

for example in this phrase, *I found the time very long*; for the time seems long to us, when the ideas have succeeded each other slowly in our mind.

§.114. It is easy to grasp that measurements of time can be different for different peoples, the annual and daily course of the Sun, the vibrations of a pendulum (which are, of all measurements, the most accurate) have provided us with those of *minutes, hours, days, and years*; but it is quite possible that other things have been used as measurements by other peoples. The only one that might be universal is what is called *an instant*; for all men necessarily know this portion of time, which flows while a single idea stays in our mind.

§.115. All measurements of time are founded only on the duration of our being, and on that of the beings that coexist with us and whose existence we view in terms of our own. For, having acquired the idea of successions and of time, although we have successive ideas, we transfer this idea to time during which we did not have any ideas as, for example, when one has fainted, and thus do we acquire the idea of the duration of the world and the universe, by relating the idea that we have of the duration of our existence to the time that passed when we did not yet exist, and to that which will pass when we are no longer.

HOW WE ACQUIRE THE IDEA OF ETERNITY.

§.116. To us the duration of all finite beings has a beginning and an end; so, if we subtract from this idea that of the beginning, then the duration is *eternity a parte ante*; if we remove the end, the kind of duration is called *eternity a parte post*, and it is thus that the soul of man is eternal.⁸⁵ Finally, if we remove its beginning and its end from the idea that we have of the duration of finite beings, the duration will become *the eternity of God*, for only God can be eternal *a parte post*, and *a parte ante*, that is to say, have neither beginning nor end. Thus, men acquire the idea of infinite duration, as of all other ideas of the infinite, by additions and subtractions, the end of which we can never see.

CHAPTER SEVEN

Of the elements of matter

WHAT WERE, ACCORDING TO ANCIENT PHILOSOPHERS, THE PRINCIPLES OF THINGS.

§.117. Philosophers from all times have exerted themselves about the origin of matter, and the elements. The Ancients each had their own different sentiment on this subject, some thought water the basic element of all bodies;

85. Again Du Châtelet has used Descartes' idea of the nature of the soul.

others, air; others, fire; Aristotle bringing these diverse sentiments together, admitted four elements of things: water, air, earth and fire. He believed that the mixture of these four principles, which, according to him, were basic, because they were not resolvable into other combinations, resulted in all that surrounds us.⁸⁶

DESCARTES' IDEA ON THE ELEMENTS OF MATTER.

§.118. Descartes, who despite the interval of time between Aristotle and him was Aristotle's successor, also made elements, but in his own way. For Aristotle's four principles Descartes substituted three kinds of small bodies of different sizes and shapes, these small bodies, or elements, resulted, according to him, from the original divisions of matter, and were formed by their combination: fire, water, earth, air, and all the bodies that surround us.⁸⁷

NEW OPINION ON THE ELEMENTS THAT WAS FORMED FROM DESCARTES'. Most philosophers today have abandoned Descartes' three elements and conceive of matter simply as a mass, uniform and similar, with no internal difference; but, the small particles have such diversified forms and sizes that the infinite variety existing in this universe can result from them. Thus, they suppose the only difference between the constituent particles of gold and paper, for example, to be that which comes from the shape and the arrangement of these particles.

THIS OPINION IS CLOSE TO THAT OF EPICURUS ON ATOMS.

This opinion, which, like that of Descartes, is very well known, is nearly that of Epicurus on atoms, as revived by Gassendi in our own day; these solid and indivisible particles of matter, distinguished from one another by their shape and size, only differ in name from Epicurus's atoms.⁸⁸

THE PRINCIPLE OF SUFFICIENT REASON SHOWS THAT ATOMS ARE INADMISSIBLE.

§.119. M. Leibniz, who never lost sight of the principle of sufficient reason, found that these atoms did not explain extension in matter, and, seeking

86. Aristotle's ideas of the elements and the nature of matter prevailed into the seventeenth century.

87. In the course of the seventeenth century Descartes' ideas became the prevailing wisdom as described in his *Principles of Philosophy*.

88. Pierre Gassendi (1592–1655), the French experimentalist and philosopher, brought the ideas of Epicurus and the Stoics to his contemporaries. Du Châtelet is referring to his support for the Greek philosopher's concept, "atomism."

to discover this reason, he believed that it could only lie in a different idea of particles, those without extension, which he named *monads*.

