

How Matter Might at first be Made

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In the fourth book of *An Essay Concerning Human Understanding* Locke hints that he could explain how God may have created matter *ex nihilo*, but refrains from doing so. Leibniz, when he came upon this passage, pricked up his ears. There ensued a sequence of personal events which are not without charm and piquancy, and a sequence of philosophical events which are of some interest. In this paper we tell the tale.

I

Locke has been discussing the view that the creation of matter out of nothing is so inconceivable—it is so utterly impossible to think of how it might be done—that not even omnipotence could bring off such a feat, and matter must therefore be co-eternal with God. After arguing that the creation of matter is not more inconceivable than that of spirits, Locke goes on to suggest that it may be less so:

Nay possibly, if we would emancipate our selves from vulgar notions, and raise our thoughts, as far as they would reach, to a closer contemplation of things, we might be able to aim at some dim and seeming conception how matter might at first be made, and

begin to exist by the power of that eternal first being; but to give beginning and being to a spirit, would be found a more inconceivable effect of omnipotent power. But this being what would perhaps lead too far from the notions, on which the philosophy now in the world is built, it would not be pardonable to deviate so far from them; or to enquire, so far as grammar it self would authorize, if the common settled opinion opposes it: especially in this place, where the received doctrine serves well enough to our present purpose, and leaves this past doubt, that the creation or beginning of anyone SUBSTANCE out of nothing, being once admitted, the creation of all other, but the CREATOR himself, may, with the same ease, be supposed.¹

Faced with this hint of a mechanism for the creation of matter, Leibniz was tantalized and exasperated; but he had a guess to offer. Having made Locke's spokesman Philalethes speak the whole of the above passage, he gives his own mouthpiece Theophilus this reply:

You have given me real pleasure, sir, by recounting something of a profound line of thought of your able author, which his over-scrupulous caution has

¹ *An Essay Concerning Human Understanding* IV.x.18. What does Locke mean by 'so far as grammar it self would authorize'? We have not been able to conjecture a satisfactory explanation.

stopped him from offering in its entirety. It would be a great pity if he suppressed it and, having brought us to a certain point with our mouths watering, left us standing there. I assure you, sir, that I believe there is something fine and important hidden under this rather enigmatic passage. The word ‘substance’ in capital letters might make one suspect that he conceives the production of matter in the manner of the production of accidents; there is not thought to be any problem about their being got from nothing. And when he distinguishes his special line of thought from ‘the philosophy which is now established in the world’ or in ‘this place on earth’, I suspect that he has the Platonists in mind: they took matter to be something fleeting and transitory, in the way accidents are, and had an entirely different idea of minds and souls.¹

Of the two quoted phrases, the former is explained by a detail in the French translation of the *Essay* on which Leibniz was relying, together with some re-arranging of words by Leibniz. The second reflects a misunderstanding by Coste, the French translator: Locke wrote ‘in this place’ meaning ‘in this place in my book’, but Coste put ‘dans cet endroit de la Terre’. Neither point matters much for the rest of the story.

Leibniz’s guess, then, is that Locke envisages matter as having the status of an accident or property or quality: if matter is adjectival upon something else (so the thought runs), then God’s creating it out of nothing is on a par with his setting a motionless thing into motion, or making a spherical thing cubic; and this is supposed to provide some idea of how the thing is done—enough of an idea, anyway, to ease the pressure towards saying that it could not be done

even by God.

To this Leibniz adds the further guess that Locke proposes to execute this manoeuvre in a manner which is platonistic, at least to the extent that it will result in matter’s being essentially ‘fleeting and transitory’.

That is how matters stand in each version of the *Nouveaux essais*, including the first draft, which seems to have been completed by May 1704.

II

At the time that Leibniz completed the first draft of the *Nouveaux essais* Locke and Coste were both living at Oates, the country home of Sir Francis and Lady Masham, Locke as a permanent guest of the Mashams and Coste as their son’s tutor. Newton, Shaftesbury, Samuel Clarke, and other members of Locke’s circle were frequent visitors there.

