28. Permanence and Corruption

The elaborate scholastic metaphysics of prime matter and forms, accidental and substantial, serves at the behest of commonsense. It offers a theoretical framework for our ordinary way of viewing the world: as full of things undergoing changes of one and another kind, sometimes surviving those changes and sometimes not. We take ourselves to be the most familiar example of such a thing, undergoing changes that, as the saying goes, either kill us or make us stronger. Other things, we ordinarily suppose, likewise undergo changes, some of which they survive and some of which they do not.

The most radical challenge to this framework would deny the very existence of change. This is a position that no one during our period embraces. What one finds instead is the only slightly less startling claim that, barring supernatural acts of creation or annihilation, nothing comes into or goes out of existence, and that instead all change is a matter of how or where a thing is. I will call this the *permanence thesis*. Permanence obviously requires rethinking what the things – the substances – are. Animals cannot be substances, since they obviously do come into and go out of existence, and this means that we (supposing, as everyone does, that we exist) are not animals, which is to say we are not soul–body composites. In general, on this view, no composite body of any sort can count as a substance, because all composites things can, and regularly do, come into and go out of existence. Only a few authors during our four centuries willingly embrace so thoroughgoing a rejection of commonsense ontology. But many authors, once they reject scholastic hylomorphism, are hard pressed to avoid falling into its arms. Here, as we have seen so many times already, what is most interesting about post-scholastic thought is not its rejection of scholasticism, but what happens thereafter.

28.1. Generation and Corruption

When one thing is corrupted, another is generated. So said Aristotle (*De gen.* 318a23-25), and this notion came to be generally embraced throughout our four centuries. One way to understand the process of corruption followed by generation – substantial change – would be in terms of complete discontinuity: a thing exists, then wholly goes out of existence, at which point something wholly new comes into existence. As discussed back in Chapter 2, this possibility was universally rejected during our period, on the grounds that something has to endure through all natural change. This enduring stuff is what everyone refers to as *matter*. There was, however, no agreement on the nature of such matter, with the Thomists insisting on its status as pure potentiality (see §3.3), but most viewing it as something somehow actual, whether that actuality consisted simply in some sort of being, or else in indeterminate extension or perhaps even in some determinate, unchanging extension (see Ch. 5). In addition to this disagreement, there was disagreement over whether anything other than matter can endure through substantial change. The Thomists again take the most austere line, insisting that every form of the corrupted substance ceases to exist with that substance. Others, however, allow that some forms endure through substantial change, inhering in the surviving matter. Some argue that accidental forms can survive in this way (see §6.3), whereas others argue that substantial forms can survive in this way (§25.?). There is indeed such a variety of views regarding the process of substantial change that one cannot speak, even in rough outline, of *the* scholastic view about substantial change. The most one can say is that there is a very broad, shared framework.

The most distinctive feature of this shared framework is the conviction that substantial change is marked by the loss and then gain of one or more substantial forms. (There might be more than one form lost or gained if a substance has multiple substantial forms, or if a single substance is

corrupted into many distinct substances, or if many substances come together to make a single substance.) It is this shared conviction that guarantees the scholastics will be realists about substantial change, treating it as an objective fact rather than a matter of convention that certain kinds of change count as substantial whereas others count as merely accidental. On this theory, moreover, substantial change is not only a real event but also a well-defined one, inasmuch as the corruption or generation of a substance happens at an instant. In contrast to accidental change, which often takes place over time, substantial change is an all-or-nothing affair: a thing either is a dog, say, or is not, because either it has a certain soul or it does not. Because the loss or gain of a substantial form is instantaneous, there is no vagueness regarding when a substance begins or ceases to exist.[1]

The scholastic framework is particularly vulnerable in two places. First, it requires maintaining that in generation and corruption there is something – the substantial form – that comes into existence anew, seemingly *ex nihilo*. Scholastic authors have to admit that the substantial form comes into existence anew, since otherwise the change would not count as substantial. But they cannot allow that it is truly *ex nihilo*, since that sort of coming into existence counts as *creation*, and only God can create. This led to many long discussions of various ways in which a form might or might not be "educed from the potentiality of matter" – that is, arise out of the one ingredient that all parties agree to endure through change. Among later scholastics and their critics this becomes a prominent topic of dispute.[2]

This debate over the origins of a new substantial form leads directly to a second vulnerable aspect of the scholastic framework, regarding just how much endures through substantial change. Here there was a tension that drives the disagreement among different authors. On one hand it is tempting to want to allow more to survive substantial change, because the more that survives – whether that be accidental or substantial forms, or simply more thoroughly actualized matter – the

easier it is to explain where the new substantial form comes from (see §25.?). For Thomists who think that only purely potential prime matter endures through substantial change, the problem of explaining the origins of the newly generated substantial form can seem well-nigh intractable. On the other hand, the Thomist account makes it clear why generation and corruption are distinct from other sorts of change: the discontinuity of substantial change is so radical, on their approach, as to present no risk of confusion with the case of alteration. In contrast, the more one allows to survive corruption, the less clear it is how substantial change differs from accidental. If each involves no more than the coming or going of a form, then they seem not so different. To be sure, one might still say that substantial change is special because it involves the going and coming of a *substantial* form. But, as we have seen (§24.?), the *reason* substantial forms are special is that they explain the accidental forms of a substance. To the extent accidental forms are allowed to endure through substantial change, independently of the substantial form, the very distinction between substantial and accidental forms tends to be undermined.

Post-scholastic authors take advantage of both of these vulnerabilities. Rejecting substantial forms (see §24.?), they question whether anything really does come into or go out of existence during the process of generation and corruption. Treating the matter that endures through change as wholly actual (see §3.1), they question whether there really is a fundamental distinction between substantial and accidental change. In making these challenges, they attack scholastic Aristotelianism at some of its weakest points, but leave themselves open to considerable difficulties. For if nothing comes into or goes out of existence during substantial change, then it is hard to see how there can be such a thing as substantial change at all, given that substantial change, by definition, is supposed to consist in the generation of a *new* substance. Similarly, if substantial and accidental change are different at all, it seems they must be *fundamentally* different, since the one kind of change is supposed to destroy the thing changed, whereas the other requires that the subject of change

endure. Hence, as remarked at the beginning of the chapter, the seventeenth-century attack on the scholastic framework for substantial change tends quite naturally to lead to a radical outcome: the complete rejection of all substantial change.

As we have over and over, however, ideas that would become famous in the seventeenth century were usually anticipated during the scholastic era. The present case is no exception. Although the scholastic framework for substantial change would remain ascendant until the middle of the seventeenth century, it had already been subject to an extensive and quite forceful attack three hundred years earlier, by Nicholas of Autrecourt. Suppressed by Church authority (see §19.?), Autrecourt's ideas would have little impact on the ongoing debate. They are nevertheless worth considering, both for their own sake and because they serve as the harbinger for what would come, once the floodgates of Church authority came crashing down.

[1] <<Albertus Magnus, In GC (11.50-51). Almost all agree that gen. and alt are different. What if we understand the two in atomistic terms? Various unacceptable consequences follow, incl. SF = situs partium; generation = change of place, etc. [all of which the moderns would accept, of course]. cited in Ch. 27

Bk. I tr. 2 ch.1. The difference between alteration and generation, and why alteration always involves the 3rd species of quality.>>

For the link between prime matter and the possibility of substantial change, see also §3.4.

On generation and corruption as instantaneous, see the Coimbrans: "Deinde quod generatione pro momentanea introductione formae sit vera et realis actio ostenditur: quia generatio sic accepta est mutatio, ut in confesso est apud omnes, cum per eam materia in instanti generationis aliter se habeat secundum formam quam recipit ac sese habebat tempore generationem antecedente" (*In Gen. et cor.* I.4.12.2). They cite a great many authorities for this view. See also Nicole Oresme, *In De gen.* I.2 p. 13.

Gassendi's guarded defense of substantial change (see §3) explicitly gives up the claim that generation and corruption are instantaneous, arguing that all natural change involves local motion, and so "cannot be instantaneous" (*Syntagma* II.1.7.4, I:473b).

[2] On the scholastic debate over whether the rational soul is educed from matter, see Pluta, "How Matter Becomes Mind.." <<Marsilius of Inghen QGC I.2 obj. 1, which claims that only substances could be gen/cor'd, but that they cannot be, because neither PM nor SF is gen/cor'd. The reply is to insist that SF *does* come into existence anew.>>

Boates….

Eustachius, pp.120-21 describes the passivity of matter consisting partly in its openness to new forms, and partly in forms being educed from it. So when people talk of forms being educed from matter, do they really mean PM??? That's highly relevant here!

28.2. Permanence: Autrecourt

Aristotle intended his hylomorphic framework to serve as a response to the various implausible views of his predecessors: to monism, atomism, Heraclitean flux, and Platonic idealism.

It was intended, above all, as a realistic theory of change. No wonder, then, that when scholastic authors contemplate the rejection of hylomorphism, they forecast dire consequences. Albert the Great warns that if generation is understand as simply a new "congregation of atoms," then "many impossibilities obtain" such as that generation would be nothing more than locomotion (*In De gen.* I.1.9). John Buridan similarly warns that if substantial form is treated as just the disposition of matter, then it becomes impossible to maintain that horses, stones, and human beings come into or go out of existence (*In De an.* III.11; see below). Such warnings get applied not only to the wholesale abandonment of the hylomorphic framework, but also to various disputed positions within that framework. Unitarians, for instance (see Ch. 25), charge pluralists with being unable to maintain the distinction between substantial and accidental change. Those who want to treat matter as intrinsically extended (see §5.3) get accused of collapsing that same distinction. For if matter itself possesses extension, the argument goes, then it itself would seem to become the enduring substance. Changes to it, even changes in an allegedly substantial form, would in fact be merely accidental.[1]

When Albert the Great issues his warning, it is nothing more than a gloss on what Aristotle himself had said. And when such accusations are thrown around among proponents of one or another variant of the hylomorphic scheme, they are intended as a *reductio* of the proposed view. No one, it is assumed, would tolerate assimilating substantial to accidental change. By Buridan's time, however, the situation had changed dramatically, because Buridan is responding to an actual challenge to the hylomorphic framework, by Nicholas of Autrecourt. Autrecourt's brilliant *Tractatus* (1330) offers an extended defense of an austere corpuscularian version of atomism, which simply embraces many of the radical consequences that might seem to follow from such a view. In particular, Autrecourt holds that a plausible case can be made for the thesis that nothing naturally comes into or goes out of existence. (More precisely, he holds that only *successive* entities, like motions, can begin or cease to exist. By invoking the permanent–successive distinction here [see Ch.

18], he can maintain that "all things [*res*] are eternal" without denying all change, and while leaving room in his theory for motion to play a robust role. Hereafter I will tacitly presuppose this qualification to his view.) If this thesis could be established, it would undermine not only substantial but also accidental change. For if everything is eternal then not only do substantial forms not come into and go out of existence, but neither do accidental forms. This wrecks the entire hylomorphic framework, because change will no longer be a matter of matter's going from potentiality to actuality through the loss and acquisition of forms. Instead, for Autrecourt, all change consists in the motion of ingenerable and incorruptible bodies. Some sorts of motions get called generation, whereas others are called corruption or alteration or growth, but in no case does anything come into or goes out of existence. In general "there is only local motion, even if it receives different denominations" (*Tractatus* ch. 1, p. 204).

Autrecourt's corpuscularianism – and in particular his rejection of qualities – was discussed in §19.4. Here the focus will be on his arguments for "the eternity of things," the thesis that serves as the springboard for his corpuscularianism. His strategy is not to *prove* that all things are eternal, but to show only that there is no evidence to the contrary, and that moreover there are reasons to treat such eternalism as the more plausible view. His negative attack proceeds by targeting the case where it seems we have the best evidence of things coming into and going out of existence: change in sensible qualities. This is a natural place for Autrecourt to focus, given that the theory of real qualities was as entrenched as any part of the Aristotelian framework (see §§19.1-2). Moreover, Autrecourt contends that his arguments here will generalize to other cases. If he can show, despite appearances, that there is no evidence that anything begins or ceases to exist in cases of alteration, then he will also be able to use arguments of the same form against alleged cases of substantial change.

How might one show that change in sensible qualities involves something's coming into or

going out of existence? Not by any sort of conceptual (non-empirical) argument, Autrecourt says, because there is nothing about the *concept* of change in sensible qualities that requires the denial of eternalism. One would, then, have to establish the thesis on the basis of experience. The argument, according to Autrecourt, would have to look something like this:

1. "Everything that previously appeared to a sense but now does not appear, no matter where the sense turns its attention, does not exist."
2. "So it is for the whiteness that previously appeared and now does not appear."
3. "Therefore, etc." (ibid., p. 199)

Think of snow turning to a dirty grey. The idea is simply that if something appears, and then disappears, and one cannot find it anywhere – like the white of the freshly fallen snow – then one would have good reason to claim that it has gone out of existence. As crude as that sounds, it seems pretty well to capture our ordinary evidence for thinking that things go out of existence.

Autrecourt's reply is fascinating. He does not challenge the realism that underlies the argument, by questioning whether sensible qualities in fact exist in the world. Like almost everyone before the seventeenth century, he takes that sort of realism for granted (see §22.?). (Relocating the sensible qualities would not help his case, anyway, because that would just shift the problem of change to somewhere else.) Instead, Autrecourt offers three ways in which even a realist about sensible qualities might deny that they ever go out of existence. The first explanatory strategy is *Reductionism*:

> It might be said that the major premise [=1] does not have any truth, because natural forms are divisible into their minimal parts in such a way that, divided from the whole, they cannot perform their action. So even though they are seen while existing as a whole, nevertheless when dispersed and divided or separated they are not seen. (ibid.)

The idea is that whiteness might be nothing more than many microscopic parts ordered in a certain way. What we take to be whiteness's going out of existence is in fact just its being diffused in such a

way that it is no longer visible.

The second explanatory strategy is *Dispositionalism*:

> The second way would be to say that a motive power sometimes performs its act – that is, when it moves it appears – and sometimes is at rest, and then it does not appear. Still one does not say on this account that it has been corrupted. Something similar might be said for all other powers…. (pp. 199-200)

Here the idea is that whiteness might be a power or disposition that remains in existence even when it is not acting. In that case its ceasing to act would not show that it ceases to exist. Now to this one could reply that, although whiteness might be a power, and so might produce its characteristic effects only in certain circumstances, still we know what those circumstances are. So if a whiteness that was once seen cannot now be seen, even in the right lighting conditions, and to observers with properly functioning visual systems, then we have as strong evidence as anyone could hope for that the whiteness has ceased to exist. It is easy, however, to see how Autrecourt would reply to this. For as soon as one admits that the entity in question is dispositional, the quick three-step argument above becomes much more complex, because one then needs at least one further premise to rule out the possibility that the power still exists but has gone dormant. But how does one ever know in what circumstances a power might go dormant? Here is a real-world example. Biologists sometimes claim that when leaves turn bright colors in the fall, they in fact do not gain any new quality, but simply lose the greenness that they once possessed, revealing their fall colors. This is to say that the yellows and oranges are there in the spring and summer, but dormant. Perhaps something similar should be said about the dirty snow – that it is really still white, but just not showing itself as such. Perhaps in general the "standard conditions" under which a disposition reveals itself are far more complicated than we tend to recognize, and dispositions are far less prone to go out of existence than we realize. Perhaps, indeed, the true dispositions of the world *never* cease to exist.

The third explanatory strategy is *Platonism*:

> In a third way, it might be said that the nature (*ratio*) of the appearance is removed from no thing. For if you

> see whiteness in Socrates's face, and blackness in his hair, and a scar on his face, you will see all these after Socrates is said to be corrupted. Not that they will be where they were before; instead, they will be somewhere else – for instance, the whiteness in John, the blackness in a horse, the scar in Peter. (p. 200)

The idea is that the sensible quality itself – the whiteness, etc. – never ceases to exist, inasmuch as that thing is a universal that exists elsewhere. Autrecourt immediately confronts the objection that the whiteness of John's face is only qualitatively and not numerically the same as the whiteness of Socrates's face. To this he responds that in cases of exact similarity one has no grounds for denying numerical identity. So far, this third strategy sounds more like an *in re* theory of universals than like Platonism. But Autrecourt now shifts direction. For he immediately concedes that there is one good reason to postulate a numerical distinction between exactly similar qualities: their difference in location. Although some might deny this principle, and hold that the same thing can exist in more than one place, Autrecourt says that he at least, contrary to what some charge him with, "does not wish to proceed from premises so at odds with experience" (ibid.). Even granting that principle, however, Autrecourt thinks it cannot be shown that Socrates's whiteness is distinct from John's whiteness. For even if the first appears to your left and the second to your right, that does not prove they in fact have distinct locations. After all, he says, we are familiar with how mirrors can give the appearance of one thing's being in multiple locations. Of course it would be ridiculous to suppose that there are really mirrors everywhere, deceiving us. But it would not be ridiculous to suggest that the material world is itself a kind of mirror for the reality of the Forms:

> One might claim in this case that here below there is only the material, and that the actions of things are traced back to separate principles of the sort that Plato postulated – for instance, the action of this whiteness might be traced back to a separate whiteness …. And then that material to which we attend is nothing other than a mirror, and by directing our attention to one place it naturally happens that the whiteness is seen there. This is Plato's view. (ibid.)

If sensible qualities are Platonic Forms, then of course they do not go out of existence.

It is easy to see how the first and third strategies would apply to the case of generation and corruption, although Autrecourt himself leaves this as an exercise to the reader. If we accept Reductionism, for instance, we might say that a human being just is a collection of microscopic particles, and that those particles never go out of existence. When that strategy is generalized, it follows that whatever exists always exists. Similarly, in the case of Platonism, if to be human is for some material to participate in the Form of Humanity, then the destruction of a human being is not the destruction of anything. The Form continues to exist, and the material continues to exist. The only case whose application to substantial change is unclear is the second. Here, however, Autrecourt tells us how this will go:

> On this [second] account, when the powers of a human being on which his principal operation depends are dormant, then the human being is said to have been corrupted, and when it is so in every part of some area, then the world is said to be corrupted with respect to that area. So it has been infinitely many times and so it will be if the world, with respect to its natural appearances, is said to be corrupted. (ibid.)

The idea is that what we think of as corruption is really the dormancy of one or more powers that give rise to the "principal operation" of a given thing. For a human being to go out of existence, then, presumably, is for those powers that account for its vital operations to go dormant. And for any region of matter, we think of something being corrupted there when the principal powers of that region fall quiet. In actual fact, on this account, those powers never truly go out of existence.

Autrecourt takes these three scenarios to undermine any reason to believe that things come into and go out of existence. As he puts it, "each is possible; nor do I see that any of them has been sufficiently disproved by Aristotle" (ibid.). This will seem all the more true, I think, if one considers how these three options might be combined in various ways. Autrecourt himself says that he regards Reduction as the most plausible of the three. This is what one would expect, given his strict corpuscularianism, and Autrecourt is willing to pay the various prices associated with such an austere metaphysics. He is willing, in particular, to deny that anything other than atoms (and motion) exists

in the material realm. What his discussion shows, however, is that if one wants to enrich a strictly corpuscularian account with other metaphysical entities, there are alternatives other than Aristotelian hylomorphism. One can, for instance, follow the second strategy and introduce dispositions. This is a strategy we considered already in Chapter 23, both in the context of the real powers of the scholastics and the nominal powers of Robert Boyle and Locke. Corpuscularians who help themselves to such powers can – at least in some contexts – offer a more plausible account of change than can strict corpuscularians. A corpuscularian willing to embrace Platonism has still more options. As I have stressed repeatedly, universals were almost never taken seriously within the scholastic tradition, or by its seventeenth-century critics, and Platonism in particular was generally regarded as wholly incredible. (One might here remember the heuristic picture of §4.1: that Platonism lies on one side of Aristotelianism, corpuscularianism on the other.) There is no reason in principle, however, why a broadly corpuscularian approach might not be supplemented by Platonic universals, so that what exists *in re* is simply particles in motion, but that these variously arranged particles might truly be said to be human, or white, in virtue of participating in Humanity and Whiteness. (Perhaps the linear spectrum of §4.1 needs to be bent into a circle.)

Autrecourt does not take these various lines of argument to prove anything. (In general, as we will see in §31.?, Autrecourt thinks that there is almost nothing that one can demonstrate with certainty.) So even if we were willing to grant to Autrecourt the bare possibility of one or more of the accounts he describes, we might still insist that it seems overwhelmingly more plausible to embrace the common sense notion that things do come into and go out of existence. This was Buridan's complaint regarding Autrecourt's view. It is both "obscure and dangerous," he charges, to contend that "a donkey was a stone, and a stone has always existed, and no horse or human being has ever been generated, although matter has been made a human being or a horse" (*In De an.* III.11; see §24.2 for the full passage). The "danger" to theology can perhaps be set aside, and the

"obscurity" is surely part of the allure of Autrecourt's view. But isn't it all the same just an incredible picture of reality? Even if it is possible, what reason would we have for believing it?

Autrecourt sees that he needs to address these questions, if he means to do more than simply trade in the sorts of skeptical scenarios that can at best do nothing more than dislodge our prior beliefs, and that in practice never do even that much. His answer is to argue that our intuitions about the perfection of the created world favor the eternalist hypothesis. Here is his first attempt at how that argument might go:

> If in each thing eternity is better than its corruption, it will then seem that the universe is more perfect if its parts – especially its permanent ones – are held to be eternal, just as its being [as a whole] is granted to be eternal…. Thus it might be argued as follows: [1] That should be posited in the universe that results in a greater perfection's appearing in the universe – if no impossibility follows from its being posited. [2] But in fact it is the case that, by positing that permanent natural things of the sort discussed above are eternal, a greater perfection appears in the universe – and no impossibility follows from this. [3] Therefore etc. (*Tractatus* ch. 1, p. 201)

Autrecourt is well aware that this is not demonstrative. It depends on two questionable assumptions: that this is the most perfect possible universe, and that generation and corruption is incompatible with such perfection. This second assumption gets defended in considerable detail, and it seems that Autrecourt came back to this part of the *Tractatus* repeatedly, piling new arguments on top of old ones. The core idea is that although perfection is compatible with some kinds of change, inasmuch as there might be some perfect-making features of the universe that can be instantiated only through local motion, perfection is not compatible with a thing's wholly ceasing to exist, or beginning to exist anew. Changes of that sort suggest that the world is becoming better or worse. Now inasmuch as we modern readers tend to treat it as obvious that the world *does* get better or worse, as it changes economically, politically, and environmentally (*inter alia*), it is hard to see the intuitive pull of this argument. It seems to me, however, that if one does embrace Autrecourt's initial perfect-world

assumption, then one can see why he is pulled in the direction of eternalism. For there can then seem something enticingly elegant about the idea that, when God created, he created just what there ought to be in the world, with just as many things in it as its perfection requires. To be sure, things appear to come and go, but the underlying reality remains constant.

Although the details of Autrecourt's argument are well worth exploring, I will pass them by here in order to consider the way these ideas would explode onto the scene once again in the seventeenth century. It would take that long because – as discussed in §19.4 – Autrecourt's eternalism was quashed by Church authorities in Avignon, condemned in 1347 as "false, erroneous, and heretical." Hence in the later scholastic era one finds only traces of it. One sees it in Buridan, as discussed above. And one continues to see it in figures like Nicole Oresme, Albert of Saxony, and Marsilius of Inghen, all of whom take quite seriously right at the start of their *De generatione* commentaries the question of whether generation can be proved to happen. Since they cannot talk about Autrecourt, they talk about, as Oresme puts it, "the many ancient doctors who denied that generation occurs" (*In De gen.* I.1 p. 4). Oresme readily concedes to these "ancients" that there can be no demonstrative proof in favor of generation and corruption. We think there is no fire because we no longer perceive heat, but strictly speaking the inference is not certain: our senses could be deceiving us, or the fire could be failing to produce heat for some reason we cannot perceive. Such concessions to skepticism are in themselves quite remarkable: one sees nothing like this in either scholastic discussions of these issues, or even in later discussions, Autrecourt's influence having by that time apparently dried up. But even Oresme and his contemporaries are willing to bend only so far in the direction of Autrecourt's eternalism. Although it cannot be demonstratively proved that things come into and go out of existence, that hypothesis "is the most plausible of all" (ibid., p. 6). This remained the orthodox judgment – not just unchallenged but unchallengeable – until the seventeenth century.

[1] Aquinas charges the doctrine of a *forma corporeitatis* with collapsing the distinction between substantial and accidental change: "et sic rediret antiquus error, quod generatio idem est quod alteratio" (*Sent*. II.12.1.4c). On extended matter as likewise collapsing that distinction, see Peter Auriol, *Sent*. II.12.1.4 (II:163aDE); Anonymous A [see note to §5.?] (f. 61raBC); Paul of Venice, *Summa phil. nat*. VI.12 (f. 101ra). Gregory of Rimini defends himself against this sort of objection with the reply that substantial change can be distinguished as change in "nomen et definitio" (*Sent*. II.12.2.1 ad 3, V:278). This makes the fact of substantial change rest on facts of species membership.

[2] Autrecourt's clearest statement of his radical corpuscularianism occurs at *Treatise* ch.1 p. 200, as quoted in §19.?. See also pp. 201-2: "et breviter inducendo in similibus non apparet quod alio modo fiat corruptio in rebus quam per recessum corporum."

On leaves changing colors, see this popular account: "The green chlorophyll disappears from the leaves. As the bright green fades away, we begin to see yellow and orange colors. Small amounts of these colors have been in the leaves all along. We just can't see them in the summer, because they are covered up by the green chlorophyll" <http://www.sciencemadesimple.com/leaves.html>. One might well wonder about the coherence of the idea that "small amounts" of yellow and orange have been in the leaves (but not large amounts?) and that yet we "just can't see them." Autrecourt, however, needs only the *possibility* of this sort of scenario. Of course, one may wonder what Autrecourt could say about the green that "disappears." Ultimately, he might need to combine dispositionalism with reductionism or Platonism, or he might need to rethink what the true dispositions are in a much more thoroughgoing and radical way than the leaf example suggests.

As Kaluza's masterful study has shown (*Nicolas d'Autrécourt* pp. 160-61), Autrecourt's very complex and interesting arguments in favor of eternalism are presented out of order in the sole surviving manuscript (albeit with indications regarding the proper order). Unfortunately, both O'Donnell's edition and the translation of Kennedy et al. fail to correct this, and as a result this part of Autrecourt's argument is nearly unintelligible. As Kaluza reconstructs it, ch. 1 goes as follows:

ed.	tr.	
198.18-203.18	59.1-66.27	
185.17-188.37	37.26-43.11	
203.19-206.22	66.28-71.14	[Kaluza secludes 203.35-48/ 67.7-24 as an interpolation]
188.38-190.10	43.12-45.21	
206.23-28	71.15-21	
190.11-196.48	45.22-56.11	

For a cut-and-pasted version of the Kennedy et al. translation in correct order, see my Provisionalia web page.

Oresme's measured defense of generation holds that "opinio Aristotelis inter omnes est probabilior, quamvis aliae non possint demonstrave improbari." Both Albert of Saxony and Marsilius of Inghen follow Oresme's discussion of generation closely. According to Albert, "contra istas opiniones non bene potest demonstrative argui, tamen aliqualiter potest contra eas persuaderi" (*In De gen.* I.1, f. 132rb). Marsilius similarly remarks that "non est nobis evidens evidentia summa aliquod generari vel corrumpi" (*In De gen.* I.2, f. 66vb). There is no trace of such concessions to skepticism in the early *De generatione* commentaries of Giles of Rome or Giles of Orleans.

28.3. Weak Permanence: Basso and Gassendi

One way to reject generation and corruption in favor of permanence would be from the top down, by rethinking the essences of things. If we are wrong about essences, then we may well be wrong about when things come into and go out of existence. If we are wrong enough, it might turn out that nothing comes into or goes out of existence. Yet although the previous chapter discussed how these issues are entwined in the seventeenth century, they are not connected quite so directly as

this. Although permanence certainly *requires* rethinking the standard conception of essence, it does not usually seem to have *followed* from a critique of essences. The motivation for the permanence thesis comes, instead, through the post-scholastic critique of prime matter.

So long as prime matter is understood in metaphysical, Aristotelian terms, as halfway between nothingness and existence (as Averroes put it [see §3.3]), the permanence thesis cannot even arise. If this is the only stuff that endures through all change, then other things must come into and go out of existence. Metaphysical prime matter is too thin an enduring substratum to count as the only thing that exists. Accordingly, permanence is never a serious option for scholastic authors (unless, like Autrecourt, they abandon Aristotelian hylomorphism). Only when prime matter is conceived of as wholly actual and corpuscularian does permanence loom into view. Atomists, for instance, do not have to embrace permanence (or any particular metaphysical thesis at all, for that matter [see §4.4]), but once the atoms are made to be the permanent substratum of change (see §3.2) it can suddenly seem attractive to think that those atoms are the only things that really exist, and that hence there is no real generation or corruption. This was never the majority view, but it is a picture that lurks, spoken or unspoken, behind much of the seventeenth-century rebellion against scholasticism.

It is, however, far from obvious why actualized prime matter should point in this direction. That it in fact did so is an historical fact. Nonetheless, it can seem quite puzzling that this is so, given that there are at least two large and dubious assumptions lying in the way. First, one has to suppose that this actualized material substratum is itself permanent. This, as we saw back at the beginning of this study (§2.5), is a legacy of scholasticism: it is what I have called the conservation thesis. When post-scholastic authors reject prime matter, they reject only its unactualized, indeterminate, metaphysical character. The idea of a permanent substratum for change is universally accepted, all the way through Locke, who takes it as a given that "the dominion of man … can do nothing

towards the making the least particle of new matter, or destroying one atom of what is already in being" (*Essay* II.2.2). Yet even granting the conservation thesis, one can arrive at permanence only after making a still larger leap, to the conclusion that this enduring stuff is the only stuff there is. The grounds for that conclusion will be the focus of the remainder of this chapter.

The previous section revealed one kind of argument for this conclusion: Autrecourt's appeal to the universe's perfection. So far as I can find, no one – not even Leibniz – followed Autrecourt down this path. What one finds instead in the seventeenth century is a line of thought with a more ancient pedigree, grounded in the principle that *nothing is made from nothing*. In one sense or another this principle was accepted throughout our period. It was this *ex nihilo* principle that underwrote the thesis of an enduring material substratum (see §2.2), and subsequently informed various scholastic debates over exactly what the content of that substratum is. The principle had played an important role in Epicurus (see §2.5) and even before then among the Presocratics. As Aristotle had described his predecessors, it was the denial of this thesis that, "more than any other, had preoccupied and alarmed the earliest philosophers" (*De gen.* I.3, 317b29-30). Aristotle took his hylomorphic framework, and in particular the potentiality–actuality distinction, to disarm those sorts of arguments. But what one finds in the seventeenth century – as if the 2000 intervening years had not happened at all – is a renewed conviction that the *ex nihilo* principle does have radical consequences regarding change.

An early example is Sebastian Basso. His difficult and often obscure *Philosophia naturalis* (1621) – one of the first major statements of the anti-scholastic corpuscularian movement – makes an extended case against Aristotelianism by attempting to rehabilitate the ancient authors whom Aristotle had taken himself to have buried. One of Basso's most prominent claims is that in cases of substantial change nothing is generated anew:

> Here [the ancients] show how nothing is generated anew as a result of corruption, and that instead there is only

> the release of the same parts that had been joined together, since each of those parts is cut up into the smaller particles out of which it had been assembled. And thus fire, air, water, and earth – which before had been tied together and hidden – now appear. And whereas before they were impeded from acting, they now – impediments removed – make an impression on the senses. (De forma III, p. 243; cf. p. 11)

Basso himself rejects the Aristotelian elements and primary qualities in favor of a strict atomistic corpuscularianism, but what he wants to take from Aristotle's old adversaries is the idea that nothing appears in generation that was not already in the thing corrupted. The target in particular is substantial form, which – as remarked in §1 – precisely does seem to appear from nowhere in the newly generated substance. Basso deploys the *ex nihilo* principle as follows:

> This principle was accepted by all the philosophers: *Nothing comes from nothing*. From this they rightly inferred that nothing is made that did not preexist with respect to its parts. Otherwise would there not be something in
> 3 that thing that did not preexist, at least with respect to its parts? From what, then, would that something be made, if the parts out of which it was made had not existed? Obviously it is necessary that they were made from nothing – which is impossible. Now if all the parts of that thing, however minute, preexisted, then it is
> 6 certain that the generation of that thing is only a certain composition of the preexisting parts, as the ancients (*prisci*) held. What about Aristotle? He denies that the thing preexisted with respect to all of its parts actually, but only potentially. He claims that the thing's matter preexisted, but not its form, unless it preexisted
> 9 potentially. Yet he also says that this form is the principal part of a physical composite. Is this form made from nothing? He does not dare to say so. But then what? It is not the form that is made, he says, but the whole composite. What? Is not the physical composite made from parts that did not exist? They existed potentially,
> 12 he claims, inasmuch as the form exists potentially in the matter from which it can be derived. But the form's existing potentially in matter – is that for there to be parts of the form existing there, from which the form comes about? Not at all. But then what? One can only surmise. (De forma I, p. 149)

Basso takes the *ex nihilo* principle to show that, in cases of generation, all the ingredients of a thing must already exist. What is "impossible" (line 5) is not generation, but rather something's coming into existence with some part that did not previously exist. This would violate the *ex nihilo* principle, requiring a supernatural act of creation to account for ordinary generation. From this preliminary

result (lines 1-5), Basso gets two important conclusions. One is that generation is simply composition (lines 5-6). The other is that Aristotle's theory of form is incoherent, because it violates this construal of the *ex nihilo* principle (lines 7-14). And although the argument is aimed primarily at substantial form, it applies just as well to accidental form, since such forms come into and go out of existence in alteration just as substantial forms do in generation and corruption. The argument therefore attacks the hylomorphic framework at its most fundamental level.

One of the most interesting features of Basso's position is that he does not embrace the permanence thesis in its full strictness. Unlike Autrecourt, and unlike the more radical post-scholastic authors to be considered in the following section, Basso thinks that substances do come into and go out of existence. Although the first of the two passages just quoted might suggest a more radical claim – with its talk of "nothing is generated anew" (line 1) – he is quite clear in the longer passage that that claim applies only to the parts. Thus the critical claim is not that nothing is made, but that "nothing is made that did not preexist with respect to its parts" (line 2). This notion, which I will call the *weak permanence* thesis, would become orthodoxy among post-scholastic authors. One finds it in, among many others, Descartes, Pierre Gassendi, Walter Charleton, Boyle, and Locke. As I have been suggesting from the beginning of this study (§2.5, §3.?), it is among the most important metaphysical principles of seventeenth-century thought. It is important, first, because it grounds one of the three principal critiques of scholastic hylomorphism: that forms should be rejected not just because they are superfluous (see §3.2, §19.? and §24.?), and because they lack explanatory value (see §3.4, §30.?), but because they would have to come into existence *ex nihilo*. What makes weak permanence even more important, however, is that it lies at the root of the enormous difficulties that post-scholastic authors face regarding substantial change, requiring them either to deny all such change, and so embrace the strict permanence thesis, or to take heroic measures to explain substantial change. For, as we will see in the following section, the rationale

behind the doctrine of weak permanence threatens to extend far beyond where its proponents wish to deploy it.[1]

What is the rationale behind weak permanence? The doctrine should be understood as a version of the conservation thesis, and as such it fits into a pattern of thought generally embraced throughout our four centuries. For the scholastics it is only indeterminate prime matter that gets conserved through all change (see §3.3, §5.4). Beginning in the late sixteenth century, it becomes common to insist that quantity itself is conserved, although this would begin to give way a century later to the Newtonian conservation-of-mass doctrine. As noted in an earlier discussion (§5.5), conservation theses are always metaphysical in character, requiring philosophical decisions about individuation over time. The weak permanence thesis makes this point particularly clear, because it insists on the conservation not of some measurable physical quantity but of bodies – that is, of material substances. So whereas unitarianism insists that no actual part of a substance endures through substantial change (see §25.?), weak permanence takes the contrary view that, as Basso puts it above (line 5), "all the parts of that thing, however minute, preexisted." This is a strictly philosophical dispute. Both sides agree on the background view that the world was created by God with a certain amount of *stuff* in it, and that – barring divine intervention – it continues to have just that much stuff and no more. What is at issue is the character of that stuff. Is it actual? Is it extended? Is it a body? No amount of observation could settle such questions.

