

Form, Substance, and Mechanism

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Philosophers today have largely given up on the project of categorizing being. Aristotle's ten categories now strike us as quaint, and no attempt to improve on that effort meets with much interest. Still, no one supposes that reality is smoothly distributed over space. The world at large comes in chunks, and there remains a widespread intuition, even among philosophers, that some of these chunks have a special sort of unity and persistence. These, we tend to suppose, are most truly agents and subjects, and are what exist in the most proper sense of the term. We believe, in other words, in substances.

Today these intuitions rest on the slightest theoretical support. The two dominant theories of substance, the bundle theory and the substratum model, have shortcomings so obvious and well known that philosophers might be excused for supposing that substance talk cannot be put on any respectable ground.¹ There is, however, a neglected philosophical tradition that attempts to account for the distinctive unity of substances in terms of a single unifying form. This is the much-scorned scholastic conception of a substantial form, which medieval and Renaissance philosophers invoked to account for why some segments of reality have a distinctive kind of coherence and hence a special metaphysical status.

The modern attitude toward substantial forms is familiar enough. Descartes dismissively remarked that they are "a philosophical being unknown to me" (AT 2:367; CSMK, 122). Henry Oldenburg congratulated Robert Boyle on having "driven out that drivel of substantial forms" which "has stopped the progress of true philosophy, and made the best of scholars not more knowing as to the nature of particular bodies than the meanest ploughmen" (3.67). Very soon, 'substantial form' became a byword for all that was obscure and obsolete in scholastic Aristotelianism, and from this scorn the theory has never recovered. But what exactly were substantial forms? Were they rejected for good reasons? These are questions that have never been satisfactorily answered.

The notion of a substantial form has its roots in Aristotle's physical conception of form as one of the four causes, along with his metaphysical conclusion that form, above all else, is substance in the primary

sense.² But this conception of form as somehow *substantial* took on new life among scholastic Aristotelians, and was developed in ways that Aristotle himself never suggested. Indeed, I will argue that scholastic philosophers transformed the notion of what a form is, replacing what was for Aristotle a mode of functional explanation with something much more like an internal efficient cause. On this account, the road from Aristotelian function to modern mechanism runs through the medieval understanding of form.

I proceed as follows. After briefly surveying some standard and fairly unhelpful scholastic formulations (section 1), I suggest that the doctrine of substantial form is two-sided, at times appearing concrete and causal (section 2), and at other times abstract and metaphysical (section 3). Both sides of the theory, I argue, serve to explain the special sort of unity possessed by substances, but in later medieval thought the concrete side seems ascendant. I then turn to the seventeenth century, first considering several gross misunderstandings of the theory (section 4), and then evaluating the extent to which substantial forms can be seen to have survived in the work of Descartes, Boyle, and Locke. Contrary to some recent suggestions, Descartes accepts virtually nothing of the doctrine (section 5). Boyle and especially Locke, however, can be read as accepting large portions of the doctrine, albeit within a mechanistic framework (section 6).

1. The Scholastic Doctrine: A First Approximation

From the start, it should be said that if modern attacks on substantial forms were unjust, the fault lies largely with the scholastics themselves. Because substantial forms were not challenged within the Aristotelian tradition, they were not defended or explained in any detail until the Renaissance. No consensus ever developed about what substantial forms were, and not even the most articulate of Aristotelians, medieval or Renaissance, explained the theory very clearly. Even if we put aside for now the perplexing question of what a *form* is, there were many different ways in which authors attempted to distinguish substantial and accidental forms. One proposal, sometimes ascribed to Averroes, was that substantial forms have as their subject (or *inform*) something that only potentially exists, whereas accidental forms have as their subject something actually existent. This is to say that substantial forms inhere in prime matter, whereas accidents inhere in a form-matter composite.³ On another conception of the distinction, associated with Thomas

Aquinas, a substantial form makes a thing be absolutely (*simpliciter*), whereas an accidental form makes a thing be in some respect (*secundum quid*).⁴ Among later Aristotelians, it was standard to characterize the substantial form in still another way: as that which combines with matter to make a composite that is *unum per se*.⁵ The sixteenth-century Paduan scholastic, Jacob Zabarella, proposed yet another criterion: that accidental forms cannot be received in prime matter unless a substantial form has already been received, whereas a substantial form can be received prior to any accidental forms.⁶

Eventually, we will be in a position to make some sense of these various proposals. On its face, however, all of this looks rather discouraging. Even if one or more of these accounts were correct in fixing the extension of the concepts in question, they seem far from perspicuous as an *explanation* of what substantial forms are. Indeed, by the end of the thirteenth century, John Duns Scotus had concluded that there is no informative account of how substantial and accidental forms differ. In practice, according to Scotus, philosophers give various derivative (“a posteriori”) accounts of what the difference is: they point to the having of contraries, to the taking on of more or less, to being known in its own right, etc. These are all characterizations of accidental forms and not substantial ones. Still, they don’t tell us about the thing in itself. It just is true that *pale* is an accident, or that *humanity* is a substantial form. Such propositions are known per se, and in these cases there is nothing more to be said, because nothing more can be said. For Scotus, the distinction between substantial and accidental forms is basic and unanalyzable.⁷

Yet despite the bewildering variety of scholastic accounts, and despite Scotus’s insistence that the concept is primitive, one fundamental feature of substantial forms was universally accepted by the scholastics: that the substantial form plays a part in the essence of a thing. The classic text is Aristotle, *Physics* 2.3, 194b27, which characterizes the formal cause as “the account of the essence.” Averroes, too, just before offering the distinction mentioned earlier between substantial and accidental forms, remarks that the substantial form is what gives a thing “its name and definition” (*Phys.* 1.63). And according to Francisco Suárez, the end of the substantial form is “to constitute and complete the essence of a natural being” (*DM* 15.1.18).

For the scholastics, this often went without saying, and was no doubt regarded as insufficient for any serious analysis of substantial forms. Scotus, in particular, would not have considered such an account very

revealing. But this is surely the place where a reconstruction of the medieval doctrine should begin. It immediately raises the question, however, of just what it means to say, as Suárez does, that the substantial form “constitutes” a thing’s essence. The most straightforward way to think about this is to suppose that the substantial form of a thing just is its essence or the set of its essential properties.⁸ This is not to identify the substantial form with all a thing’s *necessary* properties, because for an Aristotelian not all necessary properties are essential. The essential properties are those that define a thing as what it is. (To take the most hackneyed example, *rational* is included, whereas *risible* is not.) Of course, this notion of an essential property is itself badly in need of clarification and defense, but that is an issue that will have to wait (for section 3), because this initial straightforward proposal faces more immediate difficulties. First, it cannot be right to *identify* the substantial form with a thing’s essence, because there was general agreement among the scholastics that the essence of a thing includes both its substantial form and its common matter. It is part of the essence of a human being, for instance, to be a composite of soul with flesh and bones.⁹ Aristotle might be thought to reflect this point, inasmuch as he describes the form not as the essence, but as the account (*logos, ratio*) of the essence. Glossing Aristotle’s remark, the Coimbrans make it clear that the relationship between substantial form and essence is not that of identity: instead, the substantial form is “that in which the natural essence of any composite is *principally* contained, or what *completes* the essence of a thing and its definition, and distinguishes it from others” (*Physics* 1.9.10.1).

Here one might want to explore in more detail the notion of common matter—not *this* flesh and *these* bones, but flesh and bones in general—as something that is part of a thing’s essence but lies outside its form. One might well suppose, contrary to the usual medieval view, that to pick out the *common* matter of a thing just is to pick out the formal aspect of the matter, and hence not to have moved outside of form at all. But I want to set this issue to one side, and focus on a second reason why it is at least misleading to identify a thing’s substantial form with its essential properties. For scholastic philosophers of all persuasions, the substantial form is the explanatory basis of the entire substance, serving as the internal cause of a thing’s accidental properties and supplying the identity conditions for the whole substance and its parts. These are the causal and metaphysical frameworks that ground medieval theories of substance. To describe the substantial form

merely as the essence of a thing implies that the scholastics simply pick out one or more properties of the thing as somehow distinctive or definitive, and call that set of properties a form. There is, I now want to suggest, a much more interesting theory here than that, one that explains substantial unity and identity over time, and at the same time helps to justify Aristotelian realism with regard to essences.

2. The Concrete Side of Substantial Form

Among the familiar four Aristotelian causes, we can distinguish between the pair that works internally, form and matter, and the pair that is external, the efficient and the final cause. It is commonplace to remark that these four causes are not really causes in our modern sense of the term, but rather principles of explanation. The internal causes in particular seem to pick out nothing more than assorted properties of a substance, and so to offer a very different kind of explanation from the efficient cause, the only cause on the list that seems properly causal at all. But matters are more complicated, at least with respect to the formal cause, at least as it was understood by scholastic authors. According to these Aristotelians, the various forms of a substance are held together in a tight causal structure, with one form—the substantial form—producing and sustaining the various accidental forms that give a substance its particular appearances and qualities. As we will see, the substantial form can be viewed as playing something very much like the role of an internal efficient cause, sustaining and regulating the existence of that which the efficient cause originally produced.

Descriptions of this internal causal framework appear as early as Avicenna (980–1037). He claims that “among accidents, there are some that occur from without and some that occur from the substance of the thing.” As examples of the latter, Avicenna offer skin color, height, and the disposition to be hopeful or cheerful.¹⁰ By the middle of the thirteenth century, Latin authors were routinely ascribing this sort of role to substantial form. According to Albert the Great, “there is no reason why the matter in any natural thing should be stable in its nature, if it is not completed by a substantial form. But we see that silver is stable, and tin, and likewise other metals. Therefore they will seem to be perfected by substantial forms” (*De mineralibus* 3.1.7 [Wyckoff, 173]). To be “stable in its nature” is for a thing to have a constant set of properties that are characteristic of that thing. The substantial form is not that set, but something further that explains their enduring presence. Aquinas

regularly describes substantial form in a similar way. In his early treatise *De ente et essentia*, he remarks that “substance ... must be the cause of its accidents” (*De ente* 6.54–57), and though Avicenna is not expressly mentioned, Aquinas makes use of one of his examples: the black skin of an Ethiopian. More generally, he later writes, “all accidents are certain forms added onto the substance, caused by the principles of the substance” (*SCG* 4.14.3508).¹¹

Can Aquinas really mean—as some of the texts just quoted suggest—that *all* of a thing’s accidents are a determinate product of the substantial form alone? No, he cannot really mean that, because some accidents, like the cut on my left knee, clearly have an external cause. Such accidents surely cannot be the sole product of my essence. Aquinas explicitly addresses this issue in various places. He remarks, for instance, that not every perfection that might come to a thing comes from its substantial form; instead, “much is added on by supervening accidents—in a human being, for instance, shape and color are added” (*ST* 1a2ae 18.3c). Aquinas attempts to set out his view with some precision in the following passage:

There are three kinds of accidents. (1) Some are caused by the principles of the species and are called propria, as *visible* is for a human being. (2) Others are caused by the principles of the individual, and this in two ways. (2a) Some have a permanent cause in their subject, and these are inseparable accidents, such as *male* and *female* and others of this sort. (2b) Others have a cause in their subject that is not permanent, and these are separable accidents, such as *sitting* and *walking*. (*QDA* 12 ad 7)

Cuts and scrapes fall into class (2b), inasmuch as they “have a cause in their subject that is not permanent,” like my sitting or walking. Two other classes of accidents have an internal cause; I will refer to these as *internal accidents*. There are (1) propria: species-wide accidents that are not part of a thing’s essence but are necessary attributes. These flow from the “principles of the species,” which is to say that they flow from the essence as it is common to all members of a species. Then (2a) there is the class of accidents that do not necessarily belong to every member of the species, but that do flow from “the principles of the individual.” In using this phrase, Aquinas means to refer to the particular form that distinguishes me as an individual. It is a consequence of my particular form that I am male, blue-eyed, gangly, etc.¹²

It may be surprising to find Aquinas committed to differences between substantial forms within a single species. But this is something he is quite clear about. The main reason why some people are more

intelligent than others, for instance, is because of differences in their souls. In reply to an objection that two members of the same species cannot differ in soul, since that would be a difference in form, which would make them members of different species, Aquinas replies that not all differences in form do make for a difference in species (*ST* 1a 85.7 ad 3). Given this view, it follows naturally that knowledge of a thing's individual substantial form would yield knowledge of all its intrinsic accidents. Aquinas makes this point in a revealing passage from his *De veritate*. First, he says, knowledge of the essence of a species would reveal knowledge of all the accidents associated with that species: "an intellect cognizing the essence of a species comprehends through that essence all of the per se accidents belonging to the species" (*QDV*2.7c). Then, he adds, knowledge of an individual's "proper essence" would reveal not only the species-wide accidents but even the individual's peculiar intrinsic accidents, such as skin color and size: "once the proper essence of a singular is cognized, all of its singular accidents are cognized" (*QDV*2.7c).¹³ Aquinas goes on to say that only God could have such knowledge of an individual's distinctive nature. But the metaphysical point remains: all of a substance's properties, necessary and contingent, either flow from its substantial form or are imposed from without: "everything that holds true of something is either caused by the principles of its nature, as is a human being's capacity for laughter, or comes to it from an external principle, as light in the air comes from the sun's influence" (*De ente* 4.127–30).

The role of substantial form becomes even more prominent in later authors. William Ockham, for instance, remarks that "it is clear to the senses that hot water, if left to its own nature, reverts to coldness; this coldness cannot be caused by anything other than the substantial form of the water" (*Quodlibet* 3.6; 226). Later in the fourteenth century, John Buridan remarks that "substantial forms, rather than the accidents conjoined to them, are the principal active principles in the changes and rests to which the forms are suited" (*QPhys.* 2.5; f. 33rb). He illustrates the causal role played by the substantial form as follows: "When, in someone with a fever, the heat exceeds its correct proportion to other qualities, it is not apparent how it would be reduced to its [correct] state unless the soul were to reduce it" (*ibid.*).

Renaissance authors, most notably Suárez in *Metaphysical Disputation* 15, developed this claim in detail. Near the end of what must be the most detailed treatment of the topic ever attempted,¹⁴ Suárez writes that "the most powerful arguments establishing substantial forms are

based on the necessity, for the perfect constitution of a natural being, that all the faculties and operations of that being are rooted in one essential principle" (*DM* 15.10.61). Suárez refers the reader back to an earlier discussion, where he had argued:

The aggregation of multiple faculties or accidental forms in a simple substantial subject is not enough for the constitution of a natural thing.... A form is required that, as it were, rules over all those faculties and accidents, and is the source of all actions and natural motions of such a being, and in which the whole variety of accidents and powers has its root and unity. (*DM* 15.1.7)

With this, Suárez rejects the bundle theory, according to which various faculties and forms constitute a substance simply by being collected together at the same time and place. But he also rejects a substratum model, on which faculties and forms might make a substance in virtue of having some kind of underlying subject. Neither model will work, because there has to be something that, rather than lying beneath these attributes, "rules over" them, supplying the unity necessary for a genuine substance.

