

showed that a more elevated metaphysics and ethics, that is, a more elevated natural theology and an eternal and divine jurisprudence can be established, and that from the known causes of things is derived a knowledge of true happiness.

From the Letters to Clarke (1715–16)⁴³⁰

The rivalry between Leibniz and Newton is celebrated. Yet Leibniz never managed to start a genuine and extended exchange of views with the great English physicist; the correspondence with Samuel Clarke, Newton's friend and the translator into Latin of his Opticks, was as close as Leibniz got. The correspondence began in November 1715, with a letter to Caroline, Princess of Wales, whom Leibniz had known in Hanover. Caroline showed the letter to Clarke, and the exchange of letters began. The letters continued until Leibniz's death, Leibniz and Clarke each contributing five papers. While Newton was not officially involved in the exchange, he almost certainly had a hand in preparing some of Clarke's replies. The entire exchange was published in English, with French on facing pages, by Clarke in 1717, shortly after Leibniz's death. The translation below is a slightly updated version of the translation Clarke published. Leibniz's first four papers are given in their entirety; the fifth is abridged.

I. Leibniz's First Paper, Being an Extract of a Letter (November 1715)

1. NATURAL RELIGION itself seems to decay [in England] very much. Many will have human souls to be material; others make God himself a corporeal being.
2. Mr. Locke and his followers are uncertain, at least, whether the soul is not material and naturally perishable.
3. Sir Isaac Newton says that space is an organ which God makes use of to perceive things by. But if God stands in need of an organ to perceive things by, it will follow that they do not depend altogether on him, nor were produced by him.
4. Sir Isaac Newton and his followers also have a very odd opinion concerning the work of God. According to them, God Almighty needs to wind up his watch from time to time,⁴³¹ otherwise it would cease to move. He had not, it seems, sufficient foresight to make it a perpetual motion. No, the machine of God's making is so imperfect, according to these gentlemen, that he is obliged

430. G VII 352, 357–59, 363–66, 371–78, 393–406, 415–20; ALC; RLC.

431. Leibniz here calls attention to a passage in Newton's *Opticks*, p. 402, in which Newton intimates that there are regularities in planetary motions caused by the (gravitational) interaction of the planets with one another, and that these irregularities will increase "till this system wants a reformation."

to clean it now and then by an extraordinary concourse, and even to mend it, as a clockmaker mends his work, who must consequently be so much the more unskillful a workman as he is more often obliged to mend his work and to set it right. According to my opinion, the same force and vigor remains always in the world and only passes from one part of matter to another agreeably to the laws of nature and the beautiful pre-established order. And I hold that when God works miracles, he does not do it in order to supply the wants of nature, but those of grace. Whoever thinks otherwise must needs have a very mean notion of the wisdom and power of God.

II. Leibniz's Second Letter

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• IT IS RIGHTLY observed in the paper delivered to the Princess of Wales, which Her Royal Highness has been pleased to communicate to me, that next to corruption of manners, the principles of the materialists do very much contribute to keep up impiety. But I believe that one has no reason to add that the mathematical principles of philosophy are opposite to those of the materialists. On the contrary, they are the same, only with this difference—that the materialists, in imitation of Democritus, Epicurus, and Hobbes, confine themselves altogether to mathematical principles and admit only bodies, whereas the Christian mathematicians admit also immaterial substances. Wherefore, not mathematical principles (according to the usual sense of that word) but *metaphysical principles* ought to be opposed to those of the materialists. Pythagoras, Plato, and Aristotle in some measure had a knowledge of these principles, but I claim to have established them demonstratively in my *Theodicy*, though I have done it in a popular manner. The great foundation of mathematics is the *principle of contradiction or identity*, that is, that a proposition cannot be true and false at the same time, and that therefore A is A and cannot be not A. This single principle is sufficient to demonstrate every part of arithmetic and geometry, that is, all mathematical principles. But in order to proceed from mathematics to natural philosophy, another principle is required, as I have observed in my *Theodicy*; I mean the *principle of sufficient reason*, namely, that nothing happens without a reason why it should be so rather than otherwise. And therefore Archimedes, being desirous to proceed from mathematics to natural philosophy, in his book *De aequilibrio*, was obliged to make use of a particular case of the great principle of sufficient reason. He takes it for granted that if there is a balance in which everything is alike on both sides, and if equal weights are hung on the two ends of that balance, the whole will be at rest. That is because no reason can be given why one side should weigh down rather than the other.⁴³² Now by that single principle, namely, that there ought to be a sufficient reason why things should be so and not otherwise, one may demonstrate the being of God and all the other parts of metaphysics or natural theology and even, in some measure,

432. See Archimedes, *On the Equilibrium of Planes*, book I, postulate 1, in Heath, *The Works of Archimedes*, p. 189.

those principles of natural philosophy that are independent of mathematics; I mean the dynamic principles or the principles of force.

2. The author proceeds and says that according to the *mathematical principles*, that is, according to Sir Isaac Newton's philosophy (for *mathematical principles* determine nothing in the present case), matter is the most inconsiderable part of the universe. The reason is because he admits empty space besides matter and because, according to his notions, matter fills up a very small part of space. But Democritus and Epicurus maintained the same thing; they differed from Sir Isaac Newton only as to the quantity of matter, and perhaps they believed there was more matter in the world than Sir Isaac Newton will allow; wherein I think their opinion ought to be preferred, for the more matter there is, the more God has occasion to exercise his wisdom and power. This is one reason, among others, why I maintain that there is no void at all.

3. I find, in express words in the Appendix to Sir Isaac Newton's *Opticks*, that space is the sensorium of God.⁴³³ But the word 'sensorium' has always signified the organ of sensation. He and his friends may now, if they think fit, explain themselves quite otherwise; I shall not be against it.

4. The author supposes that the presence of the soul is sufficient to make it consciously perceive what passes in the brain. But this is the very thing which Father Malebranche and all the Cartesians deny; and they rightly deny it.⁴³⁴ More is required besides bare presence to enable one thing to represent what passes in another. Some communication that may be explained, some sort of influence, or a common source [*cause*] is requisite for this purpose. Space, according to Sir Isaac Newton, is intimately present to the body contained in it and commensurate with it. Does it follow from thence that space perceives consciously what passes in a body and remembers it when that body is gone away? Besides, the soul being indivisible, its immediate presence, which may be imagined in the body, would only be in one point. How then could it perceive consciously what happens out of that point? I claim to be the first who has shown how the soul perceives consciously what passes in the body.

5. The reason why God perceives everything consciously is not his bare presence, but also his operation. It is because he preserves things by an action which continually produces whatever is good and perfect in them. But the soul having no immediate influence over the body, nor the body over the soul, their mutual correspondence cannot be explained by their being present to each other.

6. The true and principal reason why we commend a machine is rather taken from the effects of the machine than from its cause. We don't inquire so much about the power of the artist as we do about his skill in his workmanship. And therefore, the reason alleged by the author for extolling God's machine, that he made it entirely, without borrowing any materials from outside—that

433. See the *Opticks*, p. 403.

434. Malebranche and other later Cartesians argued that brain events do not cause sensations in the mind, strictly speaking. Rather, the claim is that it is God who causes sensations in minds on the occasion of certain brain events. This is one feature of the so-called doctrine of occasionalism. See, e.g., Malebranche, *Search after Truth*, pp. 446–52.

reason, I say, is not sufficient. It is a mere shift the author has been forced to have recourse to, and the reason why God exceeds any other artisan is not only because he makes the whole, whereas all other artisans must have matter to work upon. This excellency in God would only be on the account of power. But God's excellency also arises from another cause, namely, wisdom, whereby his machine lasts longer and moves more regularly than those of any other artisan whatsoever. He who buys a watch does not mind whether the workman made every part of it himself, or whether he got the several parts made by others and only put them together—provided the watch goes right. And if the workman had received from God even the gift of creating the matter of the wheels, yet the buyer of the watch would not be satisfied unless the workman had also received the gift of putting them well together. In like manner, he who will be pleased with God's work cannot be so without some other reason than that which the author has here alleged.