The many advocates of weak permanence do not always frame the doctrine very carefully. Above, Basso writes as if *all* the parts of a thing are permanent, and others routinely speak this way as well. According to Boyle, for instance, it is "not that there is really any thing of substantial produced, but that those parts of matter that did indeed before preexist … are now brought together" (*Origin* V:328; Stewart p. 45). Weak permanence cannot plausibly be understood as applying to all parts, however, without collapsing into strict permanence. For if it is granted that

new, composite substances come into existence, then it will surely be granted that those new substances have new parts. Weak permanence will allow not only that plants come into existence, for instance, but also that roots and leaves do. Obviously, the doctrine is not intended to block these results, but only to insist that material substances are composed *at some level* of permanently enduring corpuscles. Such a view fits most naturally with atomism, which offers a clear story about the level at which permanence obtains, but the doctrine might be and indeed was defended by philosophers who were not atomists, such as Descartes.

One finds in Descartes another common formulation of the weak permanence doctrine: as the thesis that substance is never generated or corrupted:

> Absolutely all substances, or things that must be created by God in order to exist, are by their nature incorruptible and cannot ever cease to exist unless they are reduced to nothingness by God's denying his concurrence to them. (*Meditations* synopsis, VII:14)

This formulation is, if anything, even more misleading, since it would seem on its face to be a statement of strict rather than weak permanence. But it is quite clear that many authors use this seemingly very strong formulation to make what is intended to be a weaker point. According to Gassendi, for instance, "it should be maintained always that in generation no substance is made anew, but instead what already exists is mingled together; and so too in corruption nothing ceases to be, but instead is separated into its remnants" (*Philosophiae Epicuri syntagma* II.1.17 p. 65; tr. Stanley, *History of Philosophy* p. 871b). And, according to Boyle: "no new substance is in generation produced, but only that which was preexistent obtains a new modification or manner of existence" (*Origin* V:328; Stewart p. 45). These look for all the world like statements of strict permanence, and perhaps they reflect a certain temptation on their authors' part to embrace that more rigorous claim. But if we go by what these authors actually say, elsewhere, it is clear that they do not mean to embrace that stricter thesis. Descartes, quite to the contrary, takes an extraordinarily lax view of what counts as a substance, including not just living and non-living natural bodies but also artifacts, plus all the

integral parts of those bodies, all the way, infinitely far down (see §26.1, and §5 below). Boyle too cannot mean to defend strict permanence, inasmuch as he endorses the doctrine of real essences (§27.6). This commits him to holding that these permanent corpuscles can be combined to yield new macro-level bodies. So despite how Boyle characterizes the weak substratum thesis – as precluding the generation of "new substances" – he does not mean to advance any such radical metaphysical thesis. That would be quite out of character with his metaphysical quietism (see §23.2).

These authors write as they do, I believe, because they suppose there is no danger of being misunderstood. The no-new-substance formula became so widespread by the later seventeenth century that one could in one breath insist that substances are never generated and corrupted, and in the next breath go on to explain how ordinary substances in fact are generated and corrupted. 'Substance,' in other words, is equivocal here between the micro-level corpuscles that compose a body, which are permanent, and the macro-level substances that *of course* come into and go out of existence. To be sure, as we will see, one might insist that the latter are not really substances at all, and perhaps do not even exist, but this would be a radical interpretation of a much more commonplace notion. That this is the situation is especially clear in Gassendi. In the extended discussion of generation and corruption in his magnum opus, the *Syntagma philosophicum* (1658), he takes up a series of important objections to his strictly corpuscularian, atomistic account:

1. the enduring matter, existing in potentiality, needs form to actualize it;
2. without such a form, there would be no distinction between generation and alteration;
3. without such a form, natural things would not be essentially distinct;
4. without such a form, all composite things would be merely heaps, not entities in their own right (*entia per se*). (II.1.7.4, I:473-74)

The first objection amounts simply to stating the heart of scholastic hylomorphism. The following three objections highlight various consequences that scholastic authors constantly allege to follow

from a rejection of hylomorphism. Since the issues involved in (3) and (4) have been considered elsewhere (chs. 27 and 25), we can focus here on (2). Gassendi categorically insists that his account recognizes the distinction: "generation can always differ from alteration, inasmuch as through generation a thing is said to be made absolutely, or to come into light for the first time, whereas through alteration a thing is said to be made such, or to vary in its features while its essence persists" (ibid. I:473b). Having said this, however, Gassendi anticipates the objection that this does not count as *substantial* generation. Here his response is more guarded:

> As for whether this precludes substantial generation, the question is clearly verbal. For it is precluded if you mean that something substantial is produced that did not at all preexist through either the whole or the parts. In this there is nothing absurd; on the contrary, it is entirely appropriate, since otherwise a thing would be made *ex nihilo* either in whole or in part. On the other hand, substantial generation is not precluded if you mean that a composite emerges that has true subsistence, since it is the case both that its parts subsist on their own, and that they cohere all together, being somehow tied to one another. (ibid.)

Gassendi claims that we should deny substantial generation if that entails violating weak permanence by postulating something, such as a substantial form, that arises *ex nihilo*. But if all we mean is that from the enduring atoms a new "composite emerges" (line 5), then the notion of substantial generation is unproblematic. Gassendi's position is admittedly not terribly clear: one might well complain that the passage contradicts itself, by first denying that anything "substantial" comes into existence with respect both to whole and part (lines 2-3), and then allowing that the composite is something new. I will not try to work this position out any better on Gassendi's behalf, but merely content myself with drawing a quick moral from the story, which will carry us into the following section: that given just how delicate a compromise this is, it is no surprise that there are others in the seventeenth century who refuse to make it, and who instead go all the way to the doctrine of strict permanence.[2]

[1] For Basso, Nielsen's "Seventeenth-Century Physician" remains a useful overview. A more recent and authoritative historical study is Lüthy, "Thoughts and Circumstances." See also Ariew, "Descartes, Basso, and Toletus" and *Last Scholastics* pp. 133-34; Gregory, "Sébastien Basson." Ariew and Grene, "Cartesian Destiny," suggest Basso as an influence on Descartes in this domain.

Charleton, *Physiologia* II.1.1.9 (p. 88): "nor is there any sober man who does not understand the common material of things to be constantly the same, through the whole flux of time, or the duration of the world, so as that from the creation therefore by the *fiat* of God, no one particle of it can perish, or vanish into nothing, until the total dissolution of nature, by the same metaphysical power, nor any one particle of new matter be superadded thereto, without miracle." That this amounts only to weak permanence is clear in the detailed discussion at IV.1.1, which begins: "That nature or the common harmony of the world is continued by changes or the vicissitudes of individuals – i.e. the *production* of some and the *destruction* of other things, determined to this or that particular species … are positions to which all men most readily prostrate their assent."

Boyle, *Origin of Forms and Qualities* V:328 (Stewart pp. 44-45): "These things premised, it will not now be difficult to comprise in few words such a doctrine, touching the *generation, corruption*, and *alteration* of bodies, as is suitable to our hypothesis, and the former discourse. For if in a parcel of matter there happen to be produced (it imports not much how) a concurrence of all those accidents, (whether those only, or more) that men by tacit agreement have thought *necessary* and *sufficient* to constitute any one determinate species of things corporeal, then we say that a body belonging to that species, as suppose a stone or a metal, is *generated*, or produced *de novo*. Not that there is really any thing of substantial produced, but that those parts of matter that did indeed before preexist, but were either scattered and shared among other bodies, or at least otherwise disposed of, are now brought together, and disposed of after the manner requisite to entitle the body that results from them to a new denomination, and make it appertain to such a determinate species of natural bodies, so that no new substance is in generation produced, but only that which was preexistent obtains a new modification or manner of existence." In "Form, Substance, and Mechanism," pp. 63-64, I wrongly credited Boyle with the view I am now calling strict permanence.

Locke, *Essay* II.26.2: "First, when the thing is made new, so that no part thereof did ever exist before, as when a new particle of matter does begin to exist *in rerum natura*, which had before no being, and this we call *creation*. Secondly, when a thing is made up of particles which did all them before exist, but that very thing, so constituted of pre-existing particles, which considered altogether make up such a collection of simple ideas, had not any existence before, as this man, this egg, rose, or cherry, etc. And this, when referred to a substance produced in the ordinary course of nature, by an internal principle … we call *generation*." This passage occurs almost verbatim in the B Draft of 1671 (§134).