Suárez's most detailed set of arguments for this conclusion rests on the way that substances have natural states to which they gravitate: water, for instance, is naturally cold, and eventually reverts to that state even after being heated. What is the cause of this? It must be an internal principle, Suárez argues, and can be nothing other than a substantial form (*DM* 15.1.8).¹⁵ This is the same example that Ockham had used before, and that Boyle would explicitly attack in the seventeenth century (*OFQ* 60). The governing assumption behind the example is that substantial forms play a concrete, causal role in regulating the accidental properties of substances.

The Coimbra commentators, contemporaries of Suárez, take much the same line. They describe how "certain proper and peculiar functions apply to individual natural things: reasoning to a human being, whinnying to a horse, heating to fire, and so on in other cases" (*Physics* 1.9.9.2). This is obviously not a list of essential properties, in the Aristotelian sense—no one would suppose that whinnying is what makes a horse be a horse. But still "the origin of such accidents must be ascribed to the substantial form, as to their source" (*ibid.*). Summarizing their view about the role of such forms, they write,

In all it cannot be denied that, for each and every natural thing, there is a substantial form, by which it is established, through which its degrees of excellence and perfection among physical composites is selected, on

which every propagation of things depends, from which its aspect and character is stamped on each thing, which undertakes whatever task there is in nature given its power, which elicits all actions both of life and of all other functions, to which support accidents come, as if instruments, and finally, which marvelously distinguishes and furnishes the theater of this admirable world in its variety and beauty. (Ibid.)

This elaborate paean to the substantial form is simply the culmination of a view that was prevalent throughout the medieval scholastic era.

In all these texts, the dominant conception of form is decidedly concrete rather than metaphysical. Substantial forms are understood as causal agents that would figure centrally in any complete scientific account of the natural world. They explain why water is cold, why gold is heavy, why horses have four legs and human beings two, and why horses merely whinny whereas human beings talk. Given this conception of form, it is no wonder that some scholastic authors contemplated describing the substantial form as a kind of *efficient* cause. Thus Henry of Ghent contended in the late 1280s that “every subject through its form is the active and efficient cause of its proper accidents and likewise of its common accidents, together with the initial active causes that concur with it, disposing it for this in the way described above” (*Quod.* 10.9; 426r1). Henry doesn’t hesitate here to describe the substantial form as an efficient cause, treating it as the internal analogue to the traditional efficient cause that comes from without. Godfrey of Fontaines, a contemporary critic, took issue with that characterization, and insisted that only the initial external causes can be referred to as efficient causes (Godfrey, *Quod.* 8.2).¹⁶ Judging from later authors, Godfrey’s view won out as a terminological matter. But the point does seem to be wholly terminological, inasmuch as the later medieval conception of substantial form came to have more and more in common with an Aristotelian efficient cause.

3. The Metaphysical Side of Substantial Form

Looked at from what I am calling their concrete side, substantial forms play the role of a cause in our modern sense of the term, serving as something like an internal efficient cause that sustains and regulates the substance once it has been brought into existence by an external efficient cause. The ascension of this conception of form in the later Middle Ages marks a pronounced historical change in the theory of form. Although Aristotle’s conception of form is notoriously open-ended, it is clear that he wanted formal explanations to hold at a higher

level of abstraction than that of material and efficient explanations. According to *Metaphysics* Zeta 17, the unity of a substance is a product not just of its elements, but of some further unifying principle, the form, that is not itself an element. This argument suggests that the formal cause occupies a different conceptual space from that of material or efficient causes. Whereas explanation at these latter levels is what we now think of as yielding a narrowly physicalistic picture of the world, formal explanation seems to take place at a more abstract, metaphysical level. What is at issue here are not ground-level facts about why a body has this or that observable quality, but more refined questions of unity and individuation, requiring judgments about, for instance, a thing's modal properties.

The scholastic conception of substantial form, particularly as it emerges in later authors, looks to be quite different. For these authors, as we have seen, a substantial form is nothing like a metaphysical abstraction: it is, instead, a causal power acting in a quasi-efficient manner on the various parts and qualities of the substance. Now there are places where Aristotle himself might be thought to encourage this conception of form, particularly in his biological works.¹⁷ One might even suggest that modern Aristotelians have downplayed this side of Aristotle in favor of a more metaphysical conception of form, lest the theory seem wedded to an empirically false doctrine akin to scholastic real qualities or modern vitalism. (In this spirit, Kit Fine remarks that "Aristotle seems to have a possible basis for the belief [in individual forms], namely that forms are real and active principles in the world, which is denied to any right-minded modern" (1994, 19).) So it may be that in Aristotle, as in the scholastics, form should be seen as having two sides, not clearly reconcilable, one of which treats forms as individual causal powers whereas the other conceives of form abstractly.

Still, it seems hard to deny that Aristotle's more pronounced tendency—at least when engaged in high-level philosophical inquiry—is to treat form abstractly and metaphysically. This is particularly striking in those passages that suggest that the form of a substance just is its function. Aristotle remarks, for instance, that "if the eye were an animal, *sight* would be its soul" (*De an.* 2.1.412b18). Elsewhere, the form of a house is being "a covering for bodies and chattels" (*Met.* 8.2.1043a16).¹⁸ This conception of form looks to be a long way from the efficiently causal side of form. Understood as a function, the substantial form obviously cannot be conceived of as an internal causal power. Now, to be sure, these two conceptions of form might still be

closely connected. Form conceived of as a causal power might be characterized as that which gives rise to a thing's function, and the function might be seen as the characteristic feature of a substance that determines its nature. To be an eye, for instance, just is *to see*. Hence, the loss of that characteristic function might entail the loss of a thing's defining form, and so the loss of its identity. Still, there clearly seem to be two conceptions here of what a form is. And whereas in Aristotle a more metaphysical conception of form seems to predominate, by the end of the scholastic era the case for form rests entirely on its causal efficacy as the source of a substance's various intrinsic properties.

But even though the metaphysical side of substantial form seems largely absent from later scholastic discussions, it was not entirely neglected during the Middle Ages. Buridan, for instance, in the course of attacking a reductive account of the soul's actions to its powers, remarks of his opponent that "through similar arguments, they could say the same of substantial form's relation to matter: namely, that matter disposed in one way is fire, disposed in another way is water, air, or stone. This was the opinion of Democritus and Melissus and those who say that all things are substantially one thing" (*Quaest. de an.* 3.11). Buridan does not choose to challenge the assumption that matter variously disposed might give rise to all the superficial qualities of various substances. The stress is instead metaphysical: a purely corpuscular approach to material things would be unable to account for the individuation of substances.

Aquinas is especially interesting in this regard, for although he does—as we have seen—stress the concrete side of substantial form, he also puts substantial form to metaphysical work, using it to articulate the identity conditions for a substance and its various parts. Moreover, he does this by connecting substantial form with functional, teleological considerations, suggesting that in these contexts form might be playing the role of a higher-level, abstract explanatory principle. The passages that most strikingly display the metaphysical side of form are those in which Aquinas argues that substantial forms, unlike accidental forms, give existence to the whole substance and to each of its parts. "This is clear from the fact that both the whole and the parts take their species from it, and so when it leaves, neither the whole nor the parts remain the same in species. For a dead person's eye and flesh are so-called only equivocally" (*SCG* 2.72.1484).¹⁹ Here, what distinguishes a substantial form from an accidental form is not that it exercises some sort of quasi-efficient causality over the whole substance, but that it

individuates the whole substance and its parts, so that when a part is separated from the whole, the part becomes something else, distinct not just in number but even in kind. The eye is no longer an eye, except in name only (*homonymously*, as Aristotle put it).²⁰ What seems at issue here is not the scientist's question of what gives flesh the various observable qualities it has, but the metaphysician's question of what gives a substance and its parts their identity over time. The answer is that my flesh remains flesh—and, implicitly, remains *my* flesh—for as long as it is informed by the same substantial form.

Elsewhere, Aquinas describes in more detail the way substantial form plays this metaphysical role in individuating substances. What is characteristic of a substantial form, he argues, is that

a substantial form perfects not only the whole, but each part. For since the whole is made up of parts, a form of the whole that does not give existence to the individual parts of the body is a form that is a composition and ordering (e.g., the form of a house) and such a form is accidental. (*ST* 1a 76.8c)

Here the metaphysical role of substantial form—as that which perfects each part of the substance—is made to rest not on facts about how the observable qualities of things are regulated by the form, but on the presupposition that genuine substances are not a mere “composition and ordering,” like a house. But why should we accept this distinction between substances and artifacts? The passage immediately continues:

The soul, however, is a substantial form, and so it must be the form and actuality not only of the whole, but of each part. And for this reason, just as one does not speak of an animal and a human being once the soul has left—unless equivocally, in the way we speak of a painted or sculpted animal—so too for the hand and eye, or flesh and bones, as the Philosopher says. An indication (*signum*) of this is that no part of the body has its proper function once the soul has left, whereas anything that retains its species retains the operation belonging to that species. (*Ibid.*)

Here again we encounter Aristotle's principle of homonymy for living things, and here it is supposed to be a consequence of the way that a substantial form actualizes the whole substance and each part of that substance. Given that this consequence does indeed hold, it is easy to see why Aquinas sees a distinction between genuine substances, unified by a substantial form, and mere artifacts, unified merely by “composition and ordering.”²¹ For in the case of a genuine substance, the parts are radically dependent on the substance for their continued existence. Take away a piece of flesh, and it becomes something else. This

is not the case for non-substances. Take a brick away from a house, and it remains a brick. So the substance is unified not because it cannot exist without its parts, but because its parts cannot exist apart from it.

Yet why should we suppose that a living thing is subject to Aristotle's principle of homonymy, whereas a house is not? Why not say that a door, apart from a house (or when off its hinges) is no longer a door? Aquinas offers some guidance at the end of the above passage, when he remarks that the parts of a living thing lose their function (*opus*) apart from the soul. One might wonder whether this suggestion adequately explains this metaphysical distinction between eyes and doors. But I want to set that issue aside and focus on what the remark reveals about how Aquinas conceives of form. Aquinas, like Aristotle, never addresses the question of how the abstract and concrete sides of form interrelate, and so the issue seems wide open to interpretation. There is at least a hint in these passages, however, that Aquinas's conception of form leans more toward the concrete side. If form here is to be understood abstractly, then one would expect it to be some kind of functional property—if not identical to function, then somehow characterized in functional terms. The reference to proper function at the end of the last passage seems initially to make good on that expectation. It is significant, however, that function is introduced as a mere "indication" (*signum*). For Aquinas, '*signum*' is a technical term for a certain kind of evidential support: it indicates that what is being offered is not the *reason why* a thing is so, but simply a defeasible piece of empirical evidence.²² According to the present passage, then, loss of function does not cause or constitute loss of identity, but is merely a sign of it. This shows that—however we are to understand form here—we should not think of it as an abstract, functional principle.

This seems notably different from Aristotle's approach, in the passages on which Aquinas is drawing. In *Meteorology* 4.12, Aristotle asserts that "what a thing is is always determined by its function: a thing really is itself when it can perform its function; an eye, for instance, when it can see" (390a10–11). The most natural reading of this passage takes function itself to be that which determines what the thing is, and so to be form—especially given the corresponding claim from the *De anima*, quoted earlier, that "if the eye were an animal, *sight* would be its soul" (412b18).²³ Aquinas shows less inclination to conceive of form in this highly abstract way. Though he wants to arrive at the same metaphysical conclusions regarding the unity and endurance of substances, he arrives there by conceiving of form as a concrete internal power that

gives rise to a thing's functions. Form has the metaphysical implications it does because of its causal role in sustaining and regulating each and every internal aspect of a substance's physical constitution.

Whether or not Aristotle and Aquinas do in fact differ in this way, it seems clear that each can be found, at various points, emphasizing different sides of form, sometimes inclining more to the abstract side and other times more to the concrete. The exegetical question of which side is ascendant seems very much in need of further study.²⁴ There are, moreover, important philosophical questions to be asked here. First, one would like to know whether there is some way of synthesizing these two sides of the Aristotelian notion of form, or whether instead they are as incompatible as the labels 'abstract' and 'concrete' tend to suggest. (In describing form as having two *sides*, I mean to remain neutral on this issue.) If these two sides cannot be combined, then that leaves the modern-day Aristotelian with a choice regarding which direction to pursue, and the task of explaining what ramifications that choice will have for the larger framework of an Aristotelian account. For instance, if one goes for the abstract side of form, then what becomes of souls? If, on the other hand, one goes for the concrete side, then is the view still defensible?

Returning to historical matters, it seems quite clear that, by the time of the Renaissance, substantial forms had come to be conceived in wholly concrete terms. The intricate discussions of the topic in authors like Suárez and the Coimbraans give little or no scope for the sort of abstract, functional considerations at work in Aristotle and (sometimes) Aquinas. Perhaps in this these scholastics were bad Aristotelians. But, for better or worse, this is the conception of form that made its way into the seventeenth century. Descartes, for one, remarks that substantial forms "were introduced by philosophers solely so that through them an account could be given of the proper actions of natural things, of which this form was the principle and base" (to Regius, Jan. 1642; AT 3:506; CSMK, 208). Boyle likewise makes a lengthy attack on the view that there is "in every natural body such a thing as a substantial form, from which all its properties and qualities immediately flow" (*OFQ* 67). And Hume would later report that "the Peripatetic philosophy ... assigns to each of these species of objects a distinct substantial form, which it supposes to be the source of all those different qualities they possess, and to be a new foundation of simplicity and identity to each particular species" (*Treatise* 1.4.3, 221).