7. Thus the skill of God must not be inferior to that of a workman; no, it must go infinitely beyond it. The bare production of everything would indeed show the power of God, but it would not sufficiently show his wisdom. They who maintain the contrary will fall exactly into the error of the materialists and of Spinoza, from whom they profess to differ. They would, in such case, acknowledge power but not sufficient wisdom in the principle or cause of things.

8. I do not say the material world is a machine or watch that goes without God's interposition, and I have sufficiently insisted that creatures need his continual influence. But I maintain it to be a watch that goes without needing to be mended by him; otherwise we must say that God revises himself. No, God has foreseen everything. He has provided a remedy for everything beforehand. There is in his works a harmony, a beauty, already pre-established.

9. This opinion does not exclude God's providence or his government of the world; on the contrary, it makes it perfect. A true providence of God requires a perfect foresight. But then it requires, moreover, not only that he should have foreseen everything but also that he should have provided for everything beforehand with proper remedies; otherwise he must either want wisdom to foresee things or power to provide for them. He will be like the God of the Socinians who lives only from day to day, as Mr. Jurieu says. Indeed, God, according to the Socinians, does not so much as foresee inconveniences, whereas the gentlemen I am arguing with, who oblige him to mend his work, say only that he does not provide against them.⁴³⁵ But this seems to me to still be a very great imperfection. According to this doctrine, God must either want power or good will.

10. I don't think I can be rightly blamed for saying that God is *intelligentia*

435. Socinianism was a rationalistic movement in theology, a forerunner of unitarianism, founded by Laelius Socinus (1525–62) and his nephew Faustus Socinus (1539–1604). Socinus held a variety of heterodox views on the Trinity, the divinity of Christ, and the immortality of the soul. By the later seventeenth century, the term was used quite broadly to cover a multitude of unorthodoxies.

supramundana. Will they say that he is *intelligentia mundana*, that is, the soul of the world? I hope not. However, they will do well to take care not to fall into that notion unawares.

11. The comparison of a king under whose reign everything should go on without his interposition is by no means to the present purpose, since God continually preserves everything and nothing can subsist without him. His kingdom therefore is not a nominal one. It is just as if one should say that a king who should originally have taken care to have his subjects so well raised, and should, by his care in providing for their subsistence, preserve them so well in their fitness for their several stations and in their good affection toward him, as that he should have no occasion ever to be amending anything among them, would be only a nominal king.

12. To conclude. If God is obliged to mend the course of nature from time to time, it must either be done supernaturally or naturally. If it is done supernaturally, we must have recourse to miracles in order to explain natural things, which is reducing a hypothesis *ad absurdum*, for everything may easily be accounted for by miracles. But if it is done naturally, then God will not be *intelligentia supramundana*; he will be comprehended under the nature of things, that is, he will be the soul of the world.

1. III. Leibniz's Third Paper

ACCORDING TO the usual way of speaking, *mathematical principles* concern only pure mathematics, namely, numbers, figures, arithmetic, geometry. But *metaphysical principles* concern more general notions, such as cause and effect.

2. The author grants me this important principle, that nothing happens without a sufficient reason why it should be so rather than otherwise. But he grants it only in words and in reality denies it. This shows that he does not fully perceive the strength of it. And therefore, he makes use of an instance, which exactly falls in with one of my demonstrations against real absolute space, the idol of some modern Englishmen. I call it an idol, not in a theological sense, but in a philosophical one, as Chancellor Bacon says that there are idols of the tribe and idols of the cave.⁴³⁶

3. These gentlemen maintain, therefore, that space is a real absolute being. But this involves them in great difficulties, for it appears that such a being must be eternal and infinite. Hence some have believed it to be God himself, or one of his attributes, his immensity. But since space consists of parts, it is not a thing which can belong to God.

4. As for my own opinion, I have said more than once that I hold space to be something merely relative, as time is, that I hold it to be an order of coexistences, as time is an order of successions. For space denotes, in terms of possibility, an order of things which exist at the same time, considered as existing together, without entering into their particular manners of existing.

436. See Bacon, *New Organon*, book I, aphorisms 41–42.

And when many things are seen together, one perceives this order of things among themselves.

5. I have many demonstrations to confute the fancy of those who take space to be a substance, or, at least, an absolute being. But I shall only use, at present, one demonstration, which the author here gives me occasion to insist upon. I say, then, that if space were an absolute being, something would happen for which it would be impossible that there should be a sufficient reason—which is against my axiom. And I can prove it thus. Space is something absolutely uniform, and without the things placed in it, one point of space absolutely does not differ in anything from another point of space. Now, from hence it follows (supposing space to be something in itself, besides the order of bodies among themselves) that is impossible there should be a reason why God, preserving the same situations of bodies among themselves, should have placed them in space after one certain particular manner and not otherwise—why everything was not placed the quite contrary way, for instance, by changing east into west. But if space is nothing else but this order or relation, and is nothing at all without bodies but the possibility of placing them, then those two states, the one such as it is now, the other supposed to be the quite contrary way, would not at all differ from one another. Their difference therefore is only to be found in our chimerical supposition of the reality of space in itself. But in truth, the one would exactly be the same thing as the other, they being absolutely indiscernible, and consequently there is no room to inquire after a reason for the preference of the one to the other.

6. The case is the same with respect to time. Supposing anyone should ask why God did not create everything a year sooner, and the same person should infer from this that God has done something concerning which it is not possible that there should be a reason why he did it so and not otherwise; the answer is that his inference would be right if time was anything distinct from things existing in time. For it would be impossible that there should be any reason why things should be applied to such particular instants rather than to others, their succession continuing the same. But then the same argument proves that instants, considered without the things, are nothing at all and that they consist only in the successive order of things; this order remaining the same, one of the two states, namely, that of a supposed anticipation, would not at all differ, nor could be discerned from the other which now is.

7. It appears from what I have said that my axiom has not been well understood and that the author denies it, though he seems to grant it. It is true, says he, that there is nothing without a sufficient reason why it is, and why it is thus rather than otherwise, but he adds that this sufficient reason is often the simple or mere will of God—as when it is asked why matter was not placed otherwise in space, the same situations of bodies among themselves being preserved. But this is plainly to maintain that God wills something without any sufficient reason for his will, against the axiom or the general rule of whatever happens. This is falling back into the loose indifference which I have amply refuted and showed to be absolutely chimerical, even in creatures, and contrary to the wisdom of God, as if he could operate without acting by reason.

8. The author objects against me that, if we don't admit this simple and mere will, we take away from God the power of choosing and bring in a fatality. But quite the contrary is true. I maintain that God has the power of choosing, since I ground that power upon the reason of a choice agreeable to his wisdom. And it is not this fatality (which is only the wisest order of providence) but a blind fatality or necessity void of all wisdom and choice which we ought to avoid.

9. I had observed that by lessening the quantity of matter, the quantity of objects upon which God may exercise his goodness will be lessened. The author answers that instead of matter there are other things in the void on which God exercises his goodness. Be it so, though I don't grant it, for I hold that every created substance is attended with matter. However, let it be so. I answer that more matter was consistent with those same things, and consequently the said objects will still be lessened. The instance of a greater number of men or animals is not to the purpose, for they would fill up place in exclusion of other things.

10. It will be difficult to make me believe that sensorium does not, in its usual meaning, signify an organ of sensation. See the words of Rudolphus Goclenius in his *Dictionarium philosophicum* under *sensiterium*. "Barbarum Scholasticorum," says he, "qui interdum sunt simae Graecorum. Hi dicunt *aitheterion*. Ex quo illi fecerunt *sensiterium* pro sensorio, id est, organo sensationis."⁴³⁷

11. The mere presence of a substance, even an animated one, is not sufficient for perception. A blind man, and even someone distracted, does not see. The author must explain how the soul perceives what is outside itself.