Lady Masham was the daughter of Ralph Cudworth, the Cambridge Platonist, and late in 1703 she sent Leibniz a copy of her father’s *True Intellectual System of the Universe*. This initiated a regular correspondence between herself and Leibniz into which he entered all the more enthusiastically because, as he told another correspondent, ‘I regard the correspondence which I am having with Lady Masham as if , partly had it with Mr. Locke himself.’² He may well have hoped by this means, as he had formerly hoped by others, to bring about a direct exchange of letters and ideas with Locke; if so he was unsuccessful—Locke remains a polite but shadowy figure in the background of Lady Masham’s letters.

Leibniz wrote Lady Masham a long letter in mid-September 1704 and then, before she had had time to reply, sent after it the following short letter, dated October 7, 1704:

¹ *Nouveaux essais sur l’entendement humain* IV.x.18, our translation.

² Letter to Thomas Burnett, August 2, 1704. In C. I. Gerhardt (ed.), *Die philosophischen Schriften von Gottfried Wilhelm Leibniz* (Berlin, 1875-1890), vol. III, pp. 297-8. Our translation from the French, as with Leibniz’s letters to Lady Masham.

I hope that the letter in which I had the honour of replying to yours of August 8 has reached you. Having now called to mind a point which I had forgotten, I wish to tell you, Madam, that I noticed in Mr. Locke's *Essay*, book 4 chapter 10, a thought which appears important, which he seems to have been unwilling to reveal to the uninitiated but which ought not to be allowed to slip through our fingers since this remarkable man is still with us. It concerns the way of conceiving how matter has been made, and how it is more difficult to make spirits. Which does appear important in getting to the root of things. Your credit with him makes me hope that we can draw on it to obtain some light through your mediation. I would be delighted if the light could spread as far as me; and I am with respect etc.¹

Lady Masham's reply is dated November 24, 1704. After an apology for tardiness she continues:

Yours of the 16th September came not to my hands till our 31 of October: the day wherein was performed the last office to one that had been my friend above half my life time. Mr. Locke I mean.²

Locke had died at Oates on October 28, 1704. Lady Masham tells Leibniz of what Locke has meant to her, and excuses herself from taking up the philosophical points in his long letter, on the ground that the recent loss of her 'extraordinary friend' 'unfits me yet for other thought than such as the heart dictates'. She does, however, address herself to the inquiry about the creation of matter:

Your second letter came to my hands but two days since. I have no remembrance of it at present if

Mr. Locke has ever explained to me his thoughts concerning the production of matter. That this is less inconceivable than the creation of an immaterial substance was what I imagined before I knew Mr. Locke, which has made me perhaps more inadvertent than I should else have been to what he intimates in the chapter you cite.

In short, she has no light to transmit.

Leibniz offers his condolences in a letter dated July 10, 1705, and goes on:

I am very sorry that he has taken away with him the notion which he himself said was so different from the one we now have, and which led him to think that the creation of an immaterial substance is less conceivable. To my mind, however, it is just the opposite: since bodies cannot even be substances strictly so-called, in that they are always collections or mere resultants of simple substances or true monads, which cannot be extended and consequently cannot be bodies. So that bodies presuppose immaterial substances.³

To this he adds the following remark:

Your kindness, Madam, and Mr. Locke's, had persuaded me to set out systematically the problems I had encountered in reading his excellent *Essay*, but his death has disheartened me, since it has prevented me profiting from his elucidations.

Whether for this or for other reasons, at about this time Leibniz abandoned his intention of publishing the *Nouveaux essais*, when only the final corrections remained to be made.

¹ Ibid., p. 364.

² Ibid., p. 365.

³ Ibid., pp. 367-8.

