, and retorts retorted. Historical scholarship aims to provide a story of development, identifying the influences that help to produce a position, the stated commitments of a view, the reasons given in its support, and the criticism a view received. We need, moreover, not a mere doxographical description of what was said, but an assessment of the explicit reasons given for or against a position. We ought to track the implicit reasons for and tacit commitments of a view. We ought to debate the correctness or incorrectness of a position and of its historical criticism.

1.3 Going Forward

With this aside on the general contribution which historical scholarship might bring to contemporary philosophy on the table, let us return to the specific questions from the beginning of this introduction. How ought we to delineate neo-Aristotelian metaphysics? And what is the relation between

neo-Aristotelian metaphysics and historical scholarship on Aristotle's own metaphysics?

We have seen that a diverse range of topics fall under the umbrella of neo-Aristotelian metaphysics. What perhaps unifies a neo-Aristotelian approach in metaphysics is not a shared collection of positions so much as the general perception that Aristotle provides a fruitful way of initially framing certain philosophical issues. Consonant with this view is, or ought to be, a willingness to engage with the historical figure.

Historical scholarship, we have seen, can expose vestiges, offer rivals to contemporary assumptions, calibrate intuitions, and facilitate the assessment of novelty and conservativeness. Such contributions are of special importance when we are discussing a metaphysical theory working within, or purporting to be working within, a historical tradition. And indeed we will see examples that are arguably cases of each of these kinds of contribution. Tracking the historical vestiges lingering in the contemporary discussion is an especially pertinent task, for a general approach that draws inspiration from a historical figure. Historical judgements are especially well suited for calibration of contemporary intuitions when there are broad similarities in approach. But neo-Aristotelian metaphysics is not Aristotle's metaphysics, and bringing historical alternatives to contemporary assumptions is especially subtle and relevant when the historical and contemporary views share surface similarities. And finally, the assessment of the novelty and conservativeness of a contemporary metaphysical theory is especially well facilitated by bringing to bear a detailed understanding of what is both a set of broadly similar views and a dominant and influential philosophical tradition within the history of metaphysics.

Aristotle scholarship can bring out the original reasons for adopting a particular set of problems, interests, approaches, methodologies, and positions. The significance of this information will vary case by case. In some cases, the original reasons might well be still viable, and the historical findings can provide good motivation for adoption. In other cases, the original motivations will no longer be viable within a contemporary setting or relevant to contemporary purposes, and the historical research can make vivid the need for finding new motivations, rationales and defenses. We will see a case, category theory, where careful study of Aristotle arguably suggests that the original motivation for a distinctive theoretic approach has been lost, and either the original motivation must be recovered, or new motivations must be found.

Historical scholarship can complicate the characterization of a position as Aristotelian. We will see an example, trope theory, where the assumption that Aristotle is a fellow traveller rests on a controversial interpretation. And historical scholarship can bring out that, although the contemporary position

is similar to Aristotle's views, the application of the view to philosophical issues has shifted, or the relation of the view to positions in other areas has altered. And we will see an example, hylomorphism, where the components characteristic of the contemporary view arguably are significantly different from their historical correlates.

2 Category Theory

2.1 Introduction

Let me begin with a few initial remarks on the historical precedent found in Aristotle's own category theory. In the *Categories*, Aristotle identifies categories through considering a mix of linguistic and non-linguistic evidence. This approach partly inspired a historically influential interpretation of these categories as a conceptual or linguistic classification. But it is much more common today to view Aristotle's categories as an ontological classification. Linguistic data, along with other *endoxa*, educated opinions, provides prima facie but defeasible evidence of the content and structure of the extralinguistic reality signified by linguistic terms. Aristotle considers simple predications lacking explicit quantification or modal operators. Such predications take two terms, standing in subject and predicate position respectively, syntactically conjoined by a copula, and so having the form 'S is P' or, in a formulation Aristotle sometimes prefers, 'P belongs to S.' Aristotle identifies ten categories by considering the various kinds of these terms or, as he puts it here, linguistic expressions said without combination:

> Of things said without any combination, each signifies either substance or quantity or qualification or a relative or where or when or being-in-a-position or having or doing or being-affected. To give a rough idea, examples of substance are man, horse; of quantity: four-foot, five-foot; of qualification: white, grammatical; of a relative: double, half, larger; of where: in the Lyceum, in the market-place; of when: yesterday, last-year; of being-in-a-position: is-lying, is-sitting; of having: has-shoes-on, has-armour-on; of doing: cutting, burning; of being-affected: being-cut, being-burned. (*Cat*. 4, $1^{b}25–2^{a}3$)

Of these, substance, quality, quantity, and relations are the categories subsequently most discussed. It occasionally will prove useful to lump the categories other than substance together, and speak of substance and nonsubstance categories. Aristotle will go on in the *Categories* to discuss the characteristic marks of these categories, and to draw on a semantic distinction (concerning two kinds of predictive tie connecting terms) to generate more structure within this categorical classification. We will return to these topics, but first let us consider some aspects of category theories within the contemporary setting.

As a first stab, a category theory yields a list of highest kinds. Kinds of what? I will make a few assumptions for our discussion. For the most part, I will assume that a category theory concerns kinds of entities. And so the aim of giving a category theory is to provide an ontological classification, and not, say, merely to provide a classification of concepts by which we understand the world. And I also mostly will assume realism: the aim of the kind of category theory relevant for our discussion is to give a classification of kinds of entities that is objective and independent of human interests.

Realists might support this stance by drawing on arguments from inference to best explanation. Insofar as our categorical classifications, conceptual schemes, and ontological commitments provide the best explanations of empirical data, we have good reasons, although defeasible reasons, to view these theoretic choices as tracking the natural joints of the objective world. Realists might also view their goal as providing a realist picture, rather than as defending realism. On this approach, realism is an unexamined but not thereby an illegitimate assumption or working hypothesis, given these goals. For an expression of a similar approach, see Sider (2001, xiii–xxiv).

Perhaps the best reason for us to restrict our attention to ontological category theories with a realist bent is that these theories arguably bear the closest resemblance to Aristotle's own category theory, and so are the most likely to fall under the umbrella of neo-Aristotelian category theory. But let me flag two notes of caution. First, as just mentioned, this interpretation of the categorical schemes in the work entitled *Categories* is historically dominant but not universally endorsed. And second, as we soon will discuss, neo-Aristotelian category theories bears surface similarities to Aristotelian category theory, but offer different specific classifications, are arguably responsive to different problem sets, address different questions, are motivated by different reasons, and employ different argumentative frameworks.

Here are just a few examples of recent categorical classifications. Chisholm (1996) divides the genus of being into contingent and necessary being. Contingent beings are divided into contingent states (including events) and contingent individuals (which are further divided into contingent substances and boundaries); necessary beings are divided into necessary states and necessary non-states (which are further divided into attributes and necessary substances). Hoffman and Rosenkrantz (1994) classify entities as concrete or abstract. Concrete entities are further divided into substances (which are still further divided into physical objects and souls), event, time, place, trope, boundary, collection, and absence; abstract entities are further divided into properties, relations, sets, and propositions. Johansson (1989) offers the categories: spacetime, state of affairs, quality (which further divides into substance

and property), external relation, grounded relation, inertia, spontaneity, tendency, and intentionality. Grossman (1983) gives the categories: individuals, properties, relations, classes, structures, quantifiers, facts, and negation.

2.2 Two Kinds of Category Theory

What is the aim of a category theory? Many ontological positions suggest a partial categorical classification. For example, universal realism, the view that there are universals, suggests a distinction between the particular and the universal; and mathematical realism, the view that mathematical objects exist, suggests a distinction between the abstract and the concrete. Provided these distinctions carve ontology at the highest level of generality, universal realism, and mathematical realism suggests something akin to a category theory. Indeed, any ontological posit will partition the domain of objects. And so one well might question what added value is gained through a theoretic reflection on such a partition. After all, the questions whether there are universals, or mathematical objects, might be better answered by local considerations in the philosophy of properties, or philosophy of mathematics, respectively.

A category theory ought to do more than merely yield a classification. At very least, a category theory ought to provide principled reasons for taking a philosophical distinction to partition ontology at sufficiently high level of generality. A theory ought to answer questions such as how to identify categories as such. Any ontological posit partitions a domain, but marks of categories should govern when ontological positing is permissible. A theory ought to provide criteria for taking a class to be a category, an ontological kind not subsumed under a higher class.

The answer might well be that it is a brute fact that a given ontological kind is a category. On such a view, to continue our example, abstract and concrete objects do not fall under some broader heading, but there is no further explanation why this is so. Brutalism in category theory is at least an answer to the question: why is an ontological kind a category, if not an informative one? But putting brutalism aside, we well might expect a categorical scheme to be supplemented by an account of what makes some kinds categories and others, not.

An informative account would yield necessary and sufficient conditions for being a category, or at least marks that typically pick out categories and distinguish categories from kinds of less generality. But preferable is an account that explains why a candidate category is or is not of the highest generality, or one that tells us what highest generality consists in.

What features characterize such an account? The constraint that categories should be classes of the highest generality appears to be insufficient to ensure

that the class is a category. Or at least, being of higher generality does not make a kind better suited to be a category. A disjunctive concept is typically of greater generality than its disjuncts (since, provided the extension of each disjunct is non-empty and finite, the extension of the disjunction is greater than that of any disjunct).

We might also require that categories be natural, joint-carving, or at least non-gerrymandered. The disjunction case shows that this feature does not flow solely from the requirement that categories should be of the highest generality. Moreover, perfectly natural properties need not be categorical.

There are several other choice points. Is a categorical scheme a complete, exhaustive list of entities? Must categories within a categorical classification be mutually exclusive? Is a classification unique or might multiple schemes legitimately partition the same domain of entities under different divisions? Might there instead be multiple true classifications of categories? Category theoretic pluralism would allow the same domain of objects to be carved up in various ways.

Exclusive, exhaustive, and unique classifications offer theoretic virtues. For any entity, there is, according to such a classification, a unique singular answer for the question: under what category does the entity fall? But the features of exclusivity, exhaustiveness and uniqueness are not entailed by categories being highly general or natural. Those who view categorical classifications in this way might take the features to be stipulative, or they might view the features as simply reflecting a long tradition within metaphysics.

What are the modal features of a categorical classification? A categorical scheme is typically viewed as a noncontingent categorization. The facts concerning what the categories are, are necessarily true. And an item that falls under a given category necessarily falls under that category, if it exists. These views have some initial attractiveness. Metaphysical theses are typically thought of as similar to, say, mathematical theses: if they are true, they are necessarily true. The view on the modal status of falling under a category also has prima facie attraction. How might an abstract object, such as a number, have been instead concrete? How might a quality, such as blue, be possibly a quantity?

However, one might doubt that a categorical classification need have these modal characteristics. There has been recent reflection on contingent metaphysical truths. For example, Cameron (2007) argues that facts concerning when some things compose some thing are contingent. To give another example, one response to Black cases, alleged counterexamples to the identity of indiscernibles, is to view the identity of indiscernibles as actually but merely contingently true. Similarly, facts concerning what classes are categories might be contingent. For example, it might be that the class of entities exists, but it is contingent that the class is of the highest generality, and so not subsumed under some more

general class of entity. So facts concerning what categories there are might *typically* be viewed, like certain composition facts, or the identity of indiscernibles, as if true, then necessarily true; but this view perhaps reflects a tradition, and not the constraints of the conceptual space.

Moreover, the fact about what category a given item falls under might also be contingent. Suppose that a reductive theory of relations, under which all relations can be eliminated by reduction to properties, is contingently true. Then relational expressions would denote properties but might have denoted irreducible relations. On this view, arguably, properties might have been relations. At any rate, one might doubt that contingent metaphysical theses can be ruled out simply by consideration of category theory or the marks of what makes a classification categorical. And again, that these features are typical for category theories perhaps merely reflects a traditional approach.

What are the epistemic features of a categorical classification? Are beliefs concerning a given categorical classification warranted *a priori*? It might seem that categories are presupposed by any experience, and so beliefs concerning a given categorical classification cannot be warranted by empirical evidence. But although this may be typical for certain kinds of conceptual schemes, it is not obviously true of an ontological classification. Considerations in favour of a proposed classification may well be from the armchair and yet still be sensitive to empirical data. For example, linguistic evidence might provide prima facie evidence of a categorical classification; as we noted in Section 2.1, this may be Aristotle's own approach. Or a categorical classification may be revisable in light of empirical evidence – for example, if according to our best science time and space turn out to be not distinct categories. At any rate, that a categorical classification would be sensitive to empirical evidence in these ways is not inconsistent with the realist, ontological picture sketched at the beginning of this section.

To sum up, that a category theory provides a principled classification, with highly general, natural classes of entities, appears to leave open whether a category theory exhibits exclusivity, exhaustiveness, uniqueness, and whether the facts which characterize the theory or the facts which constitute the theory are necessary or a priori. As such, it is unsurprisingly challenging to give necessary and sufficient conditions for being a categorical classification. To illustrate, let us look at a good example of a proposal.

Rosenkrantz (2012) offers the following criteria for categories.

(1) There exists an F.

(1′) It is possible that there exists an F.

(1″) It is epistemically possible that there exists an F.

(2) It is impossible for something to be F contingently.

(3) 'F' is a non-relational predicate that is used substantivally, that is, as a noun.

(4) 'F' does not express a natural kind, a kind of artificial entity or artefact, or a kind of social entity.

(5) If 'F' is a negative predicate, then 'F' is the negation of an atomic predicate which satisfies (4).

(6) If 'F' is not a negative predicate, then there is not a more positive expression of what 'F' expresses than 'F'.

(7) If 'F' is a conjunctive predicate which has another non-atomic predicate as a part, then such a part is either a negative predicate as in (5) or a conjunctive predicate; the number of such negative parts of 'F' does not exceed the number of non-negative predicates which are parts of 'F'.

(8) 'F' is either atomic (logically simple), negative, or conjunctive, and may be of any one of these three sorts.

(9) Neither 'F' nor any of its parts is synonymous with a non-atomic predicate of the kinds excluded by (8), (7), and (6).

(10) 'F' is not a conjunctive predicate such that one of its conjuncts entails another one of its conjuncts, unless 'F' is such that (i) only one of its conjuncts expresses the notion of entity, and (ii) only one of its conjuncts entails another one of its conjuncts.

I will make just a few comments on the specifics in this categorical classification. There are some choices here that one might question. For example, although Rosenkrantz (2012) and Hoffman and Rosenkrantz (1994) take a realist stance on category theory, they take the entities classified to include the merely epistemically possible.

Another feature of the Rosenkrantz proposal which might strike the reader as somewhat idiosyncratic is an approach to categories through the linguistic expressions that legitimately pick out categories. As we have seen, this approach arguably has historical precedent. Rosenkranz appears to go further in taking the identification of categories to be sensitive to a fine-grained approach to meaning. In Rosenkrantz's usage, 'event' expresses a category; 'event and event' or 'non-nonevent' denote but do not express that category. We might express Rosenkranz's view by saying that these are co-referential but non-synonymous terms. So for example, (3) excludes 'Smith's favorite abstracta' as an appropriate way to denote a category. (9) excludes hidden disjunctions; for example, let

'subprop' denote items that are either substances or properties; then 'subprop' is also an inappropriate way to denote a category. Other criteria appear to take gerrymandered expressions as unsuitable for expressing categories. For example, (1) excludes the gratuitously complex or redundant. Rosenkrantz perhaps views categories not as classes of entities so much as classes under a certain description.

Some of Rosenkrantz's criteria appear stipulative and arguably not arising from what is necessary for a kind to be of the highest generality and natural. For example, as we have seen, the restriction against disjunctions does not arise from the generality or naturalness required of a category. Rosenkrantz's criteria are arguably uninformative, and do not explain what it is to be a category. Partly for these reasons, it is difficult to assess Rosenkrantz's apparent view that (1)–(10) are each necessary and are jointly sufficient for a class to be a category.

We might best see the criteria (1)–(10) as expressing well some traditional views concerning categories, including the view that categories are most general kinds of entities which are also natural or non-gerrymandered. This observation suggests what might prove to be a useful distinction. Call a *weak category theory* a classification of natural, highest ontological kinds. The specific categories identified by a weak category theory might well be stipulated or merely reflect a tradition. To note this is not to say that beliefs in a categorical classification of this kind are unwarranted. As discussed in Section 2.1, a traditional approach might benefit from being tested for utility over a long period. Let a *strong category theory* be a weak theory that has been supplemented with principled, non-stipulative, and informative criteria for a class to be a category.

A weak category theory suggests a modest project of laying out distinctions, rather than providing criteria to explicate that in virtue of which certain classes are categories. Such a project might still contribute to answering the question, what exists? I will briefly discuss two other roles a weak category theory might play.

First, such a theory might expose philosophical confusions through the identification of category errors. For example, Ryle (1949) held that facts such as that expressed by 'Saturday is in bed' make a category mistake, while the fact expressed by 'Ryle is in bed' does not, showing that Saturday and Ryle belong to different ontological categories. Some care is needed in going from linguistic evidence to ontological claims. 'Time flies' gives the impression that time is an object, and an object in motion. 'Sherlock Holmes lives on Baker Street' appears to commit a speaker to an existing Holmes. The sentence, however, might be taken to be true without carrying ontological commitment

to Holmes' existence. For example, the explicit sentence might be seen as the argument of a tacit fictional discourse operator, so that the utterance expresses the proposition that according to Doyle's fiction, Sherlock Holmes lives on Baker Street. To give a final example, a case where ontology cannot be straightforwardly read off of surface sentences, 'I stood up rapidly' is well formed, and 'I stood up rapid' is not, without there being thereby an ontological difference between what is expressed by adverbs and what is expressed by adjectives.