EXPOSITION OF M. LEIBNIZ'S SYSTEM OF MONADS, OR ELEMENTS
OF MATTER.

Few people in France know anything of this opinion of M. Leibniz's but the word, *monads*; the books of the famous Wolff, in which he explains so clearly and eloquently M. Leibniz's system, which, in his hands, took a totally new form, have not yet been translated into our language.⁸⁹ So, I am going to try to explain the ideas of these two great philosophers on the origin of matter; an opinion, which half of learned Europe has embraced, which deserves serious attention.

§.120. All bodies are extended in length, width, and depth. Now, as nothing exists without a sufficient reason, it is necessary for this extension to have a sufficient reason that explains how and why it is possible; for, saying *that there is extension, because there are small extended particles*, comes to saying nothing, since the same question will be asked about these small extended particles as about extension itself, and the sufficient reason for *their* extension will be asked about in turn. Now, as sufficient reason obliges us to state that a thing is different from what one is asking about, since otherwise no sufficient reason is provided and the question always remains the same, if one wants to fulfill this principle about the origin of extension, it is necessary to come in the end to something that is without extension, that has no particles, to give a reason for that which is extended and has particles. Now, a being without extension and without particles is a simple being; so, compounds, extended beings, exist because there are simple beings.⁹⁰

It must be confessed that this conclusion astonishes the imagination, simple beings are not within its province, they cannot be represented by images, and only the understanding can conceive of them. To have simple beings accepted less reluctantly, the Leibnizians use quite an accurate comparison; they say: if someone asked why there were watches, he certainly would not be content if he was answered, *it is because there are watches*; but in order to give sufficient reasons and ones that satisfy the questioner about the possibility of a watch, it would be necessary to come to things that were

89. Strictly speaking, there *were* translations which Du Châtelet and Voltaire received from Frederick of Prussia, done by one of his courtiers.

90. "Etre Simple," *simple being*, is the term Du Châtelet used to signify *monad*, perhaps to dissociate her explanation from the previous and current accounts by Leibniz's adversaries of this concept as ridiculous. By avoiding the word, she probably assumed that she could gain a better hearing for Leibniz's ideas.

not *watches*, this is to say, to springs, to cogwheels, to pinions, to the chain, etc. The same reasoning applies to extension; for, when one says there are bodies with extension because there are atoms, it is as if one said: *there is extension, because there is extension*; this is in effect saying nothing at all. Thus, the sufficient reason for an extended and composed being can only be found in simple beings without extension, just as the sufficient reason for a compound number can only be found in a noncompound number, that is to say, in a unit. So, it must be admitted, these philosophers conclude: there are simple beings, since there are compound beings.

ATOMS CANNOT BE THE SIMPLE BEINGS OF WHICH MATTER IS COMPOSED.

§.121. Atoms, or indivisible particles of matter, cannot be the simple beings; for, these particles, though physically indivisible, are extended and are consequently of the same case as the bodies they compose. Thus, the principle of sufficient reason equally denies this simplicity to very small bodies and very big ones, which is necessary if the reason for extension in matter is to be found in them.

As it is finally necessary to arrive at necessary things when explaining the origin of beings, one cannot say that it is enough only to suppose that atoms are necessarily extended and indivisible, and that then there is no longer a need to seek the reason for their extension, since all philosophers agree that what is necessary requires no demonstration of its existence. For only something the contrary of which implies a contradiction must be recognized as necessary (§.20.).⁹¹ What is necessary needs a sufficient reason showing why it is necessary; and this reason cannot but be the contradiction to be found in what is opposed to it. Now, as there is no contradiction in the divisibility of extended beings, the indivisibility of atoms cannot be accepted as necessary; thus, one must come to simple beings.

The will of the Creator, to which atomists turn to explain the extension of the atom, cannot, according to M. Leibniz, resolve this issue, because the question is not why extension exists, but how and why it is possible. Now, we saw above that the will of God is the source of the actuality, but not of the possibility of things. So, it cannot be resorted to in order to explain the possibility of extension.

91. Du Châtelet is referring to chapter one of the *Foundations* in which she established the underlying principles governing all knowledge: the laws of contradiction, of sufficient reason, the principle of indiscernibles, and the difference between necessary and contingent. She is now applying these rules of reasoning to hypotheses about the nature of matter.