12. God is not present to things by situation but by essence; his presence is manifest by his immediate operation. The presence of the soul is quite of another nature. To say that it is diffused all over the body is to make it extended and divisible. To say it is, the whole of it, in every part of the body is to make it divisible of itself. To fix it to a point, to diffuse it all over many points, are only abusive expressions, idols of the tribe.⁴³⁸

13. If active force should diminish in the universe by the natural laws which God has established, so that there should be need for him to give a new impression in order to restore that force, like an artisan's mending the imperfections of his machine, the disorder would not only be with respect to us but also with respect to God himself. He might have prevented it and taken better measures to avoid such an inconvenience, and therefore, indeed, he has actually done it.

14. When I said that God has provided remedies beforehand against such disorders, I did not say that God suffers disorders to happen and then finds

437. Goclenius, *Lexicon Philosophicum* (1613). Goclenius was a standard reference work for seventeenth-century school philosophers, an alphabetical compendium of standard definitions and distinctions. The passage translates: "[*Sensiterium* is] a barbarism due to the Schoolmen, who sometimes aped the Greeks. The Greeks said '*aitheterion*,' from which the Schoolmen made up '*sensiterium*,' in place of '*sensorium*,' that is, the organ of sensation."

438. See Bacon, *New Organon*, book I, aphorism 41.

remedies for them, but that he has found a way beforehand to prevent any disorders happening.

15. The author strives in vain to criticize my expression that God is *intelligencia supramundana*. To say that God is above the world is not denying that he is in the world.

16. I never gave any occasion to doubt but that God's conservation is an actual preservation and continuation of the beings, powers, orders, dispositions, and motions [of all things], and I think I have perhaps explained it better than many others. But, says the author, this is all I contended for. To this I answer, your humble servant for that, Sir. Our dispute consists in many other things. The question is whether God does not act in the most regular and most perfect manner; whether his machine is liable to disorder, which he is obliged to mend by extraordinary means; whether the will of God can act without reason; whether space is an absolute being; also concerning the nature of miracles; and many such things, which make a wide difference between us.

17. Theologians will not grant the author's position against me, namely, that there is no difference, with respect to God, between natural and supernatural; and it will be still less approved by most philosophers. There is an infinite difference between these two things, but it plainly appears that it has not been duly considered. The supernatural exceeds all the powers of creatures. I shall give an instance which I have often made use of with good success. If God wanted to cause a body to move free in the aether round about a certain fixed center, without any other creature acting upon it, I say it could not be done without a miracle, since it cannot be explained by the nature of bodies. For a free body naturally recedes from a curve in the tangent. And therefore, I maintain that the attraction of bodies, properly so called, is a miraculous thing, since it cannot be explained by the nature of bodies.

IV. Leibniz's Fourth Letter

1. • IN THINGS absolutely indifferent there is no foundation for choice,⁴³⁹ and consequently no election or will, since choice must be founded on some reason or principle.

2. A mere will without any motive is a fiction, not only contrary to God's perfection, but also chimerical and contradictory, inconsistent with the definition of the will, and sufficiently confuted in my *Theodicy*.

3. It is an indifferent thing to place three bodies, equal and perfectly alike, in any order whatsoever, and consequently they will never be placed in any order by him who does nothing without wisdom. But then, he being the author of things, no such things will be produced by him at all, and consequently, there are no such things in nature.

4. There is no such thing as two individuals indiscernible from each other. An ingenious gentleman of my acquaintance, discoursing with me in the presence of Her Electoral Highness, the Princess Sophia, in the garden of

439. In Leibniz's original, the claim is that "there is no choice at all."

Herrenhausen, thought he could find two leaves perfectly alike. The princess defied him to do it, and he ran all over the garden a long time to look for some; but it was to no purpose. Two drops of water or milk, viewed with a microscope, will appear distinguishable from each other. This is an argument against atoms, which are confuted, as well as the void, by the principles of true metaphysics.

5. Those great principles of sufficient reason and of the identity of indiscernibles change the state of metaphysics. That science becomes real and demonstrative by means of these principles, whereas before it did generally consist in empty words.

6. To suppose two things indiscernible is to suppose the same thing under two names. And therefore the hypothesis that the universe could have had at first another position of time and place than that which it actually had, and yet that all the parts of the universe should have had the same situation among themselves as that which they actually had—such a supposition, I say, is an impossible fiction.

7. The same reason which shows that extramundane space is imaginary proves that all empty space is an imaginary thing, for they differ only as greater and less.

8. If space is a property or attribute, it must be the property of some substance. But of what substance will that bounded empty space be an affection or property, which the persons I am arguing with suppose to be between two bodies?

9. If infinite space is immensity, finite space will be the opposite to immensity, that is, it will be mensurability, or limited extension. Now extension must be the affection of something extended. But if that space is empty, it will be an attribute without a subject, an extension without anything extended. Wherefore, by making space a property, the author falls in with my opinion, which makes it an order of things and not anything absolute.

10. If space is an absolute reality, far from being a property or an accident opposed to substance, it will have a greater reality than substances themselves. God cannot destroy it, nor even change it in any respect. It will be not only immense in the whole but also immutable and eternal in every part. There will be an infinite number of eternal things besides God.

11. To say that infinite space has no parts is to say that it is not composed of finite spaces, and that infinite space might subsist though all finite space should be reduced to nothing. It would be as if one should say, in accordance with the Cartesian supposition of a material extended unlimited world, that such a world might subsist, though all the bodies of which it consists should be reduced to nothing.

12. The author attributes parts to space, on page 19 of the third edition of his *Defense of the Argument against Mr. Dodwell*, and makes them inseparable one from another. But on page 30 of his *Second Defense* he says they are parts improperly so called—which may be understood in a good sense.

13. To say that God can cause the whole universe to move forward in a right line or in any other line, without otherwise making any alteration in it, is

another chimerical supposition. For two states indiscernible from each other are the same state, and consequently, it is a change without any change. Besides, there is neither rhyme nor reason in it. But God does nothing without reason, and it is impossible that there should be any here. Besides, it would be *agendo nihil agere*, as I have just now said, because of the indiscernibility.

14. These are idols of the tribe, mere chimeras, and superficial imaginations. All this is only grounded upon the supposition that imaginary space is real.⁴⁴⁰

15. It is a like fiction, (that is) an impossible one, to suppose that God might have created the world some millions of years sooner. They who run into such kind of fictions can give no answer to those who would argue for the eternity of the world. For since God does nothing without reason, and no reason can be given why he did not create the world sooner, it will follow either that he has created nothing at all, or that he created the world before any assignable time, which is to say that the world is eternal. But when once it has been shown that the beginning, whenever it was, is always the same thing, the question why it was not otherwise becomes needless and insignificant.

16. If space and time were anything absolute, that is, if they were anything else besides certain orders of things, then indeed my assertion would be a contradiction. But since it is not so, the hypothesis (that space and time are anything absolute)⁴⁴¹ is contradictory, that is, it is an impossible fiction.

17. And the case is the same as in geometry, where by the very supposition that a figure is greater than it really is, we sometimes prove that it is not greater. This indeed is a contradiction, but it lies in the hypothesis, which appears to be false for that very reason.⁴⁴²

18. Space being uniform, there can neither be any external nor internal reason by which to distinguish its parts and to make any choice among them. For any external reason to discern between them can only be grounded upon some internal one. Otherwise we should discern what is indiscernible or choose without discerning. A will without reason would be the chance of the Epicureans. A God who should act by such a will would be a God only in name. The cause of these errors proceeds from want of care to avoid what derogates from the divine perfections.

19. When two incompatible things are equally good, and neither in themselves, nor by their combination with other things, has the one any advantage over the other, God will produce neither of them.

20. God is never determined by external things but always by what is in himself, that is, by his knowledge, before anything exists outside himself.

21. There is no possible reason that can limit the quantity of matter, and therefore, such limitation can have no place.

22. And supposing this arbitrary limitation of the quantity of matter, something might always be added to it without derogating from the perfection of the things which do already exist, and consequently, something must always

440. See Bacon, *New Organon*, book I, aphorism 41.

441. The parenthetical remark is Clarke's addition.

442. Leibniz's text reads: ". . . which is found to be false for that reason."

be added, in order to act according to the principle of the perfection of the divine operations.

