

E81: *Euler's : Gedancken von den Elementen der Corper*
or, *Thoughts on the Elements of Bodies.....*
Translated by Dr. E.Hirsch

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Thoughts on the
Elements of Bodies,

in which
the Theory of
the Simple Things and Monads

is examined and
the true essence of bodies

is discovered.

Leonhard Euler

Berlin,
A.Haude and Joh. C. Spener,
Booksellers by royal appointment and by appointment
to the Academy of Science.
1746.

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I.

On the Theory of Monads and Its Foundation.

- 1.The theory of the monads, or the simple things, of which bodies are composed, is usually founded on two general properties of bodies, which are the extent and the moving force.
- 2.From the extent one concludes that all bodies consist of parts, and these parts are composed of further parts. Consequently one should eventually arrive at particles in which no further composition occurs, and these are the simple things, or monads, from which all bodies in the world are constructed.
- 3.From the changes, that incessantly occur in the world, one concludes that all bodies are endowed with a moving force; since all bodies are composite entities, they can only possess such forces if their constituent parts are endowed with similar forces, and consequently all the forces of the simple things constituting a body, taken together, represent the whole force of the body.
- 4.Since it is concluded from this that all simple things must be endowed with forces, a force however is ones ability to change ones state, one ascribes to every simple thing the ability to change its state.
5. According to this, the simple things are nothing other than the primary elements of the bodies, of which we so far know that they are endowed with a force to change their state continually.
6. To continue this analysis further one avails oneself of the principle of non-differentiability from which one concludes that all simple things must be different from each other, and that there can not be two amongst them that are similar in all respects.
- 7.Since the simple things can not be different either in size or shape, since one can not imagine them to have either size or shape, there can be no difference between them other than in the forces with which they are endowed.

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8. And since furthermore the state of every simple thing changes all the time, it follows from the above principle of non-differentiability that not only the present state of each monad is different from the present state of all other monads, but also that the present state of each monad must be different from all preceding and future states not only of itself, but of all others.

9. To comprehend better both the possibility and the nature of this near infinite variability one has recourse to the essence of the souls and of the ghosts, which of necessity have their place amongst the simple things, and can have no properties other than those appropriate to the essence of simple things.

10. But all properties, that we can imagine souls and ghosts to have, amount to an ability to picture to themselves the world; and since this picture depends on the connection of a soul with the world, it is easy to see how all these pictures, of one soul only as well as of all other existing ones, can be different from each other.

11. Since the ability to picture the world really is one of simple things, one ascribes to each simple thing a similar ability, and equates the above mentioned force, with which monads are endowed, with this ability to picture the world.

12. But since neither a particular monad, nor two different monads, ever find themselves in entirely similar conditions in the world, and therefore never can have the same picture, one is through this able to show the reason why all monads, as regards their forces, can be different from each other.

13. This in brief is the reasoning on which Mr. von Leibnitz and Mr. von Wolff have developed their theory of monads; notwithstanding the fact that these two men are in this not in all respects of the same opinion, the arguments each of them puts forward are either contained in what we have said, or are readily deduced from it.

14. Since the whole theory of monads rests on the above arguments, it must be accepted as true if these arguments are valid. But should these arguments be found to be invalid, then, without doubt, this sophisticated theory would have to be entirely overthrown.

15. A theory can be true if the arguments leading to it are invalid: in that case one could conclude nothing further than that the true foundations of the theory of monads are as yet unknown, but that the theory itself could nevertheless be correct, although the probability for this would be low.

16. But if after thorough examination one were to find not only the arguments to be invalid, but after amending them, arrive with valid arguments at a totally different theory of the elements of bodies, then through this not only the incorrectness of Leibnitz' theory

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would be demonstrated, but in its stead the true nature of the elements of bodies would be recognized.

17. Therefore an examination of the arguments put forward is even more the surest way to judge Leibnitz' theory of monads, since at the same time one may hope to arrive at the real understanding of the truth in this matter.

II.

An Examination of the Arguments on which the Theory of Monads rests.

1. Firstly, with respect to extent, it is indisputable that all bodies consist of parts, and that in these ever smaller parts can be discerned. If eventually one arrives through subdivision at a particle so small that with the naked eye one can detect in it no further parts, then one can examine it with a magnifying glass to discover in it still a large number of real parts.