SIMPLE BEINGS, OR MONADS, HAVE NO PARTICLES.

§.122. M. Leibniz, after having established the necessity of simple beings, explains their nature and their properties.

Simple beings having no particles, none of the properties arising from composition could fit them; thus, simple beings having no extension, are indivisible, for, not having several particles, which make up into *one*, they could not be separated.

NOR SHAPE.

§.123. They have no shape, for shape is the limitation of extension; now, these simple beings, being without extension, cannot have shape. For the same reason, they have no height and fill no space, and have no internal motion; for all these properties suit compounds, and result from composition. Thus, simple beings are completely different from compound beings, and they cannot be seen, touched, or represented in the imagination by any perceivable image.

§.124. A simple being cannot be produced by a compound being, for all that can come from a compound is born either of a new association or of the dissociation of its particles. Now, association can only produce a compound being, and dissociation, when pushed to its ultimate degree, can only end in the simple beings, those which already existed in the compound. They have not been produced by this dissociation; so, a simple being cannot originate from a compound being.

THE SUFFICIENT REASON FOR SIMPLE BEINGS IS IN GOD.

Neither can a simple being originate in another simple being; for the simple being, being indivisible and not having particles that can be separated, nothing can be detached from it. Thus, a simple being cannot originate in a simple being; now, since simple beings can originate neither in compound beings nor in simple beings, it follows that the reason for these beings must be in necessary beings, this is to say, in God. And it cannot be said that the explanation for atoms or for the indivisible particles of matter could be in God as is that of simple beings; for God cannot have created extension without creating simple beings first. The particles of compounds must have existed before the compound, but these particles not being resolvable into others, their first cause must be found in the Creator.

SIMPLE BEINGS CONTAIN THE SUFFICIENT REASON FOR ALL THAT IS FOUND IN COMPOUND BEINGS.

§.125. Simple beings, being the origin of compound beings, the sufficient reason for all that is found in compound beings must be found in simple

beings; so, simple beings must have intrinsic determinations, enabling us to understand why the compounds that result from them are such as they are, rather than quite different; that is to say, why they have such and such attributes, such and such properties, etc. Now, as you have seen here above that there are no identical beings in nature, all simple beings must be dissimilar and contain within them the differences that prevent one from being put in the place of another in a compound, without changing its determination, since if these simple beings were not all dissimilar, the resulting compounds could not be so either.⁹²

THE SIMPLE BEINGS HAVE A PRINCIPLE OF ACTION THAT ONE CALLS FORCE.⁹³

§.126. Perpetual change can be observed in compounds; nothing stays in the same state; all tends to change in nature. Now, since the primary cause for what happens in compounds must ultimately be found in simple beings, from which the compounds resulted, there must be found in simple beings a principle of action capable of producing these perpetual changes, and by which may be understood why the changes happen in such a time, rather than in any other, and in such a manner, rather than in any other.

The principle that contains the sufficient reason for the actuality of any action is called *force*; for the simple power or ability to act is only a possibility of action or of passion in beings, which requires a sufficient reason for its actuality. In this way it is said that an animal has the ability to walk; a bow, to drive an arrow; a watch, to mark the hours, because one can explain by the structure of the animal, the bow, and the watch, how and why these effects are possible, but it does not follow from this that these effects are actual; if this were so, the animal would always walk, and the watch would always mark the hours, but this does not happen. So, in addition to this possibility, a sufficient reason must be admitted for the actuality, that is to say, a force that sets to work this power that a being has to act. Now, the sufficient reason for all that happens to compounds lying ultimately in simple beings, it follows that simple beings have this force, which consists in a continual tendency to action, and this tendency always has its effect when there is no sufficient reason preventing it from acting, that is to say, when there is no

92. Here and in chapter three of the *Foundations*, Du Châtelet describes simple beings as similar to what we now call DNA. It is interesting to note how other aspects of her explanation in this chapter suggest our modern understanding of atoms.

93. *Force* in the eighteenth century had a general meaning of the impetus for motion. Note Du Châtelet's image of a universe where motion, not rest, is the natural state of all matter.

point of resistance; for one must call resistance that which contains the sufficient reason why an action does not become actual, though the reason for its actuality remains.