23. And therefore, it cannot be said that the present quantity of matter is the fittest for the present constitution of things. And even supposing it is, it would follow that this present constitution of things would not be the fittest absolutely, if it hinders God from using more matter. It is therefore better to choose another constitution of things, capable of something more.

24. I should be glad to see a passage of any philosopher who takes *sensorium* in any other sense than Goclenius does.

25. If Scapula says that *sensorium* is the place in which the understanding resides, he means by it the organ of internal sensation. And therefore, he does not differ from Goclenius.⁴⁴³

26. *Sensorium* has always signified the organ of sensation. The pineal gland would be, according to Descartes, the *sensorium* in the above-mentioned sense of Scapula.

27. There is hardly any less appropriate expression on this subject than that which makes God to have a sensorium. It seems to make God the soul of the world. And it will be a hard matter to put a justifiable sense upon this word, according to the use Sir Isaac Newton makes of it.

28. Though the question is about the sense put upon that word by Sir Isaac Newton, and not by Goclenius, yet I am not to blame for quoting the Philosophical Dictionary of that author, because the design of dictionaries is to show the use of words.

29. God perceives things in himself. Space is the place of things and not the place of God's ideas, unless we look upon space as something that makes the union between God and things in imitation of the imagined union between the soul and the body, which would still make God the soul of the world.

30. And indeed, the author is much in the wrong when he compares God's knowledge and operation with the knowledge and operation of souls. The soul knows things because God has put into it a principle representative of things without. But God knows things because he continually produces them.

31. The soul does not act upon things, according to my opinion, any otherwise than because the body adapts itself to the desires of the soul, by virtue of the harmony which God has pre-established between them.

32. But they who fancy that the soul can give a new force to the body, and that God does the same in the world to mend the imperfections of his machine, make God too much like the soul by ascribing too much to the soul and too little to God.

33. For none but God can give a new force to nature, and he does it only supernaturally. If there was need for him to do it in the natural course of things, he would have made a very imperfect work. At that rate, he would

443. Scapula, *Lexicon Graeco-Latinum* (1639). Clarke had attempted to counter Goclenius with Scapula.

be, with respect to the world, what the soul, in the vulgar notion, is with respect to the body.

34. Those who undertake to defend the vulgar opinion concerning the soul's influence over the body by instancing God's operating on things external, still make God too much like the soul of the world. The author's affecting to find fault with the words *intelligentia supramundana* seems also to incline that way.

35. The images with which the soul is immediately affected are within itself, but they correspond to those of the body. The presence of the soul is imperfect and can only be explained by that correspondence. But the presence of God is perfect and manifested by his operation.

36. The author wrongly supposes against me that the presence of the soul is connected with its influence over the body, for he knows I reject that influence.

37. The soul's being diffused through the brain is no less inexplicable than its being diffused through the whole body. The difference is only in more and less.

38. They who fancy that active forces decrease of themselves in the world do not well understand the principal laws of nature and the beauty of the works of God.

39. How will they be able to prove that this defect is a consequence of the dependence of things?

40. The imperfection of our machines, which is the reason why they need to be mended, proceeds from this very thing, that they do not sufficiently depend upon the workman. And therefore, the dependence of nature upon God, far from being the cause of such an imperfection, is rather the reason why there is no such imperfection in nature, because nature is so dependent upon an artist too perfect to make a work that needs to be mended. It is true that every particular machine of nature is in some measure liable to be disordered, but not the entire universe, which cannot diminish in perfection.

41. The author contends that space does not depend upon the situation of bodies. I answer: It is true, it does not depend upon such or such a situation of bodies, but it is that order which renders bodies capable of being situated, and by which they have a situation among themselves when they exist together, as time is that order with respect to their successive position. But if there were no creatures, space and time would only be in the ideas of God.

42. The author seems to acknowledge here that his notion of a miracle is not the same as that which theologians and philosophers usually have. It is therefore sufficient for my purpose that my adversaries are obliged to have recourse to what is commonly called a miracle, which one attempts to avoid in philosophy.

43. I am afraid the author, by altering the sense commonly put upon the word 'miracle', will fall into an inconvenient opinion. The nature of a miracle does not at all consist in usualness or unusualness, for then monsters would be miracles.

44. There are miracles of an inferior sort which an angel can work. He can, for instance, make a man walk upon the water without sinking. But there are

miracles which none but God can work, they exceeding all natural powers. Of this kind are creating and annihilating.

45. It is also a supernatural thing that bodies should attract one another at a distance without any intermediate means, and that a body should move around without receding in the tangent, though nothing hinders it from so receding. For these effects cannot be explained by the nature of things.

46. Why should it be impossible to explain the motion of animals by natural forces? Though, indeed, the beginning of animals is no less inexplicable by natural forces than the beginning of the world.

P.S. All those who maintain a vacuum are more influenced by imagination than by reason. When I was a young man, I also gave in to the notion of the void and atoms, but reason brought me into the right way. It was a pleasing imagination. Men carry their inquiries no further than those two things: they (as it were) nail down their thoughts to them; they fancy they have found out the first elements of things, a *non plus ultra*. We would have nature to go no further, and to be finite as our minds are; but this is being ignorant of the greatness and majesty of the author of things. The least corpuscle is actually subdivided *in infinitum* and contains a world of other creatures which would be wanting in the universe if that corpuscle were an atom, that is, a body of one entire piece without subdivision. In like manner, to admit the void in nature is ascribing to God a very imperfect work; it is violating the grand principle of the necessity of a sufficient reason, which many have talked of without understanding its true meaning; as I have lately shown in proving, by that principle, that space is only an order of things, as time also is, and not at all an absolute being. To omit many other arguments against the void and atoms, I shall here mention those which I ground upon God's perfection and upon the necessity of a sufficient reason. I lay it down as a principle that every perfection which God could impart to things, without derogating from their other perfections, has actually been imparted to them. Now let us fancy a space wholly empty. God could have placed some matter in it without derogating, in any respect, from all other things; therefore, he has actually placed some matter in that space; therefore, there is no space wholly empty; therefore, all is full. The same argument proves that there is no corpuscle but what is subdivided. I shall add another argument grounded upon the necessity of a sufficient reason. It is impossible there should be any principle to determine what proportion of matter there ought to be, out of all the possible degrees from a plenum to a void, or from a void to a plenum. Perhaps it will be said that the one should be equal to the other, but, because matter is more perfect than the void, reason requires that a geometrical proportion should be observed and that there should be as much more matter than void, as the former deserves to be preferred. But then, there must be no void at all, for the perfection of matter is to that of the void as something to nothing. And the case is the same with atoms: what reason can anyone assign for confining nature in the progression of subdivision? These are fictions, merely arbitrary and unworthy of true philosophy. The reasons alleged for the void are mere sophisms.

V. Leibniz's Fifth Paper (excerpts)

T

O SECTIONS 3 and 4:

21. It must be confessed that though this great principle has been acknowledged, yet it has not been sufficiently made use of. This is in great measure the reason why the *prima philosophia*⁴⁴⁴ has not hitherto been so fruitful and demonstrative as it should have been. I infer from that principle, among other consequences, that there are not in nature two real, absolute beings, indiscernible from each other, because, if there were, God and nature would act without reason in treating the one otherwise than the other, and that therefore, God does not produce two pieces of matter perfectly equal and alike. The author answers this conclusion without confuting the reason of it, and he answers with a very weak objection. "That argument," says he, "if it was good, would prove that it would be impossible for God to create any matter at all. For the perfectly solid parts of matter, if we take them of equal figure and dimensions (which is always possible in supposition), would be exactly alike." But it is a manifest begging of that question to suppose that perfect likeness, which, according to me, cannot be admitted. This supposition of two indiscernibles, such as two pieces of matter perfectly alike, indeed seems to be possible in abstract terms, but it is not consistent with the order of things, nor with the divine wisdom by which nothing is admitted without reason. The vulgar fancy such things because they content themselves with incomplete notions. And this is one of the faults of the atomists.