2. But whether this divisibility of bodies, of which one is assured that it goes very far, can be continued infinitely far, or whether it somewhere reaches a limit, such that eventually there are particles that have no size at all and that can therefore not be further subdivided, is a question still strongly debated by the wise of this world.

3. Mr. von Leibnitz appears to admit this infinite divisibility by maintaining that infinitely many monads are required to represent the smallest body. In this Mr. Wolff is of a totally different opinion by maintaining that the divisibility of bodies does not proceed infinitely far, and the number of simple things of which even the largest body is made, is finite and definite.

4. The opinion of Mr. von Leibnitz does however appear to contradict directly his theory of monads. For, if one says that one arrives at simple things only after infinite subdivision, then this is equivalent to saying that bodies can through no division, however far this might be continued, be subdivided into such simple things, through which in fact the existence of simple things is denied.

5. For if one assumes that a body is composed of simple things, then one must admit that the number of these is definite. But as soon as a number is taken to be infinite, it can no longer be definite, since infinitely large means nothing other than what in magnitude exceeds all that can be understood.

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6. Because of this circumstance Leibnitz's theory of monads contains within itself a subtle contradiction, because it states the properties of things of which it is assumed in advance that they can not possibly have a place in the world.

7. In this respect therefore, the theory of Mr. Wolff hangs better together, since he assumes that with a division that progresses further and further one finally arrives at particles that cannot be further divided. Such particles must therefore really exist, and consequently one has the right to examine their nature and properties.

8. Although the theory, that every body consists of a finite and definite number of such particles that are without any size, is subject to great difficulties, we will nevertheless accept it in this investigation, since otherwise the whole theory would automatically be annihilated. But the matter will later on be more accurately examined.

9. Let us assume therefore there really are such particles, in which, since they have no size, no further division can take place, and of which all bodies are composed, and it therefore remains to examine the reasoning from which the above mentioned properties of simple things have been deduced.

10. One concludes from the changes that go on in the world that the bodies must be endowed with forces, and that these forces consist in the ability or the tendency, to change the state of the bodies perpetually. However in Science it is dangerous to draw conclusions from such phenomena that are merely perceived, and it is absolutely necessary that in advance one formulates clear concepts regarding these phenomena, and examines carefully how and under what conditions these phenomena occur.

11. In the world changes take place in the bodies all the time, and these changes all consist in movement. Since every body is either at rest or in a certain motion with a definite speed in a certain direction, the body's state remains unchanged as long as it either remains stationary or moves with the same speed in the same direction.

12. If all bodies in the world were always at rest, or moved with the same speed in the same direction, they would maintain between themselves the same relation and order, and consequently no change would take place amongst them. Here we are not only speaking of the bodies quite generally, but in particular of their smallest parts, for if all parts either were stationary or all had the same movement, it would be impossible for the slightest change amongst them to take place.

13. On this are founded the first laws of motion, which maintain that every body, considered on its own, must always maintain its state, that means that if it is stationary, it will always remain in its state of rest, or if it is moving, it must always continue with the same speed in the same direction, unless it meets an external impediment.

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14. This general law of motion is not only proved in the most convincing way by the indisputable basic principles of our reasoning, but is also in the most definite manner confirmed by experience, which teaches us clearly that the state of no body, that is to say whether it is stationary or is in uniform motion, is altered unless it meets external impediments that prevent the continuation of its state.

15. Since every body has such a force to remain in its state, the reason for this force must be contained in the essence of bodies. From this one therefore rightly concludes that every body is endowed with a force to remain always in its present state, that means if it is stationary, to remain stationary, or if it has acquired movement, to maintain this with the same speed in the same direction.

16. This force of all bodies to remain in their state is called in the theory of movement the *vis inertiae*, and it is as general a property of bodies as the extent, such that a body without this force would cease to be a body, as will now be explained in the clearest possible manner.

17. It is not possible to imagine this force that enables bodies to remain in their state, without at the same time ascribing to them a force to resist all changes. For a body were to undergo all changes without resisting them in the slightest, one could not say that it is endowed with a force to remain in its state.

18. Since these two forces are of necessity connected with each other, and can not be separated, it is the same force through which a body remains in its state, and through which it resists all change.

19. From this is clear that if the bodies were deprived of this force, they would have to undergo all changes without any resistance and there would be no impact and quite generally no resistance in the world; in consequence it would be as if the bodies could freely interpenetrate each other, and the concept of impenetrability, which is as important a property of bodies as extent, would cease to apply.