SIMPLE BEINGS ARE IN CONTINUAL MOTION.

So, simple beings are endowed with a force, whatever it may be, as a result of whose energy they tend to act, and act indeed as soon as there is no point of resistance.⁹⁴ Now, as experiment proves that the force of simple beings is deployed continuously, since it constantly produces perceivable changes in compounds, it follows that each simple being is, by virtue of its nature and by its internal force, in a motion that produces in it perpetual changes and a continuous succession; and that its internal state and the sequence of successions that it experiences are different from the internal state, and from the successions experienced by any other simple being in the entire universe.

SIMPLE BEINGS ARE THE ONLY REAL SUBSTANCES.

§.127. Compounds last in spite of changes they endure, matter remains the same while it takes different forms, neither our body nor that of the plants, nor the air, nor anything that surrounds us is annihilated; however, the state of these beings changes constantly. Thus, simple beings from which compound beings result cannot but endure, this is to say, that they cannot but have constant and invariable determinations, while at the same time they have others within them that vary continually; for if simple beings were not durable by nature, the compounds could not last. So, simple beings are the real substances, beings that are durable and susceptible to the modifications which their internal force produces (§.52).⁹⁵

Nothing can stop this internal force of simple beings, nor change the effects that are a consequence of it, because no natural agent can either break or destroy simple beings.

§.128. This makes it clear that the real substances (that is to say), simple beings, are active, since they carry in them the principle of their changes, that is to say, this force which to them is essential, which never leaves them, and which cannot cease. And we can understand what M. Leibniz meant

94. In the eighteenth century the word *energy* simply connoted *force* and could be applied to all kinds of situations. However, Du Châtelet, following the ideas of Leibniz and Johann Bernoulli on force and motion, is close to our more modern understanding of *energy*.

95. In §.52, the concluding section of chapter three of the *Foundations* on the "Essence, Attributes, and Modes" of matter, Du Châtelet explained the Leibnizian concept of "essential determinations" of a substance from which its permanent attributes and variable, possible modes or modifications follow.

when he said that the true character of the substance is to act, that it is distinguished from accidents by action, and that it is impossible to conceive of it without force.

I said here above that, in M. Leibniz's manner of thinking,⁹⁶ each monad, or simple being (for it is the same thing), contains a sequence of changes that is different from the sequence of changes of every other simple being—a necessary consequence of the principal of indiscernibles. We have an example of this in our souls, for no one doubts that the sequence of ideas of one soul is different from the sequence of ideas of all other souls in existence.⁹⁷

§.129. The different states of a simple being depend on one another; for, such a successive state being no more necessary than another, there must be a sufficient reason why such a state is actual, and why, rather in such a time than in any other. Now, this reason can only be found in the preceding state, and the reason for that will be in the state antecedent to it, and so on back to the first. This first state, which supposes no other antecedent to it, depended on God, but all subsequent states are linked, so that from the first follows the last which was contained in it, and which must be such, because the first was so and not otherwise. In the same way the actual state of a clock depends on the preceding state, and that on another, and so on back to the first, which depended on the way in which the craftsman arranged the wheels; thus does the forty-seventh proposition of Euclid follow from the first, in which it is contained.⁹⁸

IN THE UNIVERSE EVERYTHING IS LINKED TO EVERYTHING ELSE.

§.130. All is linked in the world; each being has a relationship to all the beings that coexist with it, and to all those that preceded it, and that must follow it. We ourselves sense at every moment that we depend on the bodies that surround us; if the nourishment, the air, a certain degree of heat, are taken from us, we perish, we can live no longer. The whole Earth depends

96. Du Châtelet uses the French word *sentiment*, meaning a sensory perception on which the mind reflects, thus, indicating the operation of both the senses and reason, translated here as "manner of thinking." She probably derived this from her reading of John Locke's *Essay concerning Human Understanding* (1689), translated into French by Pierre Coste (1668–1747) in 1700. Coste also translated Newton's *Opticks* (1722).

