

Margaret Cavendish's *Philosophical Letters*,
1.1-1.29

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A note on the text

This is a modernized version of the early part of Margaret Cavendish's 1664 *Philosophical Letters*: the front matter, and the first 29 letters in part 1. Most of those letters (4-29) discuss the work of Thomas Hobbes.

It is based on a copy of Cavendish's book held by the University of Toronto library, using a scanned version available at <https://archive.org/details/philosophicallet00newc>.

The text has been modernized in its spelling (although preserving the spelling of people's names), use of capital letters (although preserving capital letters used after colons), and use of italics. Few changes have been made to Cavendish's punctuation, the main one being to add apostrophes indicating possession. Other changes to punctuation are marked with square brackets in the text.

Cavendish gives references to other authors using marginal notes. These have been moved into the text as parenthetical references, with the formatting standardized, and placed after the quoted passages where that is appropriate. All footnotes in this edition are the editor's.

Front matter of the *Philosophical Letters*

Title page

Philosophical Letters: or, modest reflections upon some opinions in natural philosophy, maintained by several famous and learned authors of this age, expressed by way of letters: by the thrice noble, illustrious, and excellent princess, the Lady Marchioness of Newcastle.

London, Printed in the Year, 1664

To Her Excellency, the Lady Marchioness of Newcastle, on her book of philosophical letters

'Tis Supernatural, nay 'tis Divine,
To write whole Volumes ere I can a line
I 'mplor'd the Lady Muses, those fine things,
But they have broken all their Fidle-strings
And cannot help me; Nay then I did try
Their *Helicon*, but that is grown all dry:
Then on *Parnassus* I did make a sallie,
But that's laid level, like a Bowling-alley
Invok'd my Muse, found it a Pond, a Dream,
To your eternal Spring, and running Stream;
So clear and fresh, with Wit and Phansie store,
As then despair did bid me write no more.

W. Newcastle¹

To His Excellency, the Lord Marquis of Newcastle

My Noble Lord,

¹This poem was written by Margaret Cavendish's husband William Cavendish, the first duke of Newcastle upon Tyne (bap. 1593, d. 1676). I have not done anything to modernize the verse.

Although you have always encouraged me in my harmless pastime of writing, yet I was afraid that your Lordship would be angry with me for writing and publishing this book, by reason it is a book of controversies, of which I have heard your Lordship say, that controversies and disputations make enemies of friends, and that such disputations and controversies as these, are a pedantical kind of quarrelling, not becoming noble persons. But your Lordship will be pleased to consider in my behalf, that it is impossible for one person to be of every one's opinion, if their opinions be different, and that my opinions in philosophy, being new, and never thought of, at least not divulged by any, but my self, are quite different from others: For the ground of my opinions is, that there is not only a sensitive, but also a rational life and knowledge, and so a double perception in all creatures: And thus my opinions being new, are not so easily understood as those, that take up several pieces of old opinions, of which they patch up a new philosophy, (if new may be made of old things,) like a suit made up of old stuff bought at the brokers: Wherefore to find out a truth, at least a probability in natural philosophy by a new and different way from other writers, and to make this way more known, easy and intelligible, I was in a manner forced to write this book; for I have not contradicted the authors in any thing, but what concerns and is opposite to my opinions; neither do I any thing, but what they have done themselves, as being common amongst them to contradict each other: which may as well be allowable, as for lawyers to plead at the bar in opposite causes. For as lawyers are not enemies to each other, but great friends, all agreeing from the bar, though not at the bar: so it is with philosophers, who make their opinions as their clients, not for wealth, but for fame, and therefore have no reason to become enemies to each other, by being industrious in their profession. All which considered, was the cause of publishing this book; wherein although I dissent from their opinions, yet does not this take off the least of the respect and esteem I have of their merits and works. But if your Lordship do but pardon me, I care not if I be condemned by others; for your favour is more than the world to me, for which all the actions of my life shall be devoted and ready to serve you, as becomes

My Lord,
Your Lordship's
honest wife, and humble servant,
M.N.²

²M.N. is Margaret Newcastle, i.e., Margaret Cavendish, Duchess of Newcastle.

To the most famous University of Cambridge

Most noble, ingenious, and industrious students.

Be not offended, that I dedicate to you this weak and infirm work of mine; for though it be not an offering worthy your acceptance, yet it is as much as I can present for this time; and I wish from my soul, I might be so happy as to have some means or ways to express my gratitude for your magnificent favours to me, having done me more honour than ever I could expect, or give sufficient thanks for: But your generosity is above all gratitude, and your favours above all merit, like as your learning is above contradiction: And I pray God your university may flourish to the end of the world, for the service of the church, the truth of religion, the salvation of souls, the instruction of youth, the preservation of health, and prolonging of life, and for the increase of profitable arts and sciences: so as your several studies may be, like several magistrates, united for the good and benefit of the whole common-wealth, nay, the whole world. May heaven prosper you, the world magnify you, and eternity record your fame; which are the hearty wishes and prayers of,

Your most obliged servant
M. Newcastle³

A preface to the reader

Worthy readers,

I did not write this book out of delight, love or humour to contradiction; for I would rather praise, than contradict any person or persons that are ingenious; but by reason opinion is free, and may pass without a passport, I took the liberty to declare my own opinions as other philosophers do, and to that purpose I have here set down several famous and learned authors' opinions, and my answers to them in the form of letters, which was the easiest way for me to write; and by so doing, I have done that, which I would have done⁴ unto me; for I am as willing to have my opinions contradicted, as I do contradict

³There is some relevant correspondence in Cavendish (1676, