

Leibniz's exchange of views with Bayle

G. W. Leibniz and Pierre Bayle

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[Brackets] enclose editorial explanations. Small ·dots· enclose material that has been added, but can be read as though it were part of the original text. Occasional •bullets, and also indenting of passages that are not quotations, are meant as aids to grasping the structure of a sentence or a thought. Every four-point ellipsis indicates the omission of a brief passage that seems to present more difficulty than it is worth. Longer omissions are reported between brackets in normal-sized type.

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Glossary

animal: This always translates ‘animal’, with the understanding that humans are animals. See **beast**.

animate: As used on page 17, the word means not merely ‘alive’ but ‘having a soul’.

appetite: In Leibniz’s usage, a soul’s *appetit* is its tendency to change from one state into another; a *désir* is an instance of appetite of which the soul in question is aware.

beast: This translates *bête* and it means ‘non-human animal’ or ‘animal lower in the scale than humans’. See **animal**.

deus ex machina: Literally ‘a god out of the machine’; referring to a god that is (in a certain kind of drama) trundled on-stage by the back-stage machinery; metaphorically meaning ‘an arbitrary and ungrounded “fix” for a defective theory’. When this expression is used on page 6 the ‘fix’ is indeed something that involves God, but that is not essential.

extraordinarily: As used on page 6 and elsewhere, this means not merely ‘unusual’ but ‘outside the God-ordained order of things’, i.e. ‘miraculous’.

entelechy: Leibniz often refers to his monads or simple substances as ‘entelechies’, especially in contexts where he wants to emphasize the idea of monads as *active* [see for example page 28].

faculty: This means, roughly, ‘ability’. But Bayle [see page 17] and Leibniz [see page 14] both tend to think of x’s ‘faculty’ for doing A as a *basic* ability to do A, one that closes off any enquiry into how or through what mechanism x can do A.

mind: This translates *esprit*, which can also mean ‘spirit’. Various contexts show that Leibniz here thinks of minds as a species of souls, namely the species that engage in reasoning. Bayle seems rather to equate *esprit* and *âme* (= soul).

mental state: This translates *sentiment* in occurrences where it doesn’t obviously mean ‘belief’ or ‘opinion’ or ‘feeling’.

pièce: Leibniz uses this word in its sense of ‘component (in an organised whole)’; thus the *pièces* of a clock include wheels and cogs, but not the microscopically small portions of metal of which they are composed. On page 23 Leibniz is metaphorically likening a music book to a machine.

point of view: This is the only possible translation of Leibniz’s *point de vue*, but the phrase has misled many English translators. Leibniz hardly ever, anywhere, speaks of a substance’s perceiving the world *from* its point of view; nearly always he says *according to* (*selon* or *suivant*) its point of view. He thinks of a substance’s point of view not as a location, or as something with a location, but rather as some kind logical construct out of all the perceptions that the substance has. See page 4 where he writes that the impressions things make on a substance’s organic body ‘constitute its point of view’.

school: By ‘the Schools’ Leibniz meant something like ‘the philosophy departments that are pretty entirely under Aristotle’s influence; and by ‘the School’ he meant the totality of such departments.

simple: As applied to souls etc., ‘simple’ means ‘having no parts’.

source of energy: This translates *principe* when that is used in what was in early modern times its most common meaning, namely as ‘source’ or ‘cause’.

spontaneous: In the present work this means ‘not caused from the outside’, and that is *all* it means.

Note H to Bayle's article 'Rorarius' (1697) and Leibniz's private comments on it

[Jerome Rorarius (1485–1566) wrote a book arguing that animals use reason better than man does; it was published in 1654; and Pierre Bayle discussed it in his great *Dictionnaire historique et critique* (1697), which was not a dictionary (in our sense) but an encyclopedia. The opening part of that discussion drew Leibniz's attention, and he wrote three comments on it, two on the main text and one on Note E. These comments are presented here intercalated with the Bayle passages that they are addressed to. Bayle then mentions Leibniz by name, calling him 'a great mind in Germany' (in the second edition he upped this to 'one of the greatest minds in Europe'), who has understood these problems and has provided some insights that are worth developing'. He then points to his Note H, which is purely about Leibniz. Leibniz privately commented on this also, and those comments are again interleaved with the corresponding passages from Bayle.]

Bayle:

Rorarius's book. . . presents many remarkable facts about the doings of animals. . . . They pose a challenge both to

- the Cartesian, who deny that beasts have souls, and
- the Aristotelians, who hold that beasts have a soul which is capable of mental states, memories, and passions, but not reason.

It's a shame that Descartes's view about this is so hard to maintain and so implausible, because its truth—if it were true—would be a great help to the true faith. . . . It doesn't generate the common opinion's dangerous consequences.

Leibniz:

That is, the opinion that the souls of beasts are capable of mental states and yet are mortal. Bayle sees this as 'dangerous' because he takes it to imply that if the soul

of a beast is capable of mental states then it necessarily follows that either •it is immaterial or •matter is capable of mental states. In fact, if it is immaterial then it must also be immortal, because the only alternative to this is to suppose that an immaterial substance can perish [*perir* = go out of existence]. But if we allow that matter has mental states or that an immaterial thing can perish, either way we'll wreck the natural proof of the immortality of our souls. My own view is that the soul of a beast does have mental states but also that it is immaterial and, indeed, can't perish naturally.

Bayle:

For a long time people held that the souls of beasts were capable of reasoning. The philosophers of the School [see Glossary] went thoroughly wrong when they denied this, thinking that their denial would keep them out of intellectual trouble. These gentlemen are well supplied with distinctions and exceptions, and with the *nerve* to lay it down that the souls of beasts won't overstep certain limits that they, the scholastics, have prescribed for them. But all that emerges from their confused and impenetrable verbiage is that there are two species of souls, and that beasts have one while humans have the other. And it doesn't seem likely that they'll ever come up with a better explanation than the one they have been giving up to now. . . .

Leibniz:

I have spent much time working on providing what Bayle asks for here, and some able people think that I have succeeded. I'll try to explain through a comparison. In the medical profession there are three kinds of practitioner:

- (1) **Empirics** don't go in for the pursuit of reasons or causes. All they want is empirical facts that will enable them to say 'This was helpful (or harmful), so it might be so again in the next case of this sort'.
- (2) **Simple-method physicians** attend only to empirical facts which they think they have traced back to reasons or causes.
- (3) **Reasonable physicians** who have tried to perfect—round off, complete—experience by combining it with the search for causes.

[In case that isn't clear: Leibniz is saying that (2) think that the truth about causes is somehow contained in the set of empirical facts, while (3) think that it is something extra.] I have shown that •we can explain all the behaviour of beasts by supposing them to be merely (1) empirics, and that •the thought-sequences that they go through •don't have to be instances of *reasoning*, because they •can be explained purely in terms of *memory*: remembering that experiences •similar to this one have previously been followed by F events, the animal expects this one to be followed by an F event also. Men also very often conduct such •similarity-inferences and find them to be successful; but because they aren't necessary they very often fail, in cases where there is a •superficial• similarity but no •underlying• sameness of cause. So it's an advantage for a man to be not merely •an empiric who is equipped with memory that he can use in making inductions but also •a reasoner who can construct strictly rigorous logical arguments and can know necessary truths. . . . That's what makes me capable of demonstrative sciences, and there's not a sliver of evidence that beasts are capable of those. All that beasts are capable of—or men when they behave like empirics—are universal generalisations based on inductions from experience, and those are never perfectly sure because the *reason* for the generalisation isn't known.

•NOW A BIT FROM NOTE E•

Bayle:

One is overcome with horror when one thinks about the consequences of this doctrine:

The soul of a man doesn't differ substantially from the soul of a beast; they belong to the same species; the human soul acquires more insights than the other, but those are only contingent advantages that depend on the way humans have set things up in the world.

This doctrine is an unavoidable consequence of what the scholastics teach about the knowledge of beasts. It implies that (a) if beasts' souls are material or mortal, then so are human souls; and that (b) if the human soul is an immaterial and immortal substance then so are the souls of beasts. Either way, the upshot is horrible. (a) If we avoid crediting the souls of beasts with immortality by supposing that the human soul dies when its body dies, that overturns the doctrine of the after-life and undermines the foundation of religion; and (b) if we retain for ourselves the privilege of immortality by granting it also to the beasts, what chasms will we find ourselves in? what will we do with so many immortal souls? will they also have a paradise and a hell? will they pass from one body to another? will they be annihilated when the beasts die? will God continually create an infinity of minds only to sink them back into nothingness soon thereafter? how many insects are there that live for only a few days? Don't think that •for the truth of the hypothesis I am criticising• all that's needed is the creation of souls for the beasts that we have encountered; there are ever so many more that we haven't encountered. The microscope shows us thousands of them in a drop of liquid, and many more would show up if we had better microscopes. And don't think •you can get the number down by supposing• that insects are mere machines •and so don't have souls•. The 'machine'

diagnosis fits the behaviour of dogs better than the behaviour of ants and bees. There may be more mind and more reason in microscopically small animals than in bigger ones.

Leibniz:

These alleged double horrors shouldn't scare us. I have three points to make about them. (1) I have shown that there is an *essential difference* between beasts' souls and *minds* [see Glossary], which are the kind of soul that engages in reasoning. [Leibniz now repeats, briefly, what his preceding note said about different ways of reaching conclusions.] (2) Granted: all souls are immaterial and indestructible, those of beasts as well as those of men. But that's not to grant that a beast's soul qualifies for the label 'mind'. It has mental states but it doesn't have understanding, which involves knowledge of reasons; and that means that it doesn't have liberty. Also, the indestructibility of a beast's soul is very different from the immortality of a reasoning soul. Every soul retains its substance, but only minds retain their personal identity—i.e. their knowledge of the *I* through which I know myself as the same person, which is what makes me susceptible to reward or punishment. [The shift from 'they' to 'I' in mid-sentence is Leibniz's.] (3) I agree that there would be bad effects from the conclusion that *our souls are not* immaterial and indestructible, but I don't see anything 'horrible' in the view that *all souls are* immaterial and indestructible. The view that souls are simple [see Glossary] substances, and thus the genuine *atoms of nature* and therefore as indestructible as the material atoms that Democritus believed in and that Gassendi has lately revived—where's the harm in that? 'What will we do with so many souls?' asks Bayle. Well, what does anyone 'do with' material atoms? According to Democritus material atoms enter into the make-up of corporeal substances; according to me souls do exactly that; there's no need to suppose that they are ever annihilated. It

doesn't have to be the case that there is a heaven and hell for them—i.e. for the souls of beasts—or that they pass from one body to another. That is enough to meet Bayle's objection; but I have cleared up this issue at a deeper level by showing that what lasts for ever is not just the soul but the whole animal. . . .

Bayle:

Leibniz, a great mind in Germany who has understood these problems has provided some insights that are worth developing. I'll say a bit about them, if only to exhibit some doubts that I have.

•NOW WE COME TO NOTE H•

Leibniz agrees with the view of some modern philosophers that animals are already organically structured in the seed; and he also thinks that unaided matter can't constitute a true unity, and therefore that each animal is unified by a •form or •soul, which is a simple, indivisible being that is truly *one*. He also holds that this form never leaves the thing whose form it is, which means that strictly speaking nothing in nature *dies* and no living thing *begins to exist*. He makes the soul of man an exception to all this; he sets it apart.

Leibniz:

That's because these reasoning substances have a double status and a double role—

- one physical, like all animals, as a consequence of their bodily mechanism, and
- the other moral, which gives them a social relationship with God, as citizens of God's city.

It's because of these that they retain not only their substance but also their *personal* identity and their knowledge of who they are.

Bayle:

This theory. . . rescues us from one part of the difficulty; we no longer need to reply to the crippling objections that are made against the scholastics:

A beast's soul is a distinct substance from its body; so it must therefore be produced by creation, and destroyed by annihilation. So you have to conclude that heat has the power to create souls and to annihilate them, and what could be more absurd than that? (In Egypt they hatch eggs by putting them in a slightly warmed oven; if it too warm, the eggs die.)