97. Du Châtelet is again using the term *soul* in the Cartesian sense.

98. Euclid's forty-seventh proposition (of his Book 1) is the first of two proofs he gave of the Pythagorean Theorem for a right triangle: $a^2 + b^2 = c^2$. Proposition 1.1 was the construction of an equilateral triangle.

on the influence of the Sun, and the Earth could not conserve itself, or grow vegetation, without the Sun's aid. It is the same with all other bodies; for, though we do not always distinctly see their mutual connection, we cannot, by the principle of sufficient reason and by analogy, doubt that there is one, and that this universe does not make a whole, an entire and a single machine, all the parts of which relate to one another, and are so linked that they all tend to the same end.

§.131. The original reasons for all that happens in bodies lie necessarily in the elements of which they are composed. It follows that the original reason for the connection of bodies to each other, insofar as they coexist and succeed each other, lies in simple beings. So, the connection of the parts of the world depends on the connection of the elements, which is the foundation and the first origin. Thus, the state of each element contains a relation to the present state of the entire universe, to all the states that will be born from the present state, just as in a well-made machine, the least part has a relation to all the others. For the state of any element A being determined, harmony and order require that the state of its neighbors B, C, D, etc. should also be determined in a particular manner rather than in any other, to work in harmony with the state of the first; and as the same reason continues for all states of the elements, all future states of the elements will also have a relation to the present state that must coexist with them, to past states from which this present state results, and to the states that will follow it, and of which it is the cause. Thus, it can be said that in M. Leibniz's system, it is a metaphysical-geometric problem, *the state of an element being given, to determine the past state, present, and future of all the universe*. The solution of this problem is reserved to the Eternal Geometrician who solves it at every moment insofar as he sees distinctly the relation of the state of each simple being to all the states, past, present, and future of all the other beings of the universe: but it will always be impossible for finite beings to have a distinct idea of this infinite relationship, that all things that exist have between them, because then they would become God. . . .

[§.132.] . . . In truth we can only have a clear representation of the most marked changes, and those that affect our organs with a certain force; but all these representations exist, though our soul does not perceive them, because of their weakness and their infinite multiplicity, which make it impossible to distinguish them, and consequently means that they only excite in us dim representations. That an infinity of dim representations accompany our clearest ideas is something we cannot deny, if we pay a little attention to ourselves. For example, I have a very clear idea of this paper, on which I

write, and of the pen I use; however, how many dim representations are enclosed and hidden, so to speak, in this clear idea. For there is an infinity of things in the texture of this paper, in the arrangement of the fibers that compose it, in the difference and the resemblance of these fibers that I do not distinguish, of which, however, I have a dim representation. For the fibers, their differences and their arrangement subsisting, there is no reason why they would not cause impressions on my organs, and consequently representations in my soul; but these impressions being too weak and too compounded, I cannot distinguish them at all, and they cause dim representations in my soul. Thus, the total representation that results from this paper as a whole is clear, but the representations of its parts are dim. It is easy to see from this why in our mother's womb we are in a state where all our ideas are dim; it is that our body, not having yet developed, our limbs and organs are weighed down and concentrated almost in a point; consequently, it is impossible for the animal not to be equally affected everywhere by the same impression. Thus, the least movement shakes the entire animal so strongly that it cannot distinguish one impression from another, nor consequently form distinct ideas. Whereas, when we have left the envelopment of the *uterus*, our body is so disposed that the movement of rays of light, for example, cannot shake our acoustic nerves, nor sounds the optic nerve, and thus embroil us in very different ideas, which must be conceived of and sensed separately for them to be distinct.

§.133. So, this connection between our soul and the entire universe comes from the union of the elements among themselves, and from the relationships they all have with one another, and these relationships spring from their dissimilarity; for this dissimilarity causes each element, by its essence and its intrinsic determinations, to require the coexistence of a particular element with it rather than any other, and an element could not be removed from its place and substituted with another while conserving the same sequence of things, such a change would change the universe, and a new universe would appear. Whence it can be seen that the dissimilarity of elements explains why this universe is such as it is rather than completely different. . . .

[Du Châtelet continues her explanation; similarly, extension is an assemblage of "several, diverse, coexisting things," an assemblage of simple beings. In §.134 Du Châtelet then explains that compound beings, also an assemblage of simple beings, are not therefore true substances, for their particles could be reassembled as another compound being, just as one might take a watch apart and reuse the parts.]

WHY SIMPLE BEINGS SO DISGUST THE IMAGINATION.