20. Having established this force of bodies to remain in their state without change, it is clear that if all bodies in the world either stood still, or moved at the same speed in the same direction, none would hinder the others to remain in their state, since each, without affecting the others, could remain in its state. Consequently there would be no change in the world.

21. Having now a clear concept of a world not subject to any changes (if such a construct could have the name of world), it will be easier for us to form an appropriate concept of

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the changes that are possible in the world. We need merely remove the previously mentioned conditions under which no change occurs.

22. As soon as all bodies are not simultaneously at rest, or move with the same speed in the same direction, changes must of necessity take place. For if these conditions do not apply, there will develop a continuously changing order and relation in the position of the bodies, and in this consist all changes that the bodies can undergo.

23. To see this more clearly, we want to begin with imagine only two bodies, one of which is stationary, but the other moves with a certain speed towards the first, such that eventually it reaches it. In this case it will be impossible that both bodies together remain in their state, but of necessity a change must occur in one or in both.

24. For if the body, that is now stationary, were to remain in its state, then the other, since it can not penetrate the former, would have to become stationary too, or it would either have to recoil or move sideways; but in all these cases its state would change.

25. But if the body, that we had assumed to be in motion, were to maintain its movement unchanged, then it would either have to drive the former in front of itself or move it sideways out of its way. But in both cases would the state of the first body be changed. It is therefore impossible for a body to move towards another one, without a change occurring in the state of either one or both.

26. In this case therefore it is the force that a body has to remain in its state, that is the reason and cause for a change either in one or both of them. From this one is even able, in mechanics, to determine, in the case under discussion, the change that must occur, in such a fashion that it agrees extremely accurately with experience.

27. What has been said here about two bodies, one of which is stationary, but the other impinges on it because of its motion, applies equally to two bodies moving unequally in such a manner that one impinges on the other, in which case, as in the previous one, a change in the state of either one or both bodies must occur.

28. This takes place even more if three or more bodies meet in unequal motion, since none can remain in its state without changing the state of the others. Since each is endowed with a force to remain in its state without change, it is in this case just this force that is the true cause why the state of the bodies suffers change.

29. If in the beginning the bodies of the world were given unequal movement, there must at once have been frequent changes in them, and since the movements after each change remain unequal, the changes must last for ever, and that is the case that is actually ob-

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served in the world, a fact which in the above was taken as the basis for determining the forces of the simple things.

30. Therefore when one asks the question *why there are incessant changes in the world*, we are now in a position to indicate the reason and cause thereof. They consist in the force, with which every body is endowed, to remain in its state without change. And this realization is the fruit of the more exact investigation of the circumstances under which the changes in the world manifest themselves.[Here Euler gives inertia as the reason for the changes in the world; later he traces it back to impenetrability.]

31. This conclusion regarding the reason for the changes that incessantly occur in the world, is therefore quite different from the one derived from only a superficial analysis, since, in order to explain them, one there ascribed to the bodies a force to change their state all the time. As well founded as the result obtained there might appear, its incorrectness is now evident.

32. From this one can see the need for a precise examination of all the circumstances, that one must undertake in all investigations, before one may dare to draw conclusions. Without this caution one is in danger to fall into the greatest error, such as in the present case where one has ascribed to the bodies a force to change their state perpetually, whilst nature shows us an oppositely directed force to remain perpetually in their state.

33. From this we realize further that such a force, which is to be directed towards incessant change in the state of bodies, is in direct opposition to the essence of bodies, and can in no way be assigned to them. For since two contradictory things can not simultaneously exist, a body can not at the same time be endowed with a force to maintain its state, and with another force to change its state.

34. It is therefore an obvious error, when some of the more recent sages of the world ascribe to bodies such moving or active forces, that are supposed to consist in a perpetual effort to change their state; and apart from the fact that some even want to regard these forces as independent entities, it has now been absolutely clearly demonstrated that such forces have their place only in the imagination and can have nothing to do with the essence of bodies.

35. Since from these imagined forces one has drawn the conclusion that also the simple things, of which bodies consist, must be endowed with similar forces, and must aim to change their state perpetually, it is easy to see how much one can rely on the validity of this conclusion.