22. Besides, I don't admit in matter parts perfectly solid, or that are the same throughout without any variety or particular motion in their parts, as the pretended atoms are imagined to be. To suppose such bodies is another ill-grounded popular opinion. According to my demonstrations, every part of matter is actually subdivided into parts differently moved, and no one of them is perfectly like another.

23. I said that in sensible things two that are indiscernible can never be found, that, for instance, two leaves in a garden or two drops of water perfectly alike are not to be found. The author acknowledges it as to leaves and perhaps as to drops of water. But he might have admitted it without any hesitation, without a 'perhaps' (an Italian would say *senza forse*), as to drops of water likewise.

24. I believe that these general observations in things sensible also hold in proportion in things insensible, and that one may say in this respect what Harlequin says in the *Emperor of the Moon*: it is there just as it is here. And it is a great objection against indiscernibles that no instance of them is to be found. But the author opposes this consequence, because (says he) sensible bodies are composed, whereas he maintains there are insensible bodies which are simple. I answer again that I don't admit simple bodies. There is nothing simple, in my opinion, but true monads, which have neither parts nor exten-

444. *Prima philosophia*, literally 'first philosophy,' or metaphysics.

sion. Simple bodies, and even perfectly similar ones, are a consequence of the false hypothesis of the void and of atoms, or of lazy philosophy, which does not sufficiently carry on the analysis of things and fancies it can attain to the first material elements of nature, because our imagination would be therewith satisfied.

25. When I deny that there are two drops of water perfectly alike, or any two other bodies indiscernible from each other, I don't say it is absolutely impossible to suppose them, but that it is a thing contrary to the divine wisdom, and which consequently does not exist.

To Sections 5 and 6:

26. I own that if two things perfectly indiscernible from each other did exist they would be two; but that supposition is false and contrary to the grand principle of reason. The vulgar philosophers were mistaken when they believed that there are two things different in number alone, or only because they are two, and from this error have arisen their perplexities about what they called the *principle of individuation*. Metaphysics has generally been handled like a science of mere words, like a philosophical dictionary, without entering into the discussion of things. *Superficial philosophy*, such as is that of the atomists and vacuists, forges things which superior reasons do not admit. I hope my demonstrations will change the face of philosophy, notwithstanding such weak objections as the author raises here against me.

27. The parts of time and place, considered in themselves, are ideal things, and therefore they perfectly resemble one another like two abstract units. But it is not so with two concrete ones, or with two real times, or two spaces filled up, that is, truly actual.

28. I don't say that two points of space are one and the same point, nor that two instants of time are one and the same instant, as the author seems to impute to me. But a man may fancy, for want of knowledge, that there are two different instants where there is but one; in like manner, as I observed in the seventeenth paragraph of the foregoing answer, that frequently in geometry we suppose two, in order to represent the error of a gainsayer, and only find one. If any man should suppose that a right line cuts another in two points, it will be found, after all, that these two pretended points must coincide and make but one point.

29. I have demonstrated that space is nothing else but an order of the existence of things observed as existing together, and therefore the fiction of a material finite universe moving forward in an infinite empty space cannot be admitted. It is altogether unreasonable and impracticable. For besides the fact that there is no real space out of the material universe, such an action would be without any design in it; it would be working without doing anything, in acting nothing would be done by the action. There would happen no change which could be observed by any person whatsoever. These are the imaginations of philosophers who have incomplete notions, who make space an absolute reality. Mere mathematicians who are only taken up with the conceits of imagination are apt to forge such notions, but they are destroyed by superior reasons.

30. Absolutely speaking, it appears that God can make the material universe finite in extension, but the contrary appears more agreeable to his wisdom.

31. I don't grant that every finite is movable. According to the hypothesis of my adversaries themselves, a part of space, though finite, is not movable. What is movable must be capable of changing its situation with respect to something else, and to be in a new state discernible from the first; otherwise the change is but a fiction. A movable finite must therefore make part of another finite, that any change may happen which can be observed.

32. Descartes maintains that matter is unlimited, and I don't think he has been sufficiently confuted. And though this be granted him, yet it does not follow that matter would be necessary, nor that it would have existed from eternity, since that unlimited diffusion of matter would only be an effect of God's choice judging that to be the better.

To Section 7:

33. Since space in itself is an ideal thing like time, space out of the world must be imaginary, as the Schoolmen themselves have recognized. The case is the same with empty space within the world, which I take also to be imaginary, for the reasons before alleged.

34. The author objects against me the vacuum discovered by Mr. Guericke of Magdeburg, which is made by pumping the air out of a receiver, and he claims that there truly is a perfect vacuum or a space without matter (at least in part) in that receiver. The Aristotelians and Cartesians, who do not admit a true vacuum, have said in answer to that experiment of Mr. Guericke, as well as to that of Torricelli of Florence (who emptied the air out of a glass tube by the help of quicksilver), that there is no vacuum at all in the tube or in the receiver, since glass has small pores which the beams of light, the effluvia of the lodestone, and other very thin fluids may go through. I am of their opinion, and I think the receiver may be compared to a box full of holes in the water, having fish or other gross bodies shut up in it, which, being taken out, their place would nevertheless be filled up with water. There is only this difference—that though water is fluid and more yielding than those gross bodies, yet it is as heavy and massive, if not more, than they, whereas the matter which gets into the receiver in the room of the air is much more subtle. The new partisans of a vacuum allege in answer to this instance that it is not the grossness of matter but its mere quantity that makes resistance, and consequently that there is of necessity more vacuum where there is less resistance. They add that the subtleness of matter has nothing to do here and that the particles of quicksilver are as subtle and fine as those of water, and yet that quicksilver resists above ten times more. To this I reply that it is not so much the quantity of matter, as its difficulty of giving place, that makes resistance. For instance, floating timber contains less of heavy matter than an equal bulk of water does, and yet it makes more resistance to a boat than the water does.

35. And as for quicksilver, it is true, it contains about fourteen times more of heavy matter than an equal bulk of water does, but it does not follow that

it contains fourteen times more matter absolutely. On the contrary, water contains as much matter, if we include both its own matter, which is heavy, and the extraneous matter void of heaviness which passes through its pores. For both quicksilver and water are masses of heavy matter, full of pores, through which there passes a great deal of matter void of heaviness (and which makes no sensible resistance), such as is probably that of the rays of light and other insensible fluids, and especially that which is itself the cause of the gravity of gross bodies, by receding from the center toward which it drives those bodies. For it is a strange fiction to make all matter gravitate, and that toward all other matter, as if each body did equally attract every other body according to their masses and distances—and this by an attraction properly so called, which is not derived from an occult impulse of bodies, whereas the gravity of sensible bodies toward the center of the earth ought to be produced by the motion of some fluid. And the case must be the same with other gravities, such as is that of the planets toward the sun or toward each other. (A body is never moved naturally except by another body which touches it and pushes it; after that it continues until it is prevented by another body which touches it. Any other kind of operation on bodies is either miraculous or imaginary.)⁴⁴⁵

To Sections 8 and 9:

36. I objected that space, taken for something real and absolute without bodies, would be a thing eternal, unchangeable, and not dependent upon God. The author endeavors to elude this difficulty by saying that space is a property of God. In answer to this I have said, in my foregoing paper, that the property of God is immensity but that space (which is often commensurate with bodies) and God's immensity are not the same thing.

37. I objected further that if space is a property, and infinite space is the immensity of God, finite space will be the extension or mensurability of something finite. And therefore the space taken up by a body will be the extension of that body. This is an absurdity, since a body can change space but cannot leave its extension.

38. I asked also, if space is a property, of what thing will an empty, limited space (such as that which my adversary imagines in an exhausted receiver) be the property? It does not appear reasonable to say that this empty space, either round or square, is a property of God. Will it then perhaps be the property of some immaterial, extended, imaginary substances which the author seems to fancy in the imaginary spaces?