The Aristotelians' replies to this objection are not worth reporting. . . . Their only effect is to convince us that from their point of view the objection is unanswerable. They are no better at climbing out of the chasm that they are thrown into by the demand that they find some sense and some shadow of reason in this continual production of an almost infinite number of substances, which are totally destroyed a few days later, even though they are much more noble and much more excellent than matter, which always remains in existence.

Leibniz's theory parries all these blows, for it would have us believe **(i)** that at the beginning of the world God created the forms of all bodies, and hence all the souls of the beasts; and **(ii)** from then on these souls continue in existence for ever, inseparably united with the first organic body in which God lodged them.

Leibniz:

It's not that a certain mass of matter always remains inseparable from the animal or the soul, but rather that certain organs always remain, at least by the replacement of portions of matter with other, similar portions of matter—like a river: water flows in as water flows out, but it continues to be the same river.

Bayle:

That rescues us from metempsychosis (according to which the soul passes all at once into another body that is quite differently organized), a concept under which we would otherwise have had to take shelter. So that it can be seen whether I have understood his thought correctly, I shall here expound some of it.

There are some problematic things in Leibniz's theory, even though they show the breadth and power of his genius. For example, he holds that the soul of a dog operates independently of its body:

. . . that everything in it arises from its own nature, with a perfect spontaneity [see Glossary] as regards itself, and yet with a perfect conformity to things outside it. And. . . thus its internal perceptions must arise from its own original constitution, that is from its representational nature (its ability to express external things that are in relation with its organs), which it has had since its creation, and which constitutes its individual character.

From this it follows that the dog's soul would feel hunger and thirst at certain times, even if there were no bodies in the universe; even if 'there existed nothing but God and that soul'.

Leibniz:

I meant this only as a fiction, which is not compatible with the order of things but which might help make my thought more intelligible. For God so made the soul that it must correspond to everything external to it, and indeed represent it, in accordance with the impressions that things make on its organic body, which constitute its point of view [see Glossary]. If the motions in the body were different from the ones that usually accompany the feeling of hunger or thirst, the soul wouldn't have that feeling. It is true that if God were

to decide to destroy everything external to the soul, but to keep the soul in isolation, with properties and states, *they* would bring it to have the same sensations as before, just as if bodies were still there, this being merely a kind of dream. But this is contrary to the designs of God, who wanted the soul to agree with things external to it; and it's clear that this pre-established harmony brushes aside that fiction: it is metaphysically possible, but it doesn't agree with the facts or with their causes.

Bayle:

He has explained his thinking by the example of two clocks which are perfectly synchronized: that is, he suggests that because of the particular laws which control its operation, the soul will feel hunger at a certain time, and because of the particular laws which govern the movement of matter, the body which is united to that soul will be modified at the same time, in the way it is modified when the soul feels hunger.

Leibniz:

I have explained the soul's agreement with the body by comparing it with the agreement between two differently structured clocks that always agree in what they say the time is. There are three ways for this to happen;

- (1) Connecting the clocks with one another, so that their pendulums have to swing at the same rate;
- (2) hiring a man to keep them in agreement;
- (3) constructing each of them so perfectly that each keeps time accurately, so that they stay in harmony with one another through their own structures. There's no doubt that this is better than either of the other two.

There is a corresponding trio of accounts that might be given for the agreement between the soul and the body:

- (1) they influence one another [for an important explanation of what Leibniz means by *influencer*, see page 9 below];
- (2) God continually keeps them in agreement with one another;
- (3) each of these two beings is so perfectly ordered that they stay in harmony with one another by virtue of their separate natures.

Of these, (1) is what is commonly believed in the Schools, but it is inexplicable. (2) is the 'occasionalist' theory of the matter—the state of one of the two is God's 'occasion' for putting the other into a corresponding state, a perpetual miracle that wouldn't fit with God's wisdom or with the order of things. (3) is the most beautiful of the three, and the most worthy of God; it is my system of *pre-established harmony*.

Bayle:

Before preferring his system to the theory of occasional causes, I'll wait for its able author complete it. 'As it stands', this series of spontaneous internal actions that result in a dog's soul feeling pain immediately after feeling pleasure, even if it were all alone in the universe, *I don't get it*. I can understand why a dog goes straight from pleasure to pain when, while it is hungrily eating some bread, it is suddenly hit with a stick; but its soul's being so constructed that it would have felt pain at that very moment even if it hadn't been hit and had continued to eat the bread—*that's what I don't understand*. . . .

Leibniz:

What I say, properly understood, is *not* that. The pre-established harmony means this:

Pain enters a dog's soul when its body is hit. And if it weren't about to be hit at time T, God wouldn't have launched it with a constitution that would produce in its soul at T •that pain and •that representation or

perception corresponding to the stick's impact. But if (though this is impossible) God had changed his mind and altered the events in the material world in such a way that the blow didn't fall, without altering the nature of the soul and the natural course of events within it, then the soul *would* feel what corresponds to the blow even though its body never received it.

But Bayle says. . . .that he doesn't understand how the dog's soul, which experiences pleasure while the dog is eating hungrily, suddenly passes to pain without **(1)** the stick's being the cause (as the Schools say), and without **(2)** any particular action by God (as the occasionalists say). But nor does he understand **(1)** how the stick can act causally on the soul, or **(2)** how God performs the miraculous operation through which the body and the soul continually agree. Whereas I have sought to explain how this agreement happens •not miraculously but• naturally, by supposing that each soul is a living mirror representing the universe according to its point of view, and above all representing its body. Thus the causes of the stick's movement—

i.e. the man stationed behind the dog, preparing to hit it while it eats, and the whole history of the material world that has led to this man's acting in this way,

are also represented in the dog's soul from the outset. These perceptions are exactly [*exactement*] true, but are weak—they consist of small confused [*confuses*] perceptions—corresponding to the tiny effects that these events have on the dog's body. [Leibniz says not that they are tiny but that they 'imperceptible', but he obviously can't mean that strictly and literally.] And although the dog *has* these small confused perceptions it isn't aware of having them. And just as this sequence of material events leads in time to a smart blow on the dog's rump, the corresponding sequence, in the dog's soul, of representations of these events lead in time to a representation

of the blow of the stick; and because that representation is prominent and strong. . . .the dog is clearly aware of it, and this awareness is what constitutes its pain. So we don't have to imagine that in this situation the dog's soul passes from pleasure to pain arbitrarily, and without any internal reason.

Bayle:

I also find the spontaneity [see Glossary] of this soul wholly incompatible with its feelings of pain, and in general with all the perceptions it has that it finds unpleasant. •Why would it put itself into a state that it hates being in?•

Leibniz:

This objection of Bayle's is based on the premise that if it's going to be unpleasant to be in state S we won't spontaneously put ourselves into S.

I accept this for cases where *we know* that will be unpleasant, but in our present case the dog doesn't know this; and that means that although the move into state S is spontaneous it isn't voluntary. The cause of the change is *in* the dog—the state of its soul moves imperceptibly towards giving it pain—but this is happening without the dog's knowledge and without its wanting it to happen. Quite generally,, if event E_c causes event E_e , the representation of E_c causes the representation of E_e

Bayle:

Also, this able man's dislike of the Cartesian system seems to be based on an error. It isn't true (as he thinks it is) that the system of occasional causes, with its two-way dependence of body and soul, credits God with the *miraculous* interventions of a *deus ex machina*. [see Glossary] God intervenes between body and soul only •according to general laws, so in these interventions he never acts extraordinarily [see Glossary].

Leibniz:

I have several reasons for disliking the occasionalist system; this is one of them. An action isn't saved from being miraculous merely by falling under some general law. If that law isn't grounded in the natures of things, all the events falling under it are miracles. If for example God made a law requiring a planet to go around the sun, without setting up something that would *make* this happen, I maintain that the planet couldn't obey that law unless God kept intervening personally to make that happen. So it's not enough for God simply to *ordain* •that the body is to obey the soul and •that the soul is to have perceptions of everything that happens in the body; he must also give them some means for doing these things, and I have explained what these means are.

Bayle:

Does the internal active power that Leibniz thinks is built into the structures of bodies *know* what series of actions it is going to produce? Surely not! We know from experience that we don't know that we'll have such and such an experience an hour from now ·let alone knowing what will happen throughout the rest of our lives·. So the bodies would have to act under the direction of some external cause; and wouldn't that be a *deus ex machina*, just as in the system of occasional causes?

[Note H's last paragraph isn't discussed in Leibniz's private comments, and is given in full ('Finally...') on page 10 below.]

Leibniz's letter to a learned journal replying to Bayle's Note H (1698)

M. Bayle has had trouble with the theory I proposed to explain the soul's union with the body, and I now take the liberty of sending you this clarification to remove his difficulties. [Leibniz adds praise for Bayle, and for his courteous tone in writing against Leibniz's system. Then:] He doesn't reject what I have said about the conservation of souls and even of animals, but he doesn't yet seem satisfied with my attempt to explain the union and the relations between the soul and the body. . . .

Here are his words, which seem to indicate what he found difficulty with:

'I can't understand the series of spontaneous internal events that could make a dog's soul feel pain immediately after having felt pleasure, even if it were all alone in the universe.'

My answer: When I said that the soul would still feel everything that it actually feels even if it and God were the only things in the world, I was only employing a fiction ·about there being only God and one soul·. I was supposing something that couldn't happen naturally, just to make the point that the soul's various states are only consequences of what is already within it. Bayle says that he doesn't

understand this—but why? Perhaps it's because of things he says later on, or perhaps it is meant to be right there in the example of the spontaneous shift from pleasure to pain. If the latter, then he may be suggesting that such a shift conflicts with the axiom that *a thing's state won't change unless something occurs to make it change*, and that therefore an animal that experiences pleasure will have it for ever if nothing external makes it move on to pain. Anyway, I agree with the axiom; indeed I claim that it supports me, for it's one of the things that my work is based on.

Don't we infer from this axiom that if there's no outside interference not only will a body at rest always remain at rest but also a moving body will always move in the same way, i.e. at that speed and in that direction? A thing left to itself will remain in the state it is in; and if that state is one of change, the thing will continue to change in the same way, i.e. always following the same law. Now, according to me it is the nature of a created substance to change continually in accordance with a certain law or order, which leads it *spontaneously*. . . through all its states, in such a way that someone who sees everything—namely, God—sees in the thing's present state all its past and future states. And this law of order, which makes each particular substance the individual that it is, corresponds exactly to what happens in every other substance and in the universe as a whole. It wouldn't be going too far to claim that I can *demonstrate* all this; but all that matters just now is to show that this theory is possible, and that it could explain the given facts. So in this way the law of change in the animal's substance takes it from pleasure to pain at the very moment when there is so to speak a *bump* in the continuity of the processes in its body; because the law of this animal's indivisible substance—its soul—is to represent what happens in its body, just as we know from our own cases, and indeed through its relation to

the body to represent in some way everything that happens in the world. Substantial unities are nothing but different concentrations of the universe—different versions of the universe-in-a-nutshell—which they represent in accordance with the different points of view that distinguish them from one another.

Bayle goes on:

'I can understand why a dog passes immediately from pleasure to pain when it is hit with a stick while hungrily eating. . .'

I wonder if he does understand this so well! Bayle knows as well as anyone that this is the crucial problem: *how to explain why what happens in the body makes a change in the soul*, and that this is what pushed the defenders of 'occasional causes' to fall back on the theory that God must be continually taking care to represent in the soul changes occurring in the body. Rather than that, I believe that it is the soul's own God-given nature to represent to itself, in accordance with its own laws, what happens in the organs of the body. He continues:

' . . . but its soul's being so constructed that it would have felt pain at that very moment even if it hadn't been hit and had continued to eat the bread—that's what I don't understand.'