§.135. One's reluctance to conceive how simple beings without extension can by their assemblage make up beings with extension is no reason for rejecting them; this rebellion of the imagination against simple beings comes probably from our habit of representing our ideas with perceivable images, which cannot help us here.

In things for which we cannot make perceivable images and that one cannot represent by characters, we must endeavor to supply them, never losing sight of the irrefutable principles by drawing conclusions from the consequences linked together with them, and without ever jumping in our reasoning.⁹⁹

Mathematical truths would be no different from simple beings; if signs had not yet been invented to represent them to the imagination, these truths would be no less certain. Perhaps some day a calculus for metaphysical truths will be found, by means of which, merely by the substitution of characters, one will arrive at truths as in algebra. M. Leibniz believed he had found it; but sadly, he died without imparting his ideas on this, which at least would have put us on the right path, even if they had not yielded all that the name of such a great man promised.

§.136. It is regrettable, no doubt, that thinking people are not in agreement on the first principles of things; it would seem that the claim the truth has on our assent should extend to all notions and for all times. However, many truths have been fought over for whole centuries before being accepted; such was, for example, the true system of the world, and in our day, *forces vives*. It does not rest with me to decide if the monads of M. Leibniz are of the same case; but whether they are accepted or rejected, our researches on the nature of things will be no less certain; for, in our experiments we never will arrive at these first elements of which bodies are composed and the physical atoms (§.172), though in their turn composed of simple beings, are more than sufficient to exercise our desire for knowledge.¹⁰⁰

99. Similar reasoning governed hypotheses about subatomic particles, hypotheses subsequently proved with the development of new scientific technologies.

100. In §.172, in chapter nine of the *Foundations* on the "Divisibility and Subtlety of Matter," Du Châtelet, having repeated the theory about the divisible parts of matter into elements, atoms, and simple beings, then asserts the probability that there is a fixed number of such particles in the universe. In this she follows Leibniz and disagrees with Newton. Her explanation was a precursor to the proofs Antoine Laurent Lavoisier (1743–1794), the celebrated French chemist, gave at the end of the eighteenth century for the conservation of mass.

Émilie Du Châtelet, *Foundations of Physics*, 1740.

Chapter 7. Of the Elements of Matter.

Translation of the passages not included the Zinsser and Bour translation.

Translation prepared by Katherine Brading *et al.*¹ at the University of Notre Dame.

Footnotes are ours except where otherwise indicated.

Du Châtelet's marginal notes are placed in {bold} in the closest appropriate place in the text. Please see the French original for the position of each note in the margin alongside the paragraph.

132. {Our Soul has obscure representations of all that happens in the whole Universe.} In truth, our Soul represents the entire Universe, but in a confused way, whereas God sees it so distinctly that none of the relations therein escape Him. This is another of Mr. Leibniz's views, one that most needs to be clarified and saved from ridicule, with which we could charge it: his claim that this representation of the entire Universe, and of all its changes, is an attribute of our Soul.

We know, and all Philosophers agree, that motion propagates in the plenum to all distances, the smallest stone thrown into the Ocean disturbs the equilibrium of this immense mass of water, and there forms rings whose end we do not distinctly discern. Let us imagine, for example, that a boat is floating on the Sea, and that one throws stones of different sizes to different distances from this boat. We perceive that each stone generates rings that in the form of waves propagate more or less strongly, in proportion to the distance they come from and to the power of the cause that produced them. Thus, this boat will receive successive impressions from all the stones, each of which is such that one could determine the cause and the distance. Now, we are in the same situation as this boat: our Body swims in an infinite fluid, and waves hit it from all sides, bringing with them the character of their origin; when an impression in our sense organs is strong, and excites in us a violent motion because the object that causes it is close, we perceive it and we have a very clear idea of it. As the object that causes the sensation becomes further away, the impression it makes upon our sense organs becomes less strong, and the clarity of the idea that it excites in us follows this deterioration and diminishes proportionately; for by the law of continuity, the clarity of the idea must follow the force of the impression. Thus, when the object is very distant and cannot make a perceptible impression upon our senses, the idea must also become imperceptible, that is to say, must form an obscure representation. Now the impressions that the objects make upon us continue to whatever distance they may be placed, because in the plenum all motion must produce waves to infinity, like this stone that one throws into the Ocean, of which I just spoke, and the waves, propagated and spread to infinity, must necessarily reach us, and consequently, there must occur in our Soul a representation in relation to the movement