Whether these developments should be seen as good or bad depends on one's perspective. One effect of this changed conception of form was to diminish the distinctness and autonomy of formal explanations. It is one of Aristotle's most cherished ideas that material and efficient explanations must be supplemented by a further level of formal analysis. Scholastic authors seem to be sliding ever farther back toward the materialism Aristotle sought to refute, as if they could not resist the temptation to ground formal explanation on material and efficient causes at a deeper level. In turn, as the scholastic conception of form grew increasingly remote from its metaphysical roots in Aristotle, it became at the same time increasingly naturalistic. Indeed, substantial forms might well be viewed as an early step in the development of scientific essentialism. By associating essences with a definite hypothesis about the causal interrelationships within a substance, the theory provides clear criteria for distinguishing between what would later be called real and nominal essences. Although, as we will see shortly, the scholastics were largely pessimistic about whether we can in fact grasp substantial forms, the theory provides no reason to be tempted by any sort of conventionalism regarding essences. If an entity is organized by the kind of causal structure we have been considering, then the internal basis of that causal structure can be identified as the form or essence. If there is no such structure, then the entity is not a substance. (If no entities are so structured, then either there are no substances, or else the whole theory is wrong.) In any case, the theory of substantial form comes out as a well-defined hypothesis about the structure of material beings.²⁵

Modern theories of form and substance grew up in the shadow of this distinctively medieval conception of form and, as we will see, they did not entirely cast off that shadow. But once the doctrine of form lost its proper place as an alternative to material and efficient modes of explanation, it became easy for the moderns to ignore the metaphysical aspects of the Aristotelian scheme. With the solitary exception of Leibniz, the leading modern authors saw the doctrine of substantial form as a physical doctrine that might be replaced by an adequate corpuscular account of the various qualities of bodies. It never seems to have occurred to authors like Descartes and Boyle that substantial form might be something other than a scientific hypothesis about why, for instance, water is cold and fire is hot. In this they were simply following the scholastic doctrine as they knew it. That in itself, indeed, is one of

the clearest indications of just how far those late scholastics had strayed from the original Aristotelian notion of form.

4. Modern Misunderstandings of Substantial Form

Early modern philosophers never refuted the doctrine of substantial form. Like so many scholastic doctrines, the theory collapsed from inattention rather than argumentation. Scorned and ignored by anti-Aristotelians, it was at the same time ineptly defended by late scholastics, many of whom as a matter of principle avoided saying anything original or controversial in philosophical matters.²⁶

It is safe to say that substantial forms were never refuted, because the most prominent early modern critics—with the notable exception of Boyle—never took the theory seriously enough to mount a vigorous refutation. Convinced of the truth of their mechanistic approach, philosophers like Descartes, Hobbes, and Locke never learned enough about scholasticism to be in a position to refute it. They simply didn't think it worth their time.²⁷ Accordingly, it is not surprising that what these authors say about substantial form is largely mistaken. Rather than dwell on those mistakes, we should consider whether they succeeded in articulating an alternative account that dispenses with substantial form.

Still, we should at least note what was actually said about substantial form in the seventeenth century, if only to move these unfounded criticisms out of the way. There were two stock complaints: first, that the notion of substantial form is too obscure or occult to be usefully employed in philosophy; second, that it is unacceptable to treat forms as themselves substances. The first complaint was expressed vigorously by Locke, who spoke of “fruitless Enquiries after substantial Forms, wholly unintelligible, and whereof we have scarce so much as any obscure, or confused Conception in general” (3.6.10). Part of what made this doctrine so pernicious, according to Locke, was the way it led scholastic authors to suppose they grasped the real essences of things. Terms of art like *animalitas* and *humanitas* were introduced as if to signify the real essence of things, all because of “the Doctrine of substantial Forms, and the confidence of mistaken Pretenders to a knowledge that they had not” (3.8.2).

There are several difficulties with this criticism. First, scholastic authors were the first to stress that they had no grasp of what substantial forms actually were. Scotus put this point as starkly as anyone, remark-

ing that “no substance is understood in its own right, except in the most universal of concepts, like *being*.” As for the fact that we do seem to offer definitions of various substances, Scotus dismissively replies that “with respect to substances we have a vocal disposition, just as someone blind is naturally able to syllogize about colors” (*QMet* 2.2–3, 115–19). That is to say: we have words that we use, but we don’t know what we are talking about. All the other leading scholastics made similar claims.²⁸ Nevertheless, seventeenth-century authors regularly supposed themselves to be disagreeing with the scholastic doctrine by insisting on the obscurity of substantial forms. Many recent scholars have repeated this mistake.²⁹

A second difficulty with this first stock criticism is that it tends to presuppose that substantial forms are useful only as part of a detailed physical account of the natural world. Now, as I have been stressing, this was an important strand of scholastic thinking about form, and to that extent the criticism is apt, especially in the context of the increased early modern interest in the details of scientific explanation. But when substantial forms are conceived in more abstract, metaphysical terms, then it is less clear just how damning the criticism is. For even if scholastic authors were unable to give a detailed account of the particulars of a given substantial form, it might still be of vital philosophical importance to postulate such forms. If, for instance, forms play a crucial role in the identity conditions of substances, then it may be enough for that purpose to be able to explain in general terms what such forms are, even if their nature in particular cases remains obscure. Since modern authors tended to focus exclusively on the concrete, causal side of form, they could see no point in the scholastics’ admittedly schematic accounts.

The second stock criticism of substantial form was that it amounted to postulating forms that are themselves substances. It ought to be something of a scandal that this criticism became so widespread in the seventeenth century, because in fact this blatantly misconstrues the scholastic doctrine. Now it certainly is true that substantial forms were understood as a real power within a substance, something over and above the purely corpuscular constitution of a body. No scholastic would have tolerated a reductive explanation of form in mechanistic terms, and this explains why the doctrine of substantial form—along with the doctrine of real qualities—was such a prominent target for early modern mechanists. Still, to insist that form cannot be explained in reductive corpuscular terms is not to treat it as a substance, if by that

one means a subsistent entity, capable of independent existence apart from matter. In fact, if there is anything that all the scholastics could agree on regarding substantial forms, it is that they are not—with the one exception of the rational soul—substances in that sense. Here, for instance, is Aquinas:

Just as substantial form does not have absolute existence per se without that which it informs, so neither does that which it informs, the matter. That existence in which the thing subsists per se is thus a result of the conjunction of both. (*De ente* 6.24–28)

And here is Eustachius a Sancto Paulo, in a textbook from the early seventeenth century:

For each principle, matter and form, there is the highest necessity between them, ... because one can never be found without the other—if you put aside the rational soul. For just as matter can never exist stripped of form, so neither can form exist placed outside of matter, since one is for the sake of the other. (*Summa philosophiae*, Physica 1.1.2.9; 127).³⁰

Here ‘form’ means *substantial form*. To say that it cannot exist outside of something else just is to say that it is not subsistent, and so not a substance in the central sense of the term.

This last text is from one of the few scholastic works that we can confidently say Descartes read.³¹ Nevertheless, Descartes treats substantial forms as substances, in the sense of being subsistent:

To prevent any ambiguity of expression, it must be observed that when we deny substantial forms, we mean by the expression a certain substance joined to matter, composing with it a merely corporeal whole, and which, no less than or even more than matter—since it is said to be an actuality, and matter only a potentiality—is a true substance, or a thing subsisting per se. (to Regius, January 1642; AT 3:502; CSMK, 207)

Various proposals have been made for why Descartes would insist on treating substantial forms as substances, when this so clearly went against the scholastic consensus.³² But part of the explanation must be that this was simply a very widespread misconception among nonacademic philosophers in the seventeenth century. Boyle, to take another example, criticizes substantial forms on the ground that they are “imagine[d] to be a very substance, indeed a kind of soul” (*OFQ* 38). Against this, Boyle argues that they are “substances in name but accidents in truth” (*OFQ* 57). This, however, is a false dichotomy: the scholastics conceived of substantial forms as neither substances nor accidents.³³

These misunderstandings did have some basis in fact. The Aristotelians did standardly claim that substantial forms are substances; this was a standard claim for the same reason that so many scholastic dicta became standard, because Aristotle said it:

We say that one kind of being is substance (*ousian*). One [sort] of substance is matter, which by itself is not a particular thing. Another is shape or form, which is that by which a particular thing is so-called. A third is what is [composed] of those. (*De an.* 2.1.412a6-9; cf. 414a14)

This and other such passages led later Aristotelians, especially in the Renaissance, to describe both substantial form and matter as substances. Suárez offers this definition: “form is a simple and incomplete substance, which as the actuality of matter constitutes with it the essence of a composite substance” (*DM* 15.5.1). Eustachius follows the same lines, remarking that substantial form is an “incomplete substance or, so to speak, a semisubstance, which conjoined with matter constitutes one whole substance” (*Summa philosophiae*, *Physica* 1.1.2.5; 124). It is not at all clear, at first glance, how to understand this notion of an incomplete substance. If to be a substance requires the capacity for independent existence—which is to say *subsistence*—then the idea of a “semisubstance” seems to make little sense: a thing either will or will not be a substance. Now one might suppose that these authors have the following in mind: that substantial forms are freestanding, independent entities, and hence substances, but that they are incomplete in that they do not naturally occur apart from matter. It would be natural for Descartes in particular to give such passages this reading, because he tends to think of soul and body as substances in just this way.³⁴ But the scholastics clearly meant something quite different. Suárez goes on to warn that ‘substance’ is predicated analogously of form, matter, and the composite (*DM* 15.7.6), referring the reader to his later disputation on substance. And in that later work, distinguishing between complete and incomplete substances, he explains that “an incomplete substance is said to be everything that is a part of a substance or is conceived in the manner of a part, in which way matter and form are substances” (*DM* 33.1.5). Matter and form are substances, then, just in virtue of being *parts* of substances. This shows just how little force Suárez gives to the claim that substantial forms are incomplete substances.³⁵

Many other scholastics likewise explain the sense in which substantial forms are substances (or, explain the force of the adjective ‘substantial’). Zabarella, for instance, remarks that “by taking ‘substance’

in various ways, we can maintain that [a] *form* is substance above all, that [b] *the composite* is substance above all, and that [c] *matter* is substance above all” (*De anima* 2.3; 116F). The last follows when ‘substance’ is taken as *substratum*. To get (b), ‘substance’ must be taken as *that which subsists*. For (a) to hold, ‘substance’ must mean *essence*. Zabarella refers back to the sixth-century Greek commentator Simplicius, who had remarked of form and matter that “neither are substance in their own right, but only substantial (*oudiōdē*),” inasmuch as they are the constituents of what is properly a substance (*InPhys.* 1.6; 201.24–25). This is a remark that the scholastics could have embraced without exception.

5. Mechanism without Form: Descartes

A thorough study of early modern treatments of substantial form would have to take account of a wide range of material. In between confirmed anti-Aristotelians like Descartes and rigid Aristotelians like the Coimbrans, there were many complex attempts to mix Aristotelian and modern principles.³⁶ But it was the anti-Aristotelians who carried the day, and so any assessment of what happened to substantial form has to focus largely on those who did the most to discredit the doctrine. In these last two sections I will pay particular attention to Descartes, Boyle, and Locke, all of whom heatedly express their opposition to substantial forms.

What makes the case of Descartes particularly interesting is that he rejects substantial forms in general, but expressly invokes the doctrine for the single case of the rational soul. There is, therefore, a question why Descartes dispensed with the doctrine in general, and a question why he retained the doctrine in one special case. Regarding the first question, Descartes adhered in his published writings to a fairly disciplined stance regarding substantial forms: he does not positively reject them, or argue against them, but simply proceeds without them, hoping to show by example that they are unnecessary. When he does mention these and other scholastic doctrines, he generally proceeds cautiously, as in the following passage from his *Meteorology*:

But to keep the peace with the philosophers, I have no wish to deny whatever they may imagine in bodies over and above what I have described, such as their “substantial forms,” their “real qualities,” and the like. But it seems to me that my arguments will be all the more acceptable in so far as I can make them depend on fewer things. (Discourse 1; AT 6:239; CSM 1:187 n.)

In saying that his view depends on “fewer things,” Descartes has in mind his view that there is just a single kind of matter shared by all bodies, giving rise to different surface phenomena in virtue of differences in its motion, size, shape, and arrangement.³⁷

Descartes’s most extensive and frank remarks on this topic come in a long letter (from January 1642) advising his then-disciple Regius on how to deal with attacks on their shared views. Descartes suggests that Regius make this reply to his principal critic, Voetius:

I wholly agree with the view of the learned Rector that those “harmless entities” called substantial forms and real qualities should not be rashly expelled from their ancient territory. Indeed, up to now we have certainly not rejected them absolutely; we merely claim that we do not need them in order to explain the causes of natural things. We think, moreover, that our arguments are to be commended especially on the ground that they do not in any way depend on uncertain and obscure assumptions of this sort. Now in such matters, saying that one does not wish to make use of these entities is almost the same as saying one will not accept them. Indeed, they are accepted by others only because they are thought necessary to explain the causes of natural effects. So we will be ready enough to confess that we do wholly reject them. (AT 3:500; CSMK, 207)

Descartes goes on to suggest several arguments that Regius might make against substantial forms, but this passage illustrates the heart of his view: substantial forms are not needed, hence should not be made use of, hence are in effect rejected. Interestingly, Descartes shows himself aware of the concrete, causal role of substantial forms, when he remarks here that others embrace them “only because they are thought necessary to explain the causes of natural effects.” It is striking that Descartes takes this to be the *only* reason for postulating such forms. This may be a distortion of Aristotle, but it is faithful (or so I have been arguing) to how scholastic authors increasingly came to conceive of these matters.

When substantial forms are so conceived, the central question—indeed, the only question—becomes whether a purely mechanistic account can explain the “natural effects” without appealing to substantial forms. Later in the same letter, still as part of the reply proposed on behalf of Regius, Descartes returns to this issue:

They were introduced by philosophers solely so that through them an account could be given of the proper actions of natural things, of which this form was the principle and base, as was said in an earlier thesis. But no account can be given of any natural action through these substantial forms, since their defenders admit that they are occult and that they do

not understand them themselves. For if they say that some action proceeds from a substantial form, it is the same as if they were to say that it proceeds from something they do not understand, which explains nothing. (AT 3:506; CSMK, 208–9)

Rather than appealing to the explanatory power of his own account, Descartes now shifts his focus to the worthlessness of scholastic accounts. He here shows himself aware not only of the concrete, causal side of the theory, but also of the scholastic willingness to concede their ignorance of what a given thing's substantial form truly is. But this is a fatal concession, Descartes believes, because an explanation in terms of something itself unknown is of no value; it "explains nothing." Returning again to the merits of his ("our") own approach, he goes on to remark that "the essential forms that we explain give manifest and mathematical accounts of natural actions" (*ibid.*).³⁸

In this last remark, Descartes is willing at least to tolerate talk of *forms*, as long as they are the sort that "we explain." This raises the question of whether we might conclude that Descartes still has something like a theory of substantial forms, albeit a theory couched in mechanistic terms. In the following section I will consider the coherence of combining mechanism with substantial forms. But here there is no reason to take that possibility seriously, because—apart from the special case of the rational soul—Descartes's account has very little in common with that scholastic doctrine. Of course, Descartes is concerned with explaining the basis of the properties and actions of material substances. His mechanistic accounts are attractive largely because of their potential to explain a vast range of surface phenomena—color, sound, etc., but also behavior of all kinds—in terms of straightforward modes of extension. But although this was likewise part of what substantial forms were intended to do, Descartes's mechanistic proposal entirely lacks what was central to the scholastic account, an explanation of why some bodies have a special sort of substantial unity that mere aggregates lack.