And it's what I didn't say, so far as I can remember. Speaking like that is engaging in a metaphysical fiction, like saying 'Suppose God created a vacuum by annihilating a certain body'; these two fictions are equally against the order of things. The soul was given from the outset a nature that would make it represent the changes in matter in order as they occurred, so the case imagined here—pain without bodily trauma—could never occur in the natural course of things. God *could* have given each substance its own series of particular states independently of all the others; but then

he would be making as many unconnected worlds as there are substances. When I call them 'worlds' I'm speaking as we do when we say that in dreaming one is in 'a world of one's own', and that on waking up one enters 'the common world'. (Actually, dreams *are* related to the states of the body, but less clearly than waking states.) Now back to Bayle:

'I also find the spontaneity of this soul wholly incompatible with its feelings of pain, and in general with all the perceptions it has that it finds unpleasant.'

There would indeed be an incompatibility if spontaneity [see Glossary] were the same as voluntariness. Everything voluntary is spontaneous, but some spontaneous actions aren't voluntary because they aren't *chosen*. It's not up to the soul to choose to put itself into states that are pleasant, because the state it *is* in depends on the ones it *has been* in.

Bayle continues:

'Also, this able man's dislike of the Cartesian system seems to be based on an error. It isn't true (as he thinks it is) that the system of occasional causes, with its two-way dependence of body and soul, credits God with the *miraculous* interventions of a *deus ex machina*. God intervenes only according to general laws, so these interventions are never extraordinary.'

That's not the only reason why I don't like the Cartesian system; and if you attend a little to my system you'll see that I found *in it* reasons to adopt it. Even if the occasional-causes theory didn't involve miracles, it seems to me that mine would still have other advantages. I have said that we can think of three systems for explaining the relations we find between soul and body: **(1)** The system of *influence*, with this understood literally as a *flow* from one into the other.

[The origin of the French *influence* and of the English word spelled the same way is Latin meaning 'flow in'. Leibniz is referring to a view of causation which goes like this (stated in terms of one example). When

a moving body *x* collides with a stationary body *y*, causing it to start moving, what happens is that *some of x's motion* is passed across from *x* to *y*, or flows from *x* to *y*. The idea is that when a body moves, three items are involved:

- this body (a concrete particular),
- motion (an abstract universal), and
- the motion of this body (an abstract particular).

And the 'influence' theory of causation holds that it is (some of) the third of those items that passes across from one body to another in a collision. Leibniz is also referring to the third kind of item when he refers to a 'chimerical scholastic species' on page 30.]

This is the system of the scholastics, and I agree with the Cartesians that it is impossible because the notion of abstract particulars, such as movable portions of motion, doesn't make sense. **(2)** The system of the perpetual caretaker, who represents in one what happens in the other, rather like a man whose job is to synchronize two inferior clocks that can't keep the same time by themselves. This is the system of occasional causes. **(3)** The theory according to which two substances naturally agree, as would two perfectly accurate clocks. I find this as possible as that of the caretaker, and more worthy of the creator of these substances, whether clocks or other machines. Still, let's see whether the occasional-causes theory really does involve a perpetual miracle. Bayle says that it doesn't, because it holds that God acts only according to general laws. I agree that he does, but in my view that isn't enough to get miracles out of the story. Even if God produced them all the time, they would still be miracles, if 'miracle' is understood not as 'the man in the street understand it but in the way philosophy needs to understand it—i.e. not as 'something rare and marvellous' but as 'something that exceeds the power of created things'. It's not enough to say that God has made a general law; in addition to his laying down the law there has to be a natural way of carrying it out; that is, what happens

must be explicable in terms of the natures that God has given to things. The laws of nature aren't as arbitrary and groundless as many think. If, for example, God decreed that

All bodies are to have a tendency to move in circles with radii proportional to their size,

either •there would be some way for this to happen through simpler laws, or •God would be doing this miraculously—or at least by angels expressly given this job, a bit like the angels that used to be assigned to •maintaining the orbits of• the celestial spheres. [By 'simpler laws' Leibniz means laws simpler than the one that can be read off from God's supposed decree. He evidently holds that a law needs to be 'simple' if it is to be sufficiently basic to count as a part or aspect of the 'nature' of the thing that obeys it.] It would be the same if someone said that God has given each body a natural basic *weight* by which it tends to move towards the centre of its globe without being pushed by other bodies; for in my view this system would also need a perpetual miracle, or at least the help of angels!

'Does the internal active power that is built into the structures of bodies *know* what series of actions it is going to produce? Surely not! We know from experience that we don't know that we'll have such and such an experience an hour from now.'

I reply that this power—or rather this soul or form—doesn't know them distinctly, but senses them confusedly. Each substance contains traces of everything that ever did or ever will happen to it; but we're prevented from sorting these perceptions out from one another by the sheer number of them, just as I can't pick out one voice from the loud and confused noise of a crowd.

'So the bodies would have to act under the direction of some external cause; and wouldn't that be a *deus ex machina*, just as in the system of occasional causes?

My preceding reply blocks this inference. The present state of each substance is a natural consequence of its preceding state, but only an infinite intelligence could see that consequence—i.e. see why and how it follows—because it involves the whole universe; this holds for souls as well as for every portion of matter.

Bayle concludes with these words:

'Finally, Leibniz with good reason thinks that all souls are simple [see Glossary] and indivisible, so how can they be compared to clocks? How can their original constitution enable them to do different things through the spontaneous activity put into them by their creator? It seems utterly obvious that a simple being will always act in the same way unless some outside cause interferes with it. If it were put together as a machine is put together out of cogs and pulleys and wheels, it could do different things because at any moment one part might move in a way that affects what the other parts are doing. But where would you find, in a unitary substance, the cause of any change of activity?'

This objection is worthy of Bayle, I think, and is one of those most deserving of clarification. But I also think that if I hadn't provided for this from the outset, my system wouldn't be worth discussing. I likened the soul to a clock only in the ordered precision of its changes, which is imperfect even in the best clocks but perfect in God's products. The soul can be described as *a perfectly exact immaterial automaton*.

'A simple being will always act uniformly—to evaluate this we must make a distinction. (1) If 'act uniformly' means 'follow a single law of order or of continuation'—as with a series of numbers •generated by a single formula•—then I accept that all simple beings act uniformly, and so do all composite beings! (2) If 'act uniformly' means 'act in

the same way'—do the same thing—then I don't agree. Here's an example that explains the difference between these two senses: a parabolic motion is 'uniform' in the sense **(1)** because it is defined or generated by a single formula; but not in sense **(2)** because the segments of a parabola are not the same as each other, as are those of a straight line. [Leibniz adds 'in passing' some further remarks about parabolas; their interest is mathematical rather than philosophical.]

And there's also this: although the soul is simple, its state at each moment is composed of several simultaneous •perceptions, which for our purposes has the same effect as if it were composed of •working parts, like a machine. That's because each perception influences the ones that come after it, in conformity with a law of order; there are such laws for perceptions as much as for motions. There's nothing striking, original, or implausible about this view of mine. For centuries now, most philosophers have attributed thoughts to souls and to angels which they believe are completely incorporeal. . . ., so they too have accepted that simple beings—ones with no parts—can change spontaneously. I will add that the perceptions that occur in a single soul at a moment involve a truly infinite multitude of tiny indistinguishable mental states that will come into the open later on, so that we shouldn't be surprised by the infinite variety of what emerges in the course of time. This is all simply an upshot of the soul's representational nature: it has to express what *does* and indeed what *will* happen in its •associated• body—and even to express, in a way, what does or will happen in all other bodies, because of the connection or correspondence among all the parts of the world. Perhaps I needed only to say that God, having made material machines, could easily have made immaterial ones that represent them; but I wanted to explain things a little more fully.

One other point: I enjoyed reading what Bayle says in the article on Zeno in his *Dictionnaire*. He may be aware that what one can learn from Zeno squares with my system better than with any other; for the only *reality* in extension and in motion is the order and regular sequence of phenomena and perceptions that they are founded on. The main thing that ran platonists and the sceptics *and* their critics into trouble was their looking for more reality in external sensible things than that of regular phenomena. We conceive of extension by conceiving of an **order among coexistences**; we shouldn't think of extension or of *space* as though it were a substance. It is like *time*, which presents to the mind only an **order of changes**. As for motion, what is real in it is force or power, i.e. whatever it is in an item's present state that carries with it a future change. Apart from that there are only phenomena [e.g. At time t_n substance S has a perception of type P] and relations [e.g. At time t_n the perceptual states of substances S_1 and S_2 are alike in manner M]. Consideration of this system of mine helps us to see that when we dig down below the surface we find in most schools of philosophy more truth than we had expected:

- Sceptics: no substantial reality in sensible things;
- Pythagoreans and Platonists: everything comes down to harmonies and numbers, ideas and perceptions;
- Parmenides and Plotinus: the *one* and the *whole* (understood so as not to involve Spinozism);
- Stoics: connectedness, which is compatible with the spontaneity maintained by others;
- Cabbalists and the Hermetics: the vitalistic philosophy that attributes mental states to everything;
- Aristotle and the scholastics: 'forms' and 'entelechies' [see Glossary]; and yet also
- the view of Democritus and the moderns that mechanical explanations can be given for all particular phenomena;

and so on. [In a condensed and difficult sentence, Leibniz says that all these philosophical views can be seen, from the perspective provided by his philosophy, to hang together as mutually consistent parts of the whole truth. He likens this to a certain kind of trick picture which looks like a jumble when seen from straight on but which falls into place when viewed from a particular angle. [In Holbein's 'The Ambassadors' in London's National Gallery, a strange shape between the two men is, when viewed from the right, a perfectly painted skull.] Leibniz continues:] Our biggest fault has been sectarianism—we reject other people's views in a way that limits our own. Philosophers who emphasize 'forms' criticize the materialists

or the corpuscularians, and vice versa. Limits are wrongly set to how finely nature is divided up, as well as to how rich and beautiful it is, when people •postulate atoms and the void, and when they •imagine that there are certain basic elements (as even the Cartesians do) in place of true unities, and when they •fail to recognize the infinite in everything, and the exact expression ·or representation· of the greatest in the smallest, which is combined with each thing's tendency to develop in a perfectly orderly way. This orderly development is the most admirable and most handsome effect of a sovereign Source whose wisdom and goodness leave nothing more to be desired by those who understand its economy.

Note L to Bayle's article 'Rorarius' (1702) and Leibniz's private comments on it

[Note L was added in the second edition of Bayle's *Dictionnaire*; when he wrote it Bayle had seen Leibniz's 1698 letter to the learned journal.]

Bayle:

Let me say first that I'm very pleased with the little problems that I raised against this great philosopher's system, for they have given rise to replies that have further explained the matter to me, and have given me a clearer view of its astonishing nature. I now consider this new system to be an important victory that pushes back the frontiers of philosophy. We used to have only two theories—that of the scholastics and that of the Cartesians—one involving **influence** of the body on the soul and vice versa, the other involving **assistance**, i.e. occasional causality. But now we have something new, a system involving **pre-established harmony**. [Bayle credits François Lamy with giving Leibniz's system this name in 1699; Leibniz's private note says that Lamy got the name from him in 1696.] We're in Leibniz's debt for this, because nothing can be imagined that gives such a lofty idea of the power and intelligence of the Author of all things. Add this to the advantage of avoiding any implication of miraculous conduct and I would be inclined to prefer this new system to that of the Cartesians if only I could see how the pre-established harmony could be *possible*.

(When I credit Leibniz's system with 'avoiding any implication of miraculous conduct', I am emphatically *not* retracting my claim in Note H that the system of occasional causes doesn't involve God's intervening miraculously. I'm

as sure as I ever was that an action is miraculous only if God performs it as an exception to general laws; so that anything he does immediately according to such laws is not strictly speaking a miracle. But I want to prune this discussion as severely as I can, so I'll allow it to be said that the best way to banish miracles from the story is to suppose that created substances are active, immediate causes of natural effects. The point of 'immediate' is that it leaves no room for God to intervene. So I shan't say what I could in response to this part of Leibniz's replies. Nor shall I present any objections that hold against the views of other philosophers as much as they against his; so I shan't make anything of the difficulties confronting the idea that God can give created things the power of self-movement. Those difficulties are severe, almost insurmountable;¹ but Leibniz's system is no more open to them than is that of the Aristotelians, and I don't know that even the Cartesians would go so far as to say that God can't give our soul the ability to act. If they do say this, how can they claim that Adam sinned? And if they stop short of saying it, they weaken their case for saying that matter is incapable of any kind of action, because that case depends on a *contrast* between bodies and souls in this respect. It can be alleged against Leibniz that he postulates a mechanical *fate*, thus destroying human freedom; but I can't see that this is more of a difficulty for him than for the Cartesians or other philosophers. So let us leave all that, and consider only what is particular to the system of pre-established harmony.)

¹ Bayle supports 'almost insurmountable' by a reference to something written by J. C. Sturm. Leibniz in a private comment says that the difficulties are not insurmountable, and refers for support to his paper 'Nature itself', which is a reply to that work by Sturm.

(I) My first point is that this system raises the power and intelligence of divine art far beyond anything that we can understand. Imagine a ship which

- doesn't sense or know anything and isn't being steered by anyone or anything, whether created or uncreated, but which
- can manoeuvre itself so perfectly that it always has a favourable wind, avoids currents and rocks, anchors where it is appropriate to, and takes shelter in a harbour precisely when it needs to.

Suppose that such a ship sails like that for several years in a row, with its location and direction always appropriate to changes of wind and differing circumstances of land and sea. You'll agree that even God's infiniteness is not too much for giving a ship the ability to do this; and you'll even say that ships aren't the sort of things that could be given such a power by God. Yet Leibniz supposes that the mechanism of the human body is more wonderful and more astonishing than all this.

Leibniz:

I'll tackle first the question of whether such a ship is possible, and will then turn to the comparison between the ship and the machine of a human body. It seems strange to me that Bayle comes right out with a negative answer to the question, a denial that God could make such a ship, without giving any reason for this; and yet he himself has often said that God could make *anything* that doesn't involve an outright contradiction or an imperfection. I accept that Bayle would be right if it were a question of God's giving to the ship a certain 'faculty' [see Glossary] or perfection or occult quality enabling it to stay on course unaided, with no internal understanding or external attraction or direction. . . . It *would* be impossible for God to do that: it would conflict with the principle of sufficient reason, because no reason

could be given for providing a ship with such a power, and God would have to steer it by a perpetual miracle. . . . Setting these occult qualities aside, though, it must be admitted that there's no obstacle to there being a ship that was *born lucky*, so to speak, a ship that always arrived in port without being steered, through winds and tides, past storms and reefs, simply through a set of happy accidents. [Throughout this paragraph, 'accidents' are just particular events.] It certainly has actually happened sometimes that an unmanned ship has reached its destination. Is it *impossible* that this should happen several times to a single ship? that it should happen every single time—adding up to a finite number of times—the ship put out to sea? The number of 'happy accidents' that this would involve, though vastly larger than the number of voyages, would also be finite; so those events could be predicted by God, or even by a powerful enough finite mind. And such a mind could work out, as a problem in geometry and mechanics, how the ship should be structured and the time and place and launching procedure that would make it relate in the desired way to this finite number of events. Don't we know that men are ingenious enough to make automata that can turn appropriately at certain designated street-corners, thus being adjusted to fit certain accidents? Well, a larger number of accidents could be provided for by a proportionately stronger mind. And if this excellent Mind didn't have to accept these accidents as given, but was free to start or stop them as he wished, that would make it incomparably *easier* for him to do what was wanted, adjusting the ship to the accidents and the accidents to the ship, in advance—this being a pre-established harmony. So it is utterly wrong to doubt that God's infinitude is large enough to succeed at this task.

Bayle:

Let us apply Leibniz's system of the union of soul and body to Caesar.

(II) According to this system we have to say that Julius Caesar's body exercised its power [*vertu*] of movement in such a way that from birth to death it went through a continual sequence of changes that corresponded in the smallest detail to the incessant changes in a certain soul—a soul that it didn't know and that had no effect on it.

Leibniz:

Bodies don't know what happens in the soul, and the soul doesn't in any way affect the body—Bayle has got that right. But God makes up for this, not by himself •affecting the body from time to time so as to make it obey the soul, but by •constructing this automaton from the outset in such a way that it will do just what the soul requires, when and where it requires it.

Bayle:

We have to say that even if God had chosen to annihilate Caesar's soul the day after it was created, this act-producing 'faculty' of Caesar's body would still have obeyed the rule that was built into it, so that the body would have gone to the Senate at a certain time, and would have uttered such and such words, etc.

Leibniz:

There's nothing strange about that. When we think about it, we'll see that a craftsman as great as God can make an automaton that resembles a servant and can do a servant's work, carrying out the orders it has been given over a long period of time. The body is such an automaton with respect to the mind.

Bayle:

We have to say that this power [*vertu*] of movement produced

its changes and modifications punctually to correspond to the volubility of the thoughts of this ambitious mind, and that it moved into some particular state rather than any other, because Caesar's soul moved on from one thought to another.

Leibniz:

Bayle seems to think that the ship or the human body is being furnished with who-knows-what 'faculty' or *vertu* that can adjust itself to accidents or to thoughts without having any knowledge of them and without there being any intelligible reason for this. He has good reason to condemn such a 'faculty' as impossible, but it's not something I have ever believed in. The servant automaton would only need a structure that led to its playing its part by virtue of the laws of mechanics. It wouldn't alter itself so as to fit with its master's thoughts. Just by following its course, it would fit in exactly with the wishes of the person the craftsman had built it to serve.

Bayle:

A blind force was given certain instructions a few decades ago, since when it has been **(i)** left to itself with **(ii)** no renewal of the instructions, which in any case it **(iii)** didn't ever know anything about. Can that blind force act now in accordance with those instructions? Isn't that much more incomprehensible than the voyage of the unmanned ship that I spoke of a little way back?

Leibniz:

It is more and more evident that Bayle hasn't properly grasped my thought, which is that the body modifies itself appropriately not because of •some kind of instruction or *vertu* that it has been given, but because of •its structure, which is designed for that purpose. The servant automaton again removes the difficulty. The structure it has been given

is sufficient for all its functions, even though it is **(i)** left to itself, even though **(ii)** what was first done to it isn't renewed, and even though **(iii)** it doesn't know anything about what it is to do or of the instructions it was given. And the difference between Caesar's body and this automaton is only one of degree.

Bayle:

(III) What adds to the difficulty is that the human mechanism has an almost infinite number of organic parts, and² is continually exposed to the battering of surrounding bodies, which through an endless variety of disturbances will put it into a thousand different kinds of state. Supposedly the pre-established harmony

is never upset, always stays on course through even the longest life of a man, despite the infinite variety of ways in which these parts act on one another, surrounded on all sides by an infinity of corpuscles, sometimes cold, sometimes hot, sometimes dry, sometimes wet, always active, always pricking at the nerves, in this way *here* and in that way *there*

—how are we to make sense of *that*? The almost infinite variety of changes in the human body *requires*, I think, the vast number of parts and of external thing acting on it; but could this variety be as perfectly ordered as Leibniz has to say it is? Will it never disturb the correspondence between these changes and those of the soul? That's what seems to be quite impossible.

Leibniz:

[Commenting on Bayle's footnote] I agree that this will •vary in infinitely many ways the effects of the sources or true unities,

but not that it will •'disturb' these unities or souls themselves, or conflict with their spontaneity. The impact of bodies causes changes in mere masses, but not in souls or monads, which spontaneously follow out their •separate• courses, adjusted to and representing everything that happens in masses.

[Commenting on the main text of Bayle's (III)] Why is it so impossible? He should give a reason for saying this. All we are given here are extreme cases that don't make the alleged difficulty any worse but merely increase our admiring wonder at God's skill in constructing things. And Bayle would have had trouble setting out his point in proper logical form. Because the pre-established harmony involves every state of every thing in the universe, and brings it about that each individual thing is adjusted, once for all, to all the others,

it is obvious that

accidents can't upset the pre-established harmony, any more than they can make God *miss* something he aims at, when he has foreseen everything and taken it all into account. . . .

Bayle:

(IV) It's no use appealing to God's power in support of the thesis that beasts [see Glossary] are only automata; it's no use claiming that God was able to make machines that are so cleverly constructed that a man's voice, the light reflected from an object, etc., affects them exactly as is needed for them to move in such and such a manner—e.g. for a dog to 'obey' when its master throws a stick and says 'Fetch!'. Everyone except some of the Cartesians rejects that idea;

² Note that according to Leibniz that what is active in each substance is something that comes down to a true unity, •i.e. something that has no parts•. Each man's body is composed of many substances, and each of these •simple• substances must have a source of action really distinct from that of each of the others. Leibniz holds that such sources act spontaneously [see Glossary]. But their effects will necessarily be disturbed; and will vary in infinitely many ways, because neighbouring bodies will constrain somewhat the natural spontaneity of each one.

and no Cartesian would accept it as applied to man, i.e. if it were maintained that God was able to make bodies that did mechanically everything that we see other men do.

Leibniz:

'Everyone rejects that idea'—only as improbable, not as impossible. As for the Cartesians: a Cartesian wouldn't deny that such an automaton is possible for God; but he wouldn't accept that other people are in fact inanimate automata of this sort. He would rightly say that they are like him. According to me, however, they are all automata—the bodies of humans as well as of beasts—but they are all animate [see Glossary], the bodies of beasts as well as of human. Thus, pure materialists, like the Democriteans, are partly right and partly wrong; and so are the formalists such as the Platonists and the Aristotelians. The Democriteans had the perfectly justified belief that the bodies of humans as well as of beasts are automata and do everything completely mechanically; but they were wrong to believe •that these machines are not associated with an immaterial substance or form, and •that matter could have perceptions. The Platonists and Aristotelians •rightly• believed that the bodies of beasts and men are animated, but they were wrong in •thinking that souls change the rules of bodily motion, thereby •depriving the bodies of beasts and humans of their status as automata. The Cartesians were right to reject that influence, but they went wrong in depriving man of his status as automaton and depriving beasts of mental states. [By 'reject that influence' Leibniz seems to mean that the Cartesians rightly reject the account of causation that is explained in the long note on page 9. He presumably thinks that they allow *some* kind of action of soul on body, this being how they deprive man of his status as an automaton. It should be added that Leibniz is not a perfectly accurate reporter on Cartesianism.] I think we should keep both sides for both things: we should be Democritean and make all actions of bodies mechanical and

independent of souls, and we should also be more than Platonic and hold that all the actions of souls are immaterial and independent of mechanism.

Bayle:

In denying this possibility I'm not setting limits to God's power and knowledge! My point is just that the nature of things requires that there be limits to the *faculties* that are given to a created thing. It is utterly necessary that how created things act is appropriate to what they essentially are, and that how each machine acts be in accordance with its character; for according to the philosophers' axiom, whatever is received is commensurate with the capacity of the receiver.

Leibniz:

Bayle keeps coming back to I-don't-know-what 'faculty' •that is supposed to be• given to the body so as to make it fit with the soul. I am not arguing for any such thing; and I am not flouting the limitations of created things or the nature of bodies and machines. There's nothing in the structure of the divine machine that puts it out of reach of God's power and knowledge. He •knows everything that is knowable, and •can do anything that is do-able; so he •knows all •future• human volitions (there aren't *that* many of them!), and he •has the power make a machine that can carry them out.

Bayle:

So we can reject Leibniz's theory as impossible, since it involves more serious difficulties even than that of automata. . .

Leibniz:

This would be a good argument if the theory of automata (TA) had been shown to be impossible, •because if the theory of pre-established harmony (PH) involves 'more serious difficulties' than TA then of course PH is impossible too. But TA it clearly isn't impossible, as the Cartesians have shown well enough; so all we are talking about here are

degrees of difficulty—it would be *harder* to make PH true than (TA) to make a servant automaton—but when we're talking about God's *infinite* power and wisdom, nothing is harder than anything else as long as the tasks in question are possible. Someone might wonder what the harmony between mind and body could consist in when the mind is engaged in abstract thinking. Well, here is my answer to that. Even when humans reason about abstract things that go beyond the imagination, there are still signs in the imagination—e.g. letters and symbols—that correspond to those things. No act of understanding is so pure that it isn't accompanied by some event in the imagination. So there's always something mechanical in the body that exactly corresponds to the train of thoughts in a person's mind, in so far as they involve imagination. Consequently, the automaton of his body doesn't need the soul's influence, or the supernatural assistance of God, any more than does the body of a beast. [How does that last sentence follow from what came before it? The French original doesn't answer this question any more than the present version does.]

Bayle:

... it postulates a continuous harmony between two substances that don't act on one other.

Leibniz:

Why not? They are made by the same creator, who wanted them to agree without acting on each other, and was able to bring this about.

Bayle:

But even if servants were machines and immediately did whatever their master ordered, the master would still be having a real effect on them: he would utter words, he would make gestures, and these would set up a real disturbance in these servants' organs.

Leibniz:

But there are automaton servants so well primed that they don't need signs. They get in ahead of them. Chiming watches, for example, and alarm clocks are servants of this kind. Far from waiting for signs from us, they give signs to us. The artificial servant I described above, who imitates or mimics a real one, doesn't even need to be wound up or set by us as watches and alarm clocks do; its maker has set it for us. Our body is a servant of this kind.

Bayle:

(V) Let us now consider Caesar's soul: we'll find even more impossibilities. This soul was in the world without being exposed to the influence of any body or any mind. The power God had given it was the sole source of each of its particular actions, and any difference between one action *x* and another *y* was *not* a result of *x*'s being produced by a different set of springs (as it were) from the ones that produced *y*. Why not? Because man's soul is simple, indivisible, and immaterial—it doesn't contain different sources of energy [see Glossary], because it has no parts. Leibniz agrees about this. And if he didn't agree, and instead joined the common run of philosophers and some of the best metaphysicians of this century (e.g. Locke) in holding that a suitably structured portion of matter could think, I would regard his theory as absolutely impossible. . .

Leibniz:

So Bayle doesn't yet regard it as absolutely impossible.

Bayle:

... and it would be open to other refutations that I needn't go into here, because Leibniz does acknowledge that our soul is immaterial and indeed builds on that.

Leibniz:

Saying that the soul's God-given force is the only source

of its particular actions isn't fully explaining those actions. It's better to say that God put into each soul 'the world in concentrated form', or enabled it to represent the universe according to the point of view appropriate to that soul. That is the source of a given soul's actions; it's what makes those actions different from one another and from the actions of other souls. For it follows from a soul's representing the world that it will continually undergo changes that represent the universe's changes, and that other souls will have different changes though corresponding ones.

Bayle:

Returning to Julius Caesar's soul, let us follow Leibniz in calling it an *immaterial automaton*, and compare it with an Epicurean atom—I mean an atom surrounded by empty space on all sides so that it never comes into contact with any other atom. It's a fair comparison! On the one hand

the atom has a natural power of self-movement which it exercises without being helped in any way, and without anything's interfering with it;

and on the other hand

Caesar's soul is a mind that has been given the ability to give itself thoughts, and it exercises this ability without the influence of any other mind or of any body. Nothing helps it, nothing interferes with it.

Common notions and ideas of order tell us that this atom will never stop: once in motion, always in motion, and always in the same manner. [Bayle gives some quotations showing that Leibniz would agree with this.] It is clear to everyone that this atom (whether it is moved by an innate power, as Democritus and Epicurus hold, or by a power given by the Creator) will keep moving forward at the same speed in a straight line, never turning to the right or the left and never turning back. Epicurus was derided for inventing the movement of 'declination' [= a built-in capacity to swerve without

being caused to do so]; he couldn't give any explanation for this addition to his theory; he simply helped himself to it in an attempt to introduce a *chance* element into the world, so as to escape the tangle of difficulties involved in the view that everything that happens was always certain to happen. It conflicts with our most obvious ideas, for we can see clearly an atom moving in a straight line won't suddenly swerve unless **(1)** it meets some obstacle, or **(2)** it comes to want to change course, or **(3)** it incorporates some device that comes into play at that moment. Of these, **(1)** is ruled out in an empty space; **(2)** is impossible, because an atom has no power of thought; and **(3)** is similarly impossible in an absolutely unitary corpuscle, i.e. one that has no parts.

Leibniz:

Before we go on, it would be as well to take note of a big difference between matter and the soul. Matter is an incomplete being; it doesn't have any source of action. And when it is put into some state, what it gets is just precisely that state as it is at that instant. That's why unaided matter can't even move in a circle; a circular motion is not simple enough for it to remember, so to speak. Matter remembers only what happened in the previous moment...., i.e. it remembers the direction of the tangent, but lacks the talent to remember the command 'Diverge from the tangent, stay on the circumference'. That is why a body that is moving in a circle can't keep that up unless something makes it do so. It's why an atom is too stupid and imperfect to learn to do anything except move in a simple straight line. With a soul or a mind the situation is quite different. Because this is

a true substance, i.e.

a complete being, and

the source of its own actions,

it as-it-were-remembers (confusedly, of course) all its preceding states, and is affected by them. It can preserve not

only its direction (like the atom) but also the law of changes of direction (which the atom can't do). And whereas in the atom there is only one change, there is an infinity of changes in the states of a soul, each with its own law. Why? Because the Epicurean atom, although it has parts, has a uniform interior, whereas the soul, although it has no parts, has within it an infinite variety, because. . . .of the representation of the universe that the Creator has packed into it. If Bayle had considered this difference between the driving forces of bodies and those of souls, he wouldn't have brought against me his comparison between an Epicurean atom and the human soul. . . .

Bayle:

(VI) Let us now apply all of this. Caesar's soul is a being that counts as *one* in the strictest sense. The ability to give itself thoughts belongs to its nature, according to Leibniz's system—it received from God both the possession of this ability and the use of it. If the first thought it gives itself is a state of pleasure. . .

Leibniz:

I don't think of the soul as 'giving itself' its first mental states. It got them from God, along with its existence, at the moment of creation; for it was in mental states from the outset, and in its first ones it received potentially all the others.

Bayle:

. . . it's hard to see why the second shouldn't also be a state of pleasure; for when the total cause of an effect remains the same, the effect can't change.

Leibniz:

The total cause doesn't remain the same here. Present thoughts involve a tendency towards other thoughts. For the soul has not only perception, but also appetite [see Glossary]. But when tending towards new pleasures, it sometimes

encounters pains.

Bayle:

Now, this soul in the second moment of its existence doesn't acquire a new ability to think, but only keeps the ability it had in the first moment; and it continues to be untouched by any external cause; so it ought to reproduce in the second moment the same thought that it had produced a moment before.

Leibniz:

No! Because it tends towards change according to the laws of appetite, just as the body tends towards change according to the laws of motion.

Bayle:

If you object against me that the soul must be in a state of change, and that in the situation I describe it wouldn't be, I reply that its change will be like the atom's change: an atom that keeps moving along the same line is in a new situation at each moment, but one which is exactly like the previous situation. Similarly, for a soul to continue in its state of change all that is needed is for it to give itself a new thought that is exactly like the previous one.

Leibniz:

I have already explained the great difference there is between an atom's laws of change and a soul's. This can be seen in the difference between the thought of a soul and the motion of an atom. Spontaneous motion consists in the tendency to move in a straight line; there's nothing *·else·* as uniform as that. But thought involves an actual external material object, the human body; and this is a composite object which contains vastly many different states, through which it is connected with surrounding bodies and, by means of them, step by step with all other bodies in the universe. The soul's tendencies towards new thoughts correspond to the

body's tendency towards new shapes and new motions. And because these new motions can take the object from order to disorder, their representation in the soul can also take the soul from pleasure to displeasure.

Bayle:

But let's not be so strict about this; let us allow that the soul might go from one thought to another that is unlike it; but it would at least still be necessary that the passage from one thought to another *involves some reason*, some affinity between them. Suppose that at one moment Caesar's soul sees a tree with flowers and leaves; I can conceive³ of its suddenly wanting to see one that has only leaves, and then one that has only flowers, in this way making for itself a series of images, each arising from the one before. But we can't see as possible changes from black to white or from yes to no, or those wild leaps from earth to heaven that are quite common in human thought. We can't understand how God might have been able to put into Julius Caesar's soul something that produced a change such as the following: no doubt sometimes while he was suckling he was pricked by a pin; according to the theory we are examining here, his soul would have had to put itself into a state of pain immediately after the pleasant sensations of the sweetness of milk. . . . What device—what as-it-were spring or wheel or pulley—caused it to interrupt its pleasures and suddenly put itself into a state of pain, without anything's having alerted it to prepare it for the change, and without anything new happening in its substance? Review the life of this first Roman emperor and at each stage you'll find material for an objection even stronger than this one.

Leibniz:

Let us review what's being said here. It is certainly necessary that 'the passage from one thought to another *involves some reason*, some affinity between them'; this has been shown. If each thought of Caesar's soul stood out clearly from its neighbours, and if the soul produced them all voluntarily, the change from one thought to another could be like the one Bayle describes from one tree to another. But that's not what happens in souls. As well as the perceptions that the soul remembers, there's a cloud of infinitely many confused perceptions that it doesn't sort out from one another. It is through these that it represents external bodies and comes to have distinct thoughts that are unlike the preceding ones, because the bodies the soul represents have suddenly changed in a way that strongly affects the soul's own body. So the soul sometimes goes from white to black or from yes to no, without knowing how it does this, or at least without being in charge of this change; and we attribute to the body the upshots of the soul's confused thoughts and feelings. So we shouldn't be surprised if a man who is stung by some insect when eating jam involuntarily passes immediately from pleasure to pain. When the insect was *approaching* the man's body it was already affecting it, and the representation of this was already affecting his soul, though not in a way he could be aware of. [In passages like that one, don't think of 'affecting' as causal. The only relation Leibniz allows between the insect's approach and your body's change, and between your body's change and a change in your soul, is *correspondence in accordance with the pre-established harmony*.] However, in the soul as in the body, there is a smooth gradation from insensible events to sensible ones—i.e. from ones that the soul is not aware of to ones that it is aware of. That's how it comes about

³ In saying this I am making a concession—i.e. I'm setting aside the reasons that make it impossible for us to understand how a created spirit could give itself ideas.

that the soul puts itself into a state that it doesn't want to be in: it is enslaved by the feelings and confused thoughts that occur in it according to the states of •its body, and of other bodies through their relation to •it. These, then, are the 'devices' through which pleasures are sometimes interrupted and followed by pains, without the soul's always being alerted or prepared for it. . . . So we mustn't say that nothing new happens in the substance of the soul to make it feel the sting; something new *does* happen, namely. . . .the insensible dispositions of the soul that represent the states of the body involved in the coming of the sting.

Bayle:

(VII) We could make some sense of this if we supposed that a man's soul is not a mind but a host of minds, each with its own functions that start and stop exactly as required by the changes in his body. Then there would be something analogous to a great apparatus of wheels and springs. . . . arranged in accordance with the happenings in our bodily mechanism, to start up or close down, moment by moment, the action of each of these minds. But then man's soul would no longer be a substance; it would, just like a chunk of matter, be a . . . mass or collection of substances. What we are looking for here is a *single being* which experiences now joy, now sadness, and so on; we aren't looking for several beings of which one produces hope, another despair, and so on.

Leibniz:

If the soul were composite in that way, it would be a mass—something that could be destroyed by being scattered—and Bayle is right to deny that the soul is something like that. But we don't need the soul's substance to be composite; it is enough for its thoughts to be composite and to involve a large number of objects and states distinctly or confusedly

understood; and our experience shows us that that's what the soul is in fact like. Although the soul is a simple unitary substance, it never has simple unitary perceptions. At every moment it has several distinct perceptions that it can remember, and they bring with them infinity of confused ones that it can't sort out. This composition of thoughts has only to produce other composite thoughts, and it can do that unaided, so it has no need of such a host of minds. Each detail of the soul's state at a given time contributes to that soul's next total state, giving it a new variation.

Bayle:

The observations you have just read are merely expansions of ones that Leibniz has done me the honour of examining. I am now going to comment on his replies.