39. If space is the property or affection of the substance which is in space, the same space will sometimes be the affection of one body, sometimes of another body, sometimes of an immaterial substance, and sometimes perhaps of God himself, when it is void of all other substance, material or immaterial. But this is a strange property or affection, which passes from one subject to another. Thus subjects will leave off their accidents like clothes, that other

445. Clarke gives this last parenthetical remark as a note, though it is in the main text of Leibniz's letter.

subjects may put them on. At this rate how shall we distinguish accidents and substances?

40. And if limited spaces are the affections of limited substances which are in them, and infinite space is a property of God, a property of God must (which is very strange) be made up of the affections of creatures, for all finite spaces taken together make up infinite space.

41. But if the author denies that limited space is an affection of limited things, it will not be reasonable either, that infinite space should be the affection or property of an infinite thing. I have suggested all these difficulties in my foregoing paper, but it does not appear that the author has endeavored to answer them.

42. I have still other reasons against this strange imagination that space is a property of God. If it is so, space belongs to the essence of God. But space has parts; therefore, there would be parts in the essence of God. *Spectatum admissi!*⁴⁴⁶

43. Moreover, spaces are sometimes empty and sometimes filled up. Therefore, there will be in the essence of God parts sometimes empty and sometimes full and consequently liable to a perpetual change. Bodies filling up space would fill up part of God's essence and would be commensurate with it; and in the supposition of a vacuum, part of God's essence will be within the receiver. Such a *God having parts* will very much resemble the Stoics' god, which was the whole universe considered as a divine animal.

44. If infinite space is God's immensity, infinite time will be God's eternity; and therefore, we must say that what is in space is in God's immensity and consequently in his essence, and that what is in time is also in the essence of God. Strange expressions, which plainly show that the author makes a wrong use of terms.

45. I shall give another instance of this. God's immensity actually makes him present in all spaces. But now if God is in space, how can it be said that space is in God or that it is a property of God? We have often heard that a property is in its subject, but we never heard that a subject is in its property. In like manner, God exists in all time. How then can time be in God, and how can it be a property of God? These are perpetual *alloglossies*.⁴⁴⁷

46. It appears that the author confounds immensity, or the extension of things, with the space according to which that extension is taken. Infinite space is not the immensity of God; finite space is not the extension of bodies, as time is not their duration. Things keep their extension, but they do not always keep their space. Everything has its own extension, its own duration, but it has not its own time and does not keep its own space.

47. I will here show how men come to form to themselves the notion of space. They consider that many things exist at once, and they observe in them a

446. This is a reference to Horace, the first words of a line that reads: "admitted to such and such a sight [*spectatum admissi*], could you restrain your laughter, friends?" [De Arte Poetica, 1.5].

447. Literally, this corresponds to the Greek for 'foreign'; Leibniz probably has in mind here the associated meaning of its Latin counterpart, '*barbarus*,' barbaric.

certain order of coexistence, according to which the relation of one thing to another is more or less simple. This order is their situation or distance. When it happens that one of those coexistent things changes its relation to a multitude of others which do not change their relations among themselves, and that another thing, newly come, acquires the same relation to the others as the former had, we then say it is come into the place of the former; and this change we call a *motion* in that body wherein is the immediate cause of the change. And though many, or even all, the coexistent things should change according to certain known rules of direction and swiftness, yet one may always determine the relation of situation which every coexistent acquires with respect to every other coexistent, and even that relation which any other coexistent would have to this, or which this would have to any other, if it had not changed or if it had changed any otherwise. And supposing or feigning that among those coexistents there is a sufficient number of them which have undergone no change, then we may say that those which have such a relation to those fixed existents as others had to them before, have now the same *place* which those others had. And that which comprehends all those places is called *space*. This shows that, in order to have an idea of place, and consequently of space, it is sufficient to consider these relations and the rules of their changes, without needing to fancy any absolute reality beyond the things whose situation we consider. And to give a kind of definition, *place* is that which we say is the same to A and to B, when the relation of the coexistence of B with C, E, F, G, etc., agrees perfectly with the relation of the coexistence which A had with the same C, E, F, G, etc., supposing there has been no cause of change in C, E, F, G, etc. It may also be said, without entering into any further particularity, that place is that which is the same in different moments to different existent things when their relations of coexistence with certain other existents which are supposed to continue fixed from one of those moments to the other agree entirely together. And *fixed existents* are those in which there has been no cause of any change of the order of their coexistence with others, or (which is the same thing) in which there has been no motion. Lastly, *space* is that which results from places taken together. And here it may not be amiss to consider the difference between place and the relation of situation of the body that fills up the place. For the place of A and B is the same, whereas the relation of A to fixed bodies is not precisely and individually the same as the relation which B (that comes into its place) will have to the same fixed bodies; but these relations only agree. For two different subjects, as A and B, cannot have precisely the same individual affection, it being impossible that the same individual accident should be in two subjects or pass from one subject to another. But the mind, not contented with an agreement, looks for an identity, for something that should be truly the same, and conceives it as being extrinsic to these subjects; and this is what we here call *place* and *space*. But this can only be an ideal thing, containing a certain order, wherein the mind conceives the application of relations. In like manner, as the mind can fancy to itself an order made up of genealogical lines whose size would consist only in the number of generations, wherein every person would have

his place; and if to this one should add the fiction of a metemphyschosis and bring in the same human souls again, the persons in those lines might change place; he who was a father or a grandfather might become a son or a grandson, etc. And yet, those genealogical places, lines, and spaces, though they should express real truths, would only be ideal things. I shall allege another example to show how the mind uses, upon occasion of accidents which are in subjects, to fancy to itself something answerable to those accidents outside of the subjects. The ratio or proportion between two lines L and M may be conceived three ways: as a ratio of the greater L to the lesser M, as a ratio of the lesser M to the greater L, and lastly, as something abstracted from both, that is, the ratio between L and M without considering which is the antecedent or which the consequent, which the subject and which the object. And thus it is that proportions are considered in music. In the first way of considering them, L the greater, in the second, M the lesser, is the subject of that accident which philosophers call ‘relation’. But which of them will be the subject in the third way of considering them? It cannot be said that both of them, L and M together, are the subject of such an accident; for, if so, we should have an accident in two subjects, with one leg in one and the other in the other, which is contrary to the notion of accidents. Therefore, we must say that this relation, in this third way of considering it, is indeed out of the subjects; but being neither a substance nor an accident, it must be a mere ideal thing, the consideration of which is nevertheless useful. To conclude, I have here done much like Euclid, who, not being able to make his readers understand well what *ratio* is, absolutely, in the sense of geometers, defines what are the *same ratios*. Thus, in like manner, in order to explain what *place* is, I have been content to define what is the *same place*. Lastly, I observe that the traces of movable bodies, which they sometimes leave upon the immovable ones on which they exercise their movement, have given men occasion to form in their imagination this idea, as if some trace did still remain, even when there is nothing unmoved. But this is a mere ideal thing and imports only that *if there were any unmoved thing there, the trace might be marked out upon it*. And it is this analogy which makes men fancy places, traces, and spaces, though these things consist only in the truth of relations, and not at all in any absolute reality.

48. To conclude, if the space (which the author fancies) void of all bodies is not altogether empty, what is it then full of? Is it full of extended spirits perhaps, or immaterial substances capable of extending and contracting themselves, which move therein and penetrate each other without any inconvenience, as the shadows of two bodies penetrate one another upon the surface of a wall? I think I see the revival of the odd imaginations of Dr. Henry More, otherwise a learned and well-meaning man, and of some others who fancied that those spirits can make themselves impenetrable whenever they please. Some have even fancied that man in the state of innocence had also the gift of penetration, and that he became solid, opaque, and impenetrable by his fall. Is it not overthrowing our notions of things to make God have parts, to make spirits have extension? The principle of the want of a sufficient reason

does alone drive away all these specters of imagination. Men easily run into fictions for want of making a right use of that great principle.