The result, for better or worse, is that Descartes's ontology of substances is much more liberal than the scholastic one. Artifacts, for instance, are substances just as much as living organisms. A man's clothing counts as a substance,³⁹ and in general Descartes remarks, "I do not recognize any difference between artifacts and natural bodies except that the operations of artifacts are for the most part performed by mechanisms that are large enough to be easily perceivable by the senses" (*Principles* 4.203). Descartes entirely lacks an account of why

certain chunks of matter seem to possess a unity (synchronic or diachronic) that others lack. Bodies necessarily have extension, and potentially come in various shapes, sizes, and patterns. But there is nothing here to account for why a single body endures, or even what makes for a single body. Bodies cohere, he writes, “from the simple fact that they are at rest relative to each other.” The argument is worth quoting in full:

We certainly cannot think up any kind of glue that could join together the particles of two bodies any more firmly than is achieved simply by their being at rest. For what could that glue be? It could not be a substance, for since the particles are themselves substances, there is no reason why another substance should join them more effectively than they join themselves together. Nor could the ‘glue’ be any mode distinct from their being at rest. For no other mode could be more contrary to the motion that separates them than their being at rest. And we recognize no other kind of things apart from substances and their modes. (*Principles* 2.55; cf. 2.63).

This is utterly implausible, but we can see what motivates it. The strictures of Descartes’s physics preclude him from allowing that the parts are attracted to one another by some kind of force. At the same time, his hostility to scholasticism leaves him unwilling to appeal to something that would be neither a substance nor a mode, but a substantial form, defining and regulating the substance’s various modes.

Such forms will seem most plausible in the case of living organisms, and least plausible in the case of artifacts that can be assembled and disassembled at will. No wonder, then, that the scholastics insisted on distinguishing these cases, whereas Descartes ran them together. (Sticks and stones will be an uncomfortable middle ground for the scholastics, for whom it is far from clear that such nonliving aggregates genuinely are substances.) It is not obvious whose position is more defensible. The scholastics have a robust explanation of substantial unity, but as a result they must make some questionable distinctions between what does and does not count as a substance. Descartes can be much more ecumenical (if not downright casual) about substancehood, but he can do so because he isn’t constrained by a systematic account. Whether these questions are all that important depends on just how much weight one gives to substantial unity. For Aquinas, as for the scholastics in general, “each and every thing is a being only to the extent that it is one thing” (*QDA* 11c). This may or may not be innocuous. At times, Aquinas pushes for some fairly radical conclusions:

But if you say that Socrates is not one thing *simpliciter*, but one thing as an aggregate of mover and moved, then many absurdities follow. First, since each and every thing is one and a being in the same way, it follows that Socrates is not *a* being, and [second] that he is not in a species or a genus, and further [third] that he does not have an action, since an action belongs only to a being. Hence we do not say that a sailor's thinking is the thinking of the whole that is the sailor and the ship, but of the sailor only. (*De unitate* 3.148–58)

In general, for Aquinas, only something that is one in the fullest sense—that is, only a substance—can properly be said to exist in the fullest sense. Other things, like heaps and aggregates, do exist, but only in an extended sense of the term. Properly, we would not even say that such quasi-beings perform actions. Instead, their substantial parts do.

Descartes is not in a position to worry about such matters, even if he wanted to. As evidence of just how far he is from focusing on this aspect of substantial form, consider how he argues against the presence of a substantial form—a soul, that is—in nonhuman animals. For the scholastics, the soul of an animal would explain the enduring presence within the animal of its various defining and accidental properties. Descartes of course thinks that he can explain all this in mechanistic terms. What need is there, then, for a soul or substantial form? In arguing against the scholastics on this score, Descartes can see no argument for animal souls other than their need to perform the various functions of movement and life that we ascribe to animals.⁴⁰ His reply therefore consists in either insisting on the adequacy of a mechanical account, or else (notoriously) denying animals the capacity to perform these functions. Yet all this obscures the central issue regarding substantial forms. Of course, an orthodox Aristotelian would dispute the adequacy of such mechanistic accounts. But the rationale for a substantial form would be based, above all, on the need to explain an animal's striking unity and continuity over time. As we have seen, Descartes has nothing better to say on this score than to make appeal to “the simple fact that they [bodies] are at rest relative to each other.”

Descartes's general attitude toward substantial forms—that they are simply unnecessary—is nicely calculated to leave room for substantial forms in the one case where they do have explanatory force: the case of human beings. In his correspondence with Regius, he writes that the soul is “the true substantial form of man” (AT 3:505; CSMK, 208).⁴¹ To Arnauld's worry that Meditation 6 turns a human being into a soul making use of a body, Descartes replies,

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I thought I was very careful to guard against someone's supposing from this that man is simply a soul using a body. For in the Sixth Meditation, where I dealt with the distinction between mind and the body, I also proved at the same time that the mind is substantially united with the body. (Fourth Set of Replies; AT 7:227–28; CSM 2:160)

Meditation 6 is indeed full of descriptions of man as a composite of mind and body, culminating in this explicit remark: "Nature also teaches, by these sensations of pain, hunger, thirst and so on, that I am not merely present in my body as a sailor is present in a ship, but that I am very closely joined and, as it were, intermingled with it, so that I come together with the body as one thing" (AT 7:81; CSM 2:6). But Descartes's argument here, which appeals to the mind's *feeling* damage to the body, hardly yields any precise results about *how* mind and body are connected. Although Descartes would later claim that they are "substantially united" (as above), it is unclear to just what extent Descartes is accepting the scholastic doctrine of substantial form.

There has in recent years been considerable discussion of this issue.⁴² In light of the foregoing, we can reach a more informed judgment about where Descartes stands. With respect to the concrete side of the doctrine, Descartes clearly did not adhere to the standard medieval conception of the relationship between substantial form and matter. On that conception, the substantial form regulates a body's physical attributes. For Descartes, in contrast, all bodies—even the human body—can be explained in mechanical terms without recourse to substantial forms. Thus, he remarks, again to Regius (Dec. 1641), that "when we consider the body alone we evidently perceive nothing in it demanding union with the soul" (AT 3:461; CSMK, 200). Although the mind does of course exert causal influence on the body, through the pineal gland, it does not define and sustain the body in the way that a substantial form would.

Against this conclusion, one might invoke Descartes's repeated claim that the soul, although unextended, informs the whole body: "we need to recognize that the soul is really joined to the whole body, and that we cannot properly say that it exists in any one part of the body to the exclusion of the others" (*Passions* 1.30).⁴³ This suggests the kind of dependence, hence unity, intended by the scholastic account. But Descartes immediately goes on, in the next article (1.31), to introduce the pineal gland: "We need to recognize also that although the soul is joined to the whole body, nevertheless there is a certain part of the body where it exercises its functions more particularly than in all the

others.” More decisively, the following article (1.32) concludes that “apart from this gland, there cannot be any other place in the whole body where the soul directly exercises its functions.” So although in some sense the mind exists in every part of the body, it has direct causal efficacy on only one small part, in the middle of the brain. This precludes the mind from playing the causal role that the scholastics standardly ascribed to a body’s substantial form.

Still, although Descartes clearly has no room for the concrete side of substantial form, there are suggestions that he embraces the metaphysical side. His insistence that the mind informs each part of the body, even though it is not causally efficacious on each part, invites a metaphysical reading: that each part of the body is made what it is by being united to a rational soul.⁴⁴ This would be rather speculative if not for certain comments that Descartes made in correspondence with Denis Mesland in 1645. When we speak of a man’s body, Descartes writes, we are referring to whatever matter is united with the soul of that man. “And so, even though that matter changes, and its quantity increases or decreases, we still believe that it is the same body, numerically the same body, so long as it remains joined and substantially united with the same soul” (AT 4:166; CSMK, 243).⁴⁵ As we saw in section 3, this is precisely the metaphysical role that the substantial form of a substance was thought to play. So even without endorsing the concrete side of substantial form, Descartes might have appealed to this metaphysical doctrine to account for a human being’s substantial unity.

But if this is an idea that Descartes toyed with, it is certainly not one to which he was committed. He never mentioned this doctrine in his published works, and never showed any signs—in any of his surviving writings—of wanting to use it to explain mind–body union.⁴⁶ Indeed, it might have been dangerous for him to do so, because by giving this role to substantial form in the human case, Descartes opens himself up to the possibility that substantial forms might play an individuating role in all substances—or at least in all living things. For if this is how the human body is individuated over time, then why not give a similar account for horses and cows and trees? Here would be the sort of useful work for substantial form that Descartes was dead set on eliminating. It is not surprising, then, that his published work is not just silent but positively adverse to this kind of metaphysical role for substantial form. In *The Passions of the Soul*, his last work published during his lifetime, he describes “a very serious error that many have fallen into, and that I regard as the primary cause of our failure up to now to give a satisfac-

tory explanation of the passions and of everything else belonging to the soul.”

The error consists in supposing that since all dead bodies are devoid of heat and movement, it is the absence of the soul that causes this cessation of movement and heat. Thus it has been believed, without reason, that our natural heat and all the movements of our bodies depend on the soul; whereas we ought to hold, on the contrary, that the soul takes its leave when we die only because this heat ceases and the organs that bring about bodily movement decay. (*Passions* 1.5)

This is not incompatible with the metaphysical role proposed in the correspondence with Mesland. What Descartes here denies is the concrete, causal role of substantial form. He might consistently deny this and continue to hold that, although the mind separates from body *because* the body ceases to function, the body ceases to exist when the mind departs. Yet the very next article extends these causal considerations into the abstract, metaphysical side: “So as to avoid this error, let us note that death never occurs through the absence of the soul, but only because one of the principal parts of the body decays” (*Passions* 1.6). This is still, just barely, compatible with the metaphysical proposal to Mesland. If we think of the death of the body not as the body’s ceasing to exist, but as a physical process of decay, then Descartes can maintain that the mind (soul) determines the body’s existence over time but is not responsible for the cessation of life. What he says next, however, seems impossible to reconcile with the abstract, metaphysical side of substantial form: he goes on to compare “the difference between the body of a living man and that of a dead man” to the difference between a watch that is working and “the same watch or machine” when it is broken (*ibid.*). This is not what Descartes should say if he takes seriously his remarks to Mesland. If a watch stands to *working* as the human body stands to *being alive*, then a broken watch should not be “the same watch”—not if Descartes accepts that the soul is what gives the body its identity conditions. Indeed, the very point of this metaphysical conception of substantial form is to yield a kind of unity not present in the case of machines assembled by hand. Descartes is quite clearly going out of his way to dismiss that entire project.

So although Descartes sometimes refers to the mind as the body’s substantial form, there is no reason to think that he is putting this claim to any serious philosophical use.⁴⁷ That is not to say that his remarks in this area were dishonest, or even disingenuous. In the vast majority of cases, in discussing the relationship of mind and body, Descartes makes

no appeal at all to the mind's status as a substantial form. On the few occasions when he does so, he makes no claim that this way of speaking does any philosophical work. His attitude rather seems to be that it does no harm—in the case of the human soul—to speak of it as a substantial form. It seems to me that the following remark accurately reflects Descartes's true attitude:

Whenever the occasion arises, in private and in public, you should give out that you believe that a human being is a *true ens per se, not an ens per accidens*, and that the mind is really and substantially united to the body. You should say that they are united not by position or disposition, as you assert in your last paper—for this too is open to objection and, in my opinion, not true—but by a true mode of union, in the way everyone commonly accepts, even if no one explains in what way this is so, and so you need not do so either. (AT 3:493; CSMK, 206; cf. AT 3:508)

Again this is Descartes's advice to Regius, under external pressure. But this is not a verbatim description of what Descartes thinks Regius should say. Here the advice comes with a kind of private gloss indicating what their attitude toward such terminology should be. What emerges is that Descartes thinks no one has a clear sense of what it means to use expressions like 'ens per se', 'really and substantially united', and 'true mode of union'. Certainly, he implies, it would be better to avoid such language entirely. But since others throw these terms around without giving them any well-defined sense, and since Descartes himself believes that the connection between mind and body is in fact quite intimate, there is no reason to make trouble for oneself by rejecting this traditional and authoritative language. In effect, since he judges that the scholastics themselves don't have a clue about what these concepts involve, Descartes seems to feel free to invoke such language himself. By now, however, it should be clear just how wrong that judgment was, and how the lack of substantial form leaves Descartes awkwardly positioned to account for the unity of substances.⁴⁸

6. Mechanism with Form: Boyle and Locke

Descartes's aggressively reductive form of mechanism did not go uncriticized, even by his fellow mechanists. Gassendi, for instance, challenged Descartes's claim to have distinctly perceived the wax itself through the mind:

Besides the color, the shape, the fact that it can melt, etc., we conceive that there is something that is the subject of the accidents and changes we observe; but what this subject is, or what sort of thing it is, we do not know.

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This always eludes us; and it is only a kind of conjecture that leads us to think that there must be something underneath the accidents. (Fifth Set of Objections; AT 7:271; CSM 2:189; cf. AT 7:338, AT 7:275)

Descartes took the essences of things to be clearly evident, for anyone who would use the mind alone to perceive them. His ontology is consequently as transparent and parsimonious as one could want: there are extended things, in various modes, and there are thinking things, in various modes. Sometimes—in the human case—those things are intimately united. For Gassendi, this ontology is incomplete, because it fails to capture the nature of the subject that underlies the accidents. What this subject is, we do not know, and perhaps cannot know.

This conjecture of an underlying subject would have been congenial to friends of the substantial form. Gassendi himself does not move the claim in that direction, but his line of thought would resonate widely with later mechanists, some of whom would retain more of that Aristotelian framework.⁴⁹ In this final section I want to show how it was possible in the seventeenth century to be a mechanist and at the same time to embrace central aspects of the scholastic theory of substantial form. This is particularly evident, I will suggest, in John Locke.