Charges of category mistakes can do work elsewhere in philosophy. Ryle himself argued that dualism and the resulting mind-body problem arises from conjoining entities that belong in two different categories. Without getting into the weeds of Ryle's argument, something more needs to be said here. It is not easy to show that minds and bodies belong to different categories, as opposed to just different kinds of objects falling under classes of lesser generality than is typical of categories. But even if we concede this, it is not clear that the challenges for dualism arise from categorical differences. One difficulty for dualism is the causal interaction between mind and body. It is not obvious that items in different categories could not causally interact.

A second role for weak category theory is to resolve ontological disputes. Thomasson (2022) takes ontological disagreements as resting on the mistaken use of category-neutral existential and quantificational claims. For example, the assertion 'there are numbers' is ambiguous between a false claim about concreta and a true claim about abstracta. Mathematical realists and their opponents both purport to be using quantifiers that range over any object whatsoever. But the considerations that favour realism only support the existential claim when read as restricted to abstracta; and the considerations that challenge realism only undermine the existential claim when read as restricted to concreta. Such an approach to ontological disputes faces challenges. The underlying disagreement over whether there are numbers does not appear to be resting on a confusion over whether we are talking about concrete or abstract objects. On the contrary, there appears to be a genuine dispute here. And those who take existential quantifiers, even in philosophical claims, to be implicitly restricted owe us an error theory to explain how disputants are unaware they are talking past each other.

2.3 Fourfold Category Theories

Before moving on, let us now return to Aristotle's categories. Recall, Aristotle arguably draws on linguistic evidence to infer from different kinds of linguistic terms different kinds of ontological kinds. Aristotle gives this categorical

classification more structure by drawing a further semantic distinction. This is a long quotation, but it will pay dividends going forward to have this whole passage before us. We will next discuss Lowe's influential category theory, and the structure that Aristotle presents here bears surface similarities with Lowe's classification; having the Aristotelian picture on the table will help to bring out deeper dissimilarities between Lowe and Aristotle. But the passage also presents an interpretive difficulty (over the reading of individuals in nonsubstance categories) which will occupy us in Section 3, when we discuss Aristotelian and neo-Aristotelian views of properties.

> Of things there are: (a) some are said of a subject but are not in any subject. For example, man is said of a subject, the individual man, but is not in any subject. (b) Some are in a subject but are not said of any subject. (By 'in a subject' I mean what is in something, not as a part, and cannot exist separately from what it is in.) For example, the individual knowledge-of-grammar is in a subject, the soul, but is not said of any subject; and the individual white is in a subject, the body (for all colour is in a body), but is not said of any subject. (c) Some are both said of a subject and in a subject. For example, knowledge is in a subject, the soul, and is also said of a subject, knowledge-of-grammar. (d) Some are neither in a subject nor said of a subject, for example, the individual man or individual horse – for nothing of this sort is either in a subject or said of a subject. Things that are individual and numerically one are, without exception, not said of any subject, but there is nothing to prevent some of them from being in a subject-the individual knowledge-of-grammar is one of the things in a subject. (*Cat*. 2, $1^a20–29$)

Aristotle here distinguishes between two ways in which a term can be predicated of a subject, as referring to something said of the subject, or as referring to something present in that subject. We will need to set aside until Section 3.2 a more detailed interpretation of these predicative ties, but let me make a few observations here. The present-in tie is a cross-categorical relation connecting items in nonsubstance categories with substances. The said-of tie is an infra-categorical relation connecting what appear to be individuals with the species under which they fall, or species with the genera under which they fall. What is said of a subject is a term which Aristotle calls synonymous with that subject.

> When things have the name in common and the definition of being which corresponds to the name is the same, they are called synonymous. Thus, for example, both a man and an ox are animals. Each of these is called by a common name, animal, and the definition of being is also the same; for if one is to give the definition of each what being an animal is for each of them-one will give the same definition. (*Cat*. 1, $1^a6–11$)

So, for example, suppose that humans are rational animals; if Socrates is a human, then he is a rational animal. The present-in tie does not have this entailment. If paleness is a colour and Socrates is pale, it of course does not follow that Socrates is a colour. The introduction of these two kinds of predictive ties yields a fourfold classification. Individual substances, such as Socrates, are neither said of nor present a subject; terms referring to such entities can only stand in subject position. Universal substances, such as the species picked out by 'human' are said of individual substances but are not present in a subject. Universal nonsubstances are present in substances and said of appropriate nonsubstances of lesser generality. For example, colour is said of white; and colour is present in the species dove; and, although it raises an interpretive difficulty I will not discuss, colour is arguably present in individual doves. Finally, individual substances are present in a subject, as perhaps a term picking out this paleness might be predicated of Socrates, but are not said of any subject; we will return to the interpretation of these items.

Let me now discuss in more detail a fleshed out contemporary category theory – one of special interest to us, due to some surface similarities to Aristotle's category theory. Lowe (2006) offers a categorical structure, with individual substances, universal kinds, modes, and attributes. Individual substances are characterized by modes, and universal kinds are characterized by attributes. So for example, the individual Socrates is characterized by a mode or particular instance of paleness, and humanity is characterized by paleness. Socrates instantiates humanity and Socrates' paleness instantiates the attribute paleness.

This yields a four-category picture. Notice that despite the surface similarities with Aristotle's categorical scheme, there are significant differences. As we have seen, Aristotle does not view universals and individuals as distinct categories; rather, the distinction divides each category. Rosenkrantz (2012) appears to mischaracterize Lowe as taking the distinction between universals and individuals as yielding primary categories, with the distinction among universals between kinds and attributes, and the distinction among individuals between substances and modes, yielding a subordinate groups within the main categories.

This categorical structure might strike the reader as baroque in comparison with more standard pictures. On realist views, individual substances instantiate universal properties. Kinds are merely collections of properties. According to bundle versions of trope theory, there are only tropes, individual properties. According to nominalism, there are only concrete individuals. We will discuss these three positions in more detail in Section 3. The added structure in Lowe's structure raises some initial concerns. For example, a categorical scheme with

both tropes and universals appears redundant, since universals and tropes typically play the same role in explaining attribute agreement (more on this later). The distinction between kinds and attributes also initially appears unnecessarily complex. Natural kinds are typically reduced to sets of attributes. For example, the kind electron is identified with a certain charge, mass, and spin. Lowe views kinds as being characterized by attributes, and not to be identified with these attributes. But then it is arguably obscure what a kind is over and above the attributes which characterize it. What more is there to being the kind electron, other than having a specific charge, mass, and spin?

One might worry about the lack of ontological parsimony in Lowe's category theory, in contrast with more standard views. But the value of parsimony typically only adjudicates among theories with equivalent explanatory power. Lowe views the ontological inflationism as offering several theoretic advantages. For example, the fourfold category theory allows an account of dispositions without appeal to non-occurrent properties. And the theory allows an account of natural laws without appeal to certain modal relations. To illustrate, I will discuss Lowe's approach to dispositions.

To ascribe a categorical or occurrent property, such as squareness, is to say how an object is; to ascribe a dispositional property, such as elasticity, is to say how it might be. Dispositions are not mere possibilities, but are rather typically tendencies towards certain behaviour, in response to specific stimulus. Fragile glasses break when dropped on hard surfaces. Elastic materials stretch when pulled, and so on. Dispositions are often taken to be a different kind of property from occurent properties. But Lowe views dispositions as two ways of attributing the same property. An attribute characterizing a natural kind or substantial universal is typically a dispositional property. The same attribute, when exemplified by an individual substance, which amounts to being instantiated by a trope or mode which itself characterizes an individual substance, is an occurent property. For Lowe, an object can fall under a kind which is characterized by an attribute, or be characterized by a mode which is an instance of that attribute.

What advantage is being claimed over traditional theories of dispositions? Traditional analyses of dispositions are in terms of counterfactuals. For an object x, dispositional behaviour M and triggering condition C,

> x is disposed to M when C iff x would M were C the case, that is, close possible C worlds are M worlds.

That is to say, we are considering worlds where the triggering condition C occurs are worlds where x does the M action; the restriction among these worlds to those close or relevantly similar to the actual world rules out remote or

irrelevant possibilities. This restriction is common to analyses of counterfactuals. Suppose that it is true that, if I had gone to the game, I would've seen the home run. This is true even though there are remote worlds where I go to the game but, sitting behind the mascot, my view is blocked and I do not see the home run. The appeal to closeness introduces some vagueness to the analysis. But as Lewis (1997) notes, such vagueness is not problematic. Counterfactuals and dispositions also exhibit a certain vagueness.

Counterexamples to the LTR direction include masks or antidotes: a poison is lethal despite not killing when drunk, provided one drinks the antidote with the poison. Finks are a special case where the triggering condition also mask or cause a disposition to recede. Lewis (1997, 143–144) describes this class of counterexample:

> Dispositions come and go, and we can cause them to come and go. Glassblowers learn to anneal a newly made joint so as to make it less fragile. Annoyances can make a man irascible; peace and quiet can soothe him again. Anything can cause anything; so stimulus s itself might chance to be the very thing that would cause the disposition to give response *r* to stimulus *s* to go away. If it went away quickly enough, it would not be manifested. In this way it could be false that if *x* were to undergo *s*, *x* would give response *r*. And yet, so long as *s* does not come along, *x* retains its disposition. Such a disposition, which would straight away vanish if put to the test, is called *finkish*. A finkishly fragile thing is fragile, sure enough, so long as it is not struck. But if it were struck, it would straight away cease to be fragile, and it would not break. Any finkish disposition is a counter-example to the simple conditional analysis. The thing is disposed to give response *r* to stimulus *s*; it is not true that if it were to undergo *s*, it would give response *r*. The *analysandum* is true, the alleged *analysans* is false.

Counterexamples to the RTL direction include mimics. Suppose that a magic being is angered whenever any styrofoam cup in the world falls when dropped, and reacts by shattering the cup. Then any stryofoam cup breaks when dropped, but arguably it isn't thereby fragile. Frankfurt-style counterexamples to the claim that if I act freely, then I could have done otherwise, are similar to mimics: the brainwashed assassin freely chooses to commit the assassination, but if they had chosen to not assassinate the target, the brainwashing would have kicked in, and the assassin would have assassinated the target anyways.

Does Lowe's approach to dispositions offer advantages to standard analyses with respect to these counterexamples? Recall, Lowe's analysis of dispositions, on which x is disposed to M iff x's kind Ms, that is, x instantiates a kind which is characterized by M. Wasserman (2006) objects to Lowe's kind-based analysis in a variety of ways. One line of objection is to raise counterexamples to the analysis. Against the RTL direction, Wasserman notes that lions hunt but

domesticated lions do not. Against the LTR direction, Wasserman notes that salt cars dissolve in water but cars do not. Notice that Wasserman's objections are variants of masks and mimics.

A variety of responses are available. We might hold that objects can fall under multiple kinds. Salt cars dissolve in water because they are a kind of salt, not because they are a kind of car. We might view some of these cases as similar to one response to masks. Domesticated lions indeed do have the disposition to hunt but that disposition is blocked by domestication. Indeed, an advantage of the Lowe is that exceptions might not cause the immediate difficulties for a kind-based analysis which they cause for a counterfactual analysis.

The claim that lions hunt is a generic statement that admits of exceptions. Let's take up this suggestion, to discuss the connection between dispositions and kinds a bit further. Consider generic statements such as 'Dogs bark'. We might view this as using a general quantifier, restricted by the kind term

GEN (dogs x)(bark x)
GEN_{dogs}(x)(bark x)

Liebesman (2011) argues against this view of generics and instead views generic statements as ascribing a property to the kind, an approach to generics simpatico with some of the Lowe structure. An objection to this approach, as Liebesman recognizes, is that although individual dogs bark, the species dog-kind does not engage in the activity of barking. Liebesman responds that kinds inherit properties from their members – in a myriad of ways. So although we might hesitate to say that the species barks in the same sense that its members do, the species indeed has itself the property of being barkers. A challenge here is to cash out the inherence of properties without reliance on what is generally true of a species' individual members. If 'dogs bark' means generally for the individual dogs that they bark – then we are back with the standard analysis.

2.4 Aristotle's Category Theory

Let us return now to Aristotle's own category theory, where the motivation and structure of an ontological classification is quite different from contemporary theories. Aristotle raises an *aporia* or difficulty for ontology. He holds that the first principles of metaphysics, like any field of scientific inquiry, should be genera, and the first principles in the highest degree should be the highest genera. The primary genera, predicated of all things, appear to be being and unity. But being and unity are not genera.

> But it is not possible that either unity or being should be a genus of things; for the differentiae of any genus must each of them both have being and be one,

> but it is not possible for the genus to be predicated of the differentiae taken apart from the species (any more than for the species of the genus to be predicated of the proper differentiae of the genus); so that if unity or being is a genus, no differentia will either be one or have being. (*Meta*. 2.3, $998^{b}22$–27)

The argument here rests on Aristotle's views that species have a differentia and genus structure, and that the genus cannot be predicated of the differentia or species alone. Aristotle appears to view a differentia as falling under only one genus and so expressions denoting a species and its differentia respectively are co-extensive. For example, if humans are rational animals by definition, then 'the rational' picks out all and only the humans, and we cannot predicate 'animal' of the rational except insofar as we can call humans animals.

Aristotle's argument against viewing being as a genus well might be resisted, and the interested reader might consider other passages where Aristotle endorses the claim, such as in APo 2.7. But let us grant the position that being is not a genus, and see its consequences for Aristotle. How is the *aporia*, seemingly blocking the possibility of an ontology or science of being, resolved? How might there be a systematic body of knowledge concerning what there is? Aristotle holds that 'being' and its cognates are a certain kind of homonym. Homonymy is similar to ambiguity.

> When things have only a name in common and the definition of being which corresponds to the name is different, they are called *homonymous*. Thus, for example, both a man and a picture are animals. These have only a name in common and the definition of being which corresponds to the name is different; for if one is to say what being an animal is for each of them, one will give two distinct definitions. (*Cat*. 1, $1^{a}1$–6)

The gloss on homonymy here precludes homonymous terms having a single shared definition, but allows for cases where there is overlap, or cases where a single *definiens* provides a partial definition for all cases. Owen (1960) coined the term 'focal meaning' for this kind of ambiguity; the phenomenon is not merely linguistic and partly for this reason Irwin (1981) prefers 'focal connection' and Shields (1999) 'core-dependent homonymy.'

Aristotle characterizes 'being' as a multivocal, an expression said in many ways, and a core-dependent homonym, when he discusses the possibility of a science of being. Here is another of one of our long quotations, but one that is central to understanding Aristotle's ontology and category theory.

> There are many senses in which a thing may be said to 'be', but they are related to one central point, one definite kind of thing, and are not homonymous. Everything which is healthy is related to health, one thing in the sense

> that it preserves health, another in the sense that it produces it, another in the sense that it is a symptom of health, another because it is capable of it. And that which is medical is relative to the medical art, one thing in the sense that it possesses it, another in the sense that it is naturally adapted to it, another in the sense that it is a function of the medical art. And we shall find other words used similarly to these. So, too, there are many senses in which a thing is said to be, but all refer to one starting-point; some things are said to be because they are substances, others because they are affections of substance, others because they are a process towards substance, or destructions or privations or qualities of substance, or productive or generative of substance, or of things which are relative to substance, or negations of some of these things or of substance itself . . . . As, then, there is one science which deals with all healthy things, the same applies in the other cases also. For not only in the case of things which have one common notion does the investigation belong to one science, but also in the case of things which are related to one common nature; for even these in a sense have one common notion. It is clear then that it is the work of one science also to study all things that are, qua being. – But everywhere science deals chiefly with that which is primary, and on which the other things depend, and in virtue of which they get their names. If, then, this is substance, it is of substances that the philosopher must grasp the principles and the causes. (*Meta* 4.2, $10003^{a}33$–$^{b}19$)

Aristotle's claim here that 'being' is not a homonym is standardly read as the claim that 'being' is not *merely* ambiguous, as he goes on to talk of being in a way consistent with taking 'being' to be a core-dependent homonym. Aristotle's example of a core-dependent homonym in this passage is 'healthy'. A variety of items may be called healthy, and there is not one property exemplified by, or single definition applicable to, say, both healthy diets and healthy complexions. However, there is a core definitional component in each case. Healthy diets are conducive to the health or well-being of a dieter; healthy complexions are indicative of such health; and so on.

Allow me an aside on another example. Aristotle holds that 'good' is a core-dependent homonym, and this observation underlies some of his criticism of Platonic ethics. Plato views the source of normativity as a universal, operative in every instance. Good actions, good consequences, good intentions, good means, good individuals, good political states, are all good insofar as they participate in the form of the good. The goal of ethics, a science of the good, is for Platonists to provide the single definition, corresponding to the form, applicable in all these cases.

> Further, since things are said to be good in as many ways as they are said to be (for things are called good both in the category of substance, as God and reason, and in quality, e.g. the virtues, and in quantity, e.g. that which is moderate, and in relation, e.g. the useful, and in time, e.g. the right opportunity, and in place,

> e.g. the right locality and the like), clearly the good cannot be something universally present in all cases and single; for then it would not have been predicated in all the categories but in one only. Further, since of the things answering to one Idea there is one science, there would have been one science of all the goods; but as it is there are many sciences even of the things that fall under one category. (*EN* 1.6, 1096[a]23–32)

As a homonym, there is no single account of being that allows for a simple ontology, with goals analogous to a Platonic ethics. Instead, as we have seen, Aristotle holds that we must approach ontology partly through a category theory, a study of the highest kinds of beings, not subsumed under a genus of being. If being were a mere homonym, there would be nothing more that could be done. But as being is in Aristotle's view a core-dependent homonym, more structure can be imposed on an ontology. Aristotle views the various categorical senses of 'being' to be 'focally connected' on substance. Substance plays the role, in the definitions of the various senses of 'being,' that the well-being of a living thing played in the definitions of various senses of 'healthy.' What it is to be a quality is, primarily or strictly, to be a qualification of a substance; what it is to be a quantity is to be a quantification of a substance or substances; and similarly for the other categories. In this way, an ontology or science of being is possible. The result is not a single science in the sense suggested by the EN 1.6 passage, with a topic falling under a single genus. Rather, by employing a category theory supplemented by a substance theory, the science of being is a systematic body of knowledge drawing on two complementary theories.

2.5 Conclusion

We have seen that categorical distinctions arise from local considerations. Universal realists hold there are universals as well as particulars; realists hold there are numbers; and so on. So why should you pursue a category theory per se and in addition to simply accepting whatever kinds of entities your metaphysical views commit you to? Why study a categorical classification, in addition to simply discussing properties, the philosophy of mathematics, and so on? And in particular, why pursue what I have called a strong category theory, not a mere classification of kinds of entities but an account of categoricity, of what it is to be a category, providing necessary and sufficient conditions for being a category?

For what it is worth, Aristotle has a clear motivation for pursuing the goals of a strong category theory. Since there is no genus of being, but instead 'being' is homonymous and focally connected, the best we can do, to provide an ontology or science of being, is to give both a category theory and a substance theory.

Contemporary category theorists typically appear to lack this motivation. For example, Chisholm (1996), Hoffman and Rosenkrantz (1994), and Lowe (2006)

all explicitly treat *entity* as a highest class. There are outliers. For example, Thomasson (2022) views Dummett (1973) as offering something akin to the thesis that there is no highest genus of being: Dummett views 'entity,' 'object,' and similar terms as not genuine sortals, on the grounds that they lack criteria of identity. But for the most part, the field appears vulnerable to the charge of relying on anachronistic vestiges and outdated assumptions. Category theorists might respond by embracing the more modest project of providing merely a weak category theory; by embracing the Aristotelian view that there is no genus of being, and so following the historical motivation for category theory; or by articulating a novel motivation for strong category theory.

Readers interested in going further might begin with Perovic (2024) on category theory and Friend and Kimpton-Nye (2023) on dispositions.

3 Properties

3.1 Contemporary Theories of Properties

In this section, we will discuss theories of properties, including realism, nominalism, and trope theory. Recall that Aristotle held there are both individuals and universals in each category. So both realists and trope theorists might claim historical precedent. It will emerge that ascribing trope theory to Aristotle raises difficult interpretive questions. The section will also allow us to transition from category theory to substance theory since, as we will see in the next section, one role for substances is to bear properties.

We begin with the phenomenon of attribute agreement among concrete particulars. We recognize that this dove and this flag of surrender resemble each other in a respect. Realists hold that there is an entity, a *res*, that is shared by the dove and flag. In addition to the doves and flags of this world, there is also a whiteness, a single object instantiated by both the dove and the flag of surrender. And so realists posit the existence of universals, entities that can be multiply instantiated. Nominalists hold that attribute agreement can be explained without positing universals. The dove and the flag are each characterized by the predicate 'white' but it is this term, a *nomen*, alone that is shared by the two concrete particulars.

Resemblance nominalists (sometimes called 'exemplar nominalists') hold that the condition on extensions is that each member resembles *simpliciter* an exemplar. Resemblance nominalism suggests a certain epistemic picture. When I say of something that it is white, for example, perhaps I am implicitly comparing it with the baby rattle of my youth. You are of course using some other paradigm of (to speak momentarily like a realist) whiteness. It does not matter what you and I choose as exemplars, provided resemblance to our

respective exemplars yields the same set of objects. But resemblance nominalism is not an epistemic theory. The exemplar plays a metaphysical role in generating extensions that correspond to our pre-theoretic views on what properties there are.

Russell (1912) argued against resemblance nominalism along these lines. Even in expressions such as 'I like this,' 'like' expresses a universal, for I may like other things and other people may like things as well. In hearing 'Charles I's head was cut off' we dwell on the particulars, the cutting of the head, but what is meant by 'cut' and 'head' are universals. Russell thus offers an error theory for the nominalist: they note that adjectives and abstract nouns appear to express qualities, but fail to recognize that prepositions and verbs tend to express relations, and these are also universals. Suppose that resemblance nominalism is correct. Then we call something white if it resembles an appropriate exemplar. But resemblance is a universal relation. Since there are many white things, the same resemblance must hold between many pairs. So resemblance nominalism is committed to at least one universal.

As Price (1953) and others have noted, Russell's argument begs the question. Russell assumes that if various particular resemblances resemble each other, then this is to be explained through a universal resemblance. An exemplar nominalist who accepts the burden to explain the resemblance that they themselves employ might appeal to an exemplar. The resemblance between the dove and the flag of surrender resembles the resemblance between the red ball and the stop sign, in virtue of each pair resembling a good example of resemblance. Alternatively, as Price also notes, the exemplar nominalist could take the notion of resemblance *simpliciter* to be a primitive, and ill suited for explanation from within the theory. Since our goal is the explanation of resemblance in a respect, the reliance on resemblance *simpliciter* appears to be unproblematic.

Resemblance nominalists offer a theory that is ontologically parsimonious but requires some conceptual machinery: as we've seen, resemblance nominalists arguably employ a primitive notion of resemblance *simpliciter* and a set of privileged particulars, the exemplars. But nominalists can generate the desired extensions for our property talk without drawing this distinction between ordinary particulars and exemplars. Class nominalists place, as a condition on being an extension for our talk of a given (in scare-quotes) 'property' that any two members of the set pairwise resemble *simpliciter* each other.

It will pay dividends when we turn to trope theory to consider two objections to class nominalism. First, the co-extension problem. Consider the two apparent properties of being cordate, having a heart, and being renate, having kidneys. It is a biological fact, let us suppose, that all and only the cordates are renates. Then the extension of 'cordate' is co-extensive with that of 'renate', and of

course sets are individuated by their members. It seems that class nominalists must say that there is really only one (again, in scare-quotes) 'property' here. Intuitively, the properties of being cordate and renate appear distinct. Class nominalism appears to undergenerate extensions for the terms which we pre-theoretically took to express the properties.

One response is to extend the domain of particulars to include not merely the actual objects but all possible objects. Although it is (we are assuming) a contingent fact that all and only the cordates are renates, there are possible cordates that are not renate, and possible renates that are not cordate. The move is motivated as a response to the co-extension problem, but is not ad hoc. We are discussing the extensions of our property talk, and such talk should have meaning in non-actual situations. What it is to be cordate outstrips the way the world happens to be. The inclusion of mere possibilia, however, might not be an attractive direction for many nominalists, insofar as they are motivated by a distaste for ontological inflation and non-occurent objects. Lewis is an example of a theorist who might not be bothered by the move, since he held that possibilia are concrete.

Moreover, analogous undergeneration problems can be raised even for nominalists who allow for possibilia. Consider the properties of being triangular, being a closed two-dimensional figure with three internal angles, and being trilateral, being a closed two-dimensional figure with three sides. Necessarily, all and only the triangles are trilateral. Call this the necessary co-extension problem. One response to this version of the problem is to embrace the somewhat counterintuitive result. Before constructing a theory of attribute agreement, we might have thought that triangularity and trilateralness are different properties. But pre-theoretic views are not sacrosanct, and one might view class nominalism as committed to viewing necessarily coextensive terms as expressing the same 'property.' We will see that trope theorists have an alternative response available to the problem.

A second problem for class nominalists, originally raised by Goodman (1966), is the so-called imperfect community. Imagine a small universe that consists of only three objects, and suppose further that each object has three 'properties.' There is a red wooden sphere, a black wooden cube, and a black metallic sphere. Each pair of objects in this tiny universe resembles one another. And so there is a legitimate extension for property talk, according to class nominalism, the set comprising the entire domain of this universe, all three universes. But our pre-theoretic intuition is that there is no such property. The imperfect community shows that class nominalism overgenerates the extensions for our property talk.

One response made to the imperfect community problem is to buttress the class nominalist requirement on what extensions correspond to our loose talk of

properties, so that the set comprising the three objects in the imperfect community will not be counted as a property extension. For example, Rodriguez-Pereyra (2002) requires that, in a genuine extension, pairs of members, pairs of pairs, and so on, all bear the relation R*, which might be thought of as an extension of resemblance. The dove and the flag resemble each other, two further white individuals resemble each other, and the two pairs of resembling objects bear a certain similarity as well. In the imperfect community, however, although any two individuals resemble each other, the whole community does not instantiate R*. One difficulty with this approach is to motivate the relation R*. Class nominalists aim to explicate resemblance in a respect without the ontological inflation of realism and with minimal ideological commitment. Resemblance *simpliciter* is arguably a plausible primitive, given these theoretic goals. By contrast, R* arguably appears to be an obscure and ad hoc posit.

I will turn to trope theory. Let me follow roughly Williams' (1953) own presentation. Consider a red round peppermint lollypop and a brown round chocolate lollypop. We can baptize parts of each lollypop through ostentation. I point at the red round peppermint candy and dub it 'Heraplem' and the stem attached to Heraplem, 'Paraplete.' Similarly, I baptize the brown round chocolate candy 'Boanerp' and its stem 'Merrinel.' The properties of Heraplem and Boanerp are more abstract than the candies and sticks, but arguably we can demonstrate and thereby name them too. Call Heraplem's redness 'Harlac' and its roundness 'Hamis'; and call Boanerp's brownness 'Bantic' and its roundness 'Borcas.' Harlac is Heraplem's particular redness, but instead of thinking of Harlac as an instantiation of the same universal instantiated by other red objects, think of it as a particular. Call Harlac and Hamis *tropes*. Tropes are non-repeatable individuals. And tropes are properties. Harlac is red – redness is not a property Harlac has but a property Harlac is.

Tropes can be related to each other in at least two ways. Tropes have location, and so can be co-located or concurrent. And tropes bear similarity relations to one another. Of special interest are sets (collections, sums) of concurrent tropes, and sets of precisely similar tropes. 'Heraplem is red' is true if the concurrence set picked out by 'Heraplem' includes a trope which is a member of the similarity set of red things. Heraplem and Boanerp resemble each other in a respect: they are both round. But they are similar derivatively, in virtue of having as constituents Hamis and Borcas, which are (let us say) perfectly similar.

Trope theorists are typically bundle theorists: concrete particulars are collections of tropes. The ontological commitments of this version of trope theory are minimal: the world is tropes; we need a little set theory or mereology to form the concurrence and similarity collections. Heraplem is on this view a collection of concurrent tropes. We will discuss bundle theory more in Section 3.3.

Trope theory offers several advantages over realism and nominalism. Trope theory is arguably more parsimonious than realism, since the theory only requires particulars. And trope theory avoids objections to nominalism such as the co-extension problem and the imperfect community. Although the set of concrete individual renates and the set of cordates are the same, the similarity sets of renate tropes and cordate tropes are wholly distinct. And although each pair of members of the imperfect community resemble each other, they do so in virtue of different similarity sets of tropes.

3.2 Aristotle on Properties

What are Aristotle's views of properties? As we have seen, the *Categories* presents a mixed picture. Aristotle holds that there are universals in each category. In *De Interpretatione* 17^{a}39–40 he tells us that he calls a universal that which is by its nature predicated of a number of things – we might prefer to say that an expression picking out a universal is multiply predicable. Aristotelian realists deny the existence of uninstantiated universals, and Aristotle does view universals as ontologically dependent on the items on which they are predicated, although we will need to delay discussion of Aristotle's view of ontological dependence until Section 4.4.

We have seen that Aristotle appears to hold that there are, in addition to universals, individuals in each category. In addition to individual substances such as you and I, universal substances such as humanity, and in the other categories nonsubstantial universals such as colour, there are nonsubstantial individuals. Aristotle's examples of these items, recall, given at 1^{a}25–28 and quoted in Section 2.3, are the individual knowledge-of-grammar, present in the soul, and the individual white, present in the body. Does Aristotle view nonsubstantial individuals as tropes? Call a property *recurrent* if it can be possessed by more than one object, and *nonrecurrent* if it can be possessed by at most one object. The question whether Aristotle holds that there are nonrecurrent properties has spawned a lively and ongoing debate among commentators. One source of textual evidence is Aristotle's claim that certain properties are inseparable from what they are in. Here the point of contention is whether this commits Aristotle to holding that these properties are inseparable from individuals, since it is commonly held that a property is nonrecurrent, if it is inseparable from an individual.

Recall that nonsubstantial individuals are *inherent* or present in a subject, and much of the debate on the issue of recurrence has centered on the apparent definition of inherence at *Categories* 1^{a}24–25: "By 'in a subject' I mean what is in something, not as a part, and cannot exist separately from what it is in." The assumption that a property is nonrecurrent if it is inseparable from an individual

subject drives much of the dialectic of the debated reading of $1^{a}24–25$. Those who hold that nonsubstantial individuals are nonrecurrent properties read $1^{a}24–25$ as claiming that any nonsubstantial individual is inseparable from its subject, an individual substance; and those who hold that nonsubstantial individuals are recurrent read $1^{a}24–25$ as only committed to the claim that nonsubstantial individuals are inseparable from *some* of the subjects in which they are found, but not from the individual substances in which they are found. Let me take a brief look at an example of each interpretation.

Ackrill takes the view that nonsubstantial individuals are nonrecurrent. Ackrill's (1963: 74–75) reading of $1^{a}24–25$ takes the passage to be the following condition.

> x is present in y just in case:
>
> (i) x is in y.
> (ii) x is not a part of y.
> (iii) x cannot exist independently from y.

Under the natural assumption that if x cannot exist independently from an individual subject, then x is nonrecurrent, this condition entails that only nonrecurrent properties can be present in individual substances. And so, when conjoined with the uncontroversial thesis that nonsubstantial universals are recurrent properties, the condition has the result that nonsubstantial universals can not be present in individual substances. However, at *Cat*. 5, $2^{a}34–^{b}7$ Aristotle seems to explicitly deny this result:

> All the other things are either said of the primary [i.e., individual] substances as subjects or in them as subjects . . . . [C]olour is in body and therefore also in an individual body; for were it not in some individual body it would not be in body at all . . . . So if the primary substances did not exist it would be impossible for any of the other things to exist.

So this line of interpretation faces certain textual challenges. I turn to an example of a rival interpretation, under which nonsubstantial individuals are recurrent. On Owen's (1965) view, nonsubstantial individuals are not instances individuated by individual substances but are properties not predicable of any less general property. As such, nonsubstantial individuals are the least general properties which may be shared by several individual substances and so are in principle recurrent.

> x is present in y just in case: there is a z such that
>
> (i) x is in y.
> (ii) x is not a part of y.
> (iii) x cannot exist apart from z.

Ackrill's reading has the consequence that an inherent item cannot exist independently from that in which it inheres. Owen's reading does not have this consequence; rather, Owen's reading has merely the weaker consequence that an inherent item cannot exist independently from something or other. Others who offer an interpretation of nonsubstantial individuals as recurrent or as maximally determinate universals include Frede (1987).

We need not go further into the weeds of the scholarly debate, since my aim is to bring out that the interpretation of Aristotle as a trope theorist is not straightforward. Corkum (2009) argues that the textual evidence typically discussed in the secondary literature is neutral on the question of how to individuate nonsubstantial individuals. If this is right, then it currently may not be known whether Aristotle holds that there are tropes, and so it is difficult to assess whether trope theory is an Aristotelian position.

3.3 Relations

We have seen that Aristotle views relations as a category distinct from properties. Can relations be reduced to monadic properties? When I say that Simmias is larger than Socrates, I am claiming in part that each has a relational property – being larger than Socrates and being smaller than Simmias, respectively. But it is attractive to many philosophers to go further, and explain the relational statement by reference to just non-relational or intrinsic properties. For example, one well might hold that Simmias is larger than Socrates solely because of their respective sizes, and not in virtue of some relation over and above these properties.