[2] The no-new-part formulation of weak permenance also appears in the Boates, where it is clearly not intended to preclude generation and corruption: "Ad quod nos respondemus, nullam (ordinaria via, creatione seposita) dari substantialem mutationem seu generationem, ita accipiendo hanc vocem quomodo ipsi accipiunt, ut nimirum substantialis mutatio seu generatio sit illa qua ipsius substantiae quae generatur aliqua pars substantialis de novo fit cum non existeret prius. In quo sane nulla est absurditas neque afferri quicquam potest cur ad substantiae generationem magis necessarium sit ut aliqua ipsius pars quam ut tota ex nihilo fiat" (*Philosophia naturalis reformata* 1.3.12).

I find it quite difficult to explain how the no-new-substance formulation of weak permanence could have become so entrenched, even axiomatic. The formulation appears in Jan Baptiste van Helmont, *Oriatrike* p. 67: "Whence I collect it into a new position for the schools: that no substance is to be annihilated by the force of nature or art. It has always seemed an absurd thing to me that a matter imperfect in itself, barren and impure, should after its creation be thenceforth eternal, and that forms that are to be annihilated by death should be true substances" (see Debus, *Chemical Philosophy* II:329). Although Helmont's counts as an early statement of this principle, his works were published in Latin only posthumously, in 1648, and translated into English in 1662. Some other relevant early texts are quoted in the notes to the following section.

Leibniz endorses the no-new-substance principle but offers quite a strained pedigree for it, finding it in a pseudo-Hippocratic work and, quite absurdly, in Albert the Great, who surely thought no such thing: "j'accorde encor que toute forme substantielle ou bein toute substance est indestructible et même ingenerable, ce qui êtoit aussi le sentiment d'Albert le Grand et parmi les anciens celui de l'auteur du livre *De diaeta* qu'on attribue à Hippocrate. Elle no sçauroient donc naître que par une création" (to Arnauld, 1686 [*Schriften* II:75; *Essays* p. 78]).

Descartes repeats the no-new-substance formulation in the Second Replies: "Nec quidem etiam habemus ullum argumentum vel exemplum quod persuadeat aliquam substantiam posse interire" (VII:153).

It is very important to understand the meaning of this principle in Descartes, because otherwise it is hard to resist reading him as a material monist, committed to there being just one *res extensa.* (For recent statements, see Sowaal, "Cartesian Bodies" and Lennon, "The Eleatic Descartes.") The idea is absurd on its face, given the many passages in which Descartes commits himself to ordinary, finite bodies as substances, along with the complete absence of any texts in which he so much as suggests monism (see, e.g., the criticisms of Slowik, "Individual Corporeal Substance" and Kaufman, <xxx>). Still, if Descartes embraces strict permanence, and rejects atomism, then monism can easily seem to

be the only remaining option. But once one sees that the no-new-substance formula is a commonplace among contemporaries who clearly do not embrace strict permanence, monism becomes completely unmotivated as a reading of Descartes. One can thereby also avoid the embarrassment that faces the monist with respect to what finite bodies are. They could not be modes, despite what Gueroult rather glibly asserts (*Descartes' Philosophy* I: 65-74), because we *know* what the modes of extension are – size, shape, motion, position, duration, number, etc. (*Principles* I.69) – and we know that a dog, say, is nothing like that. Perhaps a finite body could be a cluster of modes, but there seems no reason to think Descartes would say so. What finite bodies seem to be, quite plainly, on the monist scheme, are integral parts of material substance. But that is an embarrassing result for the monist, because it seems clear that Descartes is an actualist about parts (see §26.1), and that he certainly does not hold the sort of simple potential parts view, defended by Digby (§26.4), which the monist would seemingly have to ascribe to him.

For Gassendi on substantial change see also the protracted discussion in *Animadversiones* I:389-407.

28.4. Strict Permanence: Gorlaeus and Hobbes

The strict permanence thesis – that nothing naturally begins or ceases to exist – can be found hinted at in various early anti-scholastic treatises. One sees something like it in Giordano Bruno, who cites Ecclesiastes, and in Nicholas Hill, and even in Galileo. It seems to have been given its first sustained post-scholastic defense by David Gorlaeus, whose stunningly bold *Exercitationes philosophicae* (ca. 1611; publ. 1620) rejects hylomorphism entirely, and replaces it with an atomism that insists on strict permanence. According to Gorlaeus, whatever is real is indivisible, and so the only things that exist in the material realm are atoms. Human beings are not soul–body composites, but souls alone, and the body is not part of us. Aggregates are entities only because we conceive of them as such. Accordingly, generation and corruption must be rejected:

> I completely deny that any body is made, except by creation alone, when God created this world. I deny that anything has gone out of existence, or can go out of existence, unless it is brought to nothing by that same God. I deny that any body has been changed into another, or that it can be changed. (exerc. 14, p. 256)

Accordingly, in a weird but apposite inversion of the conventional wisdom, Gorlaeus denies not that things are made *ex nihilo*, but that they made *ex aliquo*: nothing, he insists, is ever made from something. Conceding that this will look ridiculous to many, he mischievously remarks nevertheless that "since we are inverting everything, we should invert this too" (exerc. 15, p. 278). Remarks such as these are the only reminders that this brilliant, precocious work was written by a twenty year old.[1]

These same ideas appear in Hobbes, who was born three years before Gorlaeus but had the good fortune of living sixty-seven years longer. We have seen intimations of Hobbes's view several times already, in his defense of the conservation of body (§2.5) and in his anti-essentialism (§27.5). In both cases, he pushes these doctrines all the way to a rejection of generation and corruption. Thus, in his *De mundo* (1642), he goes from insisting that matter cannot be corrupted to insisting in general that *ens* – being – cannot be corrupted:

> If the question is whether numerically the same being (*ens*) can come back into existence, it is clear that it cannot. For in order for something that exists to come back – that is, to exist again – it must be supposed that the preceding thing has gone out of existence. But a being cannot naturally go out of existence. For even if a ship or a plank ceases to be a ship and a plank, it nonetheless never naturally ceases to be a being. For a being, unless it is annihilated, does not cease to be a being. But to annihilate is a supernatural task, for God. (12.5)

Similarly, his *De corpore* refuses to allow that generation and corruption is anything more than the coming and going of accidents:

> When we say that an animal, a tree, or any other named body is generated or destroyed, even though these are bodies, it should not be thought that a body has been made from non-body, or non-body from body, but a non-animal from an animal, a non-tree from a tree, and so forth. That is, those accidents on account of which we name one thing an animal, another a tree, and another something else are generated and destroyed, and consequently those names that applied to them before no longer apply. (8.20)

So why do we say that now there is a tree, and now there is not? Not because anything new has come into existence, but only because there is now an accident that there was not before, which leads us to stop using "those names that applied to them before" (line 5). Out of context, one might at least suppose that Hobbes allows the generation and corruption of accidents (lines 3-4). But Hobbes has no place in his ontology for any such entities (see §7.1, §10.1). All he recognizes are bodies and motions: thus "bodies are things, and not generated; accidents are generated, and not things" (ibid.). Hence Hobbes can conclude in general, as in the first of the above passages, that beings never naturally go out of existence. (As in Autrecourt, a tacit qualification to Hobbes's

permanence thesis has to be understood in the case of motion. Without that, strict permanence turns into the complete denial of change.) Perhaps the most express statement of his view comes again in the *De mundo*, where Hobbes offers a general theory of change. All change, he argues, consists in the motion of a thing's parts, which we detect through changes introduced in our perceptual faculties. As for the difference between accidental and substantial change, he remarks that "when a thing is changed so extensively that it deserves a new name on account of its new appearance, then we say that the thing that produced the earlier appearance has been corrupted, and that another thing, exhibiting a new appearance, has been generated" (7.1). In actual fact, "things themselves do not perish through change, but only their images and looks" (7.2) – a remark that leads Hobbes into a long discussion of how we are to think about the permanent prime matter that underlies change. His conclusion, of course, is that prime matter is simply body (see §2.5).

There is no need to say much more about what the strict permanence thesis is, since the view is straightforward enough. The more interesting questions are why anyone would maintain such a seemingly implausible view, and whether views of this form can make themselves less implausible by offering an account of what apparent generation and corruption actually consists in. The remainder of this chapter will consider the first question, reserving the second question for the following chapter.

[1] Bruno, *De la causa* dial. 2, p. 53 (tr. p. 46): "non gli corpi ne l'anima deve temer la morte, perche tanto la materia quanto la forma sono principii constantissimi…." He goes on to quote Ecclesiastes 1:9-10: "What is it that has been? The same thing that shall be. What is it that has been done? The same that shall be done. Nothing under the sun is new." Granada, citing *De la causa*, describes Bruno as a defender of "a rigorous ontological monism" according to which the universe is a "unique substance" and individual beings are accidents. ("New Visions" p. 281).

Nicholas Hill, *Philosophia epicurea* n. 117: "Entis quatenus entis non est aut causa aut ratio; omnes vero quas tuemur generationes sunt degenerationes, primorumque principiorum ab incausato et inderivato statu lapsus et deflectiones."