It is fairly well known that early modern philosophers largely retained the notion of form. Kant, to take one particularly striking example, would remark of matter and form that “these are two concepts that ground all other reflection, so inseparably are they bound up with every use of the understanding. The former signifies the determinable in general, the latter its determination” (*Critique of Pure Reason*, A266/B322). Seventeenth-century philosophers likewise used the concept of form in various ways,⁵⁰ even while vigorously rejecting the notion of a *substantial* form. This stance has made it easy to suppose that substantial forms are simply incompatible with genuine mechanism. But that widespread assumption (then and now) is simply not so. The mistake stems partly from the belief that substantial forms must be substances, perhaps even immaterial substances (section 4). Beyond that all-too-common mistake, there is a confusion here between different aspects of the theory. As we have seen, one side of substantial form is metaphysical, and claims in this domain might be made regardless of whether one’s underlying physical theory is Aristotelian or mechanistic.

This should be clear enough from the prominent example of Leibniz, who was both a committed mechanist and a proponent of substantial forms. Thus, he contends, on one hand, that

the consideration of these forms serves no purpose in the details of physics and must not be used to explain particular phenomena. That is where the Scholastics failed, as did the physicians of the past who followed their example, believing that they could account for the properties of bodies by talking about forms and qualities without taking the trouble to examine their manner of operation. (*Discourse on Metaphysics* 10)

He then goes on:

This misunderstanding and misuse of forms must not cause us to reject something whose knowledge is so necessary in metaphysics that, I hold, without it one cannot properly know the first principles or elevate our minds sufficiently well to the knowledge of incorporeal natures and the wonders of God.⁵¹

The details of Leibniz's account are too complex and idiosyncratic to be discussed here. Even so, it is plain that Leibniz fits into our story quite naturally. As we have seen, scholastic authors defended substantial form by treating it in highly concrete, causal terms. When this approach came under attack in the seventeenth century, it would be perfectly natural to look again toward a more metaphysical understanding of form—a project Leibniz carried out in his own distinctive way.

Even as regards the concrete, causal side of substantial form, it is possible to combine central features of the doctrine with mechanism. In particular, one might identify some basic form from which all of a thing's properties flow, and then go on to give a mechanistic interpretation of what that form is and how it generates the properties of a substance. Of course, a theory of this sort would be more mechanistic than Aristotelian: gone would be the four elements, real irreducible qualities, and the occultness of substantial form. But though these doctrines are incompatible with the mechanistic philosophy, substantial form itself is not.

It is this last kind of view—mechanism combined with a concrete conception of form—that Boyle shows signs of embracing. Boyle attacked the theory of substantial form at length, largely because of its obscurity, and because he took the theory to be committed to forms as independent substances. But rather than attempting to do away entirely with the notion of form, as Descartes sometimes seemed inclined to do, Boyle offered a modified account:

And so, though I shall for brevity's sake retain the word *form*, yet I would be understood to mean by it not a real *substance* distinct from matter, but only the matter itself of a natural body, considered with its peculiar man-

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ner of existence, which I think may not inconveniently be called either its *specific* or its *denominating state*, or its *essential modification*—or, if you would have me express it in one word, its *stamp*. (*OFQ* 40)

Boyle takes himself to have modified the scholastic account in two ways. First, this kind of form or stamp is not a substance—elsewhere Boyle prefers to speak of it as an *essential* form⁵²—but the modification of the matter. Second, Boyle gives a definite interpretation to doctrines that “are wont to be treated of by scholastic philosophers in so obscure, perplexed, and so unsatisfactory a way ... that it is very difficult for any reader of but an ordinary capacity to understand what they mean” (*OFQ* 3). In place of these occult, irreducible forms, Boyle offers definite mechanical hypotheses regarding the physical properties that give a body its distinguishing characteristics.⁵³

Boyle may be said to have partly retained the doctrine of substantial form inasmuch as he preserves something of the concrete, causal side of the theory. He does not merely identify the form with the essence of the thing—that alone would not count as retaining the doctrine. His further claim is that the form shapes the whole body, determining all of a thing’s properties. That is suggested, for instance, in the following passage:

[T]hat, which is commonly called the form of a concrete, which gives it its being and denomination, and from whence all its qualities are in the vulgar philosophy, by I know not what inexplicable ways, supposed to flow, may be in some bodies but a modification of the matter they consist of; whose parts, by being so and so disposed in relation to each other, constitute such a determinate kind of body, endowed with such and such properties. (“Experiment relating to Salt-Petre,” in *Works* 1:237)

Boyle here identifies a disposition or modification from which is constituted “a determinate kind of body endowed with such and such properties.” This disposition is what the previous passage referred to as the “stamp” and the “form” of the body, and what Boyle more often refers to as its “texture.”⁵⁴ The properties constituted by this texture are of course only those that I have been calling intrinsic properties. Since Boyle thinks that many qualities are not intrinsic in this way but instead relational (his famous secondary qualities), there is less scope in Boyle than in the scholastics for ascribing an explanatory role to the substance’s intrinsic form. Still, he is retaining a key scholastic assumption: that there is some one state from which a thing’s intrinsic properties flow. This suggests that he has not completely abandoned the doctrine of substantial form.

Can a conception of form as mere motion, size, shape, and position—all the ingredients of Boyle’s texture⁵⁵—be regarded as *in any sense* Aristotelian? One might reasonably suggest that this allegedly vestigial scholasticism amounts to nothing more than what any materialist would be likely to regard as a truism: that the macroscopic, observable properties of a thing supervene on the microscopic properties. *Of course* all the observable qualities of a thing flow from the underlying texture of that thing (the arrangement of the thing’s particles): that just is the corpuscular hypothesis. In some authors, it seems plausible to think that this is all that is meant. Malebranche, for instance, suggests nothing more than this when he remarks that “there is nothing wrong with the terms ‘form’ and ‘essential difference.’ Honey is undoubtedly honey through its form, and in this lies its essential difference from salt. But this form or essential difference is only a matter of the different configuration of its parts” (*Search* 1.16).⁵⁶

In Boyle, however, there seems to be something more going on. In replacing the scholastic term ‘form’ with his own ‘texture’, Boyle is denying that forms are anything over and above the arrangement of corpuscles that compose a body. But what he holds onto is the idea that a unified body will have a single texture that explains the distinctive and enduring qualities of that body. Thus, in introducing his term ‘texture’, he remarks:

And when many corpuscles do so convene together as to compose any distinct body, as a stone or a metal, then from their other accidents (or modes), and from these last two mentioned [namely, posture and order], there doth emerge a certain disposition or contrivance of parts in the whole, which we may call the *texture* of it. (*OFQ* 30)

When Boyle speaks of a single texture of a distinct body, he suggests something more than the trivial claim that for any aggregate of corpuscles we can speak of an aggregate of corpuscular facts, explaining the properties of that aggregate. Now there are passages in Boyle, such as the following, that might suggest just that sort of truistic aggregative claim:

This convention of essential accidents, being taken (not any of them apart, but all) together for the specific difference that constitutes the body and discriminates it from all other sorts of bodies, is by one name, because considered as one collective thing, called its form. (*OFQ* 52 n. 9)

Here Boyle seems eager to stress that the form is nothing more than various characteristics of a body, taken all together. This may indeed be

his considered view, and if so then he cannot be said to have preserved the doctrine of substantial form in any significant sense. But there are other passages where Boyle appeals to form or texture to account for the unity of bodies. To the objection that bodies without a substantial form can be only *entia per accidens*, he replies that this need not be the case: that bodies can be unified when “matter, shape, situation, and motion *ordinantur per se et intrinsice* to constitute one natural body” (OFQ 58). Boyle breaks into Latin here (“are ordered per se and intrinsically”) as a way of ironically distancing himself from this kind of jargon. But the fact remains that he thinks the objection needs to be answered and can be: he thinks his mechanistic approach can account for the unity of bodies inasmuch as the disposition or texture of the matter gives rise to the properties of the whole.⁵⁷

If ‘texture’ here refers only to the corpuscular facts taken as a whole (that is, to a conjunction of discrete facts), then he could hardly have appealed to texture as that which unifies a coherent body. There would be no way to distinguish between the texture possessed by a “distinct body” and the texture possessed by, say, all the books and papers on top of my desk. Now perhaps Boyle would welcome this last result, or perhaps he was in fact torn over just how much weight to put on the texture of the whole as a unifying principle. But however one comes out his particular case, what is clear again (as with Descartes) is that insofar as modern authors reject Aristotelian substantial forms, they to that extent face a difficulty in accounting for the unity of substances. If Boyle has a response to scholastic arguments from unity, this is so only insofar as he retains something significant from the scholastic scheme.

Even so, the most that can be said about Boyle is that the scholastic conception of substantial form endured in part—with respect to its concrete, causal side. With respect to the abstract, metaphysical side of substantial form, Boyle rejected the doctrine, and did so in spectacular fashion. For not only did he deny that the identity of a substance and its parts is determined by the substantial form, but moreover he rejected the entire scholastic conception of substantial identity and change. So, contrary to the Aristotelian view that the parts of a substance maintain their identity only as part of that substance, Boyle argues that when a body is generated, “no new substance is in generation produced, but only that which was pre-existent obtains a new modification or manner of existence” (OFQ 45). Likewise, when a body is corrupted, it is “not that anything corporeal or substantial perishes in this change, but only that the essential modification of the matter is

destroyed" (*OFQ* 45–46). Although it is customary to speak of a body's coming into or going out of existence—and so to this extent Boyle is willing to retain the terms 'generation' and 'corruption'—in strict metaphysical fact nothing ever does come into or go out of existence. The real substances, the invisible corpuscles, endure over all change, meaning that there is no real distinction between generation/corruption and alteration. This is just the sort of radical outcome that Buridan, three centuries earlier, had described as a consequence of reducing substantial form to a purely corpuscular account (see section 3).

Boyle repeatedly describes substantial forms as purely metaphysical constructs, and hence not worthy of serious discussion.⁵⁸ Yet, ironically, his opposition to the theory rests in large part on his own views about diachronic identity. Hence, although he has no use for the special sort of substantial unity that the theory of substantial form was intended to provide, this is not because he has turned his back on metaphysics, but because he favors a rival metaphysics.

If Robert Boyle partly embraced the doctrine of substantial form, it is clear that John Locke goes much farther. Despite Locke's scorn for "fruitless Enquiries" after "wholly unintelligible" substantial forms (3.6.10), his own conception of a real essence or constitution contains many central elements of the scholastic account. In the popular imagination, Locke's theory of substance is held to rest on a bare substratum, "a supposed, I know not what, to support those *Ideas*, we call Accidents" (2.23.15). As is often observed, Locke does not positively assert that this substratum has no properties (and in that sense is *bare*), only that he himself is unwilling to speculate as to what those properties might be. Moreover, despite his pronounced caution with respect to the notion of a substratum, Locke goes out quite far on a limb when it comes to the doctrine of essence, taking for granted without argument that substances must have some unifying real essence, and then going on to "presume" that this real essence should be understood along the lines of Boyle's corpuscular account:

The particular parcel of Matter which makes the Ring I have on my Finger is forwardly, by most Men, supposed to have a real Essence whereby it is *Gold*; and from whence those Qualities flow, which I find in it, *viz.* its peculiar Colour, Weight, Hardness, Fusibility, Fixedness, and change of Colour upon a slight touch of Mercury, *etc.* This Essence, from which all these Properties flow, when I enquire into it and search after it, I plainly

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perceive I cannot discover: the farthest I can go is only to presume that it being nothing but Body, its real Essence or internal Constitution on which these Qualities depend can be nothing but the Figure, Size, and Connexion of its solid Parts. (2.31.6)

Locke's skeptical stance makes it hard for him to treat his corpuscular account as anything more than a hypothesis.⁵⁹ But he makes it clear that the doctrine of real essences is not a mere hypothesis: "'tis past doubt, there must be some real Constitution on which any Collection of simple *Ideas* co-existing must depend" (3.3.15).⁶⁰ This underlying real essence gives rise to all the properties of the substance, with the result that "it is as impossible, that two Things, partaking exactly of the same real *Essence*, should have different Properties, as that two Figures partaking in the same real *Essence* of a Circle, should have different Properties" (3.3.17).⁶¹ It is this, finally, that gives a substance its unity: "the real Essence is that Constitution of the parts of Matter, on which these Qualities, and their Union, depend" (3.6.6).

Reasonably enough, Locke treats his corpuscular interpretation of essence as a departure from the scholastic conception of form. Thus, he treats substantial form as a piece of obscurantism: "If any one will say, that the real essence and internal constitution on which these properties depend is not the figure, size, and arrangement or connexion of its solid parts, but some thing else, called its particular form; I am farther from having any idea of its real essence than I was before" (2.31.6). But though the scholastics were not corpuscularians, we have just seen that Locke's real essence plays very much the same causal role that the substantial form played. Despite Locke's long association with the doctrine of a bare substratum, his theory of substance is in fact much closer to the scholastic view on which a substance is held together by a single form that is causally responsible for its intrinsic properties and nature.

If this is so, then why did Locke show such hostility toward the doctrine of substantial form? In part, as discussed already, this hostility was based on a misconception of what the scholastic theory was; in part, too, it was based on a real and substantive disagreement on the merits of a strictly corpuscular conception of form. But there is something still further here, a deep disagreement with the scholastics regarding the relationship between substantial forms and our ideas of species membership. For the scholastics, our classification of individuals into species tracks the essences of things. Though we may not have a direct or comprehensive grasp of what those essences are (see section 4), we

know enough to sort individuals into their true species. Like Boyle before him,⁶² Locke utterly rejected this optimistic view, and took our distinctions between species to be the product of haphazard and highly fallible groupings on the basis of superficial resemblance: “the Species of Things to us, are nothing but the ranking them under distinct Names, according to the complex Ideas in us; and not according to precise, distinct, real Essences in them” (3.6.8). Even now, Locke says, we cannot know real essences well enough to classify things properly. But matters are even worse than that, because the general terms we use for species and genera “have, for the most part, in all Languages, received their Birth and Signification from ignorant and illiterate People, who sorted and denominated Things by those sensible Qualities they found in them” (3.6.25).

With this remark, Locke shows something of the profound difference in worldview that separates him from the medieval era. Medieval authors took the creation story of Genesis (2:19–20) as having established that it was Adam who gave a name to all living things (in Hebrew, or so it was supposed). In this pre-fallen state, Adam was supposed to have possessed cognitive abilities vastly superior to us fallen human beings: hence, as Henry of Ghent put it, Adam would have gone about his naming “as the ideal (*optimus*) metaphysician, knowing perfectly the essences and quiddities of things, imposing various names on just those species in keeping with the various essences and corresponding to those very essences of the things.”⁶³ We fallen descendants of Adam have lost that talent for metaphysics, among much else, but the one legacy we retain from Adam is a language scheme that truly cuts the world at its joints. Even if we no longer speak Hebrew, we can readily compare our own vulgar tongue to that Ur-language and see that our sortal terms correspond generally to those of Hebrew.