III

The story picks up again in 1729, thirteen years after Leibniz's death, with the second edition of Coste's translation of the *Essay*. This has a long footnote to IV.x.18, keyed to the end of the sentence corresponding to '... a more inconceivable effect of omnipotent power'. The footnote starts thus:

Here Mr. Locke arouses our curiosity but is unwilling to satisfy it. Within a short time after my translation appeared, many people who supposed that he had told me this way of explaining the creation of matter asked me to divulge it to them; but I had to confess to them that Mr. Locke had kept it a secret even from me. Eventually, long after his death, the whole mystery was unveiled for me by Sir Isaac Newton, to whom I happened to mention this part of Mr. Locke's book. Smiling, he told me firstly that it was he himself who had devised this way of explaining the creation of matter, the thought of it having come to him one day when he happened to touch on this question in company with Mr. Locke and an English lord who is full of life and is as distinguished for his breadth of understanding as by his birth.¹

Here is how he expounded his thought to them. One could (he said) in some fashion form an idea of the creation of matter by supposing that God could through his power prevent everything from entering a certain portion of pure space, space being by its

nature penetrable, eternal, necessary, infinite; for thereafter that portion of space would possess impenetrability, which is one of the essential qualities of matter. And as pure space is absolutely uniform, we have only to suppose God to have communicated this kind of impenetrability to another similar portion of space, and that would give us some sort of idea of the mobility of matter, another quality which is also utterly essential to it. So now we are freed from the search for what Locke had thought fit to hide from his readers.²

This makes it clear that one half of Leibniz's guess was correct: the basic idea was indeed to treat matter as an 'accident', or as adjectival upon something else; for the creation of matter was to consist in the altering of portions of space.

There seems to be nothing platonistic about the view that matter is an accident of space, though; nor is matter made out to be 'fleeting and transitory' by Newton's proposal ('thereafter that portion of space would possess impenetrability'). So the second half of Leibniz's guess was wrong.

IV

There is no evidence that this proposal of Newton's ever came to Leibniz's attention. Still, we can say with some confidence what his attitude to it would have been.

He could have rejected it as inconsistent with his own fundamental doctrine about the nature of matter. In Leibniz's

¹ A later reprinting, which omits the description of the English lord as '*plein de vie*' and the reference to '*l'étendue de ses lumières*', has a marginal note identifying him as 'the late Count of Penbrocke, who died in February of the present year, 1738'. If we allow for a certain confusion as to English names and titles and for a mix-up over the date—no Earl of Pembroke died between 1733 and 1751—it seems likely that the lord was Locke's long-time friend, Thomas Herbert, 8th Earl of Pembroke and President of the Royal Society, to whom he dedicated the *Essay*, and who died on 22 January 1733.

² From the second edition of Coste's translation of Locke, *Essai philosophique concernant l'entendement humain*; our translation.

system, matter, though still a kind of ‘accident’, is adjectival not upon space but upon the mind-like monads which somehow underlie it. The Newton proposal though it does not entail does at least allow that the creation of immaterial substances is ‘more inconceivable’ than that of matter, and Leibniz regarded that—as he wrote to Lady Masham—as ‘just the opposite’ of the truth.

There is also another element in Leibniz’s thinking—a less deeply structural one, no doubt, but still firm and considered—which conflicts with the Newton proposal about the creation of matter. The point is that the proposal assumes that portions of space could exist prior to the existence of anything in space. But in his correspondence with Samuel Clarke, Leibniz had vigorously argued, in opposition to the general Newtonian position, that space is nothing but a system of relations among co-existing bodies and that without bodies space would be nothing but the possibility of placing them.¹

V

One need not call upon specifically Leibnizian doctrines in order to criticize Newton’s proposal. Suppose that Leibniz is wrong about the fundamental nature of matter (as no doubt he is), and suppose that he is also wrong to reject the concept of pure unoccupied space (as some people think he is): Newton’s proposal still won’t do.

A portion of space is to be rendered ‘impenetrable’—but impenetrable to what? The answer must be ‘impenetrable to matter’, and then the trouble starts. There may be a circularity defect: ‘matter’ is introduced through ‘impenetrability’, which in turn must be explained through ‘matter’. But let us not press that point: there are honest conceptual

circles as well as vicious ones, and it is not clear that this one is vicious. So let us allow the answer ‘impenetrable to matter, and in a moment you will know what that is’. But the matter to which the region of space is impenetrable must be matter of the sort (or ‘matter’ in the sense) that is being introduced through the Newtonian proposal; for otherwise we shall have two sorts of matter (or senses of ‘matter’), and we shan’t know where we are. But a ‘portion of matter’ in the sense of the Newtonian proposal is an impenetrable region of space; and so when in this account any region of space is rendered impenetrable, what happens is that it is made invulnerable to invasion by other impenetrable regions of space. But this is a vacuous exercise of God’s power—a purely idle exercise—because on any tolerable theory and certainly on Newton’s it is of the essence of space that no part of it can overlap or intrude into any other part of it. So the alleged making-impenetrable has no effect at all; we are left with nothing but ‘pure space’; and so the endeavour to describe a creation of matter has failed.