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36. Since instead of being endowed with a force perpetually to change their state, bodies are endowed with a quite oppositely directed force, namely to remain with their state unchanged, we hope nobody will accept the following conclusion:

All bodies are endowed with a force to remain with their state unchanged.

Consequently the simple things, from which bodies are composed, must be endowed with a force to change their state all the time.

37. Instead the following conclusion must be correct:

Since all bodies are endowed with a force to remain with their state unchanged, but since the bodies, being composite things, can not have this force unless there is a place for a similar force in the simple things, these simple things, of which the bodies consist, must also be endowed with a force to remain in their state, or to maintain themselves therein.

38. In this way we arrive at a concept of the essence of the simple things, of which bodies are composed, that is totally different from that maintained in the initially developed theory of monads.

39. If therefore the bodies are composed of simple things, we infer about the latter, apart from the fact that they are indivisible and have no magnitude, that they must be endowed with a force to remain with their state unchanged. And from this in turn one understands readily that the bodies, if they are composed of such simple things, must be endowed with a similar force to remain in their state.

40. In the question posed by the Royal Academy of Science for the year 1747, concerning the nature of the simple things, a theory is specifically asked for, that could explain the cause of all happenings in the world. Since all happenings in the world follow the laws of motion, and these are based on the *Vis inertiae* or the force to remain in the same state, this request is fully satisfied by the property of the simple things developed here.

41. Since in the simple things there are no forces aimed at constant change, the conclusions that were drawn regarding the different nature of these forces on the basis of non-differentiability are automatically eliminated and need no further rebuttal.

42. In particular one now recognizes an infinite difference between the elements of bodies and the essence of souls and ghosts; for whilst the former are endowed with a force to maintain their state, and to resist all change, one assigns with all justification to the latter a force to change their state, and consequently places them in a class of actual things, vastly distanced from the elements of bodies.

43. However according to the theory of monads the souls and ghosts belong into the same class as that of the simple particles, since both are assumed to be endowed with a force to change their state perpetually, and the whole difference consists only in the different de-

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termination of the force. According to Mr. von Leibnitz all monads, be they ghosts or particles, have a force enabling them to imagine the world , and are thus differentiated from each other only by a higher or lower degree.

44. However much this theory of monads is admired these days, one will have to admit that its entire value can only be judged according to the validity of the reasoning on which it is based. Since this reasoning is not only found to be much too weak, but since also the forces ascribed to the simple things are in conflict with their essence, there remains nothing with which to support the whole theory any further.

45. It could be argued against this that Mr. von Leibnitz mainly tried to support his theory through the general harmony and agreement of the world. But here one must take into account that he presupposes the forces of the simple things we have mentioned, and considers them as already verified, in which case his conclusions would very much have the appearance of truth, although they did not seem to Mr. von Wolff sufficiently conclusive to incorporate the whole *Systema* into his philosophy.

46. It is also not to be supposed that, after the impossibility has been demonstrated, of the imaginary acting forces, with which the elements of the bodies are supposed to be endowed, any of the other supporters of Leibnitz' theory would concede it a place in the Science of the World.

47. It remains as established that the force to persist in its state, and to resist all change, is a main property of the bodies. And since on this are based all laws of motion, that determine all changes in the world of bodies, and since one can not imagine a happening that would not proceed according to these laws of motion, one is entitled to place even the essence of matter into this force.

48. But whoever might entertain some doubts about this, and believes that matter might perhaps still be endowed with other properties, although we cannot find any traces of these, will nevertheless have to admit that it can not contain two mutually contradictory things. But since matter possesses a force to remain perpetually in its state, it is impossible to ascribe to it at the same time a force to change its state perpetually.

49. However since it is impossible to explain the power to think and the other characteristics we know of the souls of men and of ghosts, by a force to remain steadily in their state, but requires a totally different force and ability to change their state, it is clear that matter can not be ascribed the ability to think or any other property of souls.

50. The importance of this conclusion, the truth of which we may be convinced of for other reasons, supports even more the theory of the essence of bodies put forward here, since according to the theory of monads there is such a small difference between the ele-

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ments of the bodies and the ghosts that the truth of this can hardly be derived from it with appropriate clarity .

51. One must therefore stipulate that two particular well differentiated classes of things exist in the world, to one of which belong the corporeal things, whose essence consists in the force (i.e. ability, translator) steadily to maintain their state. The other however comprises the souls and ghosts, which are endowed with a force to change their state, and to whom alone, according to the theory of Leibnitz a force (ability, translator) to have a concept of the world can be ascribed.