Locke would evidently dismiss the bulk of that as nonsense. To the extent that our language does map onto the real essences of things, he thinks we have simply gotten lucky. And he offers a series of impressive arguments against the optimism of the scholastics. He thinks it likely, for instance, that the chain of being between species is smooth and continuous, without the sorts of gaps and joints that facilitate classification: “we shall find everywhere, that the several Species are linked together, and differ but in almost insensible degrees” (3.6.12). Against the standard scholastic position that we grasp something of the thing’s essence through its superficial properties, Locke argues that without knowing the essence, we have no way of knowing which properties

point toward the nature of the species and which are merely accidental (3.6.19). Hence, our distinctions between species can be grounded only on our haphazard conceptions of the nominal essences of things. It is in this context that Locke utters his harshest words against substantial forms, calling them “fruitless” and “unintelligible” (3.6.10), and remarking,

But were there no other reason against it, yet the *supposition of Essences, that cannot be known*; and the making them nevertheless to be that, which distinguishes the Species of Things, *is so wholly useless*, and unserviceable to any part of our Knowledge, that that alone were sufficient, to make us lay it by. (3.3.17)

Though Locke has other reasons to dislike substantial forms, this is the point that he takes most seriously. And though this certainly is a serious disagreement with the standard scholastic view, it is not a criticism of the very notion of substantial form. Instead, what is at stake here is an epistemological assumption that could easily have been attacked from within the scholastic framework.

A complicating factor in this discussion is that Locke ties together real and nominal essences. Although at times he suggests that each substance has its own, unique real essence, at other times he holds that a thing’s real essence is determined relative to the nominal essence under which we conceive of the thing: “Essence, even in this [real] sense, relates to a Sort, and supposes a Species. ... But that which annexes them [real essences] still to the Species, is the nominal Essence, of which they are the supposed foundation and cause” (3.6.6). In support of this conclusion, Locke stresses that when he says that the real essence gives rise to a thing’s *properties*, he means that it gives rise to those attributes that characterize every member of the species. (Here, then, ‘property’ is being used in something like the traditional sense of *proprium*. Thus, as quoted earlier, two figures with the real essence *circle* will have all the same “properties,” though of course they might differ in size, color, etc. [3.3.17].) Hence, the real essence of a thing is tied to the species of the thing, and since we place a thing in its species according to a nominal essence, the real essence is also dependent on the nominal essence.⁶⁴

This conception of real essence threatens to take us rather far away from the scholastics. Instead of supposing that a given substance has a unique essence from which all its intrinsic attributes flow (the view described in section 2), Locke here seems to think that a given substance will have various real essences depending on how it is conceived,

each of which will be responsible for only those properties picked out by a given nominal essence. Despite these scruples, however, it is clear that Locke still accepts the scholastic notion of a thing's having a single unifying nature that explains all of a thing's intrinsic characteristics. Very often in this context, Locke speaks of a thing's "real constitution," which he contrasts with the "artificial constitution of genus and species," which is the nominal essence. These are, Locke says, the two principal senses of 'essence'. Describing the first, he writes:

First, *Essence* may be taken for the very being of any thing, whereby it is, what it is. And thus the real internal, but generally in Substances, unknown Constitution of Things, whereon their discoverable Qualities depend, may be called their *Essence*. This is the proper original signification of the Word. ... And in this sense it is still used, when we speak of the *Essence* of particular things, without giving them any Name. (3.3.15)

The last sentence makes it clear that 'essence' in this sense belongs to individuals, and belongs quite independently of our classifications.⁶⁵ Such an essence gives rise, then, not only to certain properties connected with a certain artificially imposed species, but quite generally to its "discoverable qualities."⁶⁶ This essence, moreover, makes a thing be "what it is"—which is to say again not that it puts a thing into the species or genus that we impose upon it, but that it makes the thing be what it *really* is, whatever that is.

This last, unmistakably Aristotelian notion brings Locke back into contact with the scholastic tradition. We have seen how Aquinas, for instance, standardly distinguished between form as something held in common by all members of a species, and an individual form that gives rise even to the distinctive accidental properties of an individual. For Aquinas, and for the scholastics in general, it is that individual form that makes a thing be what it is, guaranteeing its unity at a time and identity over time. All of this Locke accepts. What he does not accept, as we have seen, is the characteristic scholastic optimism that we can form abstract general accounts of species and genera that accurately map the real differences between individual constitutions (read, *forms*). But that, as I have said, is an epistemological issue that can be severed from the doctrine of substantial form.

The lingering Aristotelianism I have identified in Locke falls on the concrete side of substantial form. Locke's notion of *real constitution* yields a physical hypothesis about the relationship between a thing and its properties, and a causal account of why things tend to retain the same properties over time. But this leaves open the metaphysical ques-

tion of when we say that a thing remains genuinely the *same* thing over time, and when we say that it has become something different. Here again, Locke's views were strongly influenced by Boyle, but in this case the philosophical crudity of Boyle's account has been replaced by something much more interesting and complex. Locke's most well-known contribution to the metaphysics of identity comes in chapter 27 of book 2, where he offers a famous analysis of the diachronic identity conditions for complex substances. Unlike simple substances (including God, angels, and atoms), for which the identity conditions are (according to Locke) straightforward and unproblematic, the analysis for complex substances depends on the idea we have for that substance, "it being one thing to be the same *Substance*, another the same *Man*, and a third the same *Person*" (§7).

Locke's famous account of personal identity—in terms of psychological ties—is a wholly modern innovation. His account of the identity of "substance" (by which he means a mass of matter or a body) is likewise distinctive for being strictly mereological; Locke's rather surprising view is that a mass of matter counts as the same mass (or same body) just as long as it consists of the same parts: "whilst they exist united together, the Mass, consisting of the same Atoms, must be the same Mass, or the same Body, let the parts be never so differently jumbled" (§3).⁶⁷ Neither of these criteria makes any appeal to a thing's real constitution, which might change or remain quite independently of what happens at the psychological or mereological levels. Accordingly, when we apply either of these criteria to a substance, we arrive at a very different account from what an Aristotelian would offer. Masses of matter turn out to be changing constantly, as they gain or lose parts. Persons can shuttle around between bodies, or go out of existence while their bodies remain intact. It is plain, however, that neither of these criteria gives a satisfactory account of the identity conditions for living things, and it is here that Locke invokes something much like the doctrine of substantial form. In the case of plants, he argues, "that being then one Plant, which has such an Organization of Parts in one coherent Body, partaking of one Common Life, it continues to be the same Plant, as long as it partakes of the same Life" (§4). Although Locke does not say so at this point, it seems clear that this ongoing organization is explained by the real constitution of the tree. When a sequence of changing material parts is taken up into a continuously organized aggregate, then "that continued Organization ... is fit to convey that Common Life to all the Parts so united" (§4). Locke goes on to show

how much the same account can be given for animals (§5) and for human beings (§§6–8). As we have already seen, it is a thing's real constitution that explains why it has the organization it has.

At this point, as with the scholastics, a physical conception of substance as sustained by a single concrete causal principle is joined to a metaphysical conception of how that substance and its parts take their identity conditions from being united with that principle. Thus, the common life of a tree “has that Identity, which makes the same Plant, and all the parts of it, parts of the same Plant” (§4). Now this is not to say, by any means, that Locke has arrived at a full-blown scholastic conception of substantial form. The doctrine of real constitution is playing an analogous metaphysical role only at this one juncture, and it is quite uncertain how we are to understand the notion of *same plant*, or *same man*, when these are coupled with competing identity conditions for *same substance*, or *same person*. So although Locke looks quite Aristotelian in his account of living things, he is undeniably very far from the Aristotelians in treating that account as just one of several rival accounts of identity.⁶⁸

Still, focusing on the case of living things, we can see that a number of interesting things have happened to the scholastic doctrine. First, and most obviously, Locke severs the identity conditions for living things from the identity conditions for soul. Even in the case of human beings, he vigorously denies that “the Identity of Soul alone makes the same Man” (§6). In divorcing soul from that which gives a thing life, Locke accepts the Cartesian conception of soul as an immaterial substance (§21, 343.9–10), as against the Aristotelian conception of soul as substantial form. Indeed, from this point forward in the history of philosophy, the Aristotelian connection between soul and form would become little more than an historical curiosity. To the extent that living things can be said to have a form at all, that becomes some sort of physical structure or organization.

This last observation points toward a second interesting transformation. Once form, understood as physical structure, enters into an account of diachronic identity, it must be understood abstractly. Over the course of an organism's life, it may well be that all the individual particles will be replaced many times. What matters is that there be “the same continued Life communicated to different Particles of Matter, as they happen successively to be united to that organiz'd living Body” (§8). What remains over time—the ongoing organization responsible for continuing life—is not something real over and above the particles

that come and go. (If it were, then this would be a fatal difficulty for Locke's corpuscular account.) Instead, the endurance of a thing's real constitution over time must be an abstraction, a universal, which is to say (for Locke) that it is not a real thing in the world at all.⁶⁹ This marks an important difference from the scholastic conception of substantial form. For the scholastics, as we have seen, the substantial form was understood as a real power, enduring through bodily change, over and above the changing material components. If it is correct that this scholastic picture marks something of a departure from the more abstract conception of form to be found in Aristotle, then Locke can be seen as moving at least somewhat in a more truly Aristotelian direction.

The abstractness of Locke's account is amplified in another way. Whereas scholastic authors take the presence of a substantial form, understood as a real power, to be precisely that which gives a thing its identity over time, Locke's criterion focuses on something yet still more abstract than an enduring, abstractly conceived, organization of parts. What makes a plant or animal endure over time, for Locke, is its being continuously *alive*, where to be alive gets spelled out in terms of the characteristic functions of the living thing in question. In the case of an oak tree, for instance, what matters is "such an Organization of those parts, as is fit to receive and distribute nourishment, so as to continue and frame the Wood, Bark, and Leaves, *etc.* of an Oak, in which consists the vegetative Life" (§4). Now Locke thinks that it is the thing's enduring real constitution that accounts for this functional continuity. But we could imagine function and constitution coming apart: the constitution might change slightly, for instance, but not so much as to disrupt the thing's ongoing life. Indeed, Locke stresses in various places that the real constitutions of things can be changed, at least by God, just as the inner mechanisms of a watch can be.⁷⁰ Hence, although it is plausible to assume that the identity over time of a living thing is determined by sameness in real constitution, this can have the status of nothing more than an assumption; strictly, the identity conditions are determined by sameness of function. Once again, Locke could be said to be moving back in the direction of a more properly Aristotelian conception of form. Substantial form plays a lingering role in his account, at least in certain limited domains, but it has been transformed in various interesting and complex ways.

7. Conclusion

A clearer understanding of substantial forms and their history illuminates some central philosophical questions. In particular, first, it points toward a new (or, rather, old) way of thinking about substances, as organized around a central unifying form. As for what sorts of things would count as substances on this approach, or whether *anything* would count as a substance, these are questions I have not addressed. As for what such a form might itself be, the course of history suggests that there are a wide range of options, from the strictly functional to the strictly mechanistic. We should think not just of a single theory, but of a family of theories, some of which are no doubt preferable to others.

Second, the history of debate in this area shows how the concept of form changed over time. Aristotle had introduced formal explanation as a way of dealing with various puzzles that arose from ancient materialism. Modern authors returned to materialism at the expense of Aristotelian metaphysics, and in particular abandoned Aristotle's formal mode of explanation. But when one reads the middle chapters of this story it begins to look as if formal explanation was already undergoing at least a shift in focus during the Middle Ages, and by the Renaissance had reverted to something much more like a material mode of explanation. Hence some of the most significant changes in how form has been understood seem to have occurred not at the hands of modern anti-Aristotelians, but with an earlier generation of scholastics. If this is right, then those neglected middle chapters turn out to be pivotal for an understanding of form and substance in the modern era. The demise of Aristotelian metaphysics might in part be laid at the door of philosophers who were ostensibly Aristotelians.

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Notes

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¹ Most notorious of all is A. J. Ayer's dismissal of the debate over substance as "spurious" and as based on "the primitive superstition that to every name a single real entity must correspond" (1952, 40, 42). David Armstrong, though a friend of substances, flatly remarks that "two different models compete for the allegiance of philosophers. First there are Substance–attribute theories and second, there are Bundle theories" (1989, 59).

² See, respectively, *Physics* 2.3 and *Metaphysics* 7, esp. 1029a5–7.

³ See Averroes, *Physics* 1.63 (4, 18vab); Aquinas, *QDSC* 3c, *ST* 1a 77.6c.

⁴ See, for example, Aquinas, *ST* 1a 76.4c, *CT* 90.

⁵ See, for example, Franciscus Toletus, *In Phys.* 1.9.19 (4, 41ra); Eustachius a Sancto Paulo, *Summa philosophiae*, *Physica* 1.1.2.5; Aquinas, *SCG* 2.68.1450; Coimbra, *Physics* 1.9.10.1. For discussion, see Des Chene 1996 (65–66).

⁶ *De rebus naturalibus*, 421. Zabarella discusses and rejects various other criteria.

⁷ "There is no reason why this is a substantial form and that an accidental one, because propositions that are per se in the first mode do not have a reason why. And just as this is per se in the first mode: *white is a quality*, and likewise *a human being is a substance*, so too for this one: *humanity, by which a human being is a human being, is a substantial form*" (*QMet.* 8.4.56). See also *Ord.* 4.11.3.44 (ed. Wadding 8, 648), and Cross 1998 (103–7).

⁸ See, for example, Stump and Kretzmann 1988 (285): "On Aquinas's view, every thing has a substantial form. The substantial form of any thing is the set of characteristics that place that thing in its species and that are thus essential to it in Aquinas's sense of 'essential.'" See also Cross 1998 (12): "A substantial form, roughly speaking, is that property or set of properties in virtue of which a material substance is a substance of such-and-such a kind," and Bennett 2001 (1:11): "The crucial explanatory fact about an organism [for Aristotle] is its 'form'. This is not a subset of the properties that the organism has, but rather a set of those that are *proper* to it, and towards which it strives or tends."

⁹ For example, Aquinas, *ST* 1a 29.2 ad 3, 1a 75.4c; Buridan, *QMet.* 7.12. Averroes was an exception to the standard medieval view: he thought the essence could be identified with the form alone (see *Met.* 7.34 (8, 87ra)).