Galileo: "Di più, io non son mai restato ben capace di questa trasmutazione sustanziale (restando sempre dentro a i puri termini naturali), per la quale una materia venga talmente trasformata, che si deva per necessità dire, quella essersi del tutto destrutta, sì che nulla del suo primo essere vi rimanga e ch'un altro corpo, diversissimo da quella, se ne sia prodotto; ed il rappresentarmisi un corpo sotto un aspetto e di lì a poco sotto un altro differente assai, non ho per impossibile che possa seguire per una semplice trasposizione di parti, senza corrompere o generar nulla di nuovo, perché di simili metamorfosi ne vediamo noi tutto il giorno" (*Dialogo dei massimi sistemi*, first day [*Opere* p. 394; tr. p. 45]).

Gorlaeus: "per compositionem non fit aliquod ens, nec per dissolutionem perit" (exerc. 12, p. 230); "quodcumque est reale aliquid, id ipsum est indivisibile" (exerc. 13, p. 235); "asserimus animam et corpus esse duo entia, quae unum

sunt per aggregationem" (exerc. 12, p. 230); "confici puto, corpus essentiae partem non esse. Essentia enim eadem numero resurrectura est, corpus idem numero resurgere non potest" (exerc. 12, p. 234); "non nego horum entium per aggregationem materiam dici entia, ex quibus aggregatae sunt, sed illa materia non est physica, quam commenti sunt Peripatetici, sed quae in logicis materia dicitur consideratione nostra" (exerc. 14, p. 266); "vulgo dici solet, nihil fieri ex nihilo. At nos, nihil fieri ex aliquo, sed quae fiunt, ex nihilo fieri; ut ita si ex hac re debeat fieri illa res, prius haec res in nihilum redigenda sit, quam illa res inde fieri possit" (exerc. 15, p. 278). See also Gorlaeus's *Idea physicae*, for the same ideas more briefly: "homo non est compositum per materiam et formam per se unum, quia ipsum corpus non est de essentia eius, sed anima tantum" (II.9); "omnis substantia quae facta est immediate a Deo producta est… Quaecumque ergo substantia fit, a Deo fit; quae perit, a Deo in nihilum redigitur; quaecumque etiam fit ex nihilo fit" (III.4); "nos enim putamus nullum ens esse compositum; sed quicquid est simplex est" (IV.7).

Good discussions of Gorlaeus can be found in Lüthy, "David Gorlaeus' Atomism"; Gregory, "David Van Goorle"; Meinel, "Early Seventeenth-Century Atomism."

28.5. The Part–Whole Identity Thesis

The two conservation theses considered in this chapter – weak and strict permanence – are part of a family of views loosely associated with one other during the seventeenth century. This family includes corpuscularianism (§1.2), the substratum thesis (§2.2), atomism (§3.2, §4.2, §4.4), the rejection of the substance–accident distinction (§7.1), actualism regarding parts (§26.1), and anti-essentialism (§27.?). None of these views, however, whether severally or jointly, entails strict permanence. It could be thought that at least anti-essentialism would yield some version of the permanence doctrine, on the grounds that if a thing has no essential properties then there can be no fact of the matter about whether it starts or stops existing. This, however, is not so. One might, for instance, think that even if none of a thing's properties is essential, still there are various combinations of properties, in various circumstances, the loss of which entails the thing's corruption. Corpuscularianism too does not entail permanence, and again not even the weak version. One might think that all there are in the material realm are bodies variously arranged, and yet accept that the parts of a composite substance – all the way down – are individuated by that substance, with the result that when a body is corrupted it is corrupted all the way down. In principle even an atomist might think this, since physical indivisibility does not entail metaphysical endurance (see §4.4).

Weak permanence *is* entailed – or at least nearly so – by the substratum thesis combined with corpuscularianism. For if something has to endure through all change, and if the only thing one lets into one's physical ontology is bodies, then it will have to be some bodies that endure through all physical change. This is not yet weak permanence: it shows only that for every physical change there is one or another persisting body, rather than the stronger conclusion that at some sufficiently minute level *all* bodies endure through change. Reflection on the motivation for the substratum thesis, however, shows why that stronger conclusion might seem justified. For, as we saw in Chapter 2, the substratum thesis depends on the intuition that nature does not make things without ingredients, and that those ingredients must exist prior to the making and after the making, as a constituent part of the new substance. Ultimately, this is what the *ex nihilo* principle amounts to: that nothing naturally comes about except out of some sort of prior ingredients. For scholastic authors, there were as many ways to understand this requirement as there were theories of prime matter. Something like this intuition is still at work in Newtonian physics, with its doctrine of the conservation of mass, and remains in place in modern physics, which insists on the conservation of energy. The only way for a strict corpuscularian to honor this thesis, however, is by postulating the conservation of bodies. Without anything like matter, form, mass, or energy to endure through change, corpuscularians must invoke enduring bodies as their ingredients. In order for those ingredients to be sufficient, it seems natural to think that, at some level of composition, *all* the bodies must endure.

This line of thought, even if it yields weak permanence, will not yield strict permanence. For one might suppose that although the stuff of the universe endures through all change, still that stuff can make new things, when organized in one way or another. This is what scholastic authors thought (their stuff being prime matter), it is what Basso and Gassendi thought (their stuff being atoms), and it was what commonsensical modern physicists think (their stuff being energy). The

proponent of strict permanence therefore needs some further premise. What that further premise is in Hobbes's case is not entirely all clear. But Gorlaeus is quite clear about what motivates his account: it is the doctrine that the whole is nothing over and above its parts:

> We willingly grant that composites are to be posited. But we do not recognize some one being that should be called the composite. On the contrary, it is the many entities – namely, the composite parts – that we call the composite, because *they* are composed. We hold that each and every part both has its own essence before composition, and retains that essence afterwards. Neither is a being made that is numerically one, nor is one being made from these parts. On the contrary, they are united and mixed so as to make one continuum, which is one being by aggregation, not by essence. (*Exercitationes* 12, pp. 224-25)

This is in effect a statement of the strict permanence thesis, couched in terms of a refusal to postulate any further entity beyond the composed parts. The general rule, which he states over and over in various ways, is that "no composite is other than its parts" (*Idea physicae* VIII.1).

The part–whole identity thesis has a long history. Sextus Empiricus asserts it, as do many Aristotelian commentators and the twelfth-century Nominales. Among scholastic authors, the subject was debated extensively but inconclusively. To affirm the thesis is of course not to fall into corpuscularianism, since for an Aristotelian it will be metaphysical parts, just as much as integral parts, that make up the whole. The whole-part identity thesis also does not entail any version of permanence, since one might well think – as Aristotelians do – that parts come into and go out of existence when substances are generated and corrupted. But if one couples the part–whole identity thesis with weak permanence, one then arrives immediately at the doctrine of strict permanence. For if all the parts (at any one level of composition) are permanent, and if those parts are identical with any whole they compose, then – by the indiscernibility of identicals – any such whole must likewise be permanent. Hence authors who embrace weak but not strict permanence must deny the part–whole identity thesis. In §3 we saw that Basso and Gassendi quite clearly do just this. Thus Basso restricts the *ex nihilo* principle so as to allow something new to arise from its parts: "nothing is made

that did not preexist with respect to its parts" (as above), and Gassendi allows that preexistent parts can come together in such a way that "a composite emerges that has true subsistence" (Gassendi).

We are now in a position to see, then, just what drives corpuscularians toward strict permanence. If they accept the substratum thesis, as they all do, then it is difficult to resist weak permanence. To go from there to strict permanence, all that is needed is the part–whole identity doctrine. And although by no means everyone accepted that doctrine, it is an extremely attractive view. We can see as much by looking at the quite sophisticated scholastic disputes over this subject. Although the more ontologically profligate scholastic authors – in particular Scotus and his followers, as well as some Thomists – argued that the whole is something over and above its parts, the part–whole identity thesis was a widely accepted view. Unsurprisingly, given his parsimonious inclinations, Ockham was among its defenders. He offers in its favor a regress argument that would be very influential on later discussions. Let the parts be *a* and *b*, and the whole be *c*. Now suppose that *c* is not identical to *a* and *b*. In that case we can ask about the whole *a*, *b*, *c*. If that whole is something further, *d*, then we are clearly off on an unacceptable infinite regress. If, however, we can deny the existence of *d*, then we should by the same reason be able to deny the existence of *c*. Hence Ockham concludes that a composite substance is nothing beyond form and matter. One finds versions of this same argument in later authors stretching from Buridan to Franciscus Toletus.

Buridan contributes another argument to this debate that would prove influential. Suppose a one-pound weight is divided into two half-pound weights. The whole, which weighed one pound, no longer exists. How can it be, then, that the two parts exert the same influence on the scale that they did as a whole? Only, Buridan suggests, if the whole just was those parts.[1]

It is by no means obvious how either of these arguments is to be answered by those who would deny the part–whole identity thesis. And if that identity thesis was attractive to scholastic authors – even to a conservative Jesuit like Toletus – then it is no wonder that the corpuscularians

would find it attractive. After all, the core motive for the view is parsimony: that there is just no need for the metaphysical extravagance of postulating some further entity – a whole – above and beyond the parts. One would expect to find post-scholastic authors lining up behind this position in droves. In a way, then, the surprise is not that authors like Gorlaeus and Hobbes embrace strict persistence, but that so many others do not. It is a testimony to their felt need to retain at least some measure of a commonsense ontology that authors like Basso and Gassendi refuse to follow the logic of their position all the way to the sort of austere version of strict permanence that would deny the generation and corruption of living things and other substances. The price of doing so is to relinquish yet again some of the austerity of the pure corpuscularian framework that post-scholastic authors have as their ideal. Beyond positing simply particles in motion, these authors have to countenance the obscure idea of a whole that is somehow constituted from its parts, but without being identical to those parts.