Our objection can be made clearer by considering a somewhat more generous variant of Newton’s account, which is not open to the same objection. Suppose that, in place of impenetrability, God were to avail himself of two distinct, logically compatible, not obviously relational properties—such as redness and warmth—and were to suffuse one portion of space with one of these and another with the other. He could then move each of these two ‘property-volumes’ to other portions of space, as Newton suggests. That these two property-volumes are impenetrable, one to the other, will then consist in the fact that God never moves both of them into the same or overlapping portions of space—never brings it about that one and the same spatial point is simultane-

¹ See G. H. Alexander (ed.), *The Leibniz-Clarke Correspondence* (Manchester, 1956), Leibniz’s third letter, Section. 5.

ously characterized by both properties. Our objection to Newton's account is that he attempts to make the 'quality' of impenetrability do both the jobs just described: mark off one or more portions of space, as suffused by a property not possessed by pure space; and express his resolve never to move two suffusions into the same portion of space. But impenetrability can only do the second job—unless of course God also provides bits of matter of some other sort to bounce off regions suffused by impenetrability.

The job might even be done by a single property, *F*, if it was nonrelational and admitted of degrees of intensity. For then the mutual impenetrability of *F*-volumes could consist in there never being a reduction in the extent of *F*-space with a corresponding increase in the intensity of *F*ness of some regions of space (e.g. two cubic yards of washed-out redness never merge to form one cubic yard of intense redness). One might try to rescue Newton's proposal in this way, allowing impenetrability—construed in terms of difficulty rather than impossibility of entering—to have degrees of intensity. But this won't work. It tries to get the impenetrability of property-volumes with respect to one another out of facts about various regions' degrees of impenetrability—but this latter occurrence of 'impenetrability' has to be given some other, independent explanation, before anything can be based upon it. And Newton's proposal does not have the resources for any such explanation. The proposal, in short, attempts the impossible, namely the use of a relational property to launch an ontology.

These objections by no means imply that there is no coherent way of representing the creation of matter as a procedure of modifying space, endowing it with 'accidents'. What they imply is just that Newton, if Coste has reported him accurately and fully, did not find such a way.

VI

Coste's report may well be adequate. There is a manuscript in which Newton describes how God might have created things 'similar in every way to bodies' which 'we can hardly say' are not bodies, and here too the essence of the proposal is that God might endow certain regions of space with impenetrability.¹ Newton suggests that we might define bodies as 'determined quantities of. . . extension. which. . . God endows with [mobility, impenetrability and perceptibility]'.
 To his mention of 'mobility' he appends the comment: 'and therefore I did not say that they are numerical parts of space which are absolutely immobile, but only definite quantities which may be transferred from space to space.' Quantities of what? If Newton gives an answer, it must be 'quantities of extension'; but what could it mean to say that a particular 'quantity of extension' might be 'transferred from space to space'? Perhaps at the back of his mind Newton has the following idea. If *F* is a property which some regions of space are suffused with, God might ensure that the total quantity of *F*-suffused space is constant, while allowing changes in which regions have *F*. If those changes satisfied an appropriate continuity condition, the upshot

¹ The manuscript was brought to our attention by John Yolton. Ostensibly 'on the gravity and equilibrium of fluids', but really about many things, it is published in Latin and English by A.R. Hall and M.B. Hall (eds.), *Unpublished Scientific Papers of Isaac Newton* (Cambridge, 1962). The English text is on pp: 121-156, and the part which concerns us on pp. 138-145. Our quotations from the manuscript are all from pp. 139f. If it was written before 1672, as the Halls think it probably was, then 'the thought' of Newton's proposal cannot have 'come to him' when in conversation with Locke and the Earl of Pembroke, since 1672 is too early by several years for Locke to be in conversation with either Pembroke or Newton.
[added in 2012:] A readable version of this beautiful paper of Newton's can be found at www.earlymoderntexts.com.]

would be a kind of mobility for F-volumes—i.e. for amounts or ‘quantities’ of F-suffusion—with no implication that parts of space can themselves move. That is the best we can do to rescue what Newton says about mobility; and it seems all right, if we have a suitable F to work with.