¹⁰ *Sufficientia* 1.6 (f. 17rb). Avicenna distinguishes between accidents that come from the matter and accidents that come from the form—following the lead of Aristotle at, for example, *Gen. An.* 5.1.778a29–b2. This distinction does

sometimes get repeated in Latin discussions, but would be downplayed—as we will see—in favor of the view that all such accidents come from the substantial form.

¹¹ Many other passages might be quoted, including I *Sent.* 17.1.2 obj. 2 & ad 2 (which expressly attributes the doctrine to Avicenna) and *InDSS* 15.229–31. See also the discussion in Wippel 2000 (266–75). Often, the issue arises in Aquinas’s discussions of how the soul’s powers (its accidents) flow (*fluant*) from the soul’s essence (a substantial form): see, in particular, *ST* 1a Q77. Another context in which the issue frequently arises is in discussions of how the motions of certain bodies follow from their forms (an upward motion follows from the form of fire, etc.): see, in particular, *InPhys.* 2.1.144 and *ST* 1a2ae 17.9 ad 2. But some natural motions are not a product of the thing’s substantial form: Aquinas gives the example of the ocean’s tides (*ST* 1a 110.3 ad 1).

It is not entirely clear whether Aquinas takes such accidents to be the product of the substantial form alone or of the whole essence, which would include the substantial form and common matter. In some passages he speaks only of the substantial form. Other passages refer explicitly to the essence or else use phrases like ‘substance’ and ‘principles of the substance’, both of which should be understood as referring to the essence as a whole. What seems likely is that the form counts as the ultimate internal explanatory principle, inasmuch as it accounts for why the proximate matter has the common traits that it has.

There is a further question about whether certain accidents like eye color might be the product not of the form, but of low-level material contingencies. In the very early *De ente*, Aquinas follows Avicenna (see the previous note) in remarking that “some accidents principally follow form, and some matter” (6.60–62). But later works like the *Summa theologiae* seem to take the view that internal accidents flow from the substantial form alone. I suspect that this does not mark any deep change in Aquinas’s view. To the extent that matter at some level does have an influence on the internal accidents of a substance, it seems to do so at the start, when the substantial form and the matter come into existence as a new substance. Thus, he remarks: “a form, considered in its own right, is common to many particulars, but by its being received in matter it is made the form, determinately, of this particular thing” (*ST* 1a 7.1c). To take a concrete example, in explaining how two human beings can have qualitatively different substantial forms (that is, rational souls), Aquinas remarks that this can be a result of the matter: “A difference in form that comes solely from a distinct disposition of the matter produces no distinction in species, but only a numerical one. For distinct individuals have distinct forms, made distinct by their matter” (*ST* 1a 85.7 ad 3). The view seems to be that when the rational soul is infused into a certain embryo, the material dispositions of that embryo have an influence on the soul itself (the substantial form), and so indirectly have an influence on the internal accidents produced by the soul. Hence Aquinas can say that all such accidents flow from the substantial form, and he can also say that certain accidents are produced (indirectly) by the matter. I discuss this issue at greater length in Pasnau 2002 (chap. 12), in connection

with questions about individuation and personal identity.

¹²This list has to be drawn up with some care, because so many accidental features of an individual are shaped at least in part by external causes. Aquinas's own example, *male* versus *female*, is ideal for his purposes, because it picks out a nonessential attribute that has an entirely internal cause. Eye color, I take it, is another plausible example. But how many other such examples are there? And, in general, is there a clear external and internal division between accidents? Consider another of Aquinas's examples, skin color. It is obviously not a proprium, but can it be considered an internal accident that stems from the distinctive form of an individual? There is some temptation to say so, inasmuch as skin color obviously has an innate component. On the other hand, skin color is readily changeable, within certain limits. Does it make any sense, then, to say that *this particular skin color* is a product of my substantial form? Probably not. And the same issues arise for many other accidental properties, such as weight, height, musical ability, and much else.

Aquinas suggests a solution, however. He claims that "every natural body has some determinate substantial form. Therefore, since the accidents follow from the substantial form, it is necessary that determinate accidents follow from a determinate form" (*ST* 1a 7.3c). In saying that the accidents are determinate, Aquinas means not that they are precisely set, but that they are bound within certain limits. We can be sure that this is what he means, because the previous article (7.2c) had just told us that "matter, inasmuch as it is under one substantial form, remains in potentiality to many accidental forms," giving it a kind of potential infinity. His example is of a piece of wood that has a potentially infinite number of shapes. The only way to make these passages consistent is to understand the role of the substantial form as imposing a certain range of options on an individual. Taken alone, the substantial form rules out certain possibilities, like being ten feet tall or three feet tall, but within a certain range leaves open a virtually infinite number of possibilities. (And see *InDA* 2.8.159–71, where this line of thought is explicitly developed.) So we might say, by way of elucidating the canonical Aristotelian example, that if *albus* means *pale*, then it is an external accident for a human being, inasmuch as it depends on where you live, what you wear, and what you do. If, on the other hand, *albus* means *white*, then (on the modern English idiom, and putting aside various cultural complications) it is an internal accident, inasmuch as it refers to one's innate pigmentation.

¹³Although this passage seems to commit Aquinas to individual essences, there are reasons to doubt whether, strictly speaking, he thinks that individuals within a species can have qualitatively distinct *essences*. (For instance, the essence of a thing is given by its definition; but individuals cannot be defined.) Still, there is no room for doubt that Aquinas thinks of individuals within a species as having qualitatively distinct substantial forms. This would make it natural for him to speak, on occasion, as if they had different essences.

¹⁴This book-length treatise has recently been translated by Kronen and Reedy, with useful and extensive notes.

¹⁵For discussion of the particular argument, see Des Chene 1996 (73–75). In general, early modern scholars seem better informed today than medieval-

ists on the topic of substantial form, probably because the doctrine is stressed more in Renaissance texts. The fullest recent discussion is Des Chene 1996, which remarks that “essence, if it is identified with substantial form, is not a mere list of properties the loss of any one of which must result in the destruction of the individual” (71). See also McCann 1987 (55–57), Rozemond 1998 (104), and Ariew and Gabbey 1998: “The substantial form is a determinative active principle informing and conferring essence on matter, defining the resulting substance, and locating it in its class or species. Furthermore, the substantial form yields the sensible and insensible qualities (*qualitates*) possessed by the substance in question and is the immediate cause of the phenomena that are characteristic of it” (430).

¹⁶I owe these references to Wippel 1981 (176–84).

¹⁷If we think of souls as the paradigmatic substantial forms, then it is especially natural to think of them as being or having causal powers. See, for instance, Shields 2003 (supplement 2), which stresses the role of soul as the source of perception and thought, and as an efficient cause of motion (for example, *De an.* 2.4.415b8–28). Cooper 1988 makes an analogous point from the perspective of Aristotle’s embryology:

But [the form of an animal] is directly responsible not only for its having all the tissues, organs and limbs essential to a human being, but also for many individual features of the way these are found constituted and arranged in that particular animal. Roughly, these will be all those features that, as Aristotle thinks, cannot successfully be explained as due either to environmental influences or to incidental properties of the matter that goes to constitute and sustain them.
(37)

This is strikingly akin to the later scholastic conception of substantial form, as described in the previous section.

¹⁸According to Irwin 1980, “A natural substance’s form is its characteristic function rather than its structure or composition, which are features of its matter” (38). But compare D. C. Williams, who remarks of the Aristotelian link between form and function that “no ties in the system are flimsier than this” (1958, 309).

¹⁹Aquinas usually makes this point in the context of the soul. But he always makes it clear that the same holds for all and only substantial forms. See *ST* 1a 76.8, discussed below, and also *QDA* 10, *QDSC* 4c, *InDA* 1.14, *ST* 1a 8.2 ad 3, *I Sent.* 8.5.3.

²⁰See, for example, *Meteorology* 4.12.389b31–390a19; *De an.* 2.1.412b20–22; Shields 1999, chap. 5.

²¹Aquinas regularly denies that artifacts count as substances: see, for example, *SCG* 1.18.141, 4.35.3731; *ST* 1a 76.8, 1a2ae 17.4c; *InDA* 2.1.157–58; *QQ* 11.6 ad 3. But he does at least once, at *ST* 3a 75.6 ad 1, allow that substantial forms can be made artificially. In that passage he first gives the examples of frogs and snakes (referring to Exodus 7–8, where Moses performs his miracles and then—crucially for Aquinas’s point—they are matched by the Pharaoh’s magicians). Then he goes on to give the more mundane example of a loaf of bread, made by baking flour and water. In all these cases, “the art produces such a form not by its own power, but by the power of natural principles.” If he means here that the whole loaf is a single substance, then I have a hard time

seeing how to square this example with his broader theory. (He would have to think that slices of bread lose their identity.) In general, though, notwithstanding his usual assertions, it should not be surprising that artificial substances are possible. His theory of substantial form explains precisely under what circumstances an artifact would have the requisite unity. For an illuminating discussion of Aquinas on artifacts, see Rota 2004.

²² See *ST* 1a 13.5c, where *signum* is contrasted with *causa*: “hoc quidem signum est, illud vero causa.” ‘*Signum*’ in this sense occurs dozens of times in the first part of the *Summa theologiae* alone. See, for example, 75.6c, 76.8c, 84.7c. For a more general discussion of the plausibility of Aquinas’s metaphysics, see Pasnau 2002 (sects. 3.2–3).

²³ Still, there is ample room for interpretation here, especially since Aristotle goes on to remark that, for the parts of substances, “they all are what they are in virtue of a certain power of action or passion” (390a18)—suggesting that perhaps the form is not the function but the power for performing the function, and so perhaps drifting back toward the concrete side of form.

²⁴ Recent literature in this area has tended to concentrate on the question of whether forms are individuals or universals. Although that issue is certainly connected to the issue I am raising, they are separate questions and deserve to be treated as such. Even if forms are universal, there is still a question of whether they should be conceived of as causally active. And even if forms are particulars, one might still think of them as metaphysical abstractions rather than actual causal powers.

²⁵ Hence, Balme could not be more wrong when he writes: “The extraordinary later misinterpretations of Aristotle, the magical entelechies and real specific forms, must be largely due to these imported concepts—Species, Essentia, Substantia—which presided like three witches over his rebirth in the Middle Ages, but should be banished to haunt the neoplatonism from which they came” (1987, 306). The actual differences between Aristotle and his scholastic followers lie in precisely the opposite direction. Far from treating forms and essences as magical platonic entities, the scholastics tended to conceive of these entities in highly naturalistic and empirical ways, along just the sorts of lines that Balme himself extols.

²⁶ See the discussion in Ariew 1992 (63–69) of the restrictions placed on Jesuit philosophers and theologians. As Ariew remarks, “the Jesuits defined danger to the faith as any novelty in either theology or in philosophy, especially as it concerned the axioms and common opinions of scholasticism” (65).

²⁷ Thus, Descartes tells Mersenne, in correspondence from 1640 (which postdates his most famous philosophical works), that he has not read scholastic philosophy in twenty years. He then adds, “I would also like to know whether there is someone who has written a summary of all of scholastic philosophy and who has a following, for this would spare me the time to read their big books” (AT 3:185; CSMK, 154).

²⁸ See Henry of Ghent, *Quod.* 4.13 (f. 104vI); Ockham, *Quod.* 3.6 (*OTh* 9.227), and *Ord.* 8.3 (*OTh* 3.206); Aquinas, *De ente* 5.76–81, *ST* 1a 77.1 ad 7, *QDSC* 11 ad 3, *InPA* 2.13.119–21 [sect. 533], and *InDA* I.1.254–55; Scotus, *QMet.* 7.3.16, *Lectura* 1.22.2–4 (Balić 17.301–2), *Ord.* 1.22.6 (Balić 5.344).

²⁹ See, for example, Mackie 1976 (86–88), Yolton 1993 (68).

³⁰ See also Scotus, *QMet.* 7.8–10, 59; Zabarella, *De rebus nat.* 385c–f; Suárez, *DM* 15.1.16, 15.2.10, 15.4.4.

³¹ See AT 3:232 (CSMK, 156); cf. AT 3:185 (CSMK, 154).

³² Gilson 1951 (162–63, 170–71) stresses that Descartes’s theory has no room for real entities that are not substances; Des Chene 1996 (78–79) points to the Aristotelian distinction between primary and secondary substances; Rozemond 1998 (130–33) argues that substantial forms are separable from matter (according to the scholastics), and hence substances (according to Descartes).

³³ See also *OFQ* 150, where Boyle describes substantial forms as immaterial substances. Tellingly, Dutch translations of Spinoza render ‘*forma substantialis*’ as ‘*zelfstandige vorm*’—that is, a *subsistent* form (ed. Curley, 678). A better choice would have been ‘*wezenlijk vorm*’. Another, fairly bizarre instance is Hobbes, who identifies substantial forms with “certain essences separated from bodies” (*Leviathan* 46.15) and then remarks that “this doctrine of *separated essences*, built on the vain philosophy of Aristotle, would frighten them [men] from obeying the laws of their country with empty names, as men fright birds from the corn with an empty doublet, a hat, and a crooked stick” (46.18). Eventually, it becomes clear that Hobbes is conflating various scholastic views: that the rational soul is subsistent; that the accidents in the Eucharist can miraculously endure without their substance; and that virtues can be infused by God. Frightening as these doctrines may or may not be, only the first has anything to do with substantial forms, and it is in fact an exceptional case that goes against the general rule regarding substantial form.

³⁴ See, for example, the Fourth Set of Replies (CSM 2:157; AT 7:222), and also a letter to Regius, Dec. 1641 (CSMK, 200; AT 3:460).

³⁵ See also Scotus, *QPraed* 15.10, who stresses that ‘substance’ is equivocal, and that form and matter count as substances only inasmuch as they are principles of substance.

³⁶ The diversity of views is well brought out in Mercer 1993 and Fitzpatrick 2003 (308–16). For a discussion of seventeenth-century criticisms of substantial form before and after Descartes, see Ariew 1999 (77–96). The best-known attempt to defend some sort of middle ground is of course Leibniz, especially in his correspondence with Arnauld (see Sleight 1990). I discuss Leibniz briefly near the start of section 6.

³⁷ All translations from Descartes are based on Cottingham et al., with some alterations. On there being just one kind of matter, see, for example, *Meteorology*, Discourse I (AT 6:239; CSM 1:187 n.); *The World*, chap. 4; *Principles* 3.46. On the sorts of differences that affect it, see, for example, *The World*, chap. 5 (AT 11:25–26; CSM 1:89); *Principles* 4.187, 4.198. For a useful summary of how Descartes’s physics differs from scholasticism as he conceives of it, see Garber 2001 (224–31).