Leibniz:

So all Bayle has said so far only reinforces his first objections, and he has been talking as though I had not yet replied to them. He now begins to reply to my answers that were published in the *Histoire des ouvrages des savants* [pages 10–12 above] and should be thought of as having been inserted here.

(VIII) He says that 'the law of change in the animal's substance takes it from pleasure to pain at the very moment when there is so to speak a *bump* in the continuity of the processes in its body; because the law of this animal's indivisible substance is to represent what happens in its body. . . . and indeed through its relation to the body to represent in some way everything that happens in the world.' [page 8] These words give a very good account of the fundamentals of this system: they are. . . .the key to it. But at the same time they provide a point of view from which to look at Leibniz's system, a point of view from which we can most clearly see what those who think this new theory is impossible are getting at. The law that is in question here presupposes a

decree by God, and shows how this system in what respects this system is similar to that of occasional causes.

Leibniz:

I think of the law governing the series of states of a soul not as •a simple decree of God but as •an effect of an enduring decree within the soul's nature—a law inscribed in its substance. When God puts into an automaton a certain law—a rule for how the automaton is to conduct itself—he doesn't settle for merely announcing the law; he accompanies that with the provision of means for the law's implementation—i.e. he inscribes the law in the automaton's nature or organisation. He does this by giving it a structure in virtue of which the actions he wants or allows the animal [see Glossary] to perform are *naturally* produced in the right order. My notion of the soul is the same: I think of it as an immaterial automaton whose internal constitution contains in concentrated form, or represents, a material automaton. . . .

Bayle:

These two systems—Leibniz's and occasionalism—agree on this: there are laws according to which *a man's soul must represent what happens in his body, just as we know from our own cases*. They differ about the how these laws are implemented. According to the Cartesians, God implements them; Leibniz says that the soul itself implements them. That's what strikes me as impossible, because the soul does not have the equipment needed for such a task. However infinite God's knowledge and power might be, he couldn't do with a machine that lacked a certain part something for which that part was necessary. He would have to make up for that lack, and in that case the job would be being done by him, not by the machine. I'll show that the soul lacks the equipment it would need to carry out the divine law in

question, .i.e. the law telling it to represent everything that happens in the associated body. I'll do this by means of a comparison.

Let us help ourselves to the idea of some animal created by God, and intended to sing incessantly. It *will* sing all the time, that is obvious; but if God wants the singing to conform to a certain score, he *must* either •put a copy of that score in front of the animal's eyes, or •imprint it in its memory, or •arrange the animal's muscles in such a way that the laws of mechanics will ensure that the sequence of tones exactly fits the score. If none of those three is done, it's inconceivable that this animal should ever be able to follow the complete series of notes that God has written.

Leibniz:

We need only to imagine a chorister or opera singer who has been hired to sing at certain times, and who is supplied with a book containing the scores of the pieces of music that he is to sing, each one marked with the day and time when it is to be sung. This singer sight-reads: •his eyes are guided by the score, and •his tongue and throat are guided by his eyes; but •his soul sings, so to speak, from memory or something equivalent to it. It can't have any input from the score, the eyes, or the ears; so the soul has to find •unaided what its brain and its organs find •with the help of the score, though it finds it effortlessly, with no need to search. It can do this because the whole score, along with all the other scores that it follows in singing, is imprinted potentially in the singer's soul from the beginning of its existence; just as the score was in some way imprinted in its material causes before the *pièces* [see Glossary] were assembled into a book. But the soul isn't aware of all this because it is wrapped up in its confused perceptions, which express all the detail of the universe. The times when it is distinctly aware of it is when its organs—meaning of course the organs of the singer's

body—are *noticeably* struck by the notes in the score.

Bayle:

I've been talking about the 'animal', the singer's body. Now let us consider his soul in the same way. Leibniz holds that it has been given not only the power to keep giving itself thoughts, but also the power to have these thoughts in a certain order, corresponding to the continual changes in the bodily machine. This series of thoughts is like the score provided for the animal singer I have been talking about. But if the soul is to change its perceptions or states at each moment according to that thought-score, won't it have to know the sequence of notes, and to think of it at the time? Experience, however, shows us that it knows nothing of it.

Leibniz:

I have already shown more than once that the soul does many things without knowing how it does them—when it does them by means of confused perceptions and insensible thrusts of appetite. There are always enormously many of these, so that the soul can't possibly be aware of them, i.e. clearly sort them out from one another. No perception of ours is ever perfectly *unitary*, in the way a straight line can be; our perceptions are always clothed in something sensible, which may itself stand out vividly but which always involves something confused and therefore hidden from consciousness. That's how it is that notions of colours are vivid and easily noticed, although they are confused because our sensation of them doesn't reveal their make-up to us. Those sensations involve in themselves something of

- the light source that generates them,
- the object they come from, and
- the medium through which they have passed.

They are bound to carry traces of all that and therefore of an infinity of things that affect the medium they have

passed through, just as water always carries slight traces of the channel it has come through. I have shown elsewhere that the confused perception of *match* versus *mismatch* that occurs when we hear consonances or dissonances consists in a hidden arithmetic. The soul counts the beats of the vibrating object making the sound, and when these beats regularly coincide at short intervals, it finds them pleasant. Thus it is unconsciously counting. That is also how it performs countless other small operations which are very precise although they are not voluntary and are known only by the noticeable effect that they eventually culminate in. They put us into mental states that stand out vividly but are confused because we don't perceive in them the sources from which they came. For that we need help from reasoning—as in music, where the proportions that produce an agreeable sound have been discovered.

Bayle:

Given that the soul doesn't have that knowledge of what exactly it is doing, doesn't it at least have to be equipped with a set of particular devices, each of which is a necessary cause of such and such a thought? Don't those devices have to be precisely arranged so that they kick in exactly as needed for the 'pre-established' correspondence between the soul's thoughts and the changes in the bodily machine? But it is quite certain that an immaterial substance that is indivisible because it has no parts *can't* be made up of this vast multitude of particular devices lined up in accordance with the order of notes in the score the singer is using. So it isn't possible for the singer's soul to carry out this law.

Leibniz:

That's as far as Bayle's final objection goes. He gives my reply to it himself, and seems to concede that it is a plausible one, and could well resolve the difficulty. For I had in fact already

replied to it: the soul has all the devices that Bayle demands, appropriately arranged. But they aren't material. They are the preceding perceptions from which the subsequent ones arise according to the law of appetites. Here is what Bayle says about that.

Bayle:

Leibniz supposes that the soul has no distinct knowledge of its future perceptions, but 'senses them confusedly. Each substance contains **traces** of everything that ever did or ever will happen to it; but we're prevented from sorting these perceptions out from one another by the sheer number of them' [page 10 above]. But how are we to conceive of such **traces** in an indivisible, partless, immaterial substance?

Leibniz:

What is meant here by 'traces' are marks (which can be immaterial) such as relations, expressions, representations, effects through which some past cause can be known, or causes by which some future effect can be known. And since

- there is vast diversity within the present state of the soul, which knows many things at once and still senses infinitely more, and since
- this present diversity is an effect of a previous state's diversity and a cause of the diversity of a future state,

I thought they could be called 'traces', in which a sufficiently penetrating mind—much more penetrating than ours!—would be able to recognize the past and the future.

Bayle:

Leibniz continues:

'The present state of each soul [Leibniz had written 'each substance'] is a natural consequence of its preceding state. . . Although the soul is simple, its state at each moment is composed of several simultaneous perceptions, which for our purposes has the same effect as

if it were composed of working parts, like a machine. That's because each perception influences the ones that come after it, in conformity with a law of order; there are such laws for perceptions as much as for motions. . . The perceptions that occur in a single soul at a moment involve a truly infinite multitude of tiny indistinguishable mental states that will later on, so that we shouldn't be surprised by the infinite variety of what emerges in the course of time. This is all simply an upshot of the soul's representational nature: it has to express what *does* and indeed what *will* happen in its body—and even to express, in a way, what does or will happen in all other bodies, because of the connection or correspondence among all the parts of the world.' [from pages 10–12]

I don't have much to say in reply to that; I say only that this theory when it is fully developed will be the real solution to all the difficulties. By the penetration of his fine mind Leibniz has perfectly appreciated •the full extent and force of the objection, and •where the solution to the main difficulty will have to be found. I'm convinced that he will smooth out his system's bumpy places that could lead into error, and that he'll teach us some wonderful things about the nature of minds. No-one can more usefully or more reliably explore the world of the intellect than he can. I hope that his splendid explanations will dissipate all the impossibilities, and that he will resolve my difficulties. . . . It's because of this hope that I wasn't just flattering him when I said that his system should be regarded as a significant breakthrough.

Whereas the Cartesians suppose that there's only one general law for the union of all minds ·with bodies·, Leibniz holds that God gives to each mind its own particular law, which seems to entail that each mind's basic constitution is specifically different from that of any other mind. But there's

no need to make a fuss about that. Don't the Thomists say that in the realm of angels there are as many species as there are individuals?

Leibniz:

Having replied carefully and precisely, point by point, to Bayle's difficulties, always consistently and based on the same principles, I hope that I have smoothed all the bits that he found bumpy; and he does seem now to be pretty much willing to give up his objections. . . . In the end my system comes down to this: **(a)** each monad is the universe in concentrated form, and each mind is an imitation of the divinity of God. **(b)** In God the universe is not only concentrated, but perfectly expressed. **(c)** But in each created monad only one part of the universe is clearly expressed—the size of that part depending on how excellent that soul is—and all the infinite remainder is expressed only confusedly. **(d)** But God contains not only this concentration of the universe but also its source. He is the basic centre from which everything else emanates, and if something emanates out from us, it. . . . does so only because from the outset God wanted to accommodate things to our desires. **(e)** When

we say that each monad, soul, or mind has been given a particular law, we must add that this law only a special case of the general law that orders the universe; it's like the way a town looks different according to the different points of view from which it is seen. So human souls don't have to be of different species from one other, and in fact they aren't. Mere dissimilarity isn't enough: two leaves, two eggs, two animal bodies, are never perfectly alike though they may belong to the same species; all the infinite differences between two leaves, for instance. . . . make them different individuals, but don't put them into different species. God's wisdom has found in a way to have infinitely many different versions of the world at the same time, namely by having the world represented by infinitely many substances; and this is astonishing, because the world itself, independently of how it is represented, is already infinitely various, so that what is expressed by all the substances taken together is an infinity of infinities. Nothing could be more appropriate to the nature and intentions of the world's inexpressible Author, whose perfection in every respect far outruns our ability to capture it in thought.

Leibniz's letter to a learned journal replying to Bayle's Note L (1702)

My paper 'A new system of the nature and communication of substances' (1695) seemed to me to give a good account of the body's union with the soul. In place of the scholastics' approach to this in terms of causal influence, or the

Cartesians' in terms of help from God, I came at it through a pre-established harmony. Pierre Bayle, who can give to the most abstract thoughts the charm they need if they're to capture the reader's attention, and yet who deepens them

while bringing them into the light, kindly took the trouble to enrich this system by his comments in the 'Rorarius' article in his *Dictionnaire* [pages 3–7]. But while doing this he also raised some problems that he thought needed to be cleared up, and I tried to do this in the *Histoire des ouvrages des savants* for July 1698 [pages 7–12]. Bayle has now replied to this in the second edition of his *Dictionnaire* in the same article on 'Rorarius' [page 13–26].

He candidly says that my replies have pushed the subject along, and that if it were settled that the theory of harmony is *possible* he would willingly prefer it to the Cartesian theory because •it gives an exalted idea of the Author of things, and •stays clear of any implication of miracles in the ordinary course of nature. But he finds it hard to see how this pre-established harmony is possible, and to show why he compares it with something that he regards as easier and but would still be thought to be hardly do-able. He compares my theory with the supposition of a ship that get itself to its intended port without being steered by anyone. He doesn't say outright that this is impossible; but he thinks that •everyone will agree it would take all the power and knowledge God has to make a ship do this, and that •some will say that •it is more than even God could manage, because •a ship is not the sort of thing that could be given such an ability [*faculté*] by God.