52. In view of this difference it is not unreasonable to call the bodies, in the parlance of the Schools, *entia passive*, but only the souls and ghosts *entia active*; and in just this action and activity seems to consist the freedom of souls and ghosts, which is so characteristic of their essence as extent and *vis inertiae* are of bodies, for which reason most of Bayle's doubts , who wants to regard freedom as a particular gift from God, automatically lose their strength.

53. Since the souls and ghosts are quite different things, and have nothing in common with the essence of bodies, a number of useless questions are automatically eliminated that otherwise are raised with great emphasis by the theory of monads, such as for example whether two or more ghosts, taken together, can have extent or can represent a body.

54. The souls and ghosts are with the greatest of justification called simple things, since one can in no way imagine them to have parts. The concept of parts appears to be incompatible with their essence to such an extent that one can deduce the absence of parts not only from the absence of size. That means one can not say that the souls and ghosts are infinitely small and therefore can not have parts, as one imagines the elements of bodies.

55. For the concepts large and small are characteristic of bodies such that they are not even applicable to souls and ghosts. Just as one can not ask a soul what its colour is or whether it is hard or soft, and similarly can not ask how large or small it is. Such questions always presuppose the essence of a body: and the same can also be said of the location where a ghost is supposed to be.

56. But if one considers the ultimate particles of bodies to be simple things, one can not imagine them to be other than infinitely small, which one maintains because in the absence of size they can have no further parts. We want to examine more closely whether this concept contains no inconsistency.

57. Messrs. von Leibnitz and Wolff reject even the atoms of the Epicuraens, and consider the concept of such infinitely small particles of bodies, in which apart from the absence of size nothing is to be found, as nonsensical and contradictory. But the simple things, of

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which they believe the bodies to be composed, they only consider possible because they ascribe to them forces (ability, translator) to change their state perpetually.

58. Since it has so far been demonstrated that such forces can not possibly have a place in the simple things, the Leibnitzians and Wolffians must regard their simple things for just as impossible as the atoms of the Epicureans: so that without further proof the composition of bodies from simple things is eliminated.

59. If one wanted to argue that such simple things could exist because of the *vis inertiae* with which they are still endowed, the answer is that the necessary difference, required by the principle of non-differentiability, is not there, since this *vis inertiae* would also have to become infinitely small, and consequently disappear, because *vis inertiae* always decreases with the quantity of matter, and must disappear together with the latter.

60. Mr. von Leibnitz maintains that the number of simple things constituting a body is infinitely large, and it is more or less understandable how an infinitely large number of infinitely small things can represent a finite quantity, since in the higher mathematics the infinitely large and small are usually treated in this manner, which perhaps also has given Mr. von Leibnitz cause to think in this way.

61. However it has already been remarked that such concepts, although extremely useful in mathematics, can not be applied to real things. For in reality the infinitely small, which is supposed to be smaller than anything one can imagine, is nothing other than a pure nothing, and the infinitely large is nothing but the ratio that is obtained if one divides a number by nothing; but since such a nothing can not exist, such simple things can likewise have no reality.

62. It has already been remarked above, that the infinitely large number of such simple things, which according to Mr. von Leibnitz is required to represent a finite body, contains a self-contradiction, since such a number is intrinsically indeterminate, but the actual composition requires a definite number.

63. No less difficulties exist concerning the theory of Mr. von Wolff, who maintains that the number of simple things, of which a body is composed, is actually definite and finite. And there is no doubt that Mr. von Leibnitz would also already have adopted this view, if, following his deep insight he had not foreseen in it insuperable difficulties.

64. For firstly we have here the previously mentioned difficulty that the simple things, which of necessity must be assumed to be smaller than anything one can imagine, infinitely small and consequently nothing; for the usual excuse that these simple things must nevertheless be real things on account of their forces, is now void.

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65. After that it runs even more counter to all our firmly grounded concepts that a finite number of infinitely small things could represent a finite quantity. For how can for example a thousandth part of a cubic foot of matter be infinitely small, and have consequently no size at all? But as illogical as this appears regarding a thousandth part, that we can still see, as illogical it must also appear regarding a millionth or as small a part as can be conceived.