Many of the historical responses to this question can be fruitfully viewed in light of Aristotle's discussion of relatives in *Categories* 7. Aristotle's aim here is partly to explain our usage of sentences such as 'Simmias is larger' and 'Aesop is a slave.' Aristotle holds that relatives constitute one of the categories other than substance, along with qualities, quantities and so on. Relatives are accidents or contingent properties belonging to, present in, and ontologically dependent on, individual substances. This might suggest to the reader that Aristotle is engaged in the reductivist project described above. And indeed many scholars view Aristotle as offering a reduction of relations to monadic properties: to give just two recent examples, Studtmann (2014) and Brower (2015) endorse this reading. But it is not clear to me that Aristotle is engaged in this project. Aristotle offers two definitions or characterizations of relatives. His first stab is: "We call relatives (*pros ti*) all such things as are said to be just what they are, *of* or *than* other things, or in some other way in relation to (*pros*) something else. For example, what is larger is called what it is than something else (it is called larger than something)" ($6^{a}36$–39). But this definition does not

exclude substances and their parts. For example, what it is to be a human hand is to be a body part of a whole human substance. Aristotle recognizes this problem and takes a second stab at a definition:

> Now if the definition of relatives (*tōn pros ti*) which was given above was adequate, it is either exceedingly difficult or impossible to reach the solution that no substance is spoken of as a relative (*tōn pros ti*). But if it was not adequate, and if those things are relatives (*ta pros ti*) for which being is the same as being somehow related to something (*pros ti*), then perhaps some answer may be found ($8^{a}28$–33).

The translations of Aristotle here are from Ackrill (1963). I won't go into all of the interpretive complications arising from these two passages. But let me ask: What are relatives? Marmodoro (2014), takes relatives to be directed monadic properties. Talk of 'directed' properties corresponds to Aristotle's use of the Greek phrase *pros ti* more literally than its usual translation as 'relative,' 'related to something' or some such expression. (The Greek *pros* is a preposition with a core meaning of motion towards with the accusative; *ti* is the indefinite pronoun in the accusative; so *pros ti* is literally 'towards something.') I'm not confident I understand what it is to be a directed property. But the Marmodoro interpretation qualifies the picture of Aristotle as a reductionist. For on this reading, Aristotle is perhaps neither a realist, since he explains relations by reference to monadic properties, nor a full blown reductionist, since these directed properties retain a relational flavor. I would be tempted to go further. For I doubt that Aristotle has a reductionist agenda at all. As we have seen, Aristotle is at pains to distinguish relatives from at least some items of other categories. Both of Aristotle's definitions look strikingly like an account of relational properties in terms of ineliminable relations. For an interpretation somewhat along these lines, see Mignucci (1986). If this reading is right, then for Aristotle talk of relations is not eliminable from metaphysics. Before moving on, let me note that Aristotle's emphasis on relatives continues to influence. Donnelly (2016), for example, draws on a broadly Aristotelian notion of a relative to defend positionalism, the view that relations hold of their relata in a particular order.

I have sketched Aristotle's own response to the question whether relations can be reduced to monadic properties. Many of the contemporary responses to this question can be viewed in light of Lewis's discussion of internal relations. Lewis (1986, 62) writes:

> An *internal* relation is one that supervenes on the intrinsic natures of its *relata*: if X_1 and Y_1 stand in the relation but X_2 and Y_2 do not, then there must be a difference in intrinsic nature either between the Xs or else between the Ys.

Lewis allows that there are such non-internal relations as spatiotemporal relations. But Lewis's discussion suggests a strategy for reductionists: show that a certain class of relations are really internal relations – that is to say, relations which supervene on the intrinsic monadic properties of their relata.

The supervenient is commonly thought to be nothing over and above its subvenient base. If reductionists succeed in showing that a class of relations supervene on intrinsic properties, then these relations are ontologically innocent. The supervenient, however, is generally neither equivalent to, nor dependent on, its subvenient base. For example, if mental facts supervene on physical facts, this fails to establish their identity. It is perhaps partly for these reasons that the reductivist strategy I just described is tweaked in some way or other. Here is one example. First, reduce certain apparently non-internal relations to internal relations; and then show that internal relational truths have truthmakers involving just the relata and their monadic properties. The connection between a truth and its truthmaker is a stronger relation than that between the supervenient and its base. Some view truthmaking as a kind of grounding relation. So, if this strategy succeeds, then apparent relations are arguably grounded in non-relational properties.

Heil (2016), for example, argues that causal relations are internal relations and causal truths are made true by the mutual manifestations of powers or dispositions. For example, water has a power to dissolve salt, and salt has a reciprocal power to be dissolved by water. A particular pair of manifestations of these powers suffices for a certain claim of water causing salt to dissolve to be true. Simons (2016) goes in some ways further than Lewis or Heil, arguing that even spatiotemporal relations reduce to the internal relations among the processes upon which the relata ontologically depend. And Lowe (2016) applies a similar strategy for a wide variety of apparently external relations. Notice that where Lewis is engaged in an attenuated reductionist project, since he allows that there are such non-internal spatiotemporal relations, Lowe and perhaps Simons offer full-blown reductionism.

It is a somewhat separate issue how subsequently to take talk of relations. Even if one holds that relations are ontologically innocent, or grounded in intrinsic properties, one might view talk of relations either permissively as an innocuous conceit, or dismissively as a misleading deceit. For example, both Lowe and Heil argue that relational truths have as truthmakers states of affairs with just monadic properties and their bearers. But where Heil finds the monadic truthmakers to render talk of relations harmless, Lowe finds such talk rendered pointless.

3.4 Concrete Particulars

Concrete particulars instantiate properties. What are these particulars? If what is being asked is the extensional question, what among entities are the particulars, then a reasonable pre-theoretic view is that they are mid-sized ordinary dry goods. Of course such a view is revisable. But in what does particularity lie? The contrast with universals sheds some light: particulars cannot be shared, are not multiply instantiated or multiply located, and arguably two particulars cannot be spatiotemporally co-located. I briefly will compare three theories of particulars, bare particular theory, bundle theory, and substance theory.

Bare particular theorists hold that properties are something a particular has. A particular is a bearer of properties. We might distinguish between the thin particular, that which has the properties, and the thick particular, the thin particular along with all of its properties. What is the thin particular? It seems that this thin particular, that which bears the properties, is itself bare. It has properties, in the sense that the thick particular is correctly characterized by various predicates, but the thin particular does not have features per se.

As such, thin particulars raise epistemological worries. Russell (1912) held that we can not be acquainted with bearers. Following an empiricist principle of acquaintance, under which the indefinable terms of one's theory ought to refer only to entities with which one is directly acquainted, it seems that thin particulars cannot play their intended theoretic role. In response, Allaire (1963) held that we are acquainted with bearers but cannot recognize them, since there is no property we can use to so identify. Individuals are those entities that ground the numerical difference of two things which are the same in all nonrelational respects. The difference is presented. As an underexplored option, one might reject the principle of acquaintance, and instead hold that we can recognize the theoretic need for positing bearers, without being directly acquainted with them.

Bundle theorists hold that a particular is a bundle – a set or sum – of attributes. For the realist, these are universal properties. A common version of bundle theory, as we will briefly discuss in Section 4.3, views the properties as tropes. Van Cleve (1985) offers three versions of bundle theory. On the first version, concrete particulars are classes of properties. For a thing to 'have a property' is for that property to be a member of the class. The first version of bundle theory is open to several objections. First, if the requirements to be a concrete particular are so slight, any class of properties would count as a particular. But it is counterintuitive to include among the particulars {being an alligator, being purple} – not just because there are no purple alligators but because nothing is *just* purple and an alligator. Second, all particulars exist necessarily, under the

assumption that properties exist necessarily, since a set exists necessarily if all its members do. But of course it seems that some particulars exist contingently.

On Van Cleve's second version of bundle theory, concrete particulars are classes of properties whose members stand in a relation of co-instantiation to one another. Notice that co-instantiation is a tie with homogeneous relata, connecting properties to properties, and not the tie of bare particular theory with heterogeneous relata, connecting properties to bearers. Not all sets of properties are co-instantiated, and so the theory does not overgenerate the concrete particulars in the way suggested by the first objection to the first version of bundle theory. Also, co-instantiation is a contingent relation. And so it is a contingent matter whether some set of properties is a concrete particular. However, there are objections that can be laid against this second version of bundle theory. Since sets are individuated by their members, and on standard mereology, wholes are individuated by their parts, on this theory no concrete particular can survive a qualitative change. And all of a given concrete particular's properties are essential to, or necessarily possessed by, that particular.

Van Cleve floats a third version of bundle theory, on which there are no concrete particulars. Talk of particulars is strictly false but translatable to true property talk. 'Things' are not composed of coinstantiated properties; sentences allegedly referring to things are logically constructed from sentential components referring to properties. This third theory avoids the objections to the first two theories vacuously. But at the cost that there are no particulars.

One might respond to the worry that bundle theory cannot accommodate qualitative change, by identifying, as Casullo (1988) does, the concrete particular not with a bundle of properties but with a series of distinct bundles. We will discuss this approach in Section 4.2 when we consider perdurantist theories of persistence.

One might respond to the worry that bundle theory cannot allow for contingent properties by distinguishing, within the bundle, a core of essential or necessary properties, and a periphery of contingent properties. We might then identify the individual with the core, which persists, as a subset or proper part of the whole bundle, through changes in the inessential peripheral properties. A challenge for this approach is to identify candidates for the core properties. If these are species and their characteristic features – if my core consists of humanity, rationality, and so on – then the core bundles of two members of the same species will be indistinguishable. A response with a long history is to posit haecceities, properties that individuate their possessor. However, if my haecceity is simply the property of being myself, then haecceities risk being either trivial or uninformative.

Substance theory, as a theory of concrete particulars, is perhaps seen in contradistinction to bare particular theory and bundle theory. I'll begin with

the historical precedent. Recall that Aristotle notes that linguistic expressions denoting individual substances are impredicable and can only stand in subject position; all other terms can be predicated of individual substances. This suggests that individual substances are bearers of properties. But we have seen that Aristotle holds there are two kinds of predictive ties connecting entities. The said of predictive tie is an infra-categorical link connecting items within a category, such as a species to an individual substance. The present in tie is a cross-categorical link connecting items in different categories, such as an individual colour to an individual substance. Grice (1988) introduces the terminology of izzing and hazzing for these two predictive ties. The terminology of 'is' and 'has' is potentially misleading in this context, since both predictive ties indicate what the subject is, and having is just one of the several Aristotelian categories. Code's (1983) terminology of what a substance Be and what it Has serves a similar role. What is said of an individual substance includes species and genera. These are features essential to that individual. What is present in a subject includes accidental properties and *propria*. Recall from Section 1 that *propria* are among the necessary but inessential properties. In Grice's terminology, I iz human but I haz paleness and risibility.

The picture of substance theory suggested by this distinction resembles core bundle theory, insofar as there is a distinction between a set of core or essential properties essential to the concrete particular and which persist through qualitative changes, and a set of peripheral or inessential properties which the concrete particular might have lacked and might go on to lose. But in substance theory, the individual bears inessential properties, and is not itself a set or sum constituted by coinstantiated properties. A substance bears the properties it haz. Substance theory also resembles bare particular theory, insofar as there is such a bearer. But this bearer is not bare, and one option is to identify the bearer with the set of its essential properties or haecceities.

Readers interested in going further might begin with Maurin (2022) on properties, Heil (2021) on relations, and Marmodoro (2023) on properties in ancient philosophy.

4 Substance Theory

4.1 Introduction

We have seen substances playing a role within category theory in Section 1, and as bearers of properties in Section 3.4. In this section, we will discuss more fully substance theory both in neo-Aristotelian metaphysics and in Aristotle's own metaphysics.

Some theorists draw a distinction between an ordinary and a theoretical sense of 'substance.' For example, Simons (1998, 239) distinguishes between everyday and metaphysical substances. Metaphysical substances are theoretic posits playing the various roles discussed above. Everyday substances are ordinary, mid-sized objects. They "are what we call things or objects, as distinct from their qualities, the relations they stand in to others, the states they have, the events they enter into, the processes in which they are involved. To make clear what everyday substances are we invariably use examples, just as Aristotle did." Notice the appeal to ordinary linguistic usage as initial evidence for the inclusion of substances within an ontology. Koslicki (2015) observes that it is not clear that ordinary speakers use 'substance' in the allegedly everyday sense. Robinson (2021), however, notes that our colloquial use of 'substance' has etymological roots in the lengthy history of philosophical usage. Talk of substance in expressions such as 'illicit substances' is related to Aristotle's talk of secondary substances as kinds, although in this case, kinds of stuff. Talk of substance in expressions such as 'a person of substance' appears to be related to the role of substances as fundamental items.

Regardless of the folk use of the word 'substance' and its cognates, ordinary speakers do appear to view the world as populated in part by objects that can be linguistically and conceptually distinguished from other objects, and that play a variety of certain roles, which we will discuss in this section. Or more cautiously, there is evidence from ordinary linguistic usage that lends some prima facie plausibility to substance theory. Such evidence can do work in philosophical debates – as when, for example, assigning burdens of proof. Consider a case from Section 3.4: ordinary speakers arguably appear to talk as if there are objects which are the bearers of properties, and bundle theorists perhaps typically accept that they are arguing for a revisionist view of particulars. To give another example, we will discuss in Section 4.2 the topic of persistence, and ordinary speakers appear to view paradigmatic objects as enduring objects, and opponents to endurantism typically accept that they are arguing for a revisionist view of persistence. Perhaps language usage similarly lends initial support for the existence of everyday substances.

But to go beyond these observations to a serious analysis of linguistic data lies outside our aims. Let us turn to the characteristics of, and roles played by, the theoretic concept of substance. We have seen substances play a role in many category theories as a category distinct from various nonsubstance categories, and so contrasted with qualities, quantities, relations, and so on. And we have seen that substances play a role within substance theories of properties as bearers of properties. In this section and the next I will discuss several other roles assigned to substance. Substances are traditionally taken to be *individuals*.

Substances exhibit *unity and integrity*. Koslicki (2015, 63) illustrates: "Socrates, while he is alive, contrasts with the corpse he leaves behind in that the parts of the former are integrated into a living organism in such a way that they compose a unified whole, while the parts of the latter are only loosely assembled and slowly disintegrate into their surroundings." One way to cash out these features is view substances as having clear individuation conditions, a feature that we will discuss in Section 4.3. Substances are sometimes held to have a *hylomorphic structure*: they are not mere sums of material parts but are organized wholes. We will discuss this role in Section 5.

Substances are traditionally viewed as the impredicable, *ultimate subjects* of predication. Terms denoting substances can only stand in subject position within a predication: 'Socrates is pale' is a well-formed predication, but 'Hesperus is Phosphorus' expresses an identity claim. Simons (1998, 237) notes that impredicability instead ought to be taken as a distinctive mark of particulars, not substances. This perhaps assumes it is only expressions denoting universals that are predicated of subjects. A trope theorist might instead hold that expressions denoting abstract particulars can be predicates, and so not all particulars are impredicable. But we might appeal to the notion of inherence, discussed in Sections 2.3 and 3.2, to distinguish between two kinds of impredicability. Recall that Aristotle's category theory draws two predicative ties: an item may be said of a subject, as when colour is predicated of red, or human of Socrates; and an item may inhere or be present in a subject, as when pale is predicated of Socrates or biped of human. We might view a substance as that in which characteristics inhere but which does not itself inhere in anything, and so as impredicable in this sense.

Substances are *privileged referents*. As Koslicki (2015, 63) puts it, substances "occupy a privileged position with respect to our discourse, thoughts and actions. Natural languages, for example, reserve a proper name for Socrates, while paleness is standardly represented by means of a general term." We might go a bit further and say: substances are reference magnets. Substances are not merely typical referents; substances are better suited to be referents than non-substances. Talk of reference magnets stems from Lewis (1984). An entity is perfectly natural when it is fundamental; and more natural than another when it is relatively more fundamental. When there are two candidates to be the referent of a given expression that are equally well qualified in all other ways, the more natural entity is preferable. Lewis views naturalness as a theory-external or objective feature of entities and properties, and so not influenced by human interests or how we represent the world.

In this Section, we will discuss in more detail two roles for substance. Substances play a role in theories of persistence: substances are the *enduring*

substrata persisting through changes. And substances play a role in theories of ontological dependence, fundamentality, and grounding: substances are typically viewed as *ontologically independent* entities. I will discuss first the role of substance in theories of persistence; then I will consider recent criticism of substance theory; and finally I will discuss the role of substance as an ontologically independent and fundamental entity in the context of presenting Aristotle's own views of substance.

4.2 Persistence

A central role for a substance is as the enduring substratum persisting through change. In this section, I will take a detour through the topic of persistence. Consider two pictures of change. I go to the beach and tan. Early in the day, I am pasty; by the end of the day, I am bronzed. On one picture, the pasty thing in the morning is numerically identical with the bronzed thing in the evening. That thing, pasty in the morning, bronzed in the evening, is me. I am wholly present both in the morning and the evening, although qualitatively different from one time to the next. I endure.

On the other picture, I am not wholly present at any one time. A part of me is there, in the morning, pasty; another part of me is there, in the evening, bronzed. Just as my left arm and my right arm are distinct, but both spatial parts of me, so too my pasty self and my bronzed self are distinct, but both temporal parts of me. I am a four dimensional object extended through time, as well as through space. I perdure.