There is, however, more than just commonsense that drives some post-scholastic authors to reject the part–whole identity thesis. Some seventeenth-century authors *cannot* coherently maintain part–whole identity, because it would leave them unable to account for the existence of *anything* in the material realm. Descartes is the clearest example. Because he rejects atomism (see §3.2 and §4.?) and insists on the actuality of all the integral parts of any body (see §26.1), he has no stable ground on which to place part–whole identity. With respect to any given body he might wish to include among the things that really exists, he has to concede that it is composed of parts. So if he were to accept the identity thesis, he would have to say that those parts are what really exist. But each of those parts is itself composed of parts. Hence if confronted with the question of what really exists in the material realm, Descartes would have to go chasing reality ever further downward, infinitely far, never arriving at the things that really exist. This is an untenable position, because the part–whole identity thesis is, at least implicitly, reductive in the direction of the parts, maintaining not just that

the whole equals its parts, but that the whole must be understood in terms of its parts, inasmuch as the parts are the things that really exist. So if bodies are divisible infinitely far downward, then – given part–whole identity, along with corpuscularianism – there would be nothing in the material realm that really exists.

What Descartes lacks, in short, are material simples. Scholastic authors have their simples in the metaphysical parts of form and matter. (The simplicity of matter is, to be sure, a contentious question [see Ch. 5], but substantial forms at any rate are simples, and can serve to carve out a portion of prime matter.) Gorlaeus and other proponents of strict permanence have their atoms, and they need those atoms for their system to work at all. Without atoms, Gorlaeus could no longer maintain his anti-realism about composites, as capsulated in the phrase that "whatever exists is simple" (*Idea physicae* IV.7). For Descartes – and for others, like Boyle, who refuse to embrace atomism – the part–whole identity thesis can hold no appeal, which means in effect that the strict permanence thesis can hold no appeal. Since Descartes has no privileged level of material reality, he finds it natural to be quite ecumenical about what counts as a material substance. The human body counts, as does the mind–body composite (see §25.?). Stones count, as does a piece of gold, as do bread and clothing.

Descartes has no choice but to embrace this sort of relaxed metaphysics of substance, given two theoretical choices that he makes. The first is his refusal to recognize atoms as metaphysically basic entities, which, as just explained, forecloses the strict permanence doctrine. (Here then is a rare instance where the question of atomism has broad theoretical implications [compare §4.4].) The second is his insistence that the essence of a body is simply extension (see §27.?). Given this unorthodox conception of essence, Descartes has to treat every material substance as intrinsically just alike. Shorn of its modes, the thin or (in his words) "pure" substance (see §8.?) is just extended stuff. This forecloses the sort of restricted ontology of substance that one finds in the scholastics or

in post-scholastic authors like Gassendi. Authors like these who retain a robust theory of essences (see §27.?) can distinguish between those clusters of matter that count as substances, with the attendant unity and persistence conditions, and those that are mere clusters. It would be possible in principle – as suggested at the start of this section – to articulate a restricted ontology of substance without a theory of essences. After all, Descartes certainly thinks that minds are sharply divided into distinct substances, even if the essence of every mind is simply *thought*. Descartes's readers – from the very earliest Cartesians up to today – have speculated at great length about how this story is supposed to go in the case of body. Readers have *had* to speculate, because Descartes does not tell us. The reason he does not tell us, it seems to me, is that he took his theory to entail a thoroughly unrestricted conception of what counts as a substance. Any portion of matter counts, and if that matter is joined with a mind, then that mind–body aggregate counts too. Descartes does insist that the stuff be joined together somehow, because *unity* is part of the core meaning of 'substance.' But without atoms, and without any essence beyond mere extension, he sees no basis for restricting substancehood in any further way.

The unsatisfactory character of Descartes's position is easy to see. Consider, for instance, how much of two regions of matter need to be joined, in order to count as a substance, and how firmly, and for how long. Either Descartes has no answer to such questions – and so does not really have a theory at all – or he must suppose that any connection, however brief and tenuous, establishes substantial unity. If that is the view, then we should perhaps conclude that Descartes in effect has demolished the very last of the surviving Aristotelian categories, Substance. For lovers of commonsense ontology, this has to be chalked up as yet another cost of abandoning scholastic metaphysics. But Descartes is not the end of that story, of course, and in the following chapter we will consider some seventeenth-century attempts to preserve at least some vestige of commonsense, in the face of puzzles regarding change over time.

[1] For Sextus Empiricus's defense of the part–whole identity thesis, see Barnes, "Bits and Pieces" pp. 277-94. For the Nominales, see Normore, "Abelard and the School of the Nominales" and "Tradition of Medieval Nominalism." For Peter Abaelard in particular, see Arlig, "Medieval Mereology."

The Coimbrans cite Themistius, Philoponus, Simplicius, Alexander, and Eudemus as likewise favoring identity, along with Durand of St. Pourçain, Giles of Rome, Gregory of Rimini and "caeteri e schola Nominalium" (*In Phys.* I.2.1.2). Oresme (*In Phys*. I.7) should be included on this list, as should Albert of Saxony (*In Phys*. I.7) and pseudo-Marsilius of Inghen (*In Phys*. I.9). Boethius is a forerunner of the view (*In Topica Ciceronis commentaria* I; *Patr. Lat.* 64:1056; tr. Stump p. 39), as is Averroes (*In Phys*. I.17). Indeed, Aristotle seems to endorse the view quite clearly when he remarks that "there is no whole over and above the parts" (*Phys*. IV.3, 210a17).

The Coimbrans themselves find both sides plausible, but favor the side that denies unity, which they associate with, among others, Avicenna, Scotus and his followers, various Thomists, and Walter Burley (Coimbrans, *In Phys*. I.2.1.1). Burley does indeed insist that the whole is distinct from its parts, relying on the indiscernibility of identicals (*In Phys*. I, f. 16ra-vb). For Scotus, see *Quaest. Meta.* VIII.4 and *Ordinatio* III.2.2 n. 7 <get new ed.>, which offers a series of characteristically powerful arguments.

As we will see in §29.5, Hobbes too accepts the part–whole identity thesis. So it seems likely that his motivations for accepting strict permanence are like those of Gorlaeus, although Hobbes hardly makes this very clear.

Proponents of the part–whole identity thesis always insist on the proviso that the parts must be unified, in order for them to be identical to the whole. Thus Ockham, e.g., holds that "totum non est aliud a partibus simul iunctis et unitis" (*Summula* I.19; VI:205). That of course leads to question about what this further "unity" amounts to. For scholastic authors, this problem will overlap with the problem of inherence (see Ch. 11). Gorlaeus – since he allows modes into his ontology – is able to describe the unity of the composite parts as "tantum modum essendi" (*Exerc.* 12, pp. 226-27), an application of the theory of modes that can be found as well in Suárez (*Disp. meta.* 7.1.18). For Burley, this is the critical weakness of the part–whole identity thesis, and indeed he contends that what distinguishes the whole from its parts is precisely its unity (*In Phys*. I, f. 16va).

Ockham sets out his regress argument as follows: "si sint ibi duae formae, aut faciunt per se unum cum materia, aut non. Si sic, aut igitur est alia entitas praeter illas tres aut nulla. Si alia, quaero de ista sicut prius, et sic erit processus in infinitum. Si nulla, igitur illae tres partes faciunt per se unum sine quarta entitate, et eadem ratione duae poterunt facere per se unum sine tertia entitate" *Summula* I.19 (VI:206). For other versions see Buridan, *In Phys*. I.9; Albert of Saxony, *In Phys*. I.7; pseudo-Marsilius of Inghen, *In Phys*. I.9; and Franciscus Toletus, *In Phys*. I.8.

Buridan's weight argument: "Item sequitur quod duae semilibrae totidem traherent stateram remota ab eis una libra quantum traherent cum illa libra – quod est falsum, quia tunc illa libra nihil traherent. Consequentia patet per te quia si libra divideretur in duas medietates istae duae medietates tantumdem trahunt quantum trahebant cum libra quae erat totum ipsarum et tamen ablata est illa libra cum non remaneant nisi partes quae nec sunt nec fuerunt illa libra" (*In Phys*. I.9, f. 12va). The argument is repeated by Albert of Saxony, *In Phys*. I.7, and pseudo-Marsilius of Inghen, *In Phys*. I.9.

[2] My thinking about Descartes's conception of substance has been much influenced by my colleague Dan Kaufman, without whom I would certainly understand Descartes much less well. His forthcoming "Cartesian Substances" documents in detail Descartes's commitment to what he calls a "commonsense pluralist view."

For examples of Descartes's commitment to ordinary bodies as substances, see, e.g. Fourth Replies, VII:222 (the hand, the whole body, the mind–body composite); Third Meditation, VII:44 (a stone); to Clerselier, IV:372 (bread and gold); Sixth Replies, VII:441 (clothing).