To Section 10:

49. It cannot be said that a certain duration is eternal but that things, which continue always, are eternal, gaining always new duration. Whatever exists of time and of duration, being successive, perishes continually,⁴⁴⁸ and how can a thing exist eternally which (to speak exactly) does not exist at all? For how can a thing exist of which no part does ever exist? Nothing of time does ever exist but instants, and an instant is not even itself a part of time. Whoever considers these observations will easily apprehend that time can only be an ideal thing. And the analogy between time and space will easily make it appear that the one is as merely ideal as the other. (But if in saying that the duration of a thing is eternal, it only meant that the thing endures eternally, I have nothing to say against it.)

50. If the reality of space and time is necessary to the immensity and eternity of God, if God must be in space, if being in space is a property of God, he will in some measure depend upon time and space and stand in need of them. For I have already prevented that subterfuge—that space and time are in God and like properties of God. (Could one maintain the opinion that bodies move about in the parts of the divine essence?)⁴⁴⁹

To Sections 11 and 12:

51. I objected that space cannot be in God because it has parts. Hereupon the author seeks another subterfuge by departing from the received sense of words, maintaining that space has no parts because its parts are not separable and cannot be removed from one another by plucking them out. But it is sufficient that space has parts, whether those parts be separable or not, and they may be assigned in space, either by the bodies that are in it or by lines and surfaces that may be drawn and described in it.

To Section 13:

52. In order to prove that space without bodies is an absolute reality, the author objected that a finite material universe might move about in space. I answered, it does not appear reasonable that the material universe should be finite, and though we should suppose it to be finite, yet it is unreasonable it should have any motion otherwise than as its parts change their situation among themselves, because such a motion would produce no change that could be observed, and would be without design. It is another thing when its parts change their situation among themselves, for then one would recognize a motion in space, but it consists in the order of relations which are changed. The author replies now that the reality of motion does not depend upon being observed and that a ship may go forward, and yet a man who is in the ship may not perceive it. I answer, motion indeed does not depend upon being observed, but it does depend upon being possible to be observed. There is no motion when there is no change that can be observed. And when there is no

448. This paragraph, up to this point, is in a note in Clarke, though it is in Leibniz's text.

449. This parenthetical remark is a note in Clarke's edition, though it is in Leibniz's text.

change that can be observed, there is no change at all. The contrary opinion is grounded upon the supposition of a real absolute space, which I have demonstratively confuted by the principle of the want of a sufficient reason.

53. I find nothing in the eighth definition of the *Mathematical Principles of Nature*, nor in the scholium belonging to it, that proves or can prove the reality of space in itself.⁴⁵⁰ However, I grant there is a difference between an absolute true motion of a body and a mere relative change of its situation with respect to another body. For when the immediate cause of the change is in the body, that body is truly in motion, and then the situation of other bodies with respect to it will be changed consequently, though the cause of that change is not in them. It is true that, exactly speaking, there is not any one body that is perfectly and entirely at rest, but we frame an abstract notion of rest by considering the thing mathematically. Thus have I left nothing unanswered of what has been alleged for the absolute reality of space. And I have demonstrated the falsehood of that reality by a fundamental principle, one of the most certain both in reason and experience, against which no exception or instance can be alleged. Upon the whole, one may judge from what has been said that I ought not to admit a movable universe, nor any place out of the material universe.

To Section 14:

54. I am not sensible of any objection but what I think I have sufficiently answered. As for the objection that space and time are quantities, or rather things endowed with quantity, and that situation and order are not so, I answer that order also has its quantity; there is in it that which goes before and that which follows; there is distance or interval. Relative things have their quantity as well as absolute ones. For instance, ratios or proportions in mathematics have their quantity and are measured by logarithms, and yet they are relations. And therefore, though time and space consist in relations, yet they have their quantity.

To Section 15:

55. As to the question whether God could have created the world sooner, it is necessary here to understand each other rightly. Since I have demonstrated that time, without things, is nothing else but a mere ideal possibility, it is manifest that if anyone should say that this same world which has been actually created might have been created sooner without any other change, he would say nothing that is intelligible. For there is no mark or difference whereby it would be possible to know that this world was created sooner. And, therefore (as I have already said), to suppose that God created the same world sooner is supposing a chimerical thing. It is making time a thing absolute, independent upon God, whereas time must coexist with creatures and is only conceived by the order and quantity of their changes.

56. But yet, absolutely speaking, one may conceive that a universe began sooner than it actually did. Let us suppose our universe or any other to be represented by the figure AF and that the ordinate AB represents its first

450. See Newton, *Mathematical Principles . . .* vol. I, pp. 4-12.

state, and the ordinates CD and EF its following states; I say one may conceive that such a world began sooner by conceiving the figure prolonged backward and by adding to it SRABS. For thus, things being increased, time will also be increased. But whether such an augmentation is reasonable and agreeable to God's wisdom is another question, to which we answer in the negative; otherwise God would have made such an augmentation. It would be like as

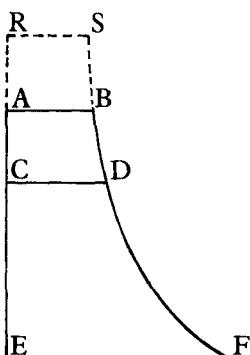


Figure 15

Humano capiti cervicem pictor equinam
Jungere si velit.⁴⁵¹

The case is the same with respect to the duration of the universe. As one might conceive something added to the beginning, so one might also conceive something taken off toward the end. But

such a retrenching from it would also be unreasonable.

57. Thus it appears how we are to understand that God created things at what time he pleased, for this depends upon the things which he resolved to create. But things being once resolved upon, together with their relations, there no longer remains any choice about the time and the place, which of themselves have nothing in them real, nothing that can distinguish them, nothing that is at all discernible.

58. One cannot therefore say, as the author does here, that the wisdom of God may have good reasons to create this world at such or such a particular time, that particular time considered without the things being an impossible fiction, and good reasons for a choice being not to be found where everything is indiscernible.

59. When I speak of this world, I mean the whole universe of material and immaterial creatures taken together, from the beginning of things. But if anyone mean only the beginning of the material world, and suppose immaterial creatures before it, he would have somewhat more reason for his supposition. For time then being marked by things that existed already, it would no longer be indifferent, and there might be room for choice. And yet, indeed, this would only be putting off the difficulty. For supposing the whole universe of immaterial and material creatures together to have a beginning, there is no longer any choice about the time in which God would place that beginning.

60. And therefore, one must not say as the author does here, that God created things in what particular space and at what particular time he pleased. For all time and all spaces being in themselves perfectly uniform and indiscernible from each other, one of them cannot please more than another.

61. I shall not enlarge here upon my opinion explained elsewhere, that there

451. These are the opening words of Horace's *De Arte Poetica*: "If a painter wished to join a horse's neck to a human head." The sentence in Horace ends with the quotation alluded to above in sec. 42 of this letter.

are no created substances wholly destitute of matter. For I hold with the ancients, and according to reason, that angels or intelligences, and souls separated from a gross body, have always subtle bodies, though they themselves are incorporeal. The vulgar philosophy easily admits all sorts of fictions; mine is more strict.

62. I don't say that matter and space are the same thing. I only say there is no space where there is no matter and that space in itself is not an absolute reality. Space and matter differ as time and motion. However, these things, though different, are inseparable.

63. But it does not at all follow that matter is eternal and necessary, unless we suppose space to be eternal and necessary—a supposition ill grounded in all respects.

To Sections 16 and 17:

64. I think I have answered everything, and I have particularly replied to that objection that space and time have quantity and that order has none. See above, No. 54.

65. I have clearly shown that the contradiction lies in the hypothesis of the opposite opinion, which looks for a difference where there is none. And it would be a manifest iniquity to infer from this that I have acknowledged a contradiction in my own opinion.