¹ Penelope Brading, Ashton Green.

that our organs experienced. For, if at a certain distance the representations that the objects excite in our Soul were to cease, even though the impressions that they make on our senses were to continue, there would be a leap in Nature, which would be contrary to the principle of sufficient reason (§13); for there would be no reason for the clarity of an idea to gradually diminish proportionately to the impressions up to a certain point, and then at this point end as if in a leap, even while the reason for its continuation still subsists. Thus, once one accepts the principle of sufficient reason, and the plenum that follows from it, one is obliged to agree that we receive impressions from all motions that happen in the Universe, and that our Soul has obscure representations of it, due to the constant liaison that there is between the impressions of the Body and the representations of the Soul.

See Bour and Zinsser for a translation of the remainder of §132.

133. *See Bour and Zinsser for a translation of the beginning of §133. The remainder of §133 reads as follows:*

Furthermore, it is by this dissimilarity that one can understand how non-extended Beings can form extended Beings; for the Elements exist each of them necessarily external to the others (since one can never be the other), and all of them being, as we have just seen, united and linked together, an assembly of several diverse Beings results from this, each of which exists external to the others, and which by their interconnections make a whole; but I have shown that we cannot represent extension other than as an assembly of several diverse, coexisting things, and which exist external to one another (§77): therefore, conclude the Leibnizians, an aggregate of simple Beings must be extended. Thus, from the Metaphysical union of the Elements flows the Mechanical union of the Bodies that we see; for all Mechanics that falls under our senses derives in the end, and in going back to the first source, from the superior and Metaphysical principles.

134. The Composite Beings cannot subsist without the simple ones, nor can they receive any change that is not founded in the Elements; thus the Composite Beings are not Substances in themselves, but assemblies of Substances or of Simple Beings. **{A Composite Being is not a Substance, but an aggregate of Substances, that is to say, of Simple Beings.}** For in the Composite Being, there is nothing Substantial except the Elements; all the rest, such as the size, the shape of the parts, how they are situated with respect to one another, the Physical qualities of Matter (such as duration, ductility, malleability², etc. that constitute the Composite Being), are nothing but Modes. Take a Watch, for example: the shape of the wheels, their combination, the elasticity of the spring, the hardness of the parts, etc. constitute the Watch; however, it is obvious that all these things are nothing but Modes that can vary without the matter of the Watch perishing. Consequently, nothing substantial perishes even though a Composite Being ceases to

² The 1740 “meabilité” is corrected to “malléabilité” in the 1742 edition.

be, and even though it forms another Being through the different combination of its parts; since the Elements still continue to subsist, and to endure through any separation that may happen to the parts that make up the Composite Beings. However, extension must seem to us a Substance, for we see that it endures, and that it can be modified (§52). But if we examine this idea with the eyes of Understanding, we will be obliged to recognize that it is nothing but a Phenomenon, an abstraction of several real things, by the confusion of which we form for ourselves this idea of extension; it is from this confusion that arise almost all the objects that fall under our senses, and of which the realities are often infinitely different from the appearances (§53). Thus, if we could see distinctly all that composes extension, this appearance of extension that falls under our senses would disappear, and our Soul would perceive only Simple Beings existing each external to the others, in the same way that if we distinguish all the small portions of matter differently moved, that compose a portrait, this portrait that is only a Phenomenon would disappear for us. **{How extension can result from the assembly of Simple Beings.}** Thus, the same confusion, that is in my organs and whereby the resemblance of a human face results from the assembly of several portions of matter differently moved (of which none has any relation to the Phenomenon that results from it for me), this same confusion, I say, is that which makes the Phenomenon of extension result for us from the assembly of Simple Beings, and of their internal differences. But as it is impossible for us to represent to ourselves the internal state of all the Simple Beings (upon which, nevertheless, the Phenomenon of extension depends), all perception of the realities must by our nature escape us. And there remains to us, of the confused ideas that we have of each of these Simple Beings, only an idea of several things coexisting and linked together, without us knowing distinctly how they are linked, and it is this confused idea that brings into being the Phenomenon of extension.