I will mention in passing a third picture, stage theory. Like perdurantists, and unlike endurantists, stage theorists hold that there is a sense in which the pasty thing in the morning is a distinct thing from the bronzed thing in the evening. But stage theorists appear to also deny that there is some whole of which these things are parts. There are instead merely a series of instantaneous stages, each unextended in time. When I said that 'I go to the beach,' the pronoun picks out a mere stage.

Objections to perdurantism and stage theory include Thompson's (1983) charge that these positions are a crazy metaphysics. The chalk in my hand now is not the chalk in my hand a second ago. A new piece of chalk keeps popping into existence *ex nihilo*. What is Thompson's concern here? One worry in the vicinity is that the emergence of each part or stage is uncaused or inexplicable. But perdurantists and stage theorists might hold that each temporal part or stage is caused by preceeding parts or stages. Another worry is that each part is instantaneous, and so do not persist over any period of time; as such, perdurantism does not seem to be an account of persistence. This may be a concern for stage theorists. But perdurantists need not hold that there are

temporal parts lacking temporal extension. And even if they embrace this picture, although no instantaneous part persists over a period, what does persists is the whole object, in virtue of having parts.

Perdurantists and stage theorists typically accept that endurantism enjoys pre-theoretic or intuitive support, and that the rejection of endurantism needs to be argued for. I will briefly discuss two arguments against endurantism, coincidence puzzles and the problem of temporary intrinsics. First, consider a coincidence puzzle from Heller (1990). There is such an object as my body; call it 'Body.' There is also such an object as all of Body except for its left hand; call this 'Body-minus.' Now consider some time t when Body's left hand is severed.

(1) Body-minus before t is numerically identical with Body-minus after t

since the severance, let us say, does not affect Body-minus. Moreover

(2) Body before t is numerically identical with Body after t

since objects such as Body can survive the loss of an inessential part.

(3) Body-minus after t is numerically identical with Body after t

since two objects cannot occupy the same space at the same time. And, by the transitivity of identity,

(4) Body-minus before t is numerically identical with Body before t.

But since, before t, Body is bigger than Body-minus,

(5) Body-minus before t is not identical with Body before t.

And of course (4) and (5) conflict.

Responses to the puzzle include to *restrict composition* so that there is no such object as 'Body-minus' before the accident. Wholly unrestricted composition allows any collection of objects to form a sum, leading to a profligate ontology of odd objects, such as the object composed solely of my left foot and the Eiffel Tower. Composition might be restricted in some way: for example, we might hold that only physically contiguous objects can form a sum, or that only objects unified as parts of an organic unity. Notice that some restrictions on composition licence the existence of 'Body-minus' before the accident.

There are alternative responses. One might *embrace mereological essentialism*, according to which a sum necessarily has its actual parts, and so cannot survive a change of parts. This blocks the argument at (2), since Body does not persist through the loss of its left hand. Mereological essentialists must explain away our intuitions that objects appear to survive changes in their parts. One

might *deny the transitivity of identity*. Then (4) does not follow from (1)–(3). One might *accept cooccupation*, the view that two objects can occupy the same spatiotemporal location.

Notice that the coincidence puzzle assumes endurantism, cashing out the survival of Body in (2) and Body-minus in (1) in terms of numerical identity. We can block the argument if we *endorse perdurantism*. Then for example Body has a temporal part before t, with a left hand, and a distinct temporal part after t, lacking a left hand. The survival of Body through the severance does not licence the numerical identity claim of (2). Or we might *accept stage theory*, where there are left-handed and non-left-handed stages, and the story is not one of survival at all.

A second kind of argument against endurantism is the problem of temporary intrinsics. Consider again my day at the beach. Since endurantists hold that the pasty object in the morning is numerically identical to the bronzed object the evening, they are committed to rejecting the indiscernibility of identicals (if *a* and *b* are numerically identical, then *a* and *b* share all and only the same properties).

One response is to *index properties to times*: I am pasty-in-that-morning and bronzed-in-that-evening. But change sometimes involves intrinsic properties; the response treats all properties as relational. A second response is *adverbialism*. It is the having of the property that is time-indexed. I have morningly pastiness and eveningly bronzeness. To have a temporary intrinsic just is to have a certain relation: to have a property (at a time) intrinsically is to have a property in virtue of the way one is (at that time) independently of anything else. A third response is to *take tense seriously*. In the evening, I was pasty and I am bronzed: these are not equivalent to tenseless claims in tension with the indiscernibility of identicals. And a fourth response is to *reject the endurantism*. Notice that the perdurantist has an attractive response to the problem of temporary intrinsics, since on either view there is a clear sense in which the object that is pasty, a temporal part or stage, is not the object that is bronzed.

Before leaving the topic of persistence, let me briefly introduce Aristotle's views on persistence. In the *Categories*, Aristotle gives the impression that the role of substance as the enduring substratum for change is the most distinctive mark of substance.

> It seems most distinctive of substance that what is numerically one and the same is able to receive contraries. In no other case could one bring forward anything, numerically one, which is able to receive contraries. For example, a colour which is numerically one and the same will not be black and white, nor will numerically one and the same action be bad and good; and similarly with everything else that is not substance. A substance, however, numerically

> one and the same, is able to receive contraries. For example, an individual man – one and the same – becomes pale at one time and dark at another, and hot and cold, and bad and good. Nothing like this is to be seen in any other case. (*Cat*. 5 $4^{a}10$–21)

Passages such as these support the ascription of endurantism to Aristotle. But it might be worth noting a few complications. First, persistence over time is just one example of a broader role for Aristotelian substances. A substance underlies contrariety while remaining numerically identical. Survival through qualitative change is one example. But the instantiation of contrary properties in different respects might be another example. An individual might be morally praiseworthy in one way but morally blameworthy in another way. I may be taller than you but shorter than them. A substance's unity and identity is not compromised by the compresence of opposites. Plato arguably viewed this compresence of opposites to undermine the ontological status of sensible particulars, and prevent such particulars from backing, or being the objects of, knowledge. It is tempting to view Aristotle as implicitly responding to Plato, taking concrete particulars to be primary substances and both universal substances and nonsubstances as derivative. We will see in Section 4.4 textual evidence that arguably complicates this picture. And second, we also will see in Sections 4.4 and 5.2 that Aristotle views individual substances as compounds of form and matter, and there is an apparent tension between taking the substance and taking its matter to be the substratum of change.

4.3 Criticism of Substance

Recall Simons' distinction between everyday and metaphysical substances. Everyday substances appear to play several of the roles discussed in Sections 4.1 and 4.2. They are the basic referents in our ordinary linguistic practice. They are continuants, persisting through genuine change. These roles are not unrelated. The choice of items taken to be the ordinary, commonsense objects reflects conceptual tendencies within a linguistic community to identity an item and re-identify that item as the same over time and through certain changes.

But everyday substances, in Simons' view, do not exhibit many of the features characteristic of metaphysical substances, and so are not well suited to play some of the other roles associated with metaphysical substances. Simons considers objections to taking ordinary objects to be substances from boundary indeterminacy, which undercuts claims that everyday substances exhibit unity and integrity, and can provide clear individuation conditions. And everyday substances are not, in Simons' view, ontologically independent. He views such

objects as trope bundles, and so are ontologically posterior to their constituent tropes. I will consider these two families of objections in turn.

Ordinary objects exhibit boundary indeterminacy. Mountains and clouds do not seem to have nonarbitrary definite boundaries. Vague predicates are unproblematic. There are clear cases of individuals who are bald and clear cases of individuals who are not bald. But there are other cases where it is not easy to characterize an individual as bald or not. Perhaps our usage of the predicate 'bald' fails to provide determinate truth conditions. Or perhaps there is an answer whether our individual is bald or not, but for principled reasons I cannot know this answer. Such vagueness seems to arise from how we represent the world. The phenomenon reflects a mismatch between the way things are and our linguistic or epistemic resources. Unlike vagueness in predicates, ontic vagueness is arguably an unattractive consequence for a metaphysical theory. Ontic vagueness entails there is no answer whether this pebble is or is not a part of this mountain, independently of how we represent the world, and many have found this unintelligible. Lewis (1986, 212) for example writes: "The only intelligible account of vagueness locates it in our thought or language. The reason it's vague where the outback begins is not that there's this thing, the outback, with imprecise borders; rather, there are many things, with different borders, and nobody has been fool enough to try to enforce a choice of one of them as the official referent of the word 'outback'. Vagueness is semantic indecision."

Secondly, Simons objects to taking everyday substances to be ontologically independent. Simons views ordinary objects to be trope bundles, and so dependent on their tropes. Moreover, traditional substance theories face objections from quantum physics, against taking midsized objects to be substances. As Koslicki (2015, 64) puts it:

> Simons notes that, in order to explain the characteristics and behavior of everyday substances, our best scientific theories (in particular, quantum mechanics) find themselves appealing to such entities as quarks, fermions and electrons which are not immediately accessible to us through our unaided senses. While these micro-physical entities play a central role in our comprehensive scientific understanding of the world, they do not figure directly into our commonsense representations.

For these reasons, among others, Simons rejects substance as a theoretic concept with utility within current metaphysics. I turn to an example of the critical reception of Simon's rejection of substances. Koslicki (2015, 70) distinguishes between taxonomic and non-taxonomic roles for substance:

> First, in its taxonomic role, philosophers employ this notion [of substance] to single out certain *kinds* of entities (e.g., macroscopic concrete particular

> objects), without thereby simultaneously committing themselves to the idea that these entities must be assigned a privileged ontological position within their respective ontologies . . . . In other contexts, however, philosophers employ the concept of substance in a second non-taxonomic role, in order to indicate that certain kinds of entities (taxonomically speaking) deserve to be singled out for special treatment in the ontology in question.

On Koslicki's reading, Simons' talk of everyday substances references a kind of entity with a taxonomy or categorical scheme, but Simons' talk of metaphysical substances references the non-taxonomic roles assigned to substances we have discussed, such as impredicability, reference magnetism, property bearing, endurantism, unity and integrity, and ontological independence. As we have seen, ordinary objects exhibit some of these characteristics and play some of these roles, but not others. Still, we might well wonder why ordinary objects such as you and I fall under a certain category or taxonomic kind, yet fail to exhibit the theoretic roles associated with this category or kind. Koslicki (2015, 72) distinguishes among three explanatory roles for substance:

> In its first absolute role, the concept of substance is used to designate entities as substances *simpliciter*. In its second relational role, the concept of substance picks out a relation between pairs of entities, x and y, when x is *the substance of*, or *a substance of*, y. When used in the third comparative way, the concept of substance ranks entities by the degree to which they are *deserving of substance status*.

These distinctions allow one to identify as substances ordinary objects, but to go on to identify something else as the *substance of* ordinary substances. For example, one might view, as Simons does, everyday substances as trope bundles, but also view these tropes to be the fundamental entities on which everyday substances are derivative. Koslicki's move leaves open questions. Is the substance of an ordinary substance not itself a substance, and if so, is it more deserving of the status of a substance than the ordinary object? The worries raised by Simons might linger, if what exhibits reference magnetism and persists through changes is not what exhibits clear individuation conditions and ontological independence. The contrast among being a substance, being the substance of a thing, and being more substantial than something else has historical precedent in Aristotle. We will see a similar move in historical scholarship to resolve an interpretive difficulty in Aristotle's *Metaphysics*, when we discuss Aristotle's own substance theory; this discussion will bring out other options for resolving the tension between everyday and metaphysical substances.

4.4 Aristotle on Substance

I will next discuss some of Aristotle's own views on substance. We have seen that the *Categories* presents a predominantly static ontology, a snapshot picture of the world. Although at *Cat*. 5 Aristotle characterizes primary substances as enduring through genuine change, he does not here aim to explicate motion, change and rest. In works such as the *Physics*, Aristotle develops an analysis of change in part through the introduction at *Phys*. 2.3 of the four causes. These causes are sometimes described as answers to why questions, but this description might mislead, since causation is not relative to the interests of a questioner. The causes include the efficient cause, that which brings the change about or which initiates the process, and the final cause, the end or that for the sake of which a thing is done. Of special interest to us are the formal cause, corresponding to the essence and definition of the agent or result of the change, and the material cause, that out of which a thing emerges and which persists through the change. We have discussed persistence in Section 4.2, and will turn to a fuller discussion of matter in Aristotelian metaphysics in Section 5.2. For our present purposes, it is enough to leave as a promissory note the observation that Aristotle occasionally views an individual substance as a hylomorphic compound of form and matter.

The result is an expanded, dynamic ontology. And with entities ranging not only over items in the various categories but also over items in the causes, and in particular with the resulting view of ordinary objects as hylomorphic compounds of form and matter, the question of what entities are fundamental needs to be asked again. In *Meta.* 7.3, Aristotle rejects the candidacy for substance of matter and of the hylomorphic compound. We saw that being the ultimate subject of predications was a mark of individual substances in the *Categories*, but in this expanded ontology, this appears to no longer be a mark of substance.

> For those who adopt this point of view [that being an ultimate subject is a mark of substance], then, it follows that matter is substance. But this is impossible; for both separability and individuality are thought to belong chiefly to substance. And so form and the compound of form and matter would be thought to be substance, rather than matter. [But] the substance compounded of both, i.e. of matter and shape, may be dismissed; for it is posterior and its nature is obvious. (*Meta* 7.3, $1029^{a}27$–32)

We will return in Section 5.2 to the interpretive difficulty of whether matter or substance is the ultimate subject of predications and the *substrata* for change. We will discuss the criterion of separability momentarily. What is translated here as 'individuality' is perhaps better translated as 'demonstrability.' Being demonstrable is often viewed by Aristotle scholars as indicating individuality as

a mark of substances, consistent with Aristotle calling individual substances primary substances in the *Categories*. See Corkum (2019) for discussion of this criterion for being a substance.

Where Aristotle appears to land is that the form is the best candidate for substance. For example, he tells us that "by form I mean the essence of each thing and its primary substance" (*Meta*. 7.7, $1032^{b}1$–2); and that "the substance is the indwelling form, from which along with the matter the so-called concrete substance is derived" (*Meta*. 7.11, $1037^{a}29$). In this way, Aristotle appears to reject the *Categories* picture, on which the individual substance is the primary substance, and to retreat to a more Platonic ontology, on which forms are fundamental. One interpretive difficulty here is to reconcile the *Categories* and *Metaphysics* pictures. I will not discuss this lengthy scholarly debate here. For what it's worth, in Corkum (2012 and 2023) I've argued that 'substance' picks out the relatively fundamental entities but the context determines the relevant contrast class; this opens up the option that what are substances in the restricted ontology of the *Categories* need not be the substances in the expanded ontology of the *Metaphysics*.

Another interpretive difficulty in the vicinity is that Aristotle rejects in *Meta*. 7.13 that universals are substances. So, as Lesher (1971) puts it, Aristotle appears to endorse an inconsistent triad: substances are forms; forms are universals, but no universal is a substance.

There are a variety of responses in the secondary literature. One strategy is to reject that forms are universals. We will see in Section 5.2 that Aristotle appears to hold in the *De Anima* that the form of an individual living organism is an individual state, a set of essential properties and, arising from these properties, an ability to act in ways that are characteristic and definitory of things of that individual's kind. This general strategy has its origins in contemporary scholarship in Sellars (1957) and was endorsed vigorously in Frede (1987) and others. A second line of interpretation is to deny that no universal is a substance. One way of going down this road is to take *Meta.* 7.13 to be denying only that some universals are substances. For example, we might read the chapter as denying that genera are substances, but not that species are substances. Alternatively, one might view 'universal' as ambiguous between an entity, a universal, and a kind of predication, being said universally. On this line, forms are substances and universals, but are not spoken of universally, since nothing spoken of universally is a substance. For this strategy, see Woods (1967) and Code (1978).

Finally, another response is to hold that Aristotle consistently holds that ordinary objects are substances, and their forms in *Meta.* 7.13 are universals, but that these forms are the *substances of* these objects. This interpretive

strategy was perhaps endorsed by Lacey (1965). And recall from Section 4.3 that Koslicki makes a similar move, in responding to Simons's criticisms of contemporary substance theory.

We have seen that substances are viewed in contemporary substance theory as ontologically independent or fundamental. Aristotle expresses kindred notions in terms of ontological separation and priority. Aristotle characterizes ontological priority at *Metaphysics* 5.11 ($1019^{a}1$–4): "Some things then are called prior and posterior . . . in respect of nature and substance, such as those which can be without other things, while the others cannot be without them." G. Fine (1984) argues for the following connection between ontological separation and priority: one thing being separate from another and the second being inseparable from the first are jointly sufficient for the first to be prior in substance to the second. Corkum (2008) argues that there is good reason to ascribe to Aristotle the following:

> PRIMACY. Individual substances are separate from, and prior to, both non-substances and universal substances, and both non-substances and universal substances are inseparable from, and posterior to, individual substances.

For example, Aristotle holds in the *Categories* that individual substances are prior to, and so separate from, universal substances. At *Cat.* 5 ($2^{a}11$–19), he calls individual substances primary with respect to universal substances and universal substances secondary with respect to individual substances. And generally, Aristotle holds that the ontological status of all other kinds of entity are somehow dependent on primary substances; for example, he claims at *Cat*. 5 ($2^{a}34$–$^{b}7$):

> All the other things are either said of the primary substances as subjects or present in them as subjects . . .. [C]olor is present in body and therefore also present in an individual body; for were it not present in some individual body it would not be present in body at all . . .. So if the primary substances did not exist it would be impossible for any of the other things to exist (*einai*).