To Section 42:

107. I maintained that an operation of God by which he should mend the machine of the material world, tending in its nature, as this author claims, to lose all its motion, would be a miracle. His answer was that it would not be a miraculous operation because it would be usual and must frequently happen. I replied that it is not usualness or unusualness that makes a miracle properly so called, or a miracle of the highest sort, but its surpassing the powers of creatures, and that this is the general opinion of theologians and philosophers; and that therefore, the author acknowledges at least that the thing he introduces and I disallow is, according to the received notion, a miracle of the highest sort, that is, one which surpasses all created powers, and that this is the very thing which all men endeavor to avoid in philosophy. He answers now that this is appealing from reason to vulgar opinion. But I reply again that this vulgar opinion, according to which we ought in philosophy to avoid as much as possible what surpasses the natures of creatures, is a very reasonable opinion. Otherwise nothing will be easier than to account for anything by bringing in the deity, *deum ex machina*, without minding the natures of things.

108. Besides, the common opinion of theologians ought not to be looked upon merely as vulgar opinion. A man should have weighty reasons before he ventures to contradict it, and I see no such reasons here.

109. The author seems to depart from his own notion, according to which miracle ought to be unusual, when in Section 31, he objects to me—though without any ground—that the pre-established harmony would be a perpetual miracle. Here I say, he seems to depart from his own notion, unless he had a mind to argue against me *ad hominem*.

To Section 43:

110. If a miracle differs from what is natural only in appearance and with respect to us, so that we call that only a miracle which we seldom see, there will be no internal real difference between a miracle and what is natural, and at the bottom everything will either be equally natural or equally miraculous. Will theologians accommodate themselves to the former, or philosophers to the latter?

111. Will not this doctrine, moreover, tend to make God the soul of the world, if all his operations are natural like those of our souls upon our bodies? And so, God will be a part of nature.

112. In good philosophy and sound theology we ought to distinguish between what is explicable by the natures and powers of creatures and what is explicable only by the powers of the infinite substance. We ought to make an infinite difference between the operation of God, which goes beyond the extent of natural powers, and the operations of things that follow the laws which God has given them, and which he has enabled them to follow by their natural powers, though not without his assistance.

113. This overthrows attractions, properly so called, and other operations inexplicable by the natural powers of creatures, which kinds of operations the assertors of them must suppose to be effected by miracle, or else have recourse to absurdities, that is, to the occult qualities of the Schools, which some men begin to revive under the specious name of forces, but they bring us back again into the kingdom of darkness. This is *inventa fruge, glandibus vesci*.⁴⁵²

114. In the time of Mr. Boyle and other excellent men who flourished in England under Charles the Second, in the early part of his reign, nobody would have ventured to publish such chimerical notions. *I hope that happy time will return under so good a government as the present* [and that minds a little too much distracted by the misfortune of the times will return to cultivate sound knowledge better].⁴⁵³ Mr. Boyle made it his chief business to inculcate that everything was done mechanically in natural philosophy. But it is men's misfortune to become disgusted with reason itself and to be weary of light. Chimeras begin to appear again, and they are pleasing because they have something in them that is wonderful. What has happened in poetry also happens in the philosophical world. People are grown weary of rational romances such as were the French *Clélie* or the German *Aramene*, and they are become fond again of the *tales of fairies*.

115. As for motions of the celestial bodies, and even the formation of plants and animals, there is nothing in them that looks like a miracle except their beginning. The organism of animals is a mechanism which supposes a divine preformation. What follows upon it is purely natural and entirely mechanical.

116. Whatever is performed in the body of man and of every animal is no less mechanical than what is performed in a watch. The difference is only such

452. "To feed on acorns when corn has been discovered."

453. The passage in brackets was in the notes in Clarke's edition.

as ought to be between a machine of divine invention and the workmanship of such a limited artist as man is.

To Section 44:

117. There is no difficulty among theologians about the miracles of angels. The question is only about the use of that word. It may be said that angels work miracles, but less properly so called, or of an inferior order. To dispute about this would be a mere question about a word. It may be said that the angel who carried Habakkuk through the air, and he who troubled the water of the pool of Bethesda, worked a miracle. But it was not a miracle of the highest order, for it may be explained by the natural powers of angels, which surpass those of man.

To Section 45:

118. I objected that an attraction properly so called, or in the Scholastic sense, would be an operation at a distance without any means intervening. The author answers here that an attraction without any means intervening would indeed be a contradiction. Very well. But then, what does he mean when he will have the sun to attract the globe of the earth through an empty space? Is it God himself that performs it? But this would be a miracle if ever there was any. This would surely exceed the powers of creatures.

119. Or perhaps, are some immaterial substances or some spiritual rays, or some accidents without a substance, or some kind of *species intentionalis*, or some other I-know-not-what, the means by which this is claimed to be performed? Of which sort of things the author seems to have still a good stock in his head, without explaining himself sufficiently.

120. That means of communication, says he, is invisible, intangible, not mechanical. He might as well have added inexplicable, unintelligible, precarious, groundless, and unprecedented.

121. But it is regular, says the author; it is constant and consequently natural. I answer, it cannot be regular without being reasonable, nor natural unless it can be explained by the natures of creatures.

122. If the means which causes an attraction, properly so called, are constant and at the same time inexplicable by the powers of creators, and yet are true, it must be a perpetual miracle, and if it is not miraculous, it is false. It is a chimerical thing, a Scholastic occult quality.

123. The case would be the same as in a body going round without receding in the tangent, though nothing that can be explained hindered it from receding. This is an instance I have already alleged, and the author has not thought fit to answer it because it shows too clearly the difference between what is truly natural, on the one side, and a chimerical occult quality of the Schools, on the other.

To Section 46:

124. All the natural forces of bodies are subject to mechanical laws, and all the natural powers of spirits are subject to moral laws. The former follow the order of efficient causes, and the latter follow the order of final causes. The former operate without liberty, like a watch; the latter operate with liberty,

though they exactly agree with that machine which another cause, free and superior, has adapted to them beforehand. I have already spoken of this above, No. 92.

125. I shall conclude with what the author objected against me at the beginning of this fourth reply, to which I have already given an answer above, Nos. 18, 19, 20. But I have deferred speaking more fully upon that head to the conclusion of this paper. He claimed that I have been guilty of a *petitio principii*. But of what principle, I beseech you? Would to God less clear principles had never been laid down. The principle in question is the principle of the want of a sufficient reason for a thing to exist, for an event to happen, for any truth's obtaining. Is this a principle that wants to be proved? The author granted it or pretended to grant it, No. 2 of his third paper, possibly because the denial of it would have appeared too unreasonable. But either he has done it only in words, or he contradicts himself or retracts his concession.

126. I dare say that without this great principle one cannot prove the existence of God, nor account for many other important truths.

127. Has not everybody made use of this principle upon a thousand occasions? It is true, it has been neglected out of carelessness on many occasions, but that neglect has been the true cause of chimeras such as are, for instance, an absolute real time or space, a void, atoms, attraction in the Scholastic sense, a physical influence of the soul over the body, and a thousand other fictions, either derived from erroneous opinions of the ancients, or lately invented by modern philosophers.

128. Was it not upon account of Epicurus' violating this great principle that the ancients derided his groundless declination of atoms? And I dare say the Scholastic attraction, revived in our days and no less derided about thirty years ago, is not at all more reasonable.⁴⁵⁴

129. I have often defied people to allege an instance against that great principle, to bring any one uncontested example wherein it fails. But they have never done it, nor ever will. It is certain there is an infinite number of instances wherein it succeeds, or rather it succeeds in all the known cases in which it has been made use of. From whence one may reasonably judge that it will succeed also in unknown cases, or in such cases as can only by its means become known, according to the method of experimental philosophy which proceeds *a posteriori*, even if the principle were not otherwise justified by pure reason, or *a priori*.

130. To deny this great principle is to do as Epicurus did, who was reduced to deny that other great principle, namely, the principle of contradiction, which is that every intelligible enunciation must either be true or false. Chrysippus undertook to prove that principle against Epicurus, but I think I need not imitate him. I have already said what is sufficient to justify mine, and I might say something more upon it, but perhaps it would be too abstruse for this present dispute. And I believe reasonable and impartial men will grant me that having forced an adversary to deny that principle is reducing him *ad absurdum*.

454. Newton's *Mathematical Principles* was published in 1687, 29 years before this letter.