But Newton’s F is impenetrability, and he has no legitimate way of introducing it into the framework of his proposal. It in fact enters as a natural by-product of an innocent feature of his exposition. Before moving to the proposal that the whole material realm might be viewed in this way, Newton tries to make convincing the idea that if we did encounter an impenetrability-volume—merely as something added to the world we in fact know—we should naturally regard it as a body:

God, by the sole action of thinking and willing, can prevent a body from penetrating any space defined by certain limits. If he should exercise this power, and cause some space projecting above the earth, like a mountain or any other body, to be impervious to bodies and thus to stop or reflect light and all impinging things, it seems impossible that we should not consider this space to be truly body. . .

This is easy enough to understand, but only because it describes the addition of an impenetrability-volume to a world which already contains bodies. So it will not serve as a basis for any proposal about the whole material realm, e.g. one about ‘how matter might at first be made’. Newton simply fails to see this. In a striking pair of sentences he winds up his remarks about the similarity to bodies of the added impenetrability-volumes, and then moves straight on to the grand proposal that this might be a total theory about what bodies are:

If several spaces of this kind should be impervious to bodies and to each other, they would all sustain

the vicissitudes of corpuscles and exhibit the same phenomena [as corpuscles do]. And so if all this world were constituted of this kind of being, it would hardly seem any different.

Between those two sentences Newton glides across the chasm.

VII

Coste was a fine translator, and did the discipline great service. Perhaps we should hear him out when, unusually, he offers a philosophical opinion. In his long footnote he says:

Speaking for myself, if I may be allowed to say freely what I think, I do not see how these two suppositions [of Newton’s] can help us to conceive the creation of matter. As I see it, they no more help with that than a bridge helps to make the water flowing immediately beneath it impenetrable to a cannon-ball which falls perpendicularly from a height of about 100 feet onto the bridge and is stopped by it from passing through to the water flowing directly below. In that case, the water remains liquid and penetrable by the cannon-ball, although the solidity of the bridge prevents the ball from falling into the water. Similarly, the power of God may ensure that nothing enters a certain portion of space but it does not thereby alter the nature of that portion of space. The latter remains for ever penetrable, like every other portion of space, and so this obstacle does not result in its acquiring the slightest degree of that impenetrability which is essential to matter.

This picture of the cannon-ball bouncing off the bridge depicts a part of the world (the water under the bridge)

which is known to be penetrable by cannon-balls from other directions and by other things from all directions, and which is known to be protected from directly-falling cannon balls by a perceptible, independently identifiable physical object. None of this need have analogues in Newton's proposal, which can (and in Newton's mind presumably did) involve the idea of a region of space becoming impenetrable through and through, in every part, to everything which might impinge upon it from any angle. When the proposal is taken in that form, it is not obvious that the conceptual gap alleged by Coste really exists.¹

VIII

Newton says, in effect, 'The existence of a portion of matter

could consist in the impenetrability of a region of space.' Leibniz would say 'I don't know what you can mean in this context by "region of space".' We have said 'Even if we understand "region of space", we don't know what you can mean in this context by "impenetrable".' Coste says 'I know quite well what you mean by "impenetrable region of space", and I declare that this is a quite different concept from that of "portion of matter".'

Leibniz hits the target, but from a dangerously exposed position. We hit it, we think, without assuming anything very disputable. Coste's position is safer still, perhaps, but only because he has withdrawn so far that the target is out of his range—at least out of range of the cannonball which seems to be his only missile.

¹ For what seems to be a contemporary instance of Coste's kind of mistake, see P. F. Strawson, *The Bounds of Sense* (London, 1966), p. 184; and for a discussion of it see J. Bennett, *Kant's Dialectic* (Cambridge, 1974), p. 172.