Notice the role here of the *said of* and *present in* predicative ties. I have followed the Ackrill (1963) translation in taking the Greek *einai* existentially. Is this the right translation? To answer this question, we must turn to the interpretation of ontological separation and priority in Aristotle.

PRIMACY suggests that ontological separation and priority concern some sort of dependency. And separation and priority in Aristotle have been standardly understood in terms of ontological dependence. One formulation of ontological dependence is expressed in terms of existence conditions. On this formulation, one entity ontologically depends on a second entity just in case necessarily, if the former exists, then the latter exists. G. Fine (1984) argues

for the following correlate as an interpretation of separation terminology in Aristotle:

EXISTENTIAL. A is *separate* from B's just in case A can exist without B's.

On a corresponding condition for priority, A is *prior* to B's just in case A can exist without B's but B's cannot exist without A. We can see EXISTENTIAL at work in the translation of *einai* in $2^{a}34$–$^{b}7$, above. EXISTENTIAL has met with criticism. Corkum (2008) argues that EXISTENTIAL fails to meet the demands imposed by the condition of adequacy, PRIMACY. For example, individual substances are separate from any given nonsubstance, but an individual substance cannot exist without its *propria*, its necessary but inessential properties. And Peramatzis (2011, chapt. 10) argues that EXISTENTIAL is incompatible with the characterization of substantial priority from *Metaphysics* 5.11.

Ontological dependence need not be cashed out in terms of existence conditions. For example, Meadows (2023) argues for a causal account of ontological priority. K. Fine (1994) argues for an essentialist account of ontological dependence. On this latter account, one entity ontologically depends on a second entity just in case the latter is a constituent in the former's essence – equivalently, just in case the latter is a constituent in a proposition that expresses a real definition of the former. Frede and Patzig (1988), Spellman (1995) and Peramatzis (2008 and 2011) ascribe to Aristotle an essentialist account of ontological separation and priority. Here is one way of cashing out that line of interpretation:

ESSENTIAL. A is *separate* from B's just in case an account of what A is makes no reference to an account of what B is.

This approach has also met with recent criticism. For example, Corkum (2013, 51–52) notes that the account captures the tie between a nonsubstance and substances: a definition of a property such as whiteness might well make reference to the surface features of physical bodies. But it is less clear that the dependence of universal substances on individual substances is captured by ESSENTIAL. That is to say, ESSENTIAL is in tension with PRIORITY, and scholar may need to choose between these two theses.

Corkum (2016) canvasses the suggestion that separation and priority in Aristotle are best characterized in terms of grounding. A way of cashing out this suggestion is as follows:

> A is *separate* from B's if, for any given B, the fact that A has its ontological status (as an item in one of the categories, and so as a substance, a quality, and so on) is not grounded in the fact that A stands in some tie to that B.

This condition conforms to PRIMACY. For example, individual substances exhibit the condition with respect to universals and nonsubstances. Individual substances are classified as substances independently of standing in any tie to anything else – independently, that is to say, of being *present in* or *said of* any other beings. Universals and nonsubstantial individuals fail to exhibit the condition. Although generosity, for example, does not depend on any particular individual, the property would not have the ontological status it enjoys were there no generous people whatsoever. Generosity falls within Aristotle's ontology in virtue of its being present in individual substances.

To assimilate separation and priority in Aristotle to grounding has some initial plausibility. Aristotle is concerned with relations in the world that underwrite certain kinds of explanations. These relations impose structure on ontology; and where facts about individual substances are fundamental, facts about universals and nonsubstances are derivative. Moreover, the generic nature of grounding offers interpretive advantages. Grounding is a big tent. To think of ontological separation and priority in terms of grounding allows for variation from one application to another. The specific way in which individuals underwrite explanations of universals can differ from the way in which substances underwrite explanations of nonsubstances: Aristotle suggests this difference in distinguishing the *said of* and *present in* predicative ties. The generic notion of grounding also allows the historian to make a negative point – separation and priority do not concern ontological dependence – without needing to specify each variation of grounding relation in play. When a more detailed account of these various grounding relations can be given, one could kick away the prop of generic grounding. Such an approach, however, may incur costs. For example, viewing separation and priority in terms of grounding arguably imposes an anachronistic factive ontology on Aristotle. Whether the interpretive benefits outweigh the costs requires careful judgment.

Readers interested in going further on persistence might begin with Miller (2022) for an overview, Heller (1990) for constitution puzzle arguments against endurantism, Lewis (1986) and Merricks (1994) for the argument from temporary intrinsics against endurantism, Haslanger (1989) for adverbialism, and Sider (1996) for stage theory. Readers interested in going further with contemporary substance theory might begin with O'Conaill (2022).

5 Hylomorphism

5.1 Contemporary Hylomorphism

We have seen that Aristotle appears to view substances as compounds of form and matter. Explicitly inspired by this tradition, contemporary hylomorphic theorists

hold that certain objects have not only material constituents but also a component analogous to a form that somehow unifies these material constituents.

One motivation for hylomorphism arises from consideration of composition. Van Inwagen (1990) poses what he calls the Special Composition Question: under what conditions do two or more material objects compose a further, composite object? Van Inwagen contrasts this question with the General Composition Question: what in general is the composition relation? Answers to the Special Composition Question include never, always, and sometimes. Mereological nihilists hold that there are only simples. Mereological universalists hold that composition is unrestricted. Both positions must accept ontological results that strikingly go against our pre-theoretic intuitions. Nihilists of course reject all composites. And, as mentioned in Section 4.2, universalists accept a profligate ontology populated by trout-turkeys, the composite composed of my left foot and the Eiffel Tower, and so forth. Johnston (2006) holds that what is it for a composite item to be is for its parts to have a property or stand in a relation conforming to a certain principle of unity. Johnston calls hylomorphism the view that each complex item has such a characterization as a statement of its essence. In this way, hylomorphism provides a template for responses to composition questions.

Van Inwagen (1981 and 1990) himself endorses the view that there are only simples and organic unities; the only wholes are living creatures, the parts of which are unified by contributing to a life. Organicists might find a historical precedent in Aristotle, who sometimes gives the impression that he denies that artifacts are substances; for example, at *Meta*. 8.3 ($1043^{b}21$–23). Scholarly proposals on why this is so include taking artifacts to lack autonomy (Gill 1991, Irwin 1988, Shields 2008), to be merely accidental unities (Kosman 1987, Halper 1989, Gerson 1984, Ferejohn 1994), to have parts that exist in actuality (Papandreou 2023), and to be impermanent (Katayama 1999). Corkum (2023) argues for the contrarian view that artifacts are indeed substances but unlike natural substances are relatively, not absolutely, fundamental.

A second consideration that might give rise to hylomorphism concerns certain constitution puzzles. Suppose that small lumps of clay are formed into a statue – just to track who is who, call the lumps of clay when amalgamated, 'Lumpl,' and the statue 'Goliath.' At a later date, the statue is destroyed in extreme heat that also destroys the clay. Lumpl and Goliath occupy the same spatiotemporal extent, and appear to have all and only the same material parts over the time they exist. Yet it seems that Lumpl and Goliath have different properties: for example, they have different dispositional properties, such as malleability. We could have destroyed Goliath by squishing the clay, but Lumpl would have survived the violence. From the indiscernibility of identicals, it

would seem then that Lumpl and Goliath are distinct. And moreover, the case gives rise to the so-called grounding problem. Modal dispositions supervene on microphysical structures; yet Lumpl and Goliath are physical duplicates.

Similar to the Lumpl and Goliath puzzle are cases of distinct signs with the same word tokens. Johnston gives the example of an Israeli highway named after Menachem Begin. A sign with the words 'Begin Highway' is erected with the dual intention of naming the highway and indicating its start. Johnston does not claim that there are really two signs, and not one sign with two communicative purposes. Johnston uses the example to indicate that, if you hold there are two signs, you must appeal to a principle of unity, since the material components of the sign indicating the name of the highway and of the sign indicating the start of the highway are the same. Fine (2000) gives a similar example of a string of token letters conveying different messages in English and in code.

A family of responses to these constitution puzzles appeal to some variant of sortal relative identity. The leading idea is to hold that to ask whether Lumpl and Goliath are simply the same is to underspecify what is being asked. There are no true, bald identity claims: identity claims are made relative to some kind under which the object or objects fall. We cannot ask whether Lumpl and Goliath are the same; we must ask whether they are the same statue, the same clay object, and so on. Johnston asks: how characterize these sortals or kinds? We might suggest that they are typically, in the identity claims of the greatest interest to those concerned with the metaphysics of composition and material constitution, *infirma species* or most specific kinds. And a further natural suggestion is that identity relative to such kinds implies having the same essence and so the same principle of unity. In this way, hylomorphism suggests a way forward for explaining how distinct composites might have all and only the same material constituents. Lumpl and Goliath are distinct composites since they are unified by different principles of unity. What holds together pieces of clay into a statue determines one malleability for the resulting complex object; what holds together pieces of clay into a lump determines a different malleability.

These observations leave hylomorphism underspecified and there are several choice points for fleshing out the approach. Hylomorphic theorists hold that some objects are in some sense composites of something like material constituents and something like a form or unifying principle. What objects exhibit this kind of structure? Some theorists view hylomorphic compounds as restricted to substances: see, for example, Koons (2014). This might be a natural assumption to make, especially if one's focus is on the characteristic features of substances of unity and integrity. But prima facie it seems that we need not deny hylomorphic structure to derivative entities. And many others allow a broader range of hylomorphic objects: see, for example, Fine (1999) and Johnston (2006). Our

focus will be on material objects, but some theorists extend the hylomorphic approach to abstracta: for example, Evnine (2016) views abstract artifacts such as musical works as hylomorphic.

A second choice point: what is a form in a hylomorphic compound? We have seen that Johnston (2006) takes the form to be a property or relation that provides a principle of unity, but there have been a range of alternatives. Some hylomorphists view forms as powers of composites that unify constituents. For example, Jaworski (2014) holds that such powers configure the materials that compose individuals. Rea (2011) holds that the natures of composites unite the powers of constituents. Koons (2014, 171) offers what he calls the sustaining instruments theory: "[o]n this account, the persistence of the whole is grounded in the ongoing cooperation of the parts, and the active and passive powers of the parts are grounded in corresponding primary powers of the whole. In addition, the whole acts through the parts, as teleologically subordinate instruments." One might wonder whether this picture requires symmetric grounding. We will see other proposals for the hylomorphic form as we discuss Koslicki (2008), Fine (1999), Marmodoro (2013) and others.

A third choice point: how does the form unify the material parts? Lowe (2011) considers and rejects a saturation picture for the unification of material constituents. On this picture, parts are incomplete entities unified when saturated by each other. The new substance is a combination of items neither of which can exist independently of the other. But such incompleteness is left unexplained by this picture. Talk of saturation is inspired by the Fregean description of propositions, but it remains either a mere metaphor or, if taken literally, mysterious. Lowe instead endorses a complementation picture. Parts are complementary; they complete each other on account of what is achieved when they so complement each other. Complementary entities can be existentially independent or codependent. Lowe illustrates: when an electron is captured by a proton, a new object, a hydrogen atom, is formed; but the electron remains just an electron; a new form is instantiated, but the form does not combine with the electron and proton to constitute the atom; the only things that combine are the electron and proton. We have seen alternative explanations of the role form plays in unifying the material parts, such as a power that configures the material constituents (Jaworski 2014), or as a nature that unite the powers of constituents (Rea 2011). And we will momentarily discuss a few other proposals.

Our last choice point: what is the nature of the composition relation in a hylomorphic compound? The material constituents appear to be parts – the bodily organs of a living creature; the internal combustion engine, transmission, alternator, and other automotive parts of a motorcycle; the hydrogen and oxygen atoms of a water molecule. And so too the hylomorphic compound might appear

to be a mereological whole. But the considerations that give rise to hylomorphism are in apparent tension with classical mereology. Standard mereologies have an axiom or theorem of extensionality. Distinct wholes necessarily differ in a proper part. Extensionality captures the intuition that a whole is nothing over and above its proper parts, taken together.

Recall the constitution puzzle involving a statue and its clay. Lumpl and Goliath are distinct, with their own dispositional properties, despite having all and only the same parts. As we have seen, hylomorphic theorists typically respond that composites are not to be identified with the sum of their parts, but are also partly individuated by a principle of composition unifying the sum. One principle unifies the material parts of Lumpl as, taken together, a lump of clay; another principle unifies these same parts as the statue Goliath. One option in response to these considerations is to take the composition relation holding together the hylomorphic compound to be nonmereological.

Some hylomorphists, however, view the compound to be a whole, but hold that the mereology appropriate for hylomorphic ontologies is nonextensional. For example, Fine (1999, 65) takes an approach to hylomorphism which does not employ standard mereological composition:

> Given objects a, b, c, . . . and given a relation R that may hold or fail to hold of those objects at any given time, we suppose that there is a new object – what one may call "the objects a, b, c, . . . in the relation R." So, for example, given some flowers and given the relation of being bunched, there will be a new object – the flowers in the relation of being bunched (what might ordinarily be called a "bunch of flowers"). Intuitively, this new object is an amalgam or composite of the component objects a, b, c, . . . and the relation R. But it is a composite of a very special sort. For the components and the relation do not come together as coequals, as in a regular mereological sum. Rather, the relation R preserves its predicative role and somehow serves to modify or qualify the components. However, the result of the modification is not a fact or state. It is a whole, whose components are linked by the relation, rather than the fact or state of the components being so linked.

Other theorists aim to retain a standard mereology. Koslicki (2008, 159), for example, develops a distinctive approach partly in response to a difficulty she sees in Aristotle.

> Aristotle seems to be committed to the view that forms themselves, at least in the guise of definitions, are mereologically complex: the parts of form are repeatedly identified as the parts of definition, the genus and the differentia. This of course gives rise to the following difficulty: if form in fact has parts, and all mereologically complex objects that are genuinely unified must have their parts held together by means of some principle of unity, then what, if anything, could act as the further principle of unity which holds together the

> parts of form? Unless this quandary can be put to rest in some way, either by meeting it head-on or by rejecting some of its presuppositions, the unity of form is called into question and, with it, also that of matter/form compounds, which depend on form as their source of unity.

On this reading, Aristotle's appeal to form merely pushes back the explanation of the unity of the hylomorphic compound. Koslicki's solution is to treat the unifying element to be a mereological atom and itself a part of the hylomorphic compound. Notice that, in making the principle of composition itself a part of the composite object, Koslicki preserves the extensionality characteristic of standard mereologies. Lumpl and Goliath do in fact differ in their parts.

Koslicki's approach has received a variety of objections. I will mention just a selection of this critical attention. First, Hovda (2009) worries that the account does not answer the Special Composition Question but leaves unexplained why some things, the parts of ordinary objects, compose something, and other things do not – why there are motorcycles but not trout-turkeys. Presumably, a motorcycle is unified by a principle that is simple, but a trout-turkey, insofar as it is unified at all, is unified by a principle that is irredeemably gerrymandered and complex. Second, the view that the unifying principle of a composite is itself a part of that composite appears vulnerable to an objection, similar to Koslicki's criticism of Aristotle, that the move merely pushes the question back: if the form unifies the material parts, now the question is what unifies the whole consisting of those material parts with the formal part. Koslicki, however, is arguably not vulnerable to this objection. The unity of the whole is borrowed from the form's simplicity, and does not need further explanation. And, as a third objection, one might wonder about the simplicity of unifying principles, and how simple principles transfer unity to the whole. Marmodoro (2013) finds the simplicity of such principles obscure.

Finally, some theorists reject a mereological model for hylomorphic compounds altogether. Marmodoro develops an alternative approach to hylomorphism explicitly inspired by her reading of Aristotle, on which Aristotle denies that matter and form are parts of the hylomorphic compound. Marmodoro (2013, 15) explicitly follows Scaltsas (1994) "in taking Aristotle to establish that being unified into a whole *re-identifies* the parts in a way they cannot be when apart from the whole. The parts are re-identified according to the unifying principle of the whole, the substantial form. Once re-identified, they have *no distinctness* in the substance; they exist in it holistically." The role of the form, as a principle of unification, is the operation of re-identification. In applying this approach to contemporary hylomorphism, Marmodoro (2013, 17–18) views form not as a part of the hylomorphic compound, but as

> *an operation* on the elements of a substance, stripping them of their distinctness, rather than being an item in the ontology . . . . A substance is *not* its parts (whether one of the parts is a form or not); and it is *not* its parts plus a form (of a different ontological type than the parts. *A substance is all its parts, re-identified*.

Koons (2014) objects that Marmodoro is committed to what he (following Koslicki) calls Reverse Mereological Essentialism, the condition that the existence of each part is dependent on the existence of a particular whole: if x is a proper part of substance y, then, necessarily, if x exists, then y exists and x is a proper part of y. My hand can only exist as a part of my whole so, provided my hand exists, then necessarily the whole exists. One might wonder whether Marmodoro is problematically committed to Reverse Mereological Essentialism, since it is unclear on her view whether parts exist or, if they do, in what sense they exist. We will return to this charge when we consider in Section 5.2 whether Aristotle is vulnerable to a similar objection.