Perhaps he is thinking of this in terms of God's giving the ship a scholastic-style 'faculty' [see Glossary] for completing its journey and reaching port, like the 'faculty' that the schools [see Glossary] attribute to heavy bodies make them fall towards the centre. If this is what he means, I'll be the first to reject this ship story as impossible. But if •he means a faculty •or ability •of the ship that can be explained through mechanical rules and through a combination of internal agencies and external circumstances, and yet •he still rejects the ship

story as impossible, then I want him to give some *reason* for this judgment of impossibility. I'll show a little later that I don't *need* it to be possible for there to be the ship that Bayle describes, understood as he seems to understand it; •but still it is possible. If we consider the thing thoroughly, far from there being any difficulty here with regard to God, it would appear that even a finite mind might be clever enough to bring it about. There is no doubt that a man could make a machine which was capable of walking around a town for a time, turning precisely at the corners of certain streets. And an incomparably more perfect, although still limited, mind could foresee and avoid an incomparably greater number of obstacles. And this being so, if this world were (as some think it is) only a composite of a finite number of atoms interacting in accordance with mechanical laws, it is certain that a finite mind could be powerful enough to. . . predict with certainty everything that will happen in a given period. This mind could then not only •make Bayle's ship by first giving it the route, the direction, and the needed equipment, but could also •construct a body that could simulate a man. The difference between the two •construction jobs •is only one of degree, which •might make a difference to their probabilities, but •is no difference at all in the realm of possibilities. . . .

(In fact the world isn't composed of a finite number of atoms; rather, it is a machine each part of which is composed of a truly infinite number of devices. But it is also true that He who made it and governs it has •a perfection that is even more infinite than that because •it encompasses an infinity of possible worlds that He has in his understanding—worlds from which He selected •for creation •the one that pleased him.)

Let us get back to limited minds. Going by the odd isolated cases that we encounter, we can judge what might be done by others that we don't know about. For example,

some men can do large arithmetical calculations very quickly in their heads [and he mentions some cases. including a Swedish boy who could do such calculations though he had never been taught arithmetic. Then:] And what is a man, however excellent he may be, in comparison with all the many possible and even actual creatures?—creatures such as angels, Spirits, who might surpass us clear across the board, so that the understanding-and-reasoning gap between us and them is incomparably wider than the number-managing gap between us and the marvellous possessors of natural arithmetical ability that I have mentioned. I realize that ordinary people don't think about such matters; they lose their grip when they're asked to think about things that are very unusual, let alone ones that don't ever occur. But when we're thinking about the size and the complexity of the universe, we see things quite differently. Bayle of all people can't fail to see the soundness of this reasoning. My theory doesn't in fact depend on it, as I'll show presently; but even if it did—even if it were right to regard my theory as more surprising than the above-mentioned theory of automata. . . .—I wouldn't be at all worried by that, given that *there is no other way* of explaining things in conformity with the laws of nature. For in these matters we shouldn't be ruled by man-in-the-street notions at the expense of conclusions that are certain. And the philosophical objection to the theory of automata is not that it is strange—wildly out of the ordinary—but that it doesn't provide sources of energy; in fact, there must be such sources, i.e. entelechies [see Glossary] everywhere. Yes, *everywhere*. The author of nature creates little worlds, little indivisible active mirrors, monads, and indeed creates as many of them as he can; anyone who thinks that they are to be found only in connection with human bodies must have a *very* impoverished idea of God! It is actually impossible that these monads,

entelechies, should fail to be *everywhere*.

So far I have talked only of what a limited substance can do; when it comes to God, the story changes. Confronting an account of God's behaviour that at first glance seems impossible—namely my theory of pre-established harmony—we shouldn't infer that it actually is impossible; instead should say that God couldn't possibly act in any other way, because he is infinitely powerful and wise, and maintains order and harmony in everything as far as is possible. Moreover, something that seems so strange when taken out of context is a necessary consequence of the constitution of things; and so the universal marvel explains the particular marvel and thereby stops it from being a marvel. . . . Everything is regulated and bound together in such a way that

these infallible natural mechanisms that have been compared to ships that steer themselves to port despite all the storms and course-changes shouldn't be regarded as any stranger than a flame running along a fuse, or a liquid flowing along a channel.

Also, since bodies are not atoms, but are infinitely divisible—indeed infinitely *divided*—and since everything is filled with them, it follows that the tiniest body is affected by the smallest of changes in any of the others, however small and far away they are, so that it has to be an exact mirror of the universe. This means that a sufficiently penetrating mind could. . . see and foresee in each **corpuscle** what is happening and what will happen both in the corpuscle and outside it. So nothing happens to it, not even through a collision with other bodies, that disturbs its internal order, i.e. that doesn't follow from what is already internal to it. This is even more obvious in the case of **simple substances** or active energy-sources themselves, which I follow Aristotle in

calling 'basic entelechies' [see Glossary], and which according to me nothing can disturb.

This answers a footnote of Bayle's [page 16] in which he objects against me that since an organic body is 'composed of many substances, and each of these substances must have a source of action really distinct from that of each of the others', and since 'the action of each such source is spontaneous', it follows that their effects will...vary in infinitely many ways, because neighbouring bodies will constrain somewhat the natural spontaneity of each one.' But we must bear in mind that for all time each one has been accommodated to every other, and conducts itself in conformity with what every other will demand of it. So there is no real constraint in substances, only the external appearance of constraint. [In this next bit, Leibniz speaks of **(i)** 'points' and **(ii)** the 'lines' they move along as a metaphor for **(i)** simple substances, monads, and **(ii)** their detailed life-histories.] Because this is so, any point you take in the world moves along a predetermined line which that point has adopted once and for all, and which nothing can make it abandon. This could be expressed more clearly and precisely for people with geometrical minds, although there are infinitely more lines of this kind than a finite mind can comprehend. In fact, if the point were all alone in the world its line would be straight; as things are, it owes its shape through mechanical laws, to the collaboration of all other bodies, and it is by just that collaboration that it is pre-established. So I claim that there is no real spontaneity in a mass...; for if this point could be isolated from everything else, it would continue not in the pre-established line but in the straight tangent. [Why does the tangent come into this? Well, Leibniz is thinking of the 'point' under discussion, moving along its predetermined line and at the instant T moving around a curve; at that instant the rest of the universe is abolished; all that the 'point' can do then is to maintain the movement

it was undergoing *at that instant*; and that is movement in a straight line, the tangent to the curve. Leibniz expounds this more fully on page 19.] So strictly speaking what is spontaneous is the entelechy (of which this point is the point of view); and whereas the point—which can't look back or forward in time—can have only a tendency to move along the straight line, the tangent, the entelechy expresses the pre-established curve itself. So no change that it undergoes is 'violent' [= 'unnatural'] with regard to it.

This shows us that there's no longer any difficulty in all those marvels such as the ship that gets itself to port, the unthinking machine that performs all the actions of a man, and I don't know how many other fictions that might still be raised to make my suppositions appear unbelievable when considered out of their theoretical context. And it also shows how all the apparent strangeness vanishes when we understand that things are determined to do what they have to do. Everything that ambition etc. produces in Caesar's soul is also represented in his body... And the body is so constructed that every decision made by the soul has a bodily movement corresponding to it. This applies even to the most abstract reasonings, through the symbols that represent them to the imagination. You might think that a calculation involving $\sqrt[2]{-1}$ couldn't possibly be registered or echoed by anything in the mathematician's body, but the physical symbol ' $\sqrt[2]{-1}$ ' clearly could be so registered, and that is enough to connect the body with that bit of the calculation.

In short, all the details of what happens in the body are what they would be if •the followers of Epicurus and Hobbes were right in accepting the wicked doctrine that the soul is material, or if •man himself were only body, or an automaton. •These materialists extended to man what the Cartesians maintain regarding all other animals, since •they

have shown that man, with all his reason, does nothing that isn't a play of images, passions, and motions in the body. Philosophers have lowered themselves in trying to prove the opposite, and have only prepared the way for the triumph of error by coming at things in that way. The Cartesians came off very badly (rather like Epicurus with his 'declination' of atoms [see page 19], which Cicero made such fun of), when they maintained that although the soul couldn't make a body move it could alter its direction of movement. But it can't do either—there's no need for it to do either—and the materialists have no need to resort to any such thing. Nothing that happens on the outside of a man is capable of refuting their doctrine; and that is enough to establish one part of my theory. Some writers have pointed out to the Cartesians that their way of proving that beasts are only automata could serve to justify anyone who said 'All men except myself are also simple automata'—and that is exactly and precisely what I need for the half of my theory that concerns the body. But the Epicurean doctrine is wrong in two ways. **(1)** It is wrong in maintaining that the material world consists of atoms, because metaphysical principles establish that there are monads, of which composites—things with sizes, such as atoms would be if there were any—are only resultants, upshots. **(2)** It is wrong in maintaining that the soul is material, as is shown by the consciousness each of us has of the 'I' that is aware of what happens in his body. And perception, since it can't be explained by shapes and motions, establishes the other half of my theory: we are obliged to admit an indivisible substance in ourselves, which must itself be the source of what happens in it. This isn't merely something you should maintain about yourself and I about myself: reason holds that each of us should attribute to all other men the advantages that he has. So, according to this second half of my theory, **everything happens in the soul**

as if there were no body; just as according to the first half, **everything happens in the body as if there were no soul.**

Besides all this, I have often shown that

even in bodies, although the details can be explained mechanically, the analysis of mechanical laws and of the nature of substances eventually requires us to appeal to active indivisible sources of energy;

and that

the admirable order that we find in the material world shows that there is a universal Source with supreme intelligence and power.

And just as we can see from what is good and sound in the false and wicked doctrine of Epicurus, namely that there's no need to say that the soul changes the causal flow of the body, so it is also easy to see that there's no need for the mass of matter to send thoughts to the soul through the influence of I know not what chimerical scholastic species [see note on page 9], or for God always to act as interpreter of the body to the soul, any more than he needs to interpret the soul's wishes to the body, as the Cartesians have it; the pre-established harmony is a good spokesman for both sides. All this shows us that what is of value in the theories of Epicurus and of Plato, of the greatest materialists and the greatest idealists, is united here; and there's no longer anything surprising in it, except the sole pre-eminent perfection of the sovereign Source, now displayed in his work far beyond anything that had been thought before. So the fact that everything goes well and smoothly, that all things work together and lead each other by the hand, isn't something to wonder at once we suppose that all this was perfectly planned. What *would* be the greatest of wonders—or rather the strangest of absurdities—would be if the ship that was destined to find port, or the machine whose path was mapped out from all time, were to fail despite the work God had put in on

them. To illustrate my theory, we shouldn't take •a ship that steers itself to port but rather •a ferry that crosses a river fixed to a rope. Just as with stage-machines [= theatrical special effects] and fireworks, whose perfect operation we no longer find strange when we know how it is all done, we transfer our wonder from the invention to the inventor—just as we do nowadays when we see that the planets don't need intelligences to guide them.

Up till now I have talked almost exclusively about the objections ·to my theory· that concern the body or matter; and the only difficulty that has been raised concerns how marvelous (though also beautiful, regular, and universal) things will have to be if bodies are to agree with each other and with souls; and in my view this should count as support for my theory rather than as an objection to it. That, ·at any rate·, will be the view of people who correctly assess 'the power and intelligence of divine art'—to quote Bayle, who has also said that 'nothing can be imagined which gives such a lofty idea of the power and intelligence of the Author of all things' [page 13]. We must now turn to the soul, where Bayle has found further difficulties after what I said to remove his initial ones. He begins by comparing this completely isolated soul that isn't receiving anything from outside itself with an Epicurean atom surrounded by empty space. Indeed I do consider souls, or rather monads, as atoms of substance; ·and those are the only atoms· because in my view there are no material atoms in nature—any portion of matter, however small, still has parts.