66. Such objections against the theory of the Wolffians are not new, however since their replies, which are usually grounded on the active forces of simple things, are totally void, these objections receive a new force and their opponents themselves must confess that they are sufficient to disprove the atoms of the Epicureans. But from now on the simple things and monads are no better than the atoms of the Epicureans.

67. Since the claim regarding the simple things, of which the bodies are supposed to be composed, meets with such insuperable difficulties, and the arguments with which one has so far defended them have totally lost their force, one can no longer give them a place in the Science of the World.

68. For firstly the infinite smallness that one is forced to ascribe to the simple things is involved in a contradiction, and in consequence neither a finite nor an infinite number of such particles would be able to represent a body, since the former is clear for a finite number; but an infinite number is intrinsically an impossible thing, if it is really to exist other than in our thoughts.

69. Since one can not maintain without contradiction that the divisibility of matter ceases somewhere and reaches its limit, because otherwise one would have to admit that a body is composed of a finite number of indivisible particles, that is of particles that have absolutely no size: therefore one is forced to admit that bodies can be subdivided further and further to infinity.

70. The usual objection does not hold here, that there could be particles which still have some magnitude, but which, because of their hardness it is impossible to divide any further. For where there is still some magnitude, there is also an extent, and consequently real particles are present, although they could not be separated from each other; here we are speaking not only of particles that can actually be separated from each other, but from such, whose existence can be clearly demonstrated.

71. One is therefore forced to say that the possibility of dividing bodies continues infinitely far and has absolutely no barriers. But from this does not follow at all, if one examines the matter more accurately, that a body is composed of an infinite number of infinitely small parts, which would also involve an obvious contradiction.

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72. For if one says that the divisibility of matter proceeds indefinitely without end, then one does not only maintain that through no subdivision, however far it is continued, one ever meets particles that that are not capable of further division, but that there simply are no such particles. For if there really existed such particles, then the infinite character of divisibility would be established. This contradicts the concept of infinity.

73. It therefore is the same whether one says that the divisibility of matter is infinite, or that there simply are no solid particles in which no further division occurs. And if one accepts this concept, one avoids all above mentioned difficulties that could otherwise not be resolved.

74. From this follows therefore that there simply are no such simple things, of which bodies are composed; and that therefore all parts of bodies, however small they might be, still are composite things as the whole body itself. As unlikely as these concepts might appear at first sight, they are, after mature consideration, perfectly correct and in accordance with the truth, as so far has been clearly demonstrated.

75. However it becomes clear that the conclusion, on which the entire theory of simple things is usually based, however conclusive it might appear, is totally incorrect, if one says: *The bodies are composite things. Therefore they must be composed of simple things.*

76. One bases this conclusion on the general concept we have of a number or a quantity, namely that where there is a multiplicity of entities, there must of necessity be single entities. But one should remember that where a number of entities represents a size, each entity on its own must already possess a size. If the entities have no size, a number of them can also not represent a size.

77. Therefore the simple thing applies solely to the souls and ghosts, of whom only, next to God, it can justly be maintained that there are no parts within them. Thus the essence of ghosts is infinitely far removed from the essence of bodies, such that they have nothing at all in common.

78. Since it was demonstrated above that the simple things, of which bodies are composed, must have a force to maintain themselves in their state, it might appear that this statement is also now invalid. However with good reason the qualification was added: provided such particles exist. For what was said there of the simple things, applies equally to parts of bodies, be they large or small.

79. For since every body is endowed with a force to remain in its state and to resist all change, each part of it must possess a similar force, which is a characteristic of all parts of matter; and to understand this force it does not matter whether the parts are large or small.

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80. In contrast to this, forces that aim at perpetual change of the state, ultimately require a simple entity in which to exist. But since there are no such forces, it is not necessary, in explaining the properties of bodies, to resort to simple things.

81. What, incidentally, Mr. von Leibnitz has in such meaningful manner shown regarding the exact interrelation of all parts of the universe, and from this has derived the monads, maintains after this examination its entire validity, provided only that what was said with regards to the monads, is referred to all parts of the bodies.

82. For because of this most perfect connection, and the general harmony in the universe arising there from, every single part is connected to all other parts in such a manner that if one had complete knowledge of a single part, one could derive from this the state of the entire world. Therefore what Mr. von Leibnitz maintains regarding the monads, can with equal justification be maintained about all finite parts of the world.