Let me bring the discussion of contemporary hylomorphism to a close by summarizing some of the choice points. What objects have hylomorphic structure? Some restrict hylomorphism to substances (for example, Koons 2014); others allow a hylomorphic analysis to a broader range of objects (Fine 1999, Johnston 2006, Evnine 2016). What is a form in a hylomorphic compound? Answers include: a property or relation that provides a principle of unity (Johnston 2006), an immaterial part (Koslicki 2008, Fine 1999), a nature or power (Rea 2011, Jaworski 2014), or an operation of reidentification (Marmodoro 2013). How does the form unify the material parts? Answers include: as a simple lending unity (Koslicki 2008), as a power that configures the material constituents (Jaworski 2014), as a nature that unite the powers of constituents (Rea 2011), as a relation among the material constituents that modifies them (Fine 1999), or by reidentifying the parts (Marmodoro 2013). Is the composite mereological? Answers include: yes, with the standard mereological feature of uniqueness of composition (Koslicki 2008), yes, but not a standard mereology with form as a part (Fine 1999), or no (Marmodoro 2013).

5.2 Aristotle on Matter

Recall that Aristotle introduces in the *Physics* the four causes of form, final, efficient, and material. Aristotle's glosses on matter, such as "that out of which a thing comes to be and which persists, is called 'cause', e.g. the bronze of the statue, the silver of the bowl, and the genera of which the bronze and the silver are species" ($194^{b}24–26$) present a mixed picture. Matter plays a variety of roles: talk of 'that out of which' suggests an originative role, as the initial stage

of a motion or process, or the source out of which some new thing arises. This characterization might also suggest a constitutive role, and Aristotle often appears to view the concrete individual substance as a hylomorphic compound, as we will discuss in more detail momentarily. On the other hand, talk of 'that which persists' suggests a role as the substratum of change. This raises a tension with the role of a substance as an enduring substratum, discussed in Section 4.2, and we will return to this tension soon. These are not the only roles for matter. Matter sometimes appears to play an individuation role. For example, Aristotle claims at *Meta*. 7.8 ($1034^{a}4$–7) that Socrates and Callias are the same in form but differ in matter, suggesting that the form of a living organism is its species, and the matter is the particular material that embodies this member of that species. This role intersects with the interpretive question, raised in Section 4.4, whether a form is a species, a universal or an individual; and we will also return to this question in a moment.

Is there a core sense to 'matter' that can explain all these roles? I've argued in Corkum (2012 and 2013b) that talk of matter in Aristotle does not pick out a single fixed extension in all contexts of usage, and it may also be true that we cannot identify one conceptual role as the meaning of the term. But there does seem to be a central sense to 'matter' that goes some way towards underlying at least some of these roles. Aristotle initially introduces matter in *Physics* 1.7 as a requirement for the intelligibility of change. Qualitative change partly involves the alteration of contrary qualities. But for there to be genuine change, it is not sufficient that there be the alteration of qualities; there also must be some thing that is undergoing a change, that initially possesses the one quality and which later possesses the contrary quality. We have seen that these considerations give rise to Aristotle's endurantism, where the individual substance persists through qualitative changes by remaining numerically identical over time. But in addition to qualitative changes, there are also substantial changes, where an individual substance comes into being or passes out of being. If Aristotle is to provide a similar analysis of this kind of change, he requires a persisting substratum. At times, matter appears to play this narrow role as the substratum of just substantial change. At other times, matter appears to play an extended role as the substratum also of qualitative change, raising an interpretive difficulty to reconcile these competing candidates for that which persists through changes in quality.

Aristotle's analysis of motion draws on a distinction between potentiality and actuality.

> We have distinguished in respect of each class [of substance or quantity or quality or place] between what is in fulfilment and what is potentially; thus the fulfilment of what is potentially, as such, is motion – e.g. the fulfilment of

> what is alterable, as alterable, is alteration; of what is increasable and its opposite, decreasable (there is no common name for both), increase and decrease; of what can come to be and pass away, coming to be and passing away; of what can be carried along, locomotion. That this is what motion is, is clear from what follows: when what is buildable, in so far as we call it such, is in fulfilment, it is being built, and that is building. Similarly with learning, doctoring, rolling, jumping, ripening, aging. (*Phys*. 3.1, 201^{a}9–19)

Aristotle includes not just locomotion but changes in each category, including substantial changes and qualitative changes, under the heading of motion. We have seen that Aristotle, in *Phys*. 1.7, has analyzed change not as the mere alteration of contraries, but as the chang*ing* of an underlying substratum. Aristotle cashes this analysis out in terms of an enduring persistent substratum partly constituted by a capacity to realize the end state of the change.

Aristotle views potentiality as a capacity to realize an actual state, if unhindered. For example, Aristotle draws on this characterization of potentiality when contrasting natural and artificial changes at *Meta*. 9.7 (1049^{a}8–18):

> there is potentially a house, if nothing in the thing acted on – i.e. in the matter – prevents it from becoming a house, and if there is nothing which must be added or taken away or changed; this is potentially a house, and the same is true of all other things for which the source of their becoming is external. And in the cases in which the source of the becoming is in the very thing which suffers change, all those things are said to be potentially something else, which will be it of themselves if nothing external hinders them. E.g. the seed is not yet potentially a man; for it must further undergo a change in a foreign medium. But when through its own motive principle it has already got such and such attributes, in this state it is already potentially a man; while in the former state it needs another principle, just as earth is not yet potentially a statue, for it must change in order to become bronze.

Although the actual state realized through a change is temporally posterior to its correlated potentiality, Aristotle views actuality as both definitional prior and prior in substance to potentiality; see for example *Meta*. 9.8 (1049^{b}10–12).

Aristotle associates matter with potentiality and form with actuality. See, for example, in the Makin (2006, 11) translation of *Meta*. 9.8 (1050^{a}15–16): "the matter is potentially because it may go to the form; and at any rate whenever it is actually, then it is in the form." Compare *De An* 2.1 (412^{a}6–11):

> We say that substance is one kind of what is, and that in several senses: in the sense of matter or that which in itself is not a this, and in the sense of form or essence, which is that precisely in virtue of which a thing is called a this, and thirdly in the sense of that which is compounded of both. Now matter is

> potentiality, form actuality; and actuality is of two kinds, one as e.g. knowledge, the other as e.g. reflecting.

This association goes some way towards reconciling the various roles of matter. Consider the hylomorphic compound that is me. Recall that the word being translated as form, *eide*, is ambiguous between a species and a form: although Aristotle might not be consistent throughout the corpus, he often seems to hold that my species is human but my form is my soul. In the *De Anima*, for example, the soul is defined as a form or a first actuality of a body potentially having life:

> the soul is an actuality of the first kind of a natural body having life potentially in it. The body so described is a body which is organized. The parts of plants in spite of their extreme simplicity are organs; e.g. the leaf serves to shelter the pericarp, the pericarp to shelter the fruit, while the roots of plants are analogous to the mouth of animals, both serving for the absorption of food. If, then, we have to give a general formula applicable to all kinds of soul, we must describe it as an actuality of the first kind of a natural organized body. That is why we can dismiss as unnecessary the question whether the soul and the body are one: it is as though we were to ask whether the wax and its shape are one, or generally the matter of a thing and that of which it is the matter. Unity has many senses (as many as 'is' has), but the proper one is that of actuality. (*De An.* 2.1, 412a27–412b9)

A first potentiality is a mere capacity, realized by a first actuality as a state. This first actuality is itself a second potentiality, a disposition towards behaviour or an ability to act in ways characteristic of members of the given kind, which is realized by a second actuality, the associated activity. An infant has the first potentiality to speak English: that is to say, they have the innate capacity for language acquisition. When this potentiality is actualized, they have linguistic abilities. One who knows English, but isn't currently speaking it, has a second potentiality, and their ability is actualized as a second actuality when they open their mouths and speak English.

Aristotle views the soul as the first actuality since, for example, one remains the human they are even when not engaged in the activities characteristic of humans, such as when they are asleep. However, in associating first actualities with forms, Aristotle views the soul as a kind of cause, an explanation of a thing's motion and rest that makes reference to that thing's essence or kind. It is this which organizes and unifies the bodily or material parts. My form is a state capable of activities characteristically human, and this capacity to act provides organizational structure to the bodily organs by which I may perform these activities.

In this way, the collection of bodily organs is a whole and not a mere aggregate. Aristotle draws the distinction between aggregates and wholes, for

example, at *Meta*. 8.5 (1045^{a}8–10): "In all things which have a plurality of parts, and which are not a total aggregate but a whole of some sort distinct from the parts, there is some cause." Both aggregates and wholes are materially constituted. Aggregates are just their constituents, taken collectively, and an aggregate is nothing over and above its constituents. What is the cause aggregates lack? Consider *Meta*. 7.17 (1041^{b}11–13): "Now since that which is composed of something in such a way that the totality is a unity; not as an aggregate is a unity, but as a syllable is – the syllable is not the letters, nor is BA the same as B and A." Aggregates exhibit no arrangement or internal structure. So an aggregate is unstructured and, since formal causes bestow structure, formless. By contrast, the constituents of wholes are arranged, in virtue of standing in a relation to a formal principle providing structure among the parts. It is this form which is that by which the whole is something over and above its parts.

But what specifically is the relation between form and matter in Aristotle? On what is I believe a standard interpretation, the formal and material constituents of a hylomorphic compound are for Aristotle distinct; in particular, the characterization of a form does not itself contain a reference to matter. A non-standard view occasionally put forward in the secondary literature is that the characterization of the form of a concrete substance contains a reference to matter. The claim comes in a range of strengths. For example, Balme (1984) advocates a strong version of this claim, under which the definition of a natural substance makes detailed reference to that substance's specific bodily parts. And Peramatzis (2011) argues for a version of the claim weaker than Balme's interpretation: the form of a concrete natural substance contains, as an independent component, merely a generic reference to that substance's materiality. Aristotle characterizes the essence identified with form as the substance without the matter – for example, at *Meta*. 1032^{b}14 and elsewhere. This might suggest that a concrete substance is composed of distinct formal and material constituents; and that the changes which a concrete substance undergoes, and the activities in which a substance engages, are explained by distinct causes.

Kitcher (1985) distinguishes among explanations those that are *top-down* from those that are *bottom-up*. Although the form–matter distinction does not correspond precisely with Kitcher's distinction, the terminology and attendant visual metaphor may be helpful to the reader. Form provides a top-down explanation of the concrete substance in terms of function or disposition towards its characteristic activities. Matter provides a bottom-up explanation of the concrete substance in terms of underlying material whose properties determine the physiology of that substance. For example, an individual human is defined as a rational animal and so formally characterized in terms

of such life activities as reproduction, assimilation, locomotion, perception, and intellection. The disposition towards such activities is realized in bodily materials such as flesh and bone, and in bodily organs such as genitalia, the digestive tract, limbs, eyes, and so on.

Aristotle appears to privilege form over matter. Since a thing's form is identified with its essence, it seems that the concrete substance is primarily and necessarily characterized functionally. What it is to be human, for example, is to be disposed towards the activities characteristic of humans. To have the physiology that humans in fact have is secondary to being human. To give another example, consider Aristotle's view, expressed at *Meta*. $1035^{b}23$–25 and elsewhere, that a body part such as a hand, when severed, is no longer strictly a hand. A body part is individuated by its function and its contribution to the activities characteristic of the whole entity of which it is a part. A severed hand has the same physiology as an attached hand. But a severed hand is no longer strictly a hand for it can no longer perform its function nor contribute to the function of the whole human being. From these considerations Aristotelian explanations appear to be predominantly top-down.

From considerations such as these, some scholars have taken Aristotelian forms to be multiply realizable. If, for example, humans are by definition rational animals, then humans are necessarily rational but merely contingently bipedal or carbon-based creatures. The functions or dispositions towards certain activities that are characteristic of humans might have been realized in radically different physiologies. For example, Gill (1989, 132–133) takes this line of interpretation. Views such as Balme's, where the characterization of the form contains specific reference to matter, by contrast might severely constrain what material organization could realize humanity.

Gill (1989, 128), Whiting (1992) and others make a helpful distinction between two kinds of matter, distal and proximate. The proximate matter is a potentiality or capacity to realize the form of the concrete substance. Such matter is also itself the realization of the distal matter and, as such, is itself an actuality. To illustrate, let us say that a concrete human being has, as its proximate matter, flesh and, as its distal matter, the element earth. Flesh is a capacity for realizing the human form but is also in Aristotle's view a manifestation of earth. Insofar as it is the former, flesh is dependent on form and so is characterized in terms of function. So described, flesh is a necessary component of the concrete substance. And the human form is necessarily conjoined with such a material component. However, insofar as flesh is the realization of earth, it is ontologically independent of the form of the concrete human. And, so described, flesh is merely contingently or inessentially conjoined with this form. It is not clear whether Aristotle holds that the form

contains reference to matter, but it may be that a thing's form constrains its proximate matter while leaving relatively open what distal matter might realize this proximate matter.

There are of course many interpretive issues in the vicinity that we cannot broach further. Readers interested in recent work on some of these issues might begin with Pfeiffer (2021), who discusses whether Aristotle's notion of matter is suited for contemporary hylomorphism. But before finishing our discussion of Aristotle's hylomorphism, let me return to a question that arose earlier in this section. Recall that Marmodoro is a hylomorphic theorist who views form as re-identifying the material parts of the composite. We wondered whether this is vulnerable to an unattractive commitment to reverse mereological essentialism. Is Aristotle vulnerable to a similar objection? We might say that reverse mereological essentialism is ambiguous between a true claim about parts, characterized in terms of proximate matter, and a false claim about parts, characterized in terms of distal matter. For Aristotle, part of the explanation of the unity of the hylomorphic compound is a top-down account provided by the form. The state realized by the compound, associated with its essence, lends organizational structure to its material parts, insofar as these parts are directed towards the ability of the whole organism to engage in certain activities. But part of the explanation, arguably, is a bottom-up account of how a specific distal matter realizes these material parts.

Readers interested in a different approach to the topic of hylomorphism might start with Simpson (2023).

References

Ackrill, J. L. 1963. *Aristotle's* Categories *and* De Interpretatione. *Translated with Notes and Glossary*. Oxford: Clarendon Press.

Allaire, E. 1963. Bare Particulars. *Philosophical Studies* 14:1–8. DOI: 10.1007/bf00396663.

Balme, D. 1984. The snub. *Ancient Philosophy* 4:1–8. https://doi.org/10.5840/ancientphil19844119.

Barnes, J., ed. 1984. *The Complete Works of Aristotle: The Revised Oxford Translation*. Princeton: Princeton University Press.

Brower, J. 2015. Medieval theories of relations. In E. Zalta, ed., *The Stanford Encyclopedia of Philosophy* (winter 2015 edition), http://plato.stanford.edu/archives/win2015/entries/relations-medieval/.

Cameron, R. 2007. The contingency of composition. *Philosophical Studies* 136 (1):99–121. https://doi.org/0.1007/s11098-007-9144-6.

Casullo, A 1988. A fourth version of the bundle theory. *Philosophical Studies* 54:125–139. DOI: 10.1007/bf00354181.

Chisholm, R. 1996. *A Realistic Theory of Categories*. Cambridge: Cambridge University Press.

Code, A. 1978. No universal is a substance: An interpretation of metaphysics Z 13, 1038b 8–15. In G. Simmons, ed., *Paideia: Special Aristotle Issue*. Brockport: Brockport State University College, pp. 65–74.

Code, A. 1983. Aristotle: Essence and accident. In R. Grandy and R. Warner, eds., *Philosophical Grounds of Rationality: Intentions, Categories, Ends*. Oxford: Oxford University Press, pp. 411–439.

Corkum, P. 2008. Aristotle on ontological dependence. *Phronesis* 53:65–92. https://doi.org/0.1163/156852808x252594.

Corkum, P. 2009. Aristotle on nonsubstantial individuals. *Ancient Philosophy* 29:289–310. https://doi.org/0.5840/ancientphil200929227.

Corkum, P. 2012. Aristotle on mathematical truth. *British Journal for the History of Philosophy* 20:1057–1076. https://doi.org/10.1080/09608788.2012.731230.

Corkum, P. 2013a. Substance and independence in Aristotle. In B. Schnieder, A. Steinberg and M. Hoeltje, eds., *Varieties of Dependence*, Basic Philosophical Concepts Series. Munich: Philosophia Verlag, pp. 65–97.

Corkum, P. 2013b. Critical notice of Michail Peramatzis. *Priority in Aristotle's Metaphysics*, Oxford University Press, 2011. *Canadian Journal of Philosophy* 43:136–156. https://doi.org/10.1080/00455091.2013.803831.

Corkum, P. 2014. Review of Daniel D. Novotný and Lukáš Novák (eds.). *Neo-Aristotelian Perspectives in Metaphysics*. Routledge, 2014. *Notre Dame Philosophical Review*, http://ndpr.nd.edu/news/49601-neo-aristotelian-perspectives-in-metaphysics/.

Corkum, P. 2016. Review of Anna Marmodoro and David Yates (eds.). *The Metaphysics of Relations*. Oxford, 2016. *Notre Dame Philosophical Review*, http://ndpr.nd.edu/news/68119-the-metaphysics-of-relations/.