Now, since the atom dreamed up by Epicurus has a moving force that gives it a certain direction, it will go on moving in that direction ·at that speed· if it doesn't collide with any other atom. In the same way the soul, placed in the same circumstances with nothing from outside affecting it, if it receives a feeling of pleasure it seems (according to Bayle)

that it must always retain that same feeling—for when the total cause remains the same, the effect must always remain the same. If I object that the soul should be regarded as in a state of change, so that in it the total cause *doesn't* remain the same, Bayle replies that this change must be like that of an atom moving continually along the same straight line at a uniform speed. And even if he granted that its thoughts might vary (he says), the change from one thought to the other would at least have to be *based on* something, some kinship between the two thoughts. I accept the principles these objections are based on, and I use them myself to explain my system. The state of a soul, like that of the atom, is a state of change, a tendency: the atom tends towards a change of place, the soul towards a change of thought; each of them when left to itself changes in the simplest and most uniform way that its state allows. Then why (I'll be asked) is there such simplicity in the atom's changes and such variety in the soul's? It is because the atom (the fictional atom we are discussing; there aren't any real atoms) has nothing to cause any variety in its tendency, because we are supposing that its parts don't change their relations; on the other hand, the soul is essentially •related to every other thing in the world, with the result that although it is completely indivisible it includes at each moment a multitude of thoughts each of which tends towards a particular change, and the changes are various because the tendencies are various.

Indeed, *one* of the reasons why there can't be any Epicurean atoms in nature is their lack of this •relatedness to other things; for each thing—each portion of the universe—must express all the others. The upshot of this is that the soul, because of the variety of its states, should be compared not with •a material atom but rather with •the universe that it represents according to its own point of view [see Glossary], and in a way even with •God, whose infinity it

represents finitely (because of its confused and incomplete perception of the infinite). And the reason for a change in the soul's thoughts is the same as for the change in things in the universe that it represents. For mechanical causes that are **spread out** through the world of bodies are **brought together**—concentrated, so to speak—in souls or entelechies; indeed, that's where they originate. It's true that not all entelechies are images of God, as our soul is, because they aren't all intended to be members of a society or a state of which he is the head; but they are all images of the universe. They are in their own way scaled-down worlds:

- fertile simplicities;
- unities of substance, though the multitude of their states makes them virtually infinite;
- centres of circles with an infinite circumference.

And they *must* be like this, as I have explained previously in correspondence with Arnauld [which hadn't yet been published at the time this was written]. . . .

Bayle has already recognized that I have done my best to reply to a good part of his objections. He also notes that in the system of occasional causes God has to implement his own laws, whereas in my system the soul implements them; and he objects that the soul has no tools for doing so. I reply—and I replied—that it does have them: it has its present thoughts, from which the subsequent ones are born; and one can say that in the soul as everywhere else the present is pregnant with the future.

I think Bayle will accept, and all other philosophers with him, that our thoughts are never simple, and that with some thoughts the soul can unaided pass from one to another, e.g. when it goes from premises to a conclusion, or from thoughts about an end to thoughts about the means to it. Even Malebranche agrees that the soul has some internal voluntary actions. Well, what reason is there for denying that

this is the case regarding all thoughts? Perhaps it has been denied because it has been thought that confused thoughts are completely different in **kind** from clear ones, whereas they only differ in **degree**, being less clearly marked off and less developed because there are so many of them. This has meant that certain movements that are rightly called involuntary have been attributed to the body so exclusively that they have been believed to have nothing corresponding to them in the soul; and conversely it has been thought that certain abstract thoughts aren't represented in the body. But both of these are mistaken. . . .

The most abstract thoughts need some imagination; and when we consider what confused thoughts (which invariably accompany the clearest thoughts we can have) are, we realize that they always involve the infinite—not only what happens in our body but also, through that, what happens elsewhere. Confused thoughts thus serve our purpose as the tool that seemed necessary for the soul to do what I described it as doing, much better than the legion of substances that Bayle talks about. The soul does indeed have these legions in its service, but not in its interior! For every soul or entelechy is dominant over an infinity of others that enter into the parts of its body, and every soul *has* some organised body appropriate to its present state. So the musical score that gives the soul its instructions consists in its present perceptions along with an orderly tendency to change. 'But' (says Bayle) 'would it then not be necessary that it know (distinctly) the sequence of notes, and be thinking (distinctly) about them?' [The two occurrences of 'distinctly' were added by Leibniz.] I answer No! All the soul needs is for the notes to be contained in its confused thoughts, in the way it has a thousand things in its memory without thinking of them distinctly. If entelechies knew distinctly all the infinity that they include, every entelechy would be

God! For God distinctly and perfectly expresses everything all at once—the •possible and the past, present, and future •actual. He is the universal source of everything, and created monads imitate him as far as created things can: he has made them the sources of their transitory states, which relate—more or less clearly, depending on the substance's degree of perfection—to everything. What is impossible about that? I want to see some positive argument that derives from my system a contradiction or the denial of some established truth. My thesis takes people by surprise, but *that* isn't an objection. Far from it: everyone who accepts that there are immaterial indivisible substances credits them with •having many perceptions at the same time, and with •spontaneity [see Glossary] in their reasonings and their voluntary acts. All I am doing is to extend that spontaneity to their confused and involuntary thoughts, and to show that it's the nature of every such substance to contain relations with everything external to it.

How is anyone going to prove that that's not right, and that everything in us must be distinctly understood? Isn't it true that we can't always remember even things that we know, and that which can immediately be brought back by some little reminder? Mightn't the soul contain many other kinds of thing that we can't get at so easily? . . .

When I gave substantially this response before—that confused perceptions take in everything that is external, and involve infinite relations—Bayle reported it, and rather than refuting it he said that 'this theory when it is fully developed will be the real solution to all the difficulties' [page 25]. And he does me the honour of saying that he expects that I will completely resolve the difficulties he has presented. Even if he said this only out of politeness, I would still have worked towards that goal, and I believe I have succeeded. If •I'm wrong about that, and •there is a difficulty that have walked

past without trying to solve it, that must have been because I didn't understand exactly what it *is*; with several of my solutions the hardest part of the task was to identify the problem in the first place! I would have liked to understand why anyone would think that indivisible substances couldn't have the multitude of perceptions that I suppose them to have; for I believe that even if this supposition weren't forced on us by experience and common sense, it would still be a legitimate thing to suppose. Being unable to conceive x is no proof that x is impossible, when •it isn't made clear where x conflicts with reason, and when •the difficulty is only one of imagination, and not of understanding.

[Leibniz now has a couple of pages in which he •praises Bayle for his candour in siding with Leibniz against some of the objections to his system, and •sketches some of these; •praises Bayle's sparing him any objections that also hold against other systems, and •sketches some of these also; •praises 'the fruitfulness, force, and brilliance of Bayle's thought' as evidenced in various articles in 'his excellent and rich *Dictionnaire*'; and •works in a mention of writers who have accepted and recommended Leibniz's system. The articles that he cites are on

- the Paulines (followers of a 7th-century CE theologian named Paul),
- Origen (a 3rd-century CE theologian),
- Pereira (a 16th-century CE physician, who wrote about animal souls),
- Rorarius [see page 1 above],
- Spinoza, and
- Zeno (of Elea, 5th-century BCE metaphysician of motion.

Then:]

Turning now to the articles of Bayle's that I have mentioned and whose subject is very relevant here: [**the Paulines,**

Origen] it seems that the reason why evil is permitted has to do with the eternal possibilities: a universe such as this, which has been allowed into actual existence although it allows evil, is over-all the most perfect of all the possibilities. Augustine perfectly understood the **general** point that evil is useful for •highlighting the good, and, so to speak, •helping us step back in order to make a better jump forward; but it's a mistake to follow the Stoics in trying to show **in detail** the usefulness of evil; for how can we grasp all the infinite particular facts that go into the universal harmony? . . . Nor does it seem to me that we have to deny action or power to created things on the grounds that if they produced their own states they would be *creators*. For it is God who conserves and continually creates

- their power, i.e.
- the source of within a created thing of its changes of state, i.e.
- the state of a thing from which it can be seen that it will undergo a change of state.

If that were not so, then—as I have shown elsewhere—God would have produced nothing, and there would be no substances other than God; which would bring back all the absurdities of Spinoza's God. And indeed it seems that Spinoza's error comes only from his having followed through the consequences of the doctrine that deprives created things of power and action.

[**Zeno of Elea**] I hold that time, extension, motion, and in general all forms of continuity as dealt with in mathematics, are only ideal things—i.e. they express *possibilities*, just as numbers do. . . . To say this in more detail: extension is

the order of possible items that could co-exist

whereas time is

**the order of possible items that couldn't co-exist
but are nevertheless connected.**

Thus, space concerns things that are simultaneous, i.e. exist together; time concerns things that are mutually incompatible and yet are thought of as all existent—which is what makes them successive. These orders—space and time—concern not only to •what is actual but also •what could replace an actual thing in its place in the relevant order, just as numbers hold good whatever is being counted. And this fact that they cover possibilities as well as actualities is what makes space and time smoothly continuous and infinitely divisible. Nature doesn't contain any perfectly uniform changes such as are required by the idea of motion that mathematics gives us, any more than there are actual shapes that exactly fit the ones geometry tells us about. The reason for this is that the actual world isn't indifferent about what possibilities are realized, because it is already divided into countless parts; and these divisions give rise to the phenomena that we encounter, which are varied all the way down. [Leibniz writes '*dans les moindres parties*' = 'in the smallest parts', but he can't mean that literally, because he holds that there are no smallest parts.] Nevertheless, the actual phenomena of nature are and must be organised in such a way that the law of continuity that I have introduced. . . . is never broken and that none of the other most exact mathematical rules is ever broken. Far from it: without these rules, nothing ·in the world· could ever be made intelligible. These rules, along with those of harmony or of perfection that the true metaphysic provides, are our only source of insight into the reasons and intentions of the Author of things. Because of the overwhelming multitude of infinitely complex things, we eventually get lost, and then we have to give up •applying metaphysical rules, just as we have to give up •applying mathematical rules in physics. But these •applications never mislead us: if after a careful calculation there is something wrong, that is because we didn't examine the facts closely

enough, and let some error into our premises. . . .

So mathematical meditations are *ideal*—their topic is possibilities, ideas in God's mind, not actual things—but that doesn't detract from their usefulness, because actual things can't ever go against their rules. Indeed, we can say that's what it is for phenomena to be real rather than dreams, namely their conformity to the rules of mathematics. However, mathematicians have no need at all for metaphysical discussions, and no need to puzzle over the real existence of points, indivisibles, the infinitely small, or strict infinities.

[Leibniz now embarks on two big pages of remarks about mathematics and a dozen named mathematicians—who has done well, who has been stupid or vain, who has condescended to his betters, and so on. The mathematical content of this passage focuses on Leibniz's view that in mathematics it is not hard to handle *infinity*. **(i)** Instead of talking about infinitely short lines, mathematicians can do their work the concept of a line that is as short as it needs to be for the purpose at hand. **(ii)** Calculations with infinitesimals have become possible through the differential calculus [discovered first by Newton and then later, independently and with a better notation, by Leibniz]. **(iii)** Infinitely long formulae needn't pose any

problem; for example it's a simple arithmetical truth that the infinitely long formula $1/2 + 1/4 + 1/8 + 1/16 + 1/32 + \dots$ has the sum of 1. The passage is book-ended by remarks about a letter that a man named Méré wrote to Pascal. Leibniz concedes that Méré shows some grasp of the difference between 'the visible world' and a higher 'intellectual world', but he says that Méré's errors show that he isn't properly at home in •the intellectual world, perhaps because the charms of the visible world didn't leave him with enough time to qualify for citizenship in •it. He continues:]

Bayle is right to say, with the ancients, that God is a geometer, and that mathematics is a part of the intellectual world and the best way into it. But for myself I believe that there's more to the intellectual world than mathematics. I have suggested elsewhere that there is a calculus more important than those of arithmetic and geometry, one that depends on the analysis of ideas. This would be a universal characteristic, whose construction seems to me to be one of the most important things that could be attempted. [This refers to Leibniz's plan for a rational language in which sentences would map directly and simply onto thoughts, so that reasoning could be conducted in it mechanically, like arithmetical calculation.]