³⁸ These two lines of attack—from the poverty of scholastic explanations and from the richness of his own—come together in a remark added to the French edition of *Principles* 4.201, that prime matter, substantial form, etc. “are harder to understand than all the things they are supposed explain.” For fur-

ther disparaging remarks, see CSMK, 107, 122, 188, 221; AT 8B:26; AT 1:430. The passages in the main text are offered as suggestions regarding how Regius should reply to criticism at the University of Utrecht. Although I see no reason to doubt that Descartes held the views he sets out in this letter, his words should be placed within the proper rhetorical context, as Chappell 1994 stresses.

³⁹ See AT 8B:351 (CSM 1:299); AT 3:460 (CSMK, 200).

⁴⁰ See, for example, his exchange with Arnauld on whether a sheep can see a wolf and run away without a rational soul (AT 7:205, 230; CSM 2:144, 161), as well as AT 11:202 (CSM 1:108), AT 1:414–15 (CSMK, 62), and AT 2:40–41 (CSMK, 99–100). Morris 2000 neatly captures the inference: “Thus his aim was to explain *sentience* without recourse to a sensitive *soul*. Success in doing so, if combined with Ockham’s razor, would imply that animals did *not* have ‘any vegetative or sensitive soul’” (402–3).

⁴¹ Earlier in this same letter, Descartes remarks that “the human soul alone is recognized as a substantial form, whereas other forms consist in the configuration and motion of their parts” (AT 3:503; CSMK, 207). Elsewhere, Descartes characterizes the mind as the form of the body, or as informing the body: see AT 10:411 (CSM 1:0); AT 7:356 (CSM 2:246); AT 4:168 (CSMK, 243–44); AT 4:346 (CSMK, 279); AT 4:373 (CSMK, 284). The original Latin text of *Principles* 4.189 speaks of the soul’s “informing the entire body,” but the subsequent French translation has the soul’s being “united to the entire body.” Voss 1994 contains a very useful cataloguing of these and other crucial texts relating to the mind–body problem. But given that these passages extend from the *Regulae* of 1628 to correspondence in 1646, there seems little reason to accept Voss’s argument that this reflects a “brief period” of scholastic thinking in Descartes’s career (277). This makes too little of this language, by confining it to a two-year period, and also—as we will see—makes too much of it, by supposing that within that period Descartes was seriously under the influence of this scholastic scheme.

⁴² See Hoffman 1986, Voss 1994, Des Chene 1996, Rodis-Lewis 1998, Roze-
mond 1998.

⁴³ See *Principles* 4.189, Med. 6 (AT 7:86; CSM 2:59), Fifth Replies (AT 7:388–89; CSM 2:266). In making these claims, Descartes is doing his best to adhere to a long tradition that goes back through Augustine (for example, *De trinitate* 6.6.8) to Plotinus (Ennead 4.2.1).

⁴⁴ Rodis-Lewis 1998 seems to give the doctrine this kind of metaphysical weight (206). Compare M. Wilson (Garber and Wilson 1998, 836), for whom the claim means nothing more than that the mind moves (is moved by) the pineal gland, which in turn moves (is moved by) the whole body. As will emerge, I am more sympathetic to Wilson’s reading.

⁴⁵ Descartes reiterates this claim in the same letter (AT 4:167), and again in a subsequent letter to Mesland (AT 4:346; CSMK, 278–79). Hoffman 1986 gives a prominent place to these passages. In reply, Chappell 1994 argues that this claim “contains nothing specifically Aristotelian” (417), a conclusion I hope we are now in a position to reject.

⁴⁶ See Rozemond 1998: “Descartes simply *never* proposes that the mind is

the form of the body *as an account of their union*" (152).

⁴⁷Rozemond 1998, after making some of these same points, concludes that "Descartes does not propose to offer a hylomorphic explanation of the unity of the human being" (163). As for apparent indications otherwise: "He did adapt various expressions from the Aristotelian scholastic tradition, which he only uses when under pressure from opponents" (162). This last remark is overstated, inasmuch as Descartes's boldest pronouncements in this area were to Mesland, an enthusiastic supporter, and were not made under pressure. But what seems correct is that Descartes did not suppose hylomorphism could explain the unity of mind and body. Rozemond goes on, quite correctly, to stress the influence of Church doctrine, as promulgated in the Lateran Council of 1513, which dictated that the rational soul is the form of the human body. For the medieval background to that doctrine, see Pasnau 1997.

⁴⁸An important further element in this discussion, which here I can only note, is the connection between Descartes and those scholastics who postulated multiple substantial forms within a human being. For key medieval figures like Ghent, Scotus, and Ockham, a human being has, in an additional to the rational soul, at least one other substantial form that is the form of the body. Although this pluralist account was the minority opinion by the time of the sixteenth century, it is still worth considering whether Descartes's view might be consistent with it. And although the argument of the main text shows that the Cartesian mind is not the form of the body in the standard scholastic sense, the mind might still count as a substantial form in something like the way it did for these medieval pluralists. This conclusion has been advanced by a number of scholars, including G. Wilson (1982), Hoffman (1986, 363–64), Des Chene (1996, 65), and Rozemond (1998, 145). Though I cannot discuss pluralism at length here, I hope it is clear at any rate just how little content there is left in Descartes's claim that the mind is the form of the body.

⁴⁹See, for example, Locke, *Essay* 2.23.29–30. Ayers remarks that "the key to understanding Locke's general theory of substance is to realize that it is nothing other than a restatement and elaboration of the sceptical position adopted by Gassendi" (1991, vol. 2, 31).

⁵⁰See, in particular, Emerton, who remarks that "the opponents of scholasticism ... did not usually reject the concept of form as such, and in fact the denials of the form, however vehemently stated, were more apparent than real" (1984, 60; see also 72).

⁵¹See also *Discourse* 12, where Leibniz remarks that, although substantial form is needed, "it makes no change in the phenomena, any more than do the souls of animals, if they have any." To Arnauld he writes: "All the phenomena of bodies can be explained mechanically, that is, by the corpuscular philosophy, following certain principles of mechanics posited without troubling oneself over whether there are souls or not" (ed. Ariew and Garber, 80).

Garber aptly remarks that Leibniz introduces substantial form "not to disrupt a perfect mechanism or to explain what cannot be explained mechanically, ... but to *ground* mechanism" (1998, 784).

⁵²"For I think it is a mistake to imagine (as we are wont to do) that what is called the *nature* of this or that body is wholly comprised in its *own matter* and

its (I say not *substantial*, but) *essential form*, as if from that or these only all its operations must flow” (ed. Stewart, 190). Boyle goes on to make the interesting claim that such operations flow from matter and form only given a certain environment. In his *Lexicon Philosophicum* (originally published in 1692), Stephanus Chauvin writes that “although no *substantial* forms are posited, still *essential* forms are posited,” which he goes on to define as “that through which each body is established in a certain species, is distinguished from all others, and operates in a way appropriate to its nature” (1713, 261a). The history of this subject might well have been dramatically different if, from the start, the scholastics had used the far more apt phrase *forma essentialis*. (This is just one more respect in which the standard translation of *ousia* as *substantia* (and *substance*) has led to endless confusion.)

⁵³ For specific details regarding Boyle’s chemical conclusions in this regard, see Emerton 1984 (143–46). Like Descartes, Boyle explicitly indicates that his attack on substantial form does not apply to “the reasonable [that is, rational] soul that is said to inform the human body” (*OFQ* 15).

⁵⁴ See *OFQ* passim—for example, 30, quoted later in the main text. The term goes back at least to Francis Bacon: “the true textures and configurations of bodies on which all the occult and, as they are called, specific properties and virtues in things depend, and from which, too, the rule of every powerful alteration and transformation is derived” (*New Organon* 2.7).

⁵⁵ See, for example, *OFQ* 18–20, 30, 71. For further discussion, see Alexander 1985 (60–88). Chauvin’s entry for ‘form’ remarks that “the form of a natural body, according to what more recent philosophers hold, is nothing other than a mode of the matter in which it inheres,” and he goes on to describe five modes: shape, rest, motion, size, position (1713, 260b).

⁵⁶ Perhaps another example is Arnauld and Nicole, in the *Port-Royal Logic*: “the form is whatever makes something to be what it is and distinguishes it from other things, whether it is a being really distinct from the matter, as the scholastics think, or merely the arrangement of its parts” (187–88).

⁵⁷ For a detailed illustration of this strategy, see the discussion in *OFQ* 65–66. Boyle there considers the argument that substantial forms are required to explain “the various changes ... the differing effects ... the preservation and restitution of the state requisite to each particular body, as also the keeping of its several parts united into one *totum*.” He replies that “many and great alterations may happen to bodies, which seem manifestly to proceed from [1] their peculiar texture and [2] the action of outward agents upon them.” Then, in exploring the first case, he writes that “various operations of a body may be derived from the peculiar texture of the whole and the mechanical affections of the particular corpuscles or other parts that compose it,” and he goes on to describe the case of vitriol produced in his laboratory, which has “most, if not all” of the properties possessed by natural vitriol. Boyle takes this to be devastating for the doctrine of substantial forms, because he assumes that his artificial vitriol will not be said to have a substantial form. Its properties, he says, “plainly emerge” from the underlying texture of the matter. But, he then reasons, surely natural vitriol should likewise be said to emerge from the underlying texture. (For further discussion of this particular example, in the context

of a general argument against putting weight on the natural–artificial distinction, see *OFQ* 74–79.) The proponent of substantial forms should probably reply that artificial vitriol *has* a substantial form. This is the tack that Aquinas suggests in note 22 above.

⁵⁸ See *OFQ* 57–58, and “History of Firmness” (*Works* 1:261a): “to engage very far in such a metaphysical and nice speculation were unfit for me.”

⁵⁹ Even so, Locke sometimes endorses such an account without any qualifications or hesitations, for example: “... Bulk, Texture, and Figure of the minute parts of Bodies, on which their real Constitutions and Differences depend...” (2.23.8). Unless otherwise indicated, references to Locke are to the *Essay* (ed. Nidditch), usually to book, chapter, and section, and occasionally to page and line number. Quotations sometimes modernize Locke’s punctuation and ignore italics.

⁶⁰ See also the first letter to Stillingfleet: “I know nobody that ever denied the certainty of such real essences or internal constitutions, in things that do exist” (*Works* 4:82); “I easily grant there is reality in them; and it was from that reality that I called them real essences” (*ibid.*, 83).

⁶¹ 3.6.7 is virtually identical. See also 3.3.18 and 3.6.2, both of which hold that all the properties of a substance “depend” on its real essence.

⁶² See, for example, *OFQ* 72: “it was very much by a kind of tacit agreement that men had distinguished the species of bodies. ... those distinctions were more arbitrary than we are wont to be aware of.”

⁶³ *Lectura* 206. See Dahan 1995 for further references and discussion. Aquinas treats Adam’s naming of the animals as an argument for Adam’s virtual omniscience. He argues: “Adam gave names to the animals, as is said at Genesis 2. But names ought to fit with the natures of things. Therefore Adam knew the natures of all animals, and by parity of reason, had knowledge of all other things” (*ST* 1a 94.3sc). (The conclusion gets qualified in the main reply, so that it extends only to omniscience regarding what it is appropriate for a human being to know about—thereby excluding things such as the thoughts of other human beings, future contingents, and trivial facts such as how many pebbles lie in a certain stream.)

⁶⁴ Many recent commentators have stressed this point: see, in particular, McCann 1987 (64–67), Ayers 1991 (2:73–74), Guyer 1994. Often enough, however, Locke ignores this purported connection between real and nominal essence: see, for example, 3.6.19–20, where he is quite clearly thinking of a substance as having a unique real essence, giving rise to just those properties that are truly essential to a thing. We can never discover this real essence, he argues there, because “it is impossible to know all those Properties, that flow from it, and are so annexed to it, that any one of them being away, we may certainly conclude, that that Essence is not there, and so the Thing is not of that Species” (sect. 19). If the real essence were fixed by the nominal essence, in the way Locke describes in 3.3.6, then we would be able simply to stipulate what the essential properties are.

⁶⁵ See also the first letter to Stillingfleet: “I grant it true, what your lordship says in the next words, ‘and let the nominal essences differ never so much, the real, common essence or nature of the several kinds, is not at all altered by

them;’ i.e. that our thoughts or ideas cannot alter the real constitutions that are in things that exist; there is nothing more certain” (*Works* 4:90); “It is true, the real constitutions or essences of particular things existing, do not depend on the ideas of men, but on the will of the Creator; but their being ranked into sorts, under such and such names, does depend, and wholly depend, upon the ideas of men” (91).

At the end of 3.3.15, Locke identifies a thing’s real constitution, so conceived, with the thing’s real essence. So that looks to be another case (see previous note) where Locke is ignoring the alleged tie between real and nominal essence.

⁶⁶See Ayers 1991 (2:73). “For if we consider the ‘real essence’ to be the underlying structure of the particular, without reference to a name, it has to be considered as a whole; and then it will appear that all the qualities and natural attributes of the thing, whether classed by us as ‘difference’, ‘properties’, or ‘accidents’, flow equally from the ‘real essence’.”

⁶⁷Locke’s account of bodily sameness, and his conviction that questions of identity somehow depend on the idea one has of a thing, closely follow Hobbes’s treatment of these matters at *De corpore* 2.11.7. Boyle had likewise stressed how identity judgments depend on the ideas we employ (ed. Stewart, 193–94).

⁶⁸It would be desirable at this point to have a clear understanding of how Locke understands these rival accounts—in particular, whether they require a conception of relative identity, or whether for a given individual there is one privileged criterion of absolute identity, with the other criteria furnishing identity only in some looser sense. The difficulties with relative identity are well known and have been much discussed, both in general and as a reading of Locke. See, in general, Perry 1970 and Wiggins 1980 (chap. 1). For the case of Locke, see Alston and Bennett 1988, Chappell 1989, Lowe 1995 (chap. 5). Here, unfortunately, I must set aside this question entirely.

⁶⁹ “[U]niversality belongs not to things themselves, which are all of them particular in their Existence” (3.3.11).

⁷⁰See the first letter to Stillingfleet: “Of what, I beseech your lordship, are the internal constitutions unchangeable? Not of any thing that exists, but of God alone; for they may be changed all as easily by that hand that made them, as the internal frame of a watch” (*Works* 4:91).