Corkum, P. 2019. This. *Dialogoi: Ancient Philosophy Today* 1:38–63. https://doi.org/10.3366/anph.2019.0004.

Corkum, P. 2020. Ancient. In M. Raven, ed., *Routledge Handbook of Metaphysical Grounding*. New York: Routledge, pp. 20–32.

Corkum, P. 2023. Aristotle on artifactual substances. *Metaphysics* 6:24–36. DOI: 10.5334/met.123.

Corkum, P. 2024. Philosophy's past: Cognitive values and the history of philosophy. *Philosophy and Phenomenological Research* 108:585–606. https://doi.org/10.1111/phpr.12990.

Della Rocca, M. 2013. The taming of philosophy. In M. Laerke, J. Smith, and E. Schliesser, eds., *Philosophy and Its History.* Oxford: Oxford University Press, pp. 178–208.

Donnelly, M. 2016. Positionalism revisited. In A. Marmodoro and D. Yates, eds., *The Metaphysics of Relations*. Oxford: Oxford University Press, pp. 80–99.

Douglas, H. 2009. *Science, Policy, and the Value-Free Ideal*. Pittsburgh: University of Pittsburgh Press.

Evnine, S. 2016. *Making Objects and Events: A Hylomorphic Theory of Artifacts, Actions, and Organisms*. Oxford: Oxford University Press.

Ferejohn, M. 1994. The definition of generated composites in Aristotle's Metaphysics. In T. Scaltsas, D. Charles, and M. L. Gill, eds., *Unity, Identity and Explanation in Aristotle's Metaphysics*. Ithaca: Cornell University Press, pp. 291–318.

Fine, G. 1984. Separation. *Oxford Studies in Ancient Philosophy* 2:31–88.

Fine, K. 1994. Essence and modality. *Philosophical Perspectives* 8 (Logic and Language):1–16. https://doi.org/10.2307/2214160.

Fine, K. 1999. Things and their parts. *Midwest Studies in Philosophy* 23 (1):61–74. https://doi.org/10.1111/1475-4975.00004.

Fine, K. 2000. A counterexample to Locke's thesis. *The Monist* 83:357–361. https://doi.org/10.2307/27903691.

Frede, M. 1987. Individuals in Aristotle. In M. Frede, ed., *Essays in Ancient Philosophy.* Minneapolis: University of Minnesota Press, pp. 49–71.

Frede, M. and G. Patzig. 1988. *Aristoteles Metaphysik* Munich: C. H. Beck.

Dummett, M. 1973. *Frege: Philosophy of Language*. London: Duckworth.

Friend, T. and S. Kimpton-Nye. 2023. *Dispositions and Powers*. Cambridge Elements in Metaphysics. Cambridge: Cambridge University Press.

Gerson, L. 1984. Artifacts, substances and essences. *Apeiron* 18:50–57. https://doi.org/10.1515/apeiron.1984.18.1.50.

Gill, M. L. 1989. *Aristotle on Substance*. Princeton: Princeton University Press.

Gill, M. L. 1991. Aristotle on self-motion. In M. L. Gill and J. Lennox, eds., *Self-Motion: From Aristotle to Newton*, Princeton: Princeton University Press, pp. 135–154.

Glock, H. 2008. Analytic philosophy and its history: A mismatch? *Mind* 117:867–97.

Goodman, N. 1966. *The Structure of Appearance*. 2nd edn. Indianapolis: The Bobbs-Merrill Co.

Grice, H. P. 1988. Aristotle on the multiplicity of being. *Pacific Philosophical Quarterly* 69:175–200. https://doi.org/10.1111/j.1468-0114.1988.tb00308.x.

Grossman, R. 1983. *The Categorial Structure of the World*. Bloomington: Indiana University Press.

Halper, E. 1989. *One and Many in Aristotle's Metaphysics*. Columbus: Ohio State University Press.

Haslanger, S. 1989. Endurance and temporary intrinsics. *Analysis* 49:119–125. https://doi.org/10.1093/analys/49.3.119.

Heil, J. 2016. Causal relations. In A. Marmodoro and D. Yates, eds., *The Metaphysics of Relations*, Oxford: Oxford University Press, pp. 127–137.

Heil, J. 2021. *Relations*. Cambridge Elements in Metaphysics. Cambridge: Cambridge University Press.

Heller, M. 1990. *The Ontology of Physical Objects*. Cambridge: Cambridge University Press.

Hoffman, J. and G. Rosenkrantz. 1994. *Substance among Other Categories*, Cambridge: Cambridge University Press.

Hovda, P. 2009. Review of Koslicki 2008. *Notre Dame Philosophical Reviews*. https://ndpr.nd.edu/reviews/the-structure-of-objects/.

Irwin, T. 1981. Homonymy in Aristotle. *Review of Metaphysics* 34:523–544.

Irwin, T. 1988. *Aristotle's First Principles*. Oxford: Clarendon Press.

Jaworski, W. 2014. Hylomorphism and the metaphysics of structure. *Res Philosophica* 91:179–201. https://doi.org/10.11612/resphil.2014.91.2.2.

Johansson, I. 1989. *Ontological Investigations*, New York: Routledge.

Johnston, M. 2006. Hylomorphism. *Journal of Philosophy* 103 (12):652–698. 0.5840/jphil2006103125.

Katayama, E. 1999. *Aristotle on Artifacts*. Albany: State University of New York Press.

Kitcher, P. 1985. Two approaches to explanation. *Journal of Philosophy* 82:632–639. https://doi.org/10.2307/2026419.

Koons, J. 2014. Staunch vs. faint-hearted hylomorphism: Toward an Aristotelian account of composition. *Res Philosophica* 91:151–177. https://doi.org/10.11612/resphil.2014.91.2.1.

Koslicki, K. 2008. *The Structure of Objects*. New York: Oxford University Press.

Koslicki, K. 2015. In defense of substance. *Grazer Philosophische Studien* 91 (1):59–80. https://doi.org/0.1163/9789004302273_004.

Kosman, A. 1987. Animals and other beings in Aristotle. In A. Gotthelf and J. Lennox, eds., *Philosophical Issues in Aristotle's Biology*, Cambridge: Cambridge University Press, pp. 360–391.

Kuhn, T. 2012. *The Structure of Scientific Revolutions*. 50th Anniversary Edition. Chicago: Chicago University Press.

Lacey, A. 1965. Ousia and form in Aristotle. *Phronesis* 10:54–69. https://doi.org/10.1163/156852865x00059.

Laudan, L. 1984. *Science and Values: The Aims of Science and Their Role in Scientific Debate*. Berkeley: University of California Press.

Lesher, J. 1971. Aristotle on form, substance and universals: A dilemma. *Phronesis* 16: 169–178.

Liebesman, D. 2011. Simple Generics. *Noûs* 45 (3):409–442. https://doi.org/0.1111/j.1468-0068.2010.00774.x.

Lewis, D. 1984. Putnam's Paradox. *Australasian Journal of Philosophy* 62:221–236. DOI: 10.1080/00048408412340013.

Lewis, D. 1986. *On the Plurality of Worlds*. Oxford: Blackwell Publishers.

Lewis, D. 1997. Finkish dispositions. *Philosophical Quarterly* 47 (187):143–158. 10.1111/1467–9213.00052.

Longino, H. 1990. *Science as Social Knowledge*. Princeton: Princeton University Press.

Longino, H. 1996. Cognitive and non-cognitive values in science: Rethinking the dichotomy. In L. Nelson and J. Nelson, eds., *Feminism, Science and the Philosophy of Science*. Dordrecht: Kluwer, pp. 39–58.

Lowe, E. J. 2006. *The Four-Category Ontology: A Metaphysical Foundation for Natural Science*, Oxford: Clarendon.

Lowe, E. J. 2011. A neo-Aristotelian substance ontology: Neither relational nor constituent. In T. Tahko, ed., *Contemporary Aristotelian Metaphysics*. Cambridge: Cambridge University Press, pp. 229–248.

Lowe, E. J. 2016. There are (probably) no relations. In A. Marmodoro and D. Yates, eds., *The Metaphysics of Relations*. Oxford: Oxford University Press, pp. 100–112.

Makin, S. 2006. *Aristotle: Metaphysics Theta. Translated with Notes and Glossary*. Oxford: Clarendon Press.

Marmodoro, A. 2013. Aristotle's hylomorphism, without reconditioning. *Philosophical Inquiry* 36:5–22. https://doi.org/10.5840/philinquiry2013371/28.

Marmodoro, A. 2014. *Aristotle on Perceiving Objects*. Oxford: Oxford University Press.

Marmodoro, A. 2023. *Properties in Ancient Metaphysics*. Cambridge Elements in Ancient Philosophy. Cambridge: Cambridge University Press.

Maurin, A.-S. 2022. *Properties*. Cambridge Elements in Metaphysics. Cambridge: Cambridge University Press.

McDaniel, K. 2014. Metaphysics, history, phenomenology. *Res Philosophica* 91:339–365. https://doi.org/10.11612/resphil.2014.91.3.6.

Meadows, K. 2023. Causal Priority in Metaphysics Θ.8. *Archiv für Geschichte der Philosophie* 105:197–240.

Merricks, T. 1994. Endurance and indiscernibility. *Journal of Philosophy* 91 (4):165–184.

Mignucci, M. 1986. Aristotle's definitions of relatives in Cat. 7. *Phronesis* 31:101–127. https://doi.org/10.1163/156852886x00074.

Miller, K. 2022. *Persistence.* Cambridge Elements in Metaphysics. Cambridge: Cambridge University Press.

O'Conaill, D. 2022. *Substance*. Cambridge Elements in Metaphysics. Cambridge: Cambridge University Press.

Owen, G. E. L. 1960. Logic and Metaphysics in Some Earlier Works of Aristotle. In I. During and G. E. L. Owen, eds., *Aristotle and Plato in the Mid-Fourth Century*. Goteborg: Elanders. Reprinted in J. Barnes, M. Schofield, R. Sorabji, eds., *Articles on Aristotle*, vol. 3: *Metaphysics*. London: Duckworth, 1979, pp. 163–190.

Owen, G. E. L. 1965. Inherence. *Phronesis* 10:97–105. https://doi.org/10.1163/156852865x00095.

Papandreou, M. 2023. *Aristotle's Ontology of Artefacts*. Cambridge: Cambridge University Press.

Peramatzis, M. 2008. Aristotle's notion of priority in nature and substance. *Oxford Studies in Ancient Philosophy* 35:187–247.

Peramatzis, M. 2011. *Priority in Aristotle's Metaphysics*. Oxford: Oxford University Press.

Perovic, K. 2024. *Ontological Categories*. Cambridge Elements in Metaphysics. Cambridge: Cambridge University Press.

Pfeiffer, C. 2021. What is Matter in Aristotle's Hylomorphism? *Ancient Philosophy Today* 3: 148–171.

Price, H. H. 1953. *Thinking and Experience*. Hutchinson's University Library.

Quine, W. and J. Ullian. 1978. *The Web of Belief*. New York: Random House.

Rea, M. 2011. Hylomorphism reconditioned. *Philosophical Perspectives* 25:341–358. DOI: 10.1111/j.1520-8583.2011.00219.x.

Robinson, H. 2021. Substance. *The Stanford Encyclopedia of Philosophy* (fall 2021 edition), Edward N. Zalta (ed.), https://plato.stanford.edu/archives/fall2021/entries/substance/.

Rodriguez-Pereyra, G. 2002. *Resemblance Nominalism: A Solution to the Problem of Universals*. Oxford: Oxford University Press.

Rosenkrantz, G. 2012. Ontological categories. In T. Tahko, ed., *Contemporary Aristotelian Metaphysics*. Cambridge: Cambridge University Press, pp. 83–93.

Russell, B. 1912. *The Problems of Philosophy*. Oxford: Clarendon Press.

Ryle, G. 1949. *The Concept of Mind*. Chicago: University of Chicago Press.

Scaltsas, Theodore. 1994. *Substances and Universals in Aristotle's Metaphysics*. Ithaca: Cornell University Press.

Sellars, W. 1957. Substance and form in Aristotle. *Journal of Philosophy* 54:688–699. https://doi.org/10.2307/2021933.

Shields, C. 1999. *Order in Multiplicity: Homonymy in the Philosophy of Aristotle*. Oxford: Clarendon Press.

Shields, C. 2008. Substance and life in Aristotle. *Apeiron* 41:129–152. https://doi.org/10.1515/APEIRON.2008.41.3.129.

Sider, T. 1996. All the World's a Stage. *Australasian Journal of Philosophy* 74 (3):433–453. https://doi.org/10.1080/00048409612347421.

Sider, T. 2001. *Four-Dimensionalism: An Ontology of Persistence and Time*. Oxford: Oxford University Press.

Simons, P. 1998. Farewell to substance: A differentiated leave-taking. *Ratio* 11 (3):235–252. https://doi.org/10.1111/1467-9329.00069.

Simons. P. 2016. External relations, causal coincidence, and contingency. In A. Marmodoro and D. Yates eds., *The Metaphysics of Relations*. Oxford: Oxford University Press.

Simpson, W. 2023. *Hylomorphism*. Cambridge Elements in Metaphysics. Cambridge: Cambridge University Press.

Spellman, L. 1995. *Substance and Separation in Aristotle*. Cambridge: Cambridge University Press.

Studtmann, P. 2014. Aristotle's Categories. *The Stanford Encyclopedia of Philosophy* (summer 2014 edition), E. Zalta (ed.), http://plato.stanford.edu/archives/sum2014/entries/aristotle-categories/.

Thomasson, A. 2022. Categories. *The Stanford Encyclopedia of Philosophy* (winter 2022 edition), E. Zalta & U. Nodelman (eds.), https://plato.stanford.edu/archives/win2022/entries/categories/.

Thompson, J. 1983. Parthood and identity across time. *Journal of Philosophy* 80:201–220. https://doi.org/10.2307/2026004.

Van Cleve, J. 1985. Three versions of the bundle theory. *Philosophical Studies* 47:95–107. DOI: 10.1007/bf00355089.

Van Inwagen, P. 1981. The doctrine of arbitrary undetached parts. *Pacific Philosophical Quarterly* 62:123–137. https://doi.org/10.1111/j.1468-0114.1981.tb00051.

Van Inwagen, P. 1990. *Material Beings*. Ithaca: Cornell University Press.

Wasserman, R. 2006. Review of Lowe, 2006. *Notre Dame Philosophical Reviews.* https://ndpr.nd.edu/reviews/the-four-category-ontology-a-metaphysical-foundation-for-natural-science/.

Whiting, J. 1992. Living bodies. In A. Rorty and M. Nussbaum, eds., *Essays on Aristotle's* De Anima, Oxford: Oxford University Press, pp. 75–91.

Williams, D. C. 1953. On the elements of being I. *Review of Metaphysics* 7 (1):3–18.

Wilson, M. 1992. History of philosophy in philosophy today; and the case of the sensible qualities. *Philosophical Review* 101:191–243. https://doi.org/10.2307/2185046.

Woods, M. 1967. Problems in Metaphysics vii 13. In J. Moravcsik, ed., *Aristotle*. Garden City: Anchor Books.

Acknowledgements

Thanks to Tuomas Tahko and two anonymous reviewers. Quotations from Aristotle are from Barnes (1984), except as noted. Section 1 draws on revised material from Corkum (2014) and (2024), Section 3.2 on Corkum (2009), Section 3.3 on Corkum (2016), Section 4.4 on Corkum (2020) and Section 5.2 on Corkum (2013b).

Cambridge Elements

Metaphysics

Tuomas E. Tahko
University of Bristol

Tuomas E. Tahko is Professor of Metaphysics of Science at the University of Bristol, UK. Tahko specialises in contemporary analytic metaphysics, with an emphasis on methodological and epistemic issues: 'meta-metaphysics'. He also works at the interface of metaphysics and philosophy of science: 'metaphysics of science'. Tahko is the author of *Unity of Science* (Cambridge University Press, 2021, *Elements in Philosophy of Science*), *An Introduction to Metametaphysics* (Cambridge University Press, 2015), and editor of *Contemporary Aristotelian Metaphysics* (Cambridge University Press, 2012).

About the Series

This highly accessible series of Elements provides brief but comprehensive introductions to the most central topics in metaphysics. Many of the Elements also go into considerable depth, so the series will appeal to both students and academics. Some Elements bridge the gaps between metaphysics, philosophy of science, and epistemology.

Cambridge Elements

Metaphysics

Elements in the Series

Ontological Categories: A Methodological Guide
Katarina Perovic

Abstract Objects
David Liggins

Grounding, Fundamentality and Ultimate Explanations
Ricki Bliss

Metaphysics and the Sciences
Matteo Morganti

Teleology
Matthew Tugby

Modal Naturalism: Science and the Modal Facts
Amanda Bryant and Alastair Wilson

Metaphysics of Race
Kal H. Kalewold

Metaphysics of Causation
Max Kistler

The Metaphysics of Gender
E. Díaz León

Reduction, Emergence and the Metaphysics in Science
Carl Gillett

The Metaphysics of Color
Elay Shech and Michael Watkins

Neo-Aristotelian Metaphysics
Phil Corkum

A full series listing is available at: www.cambridge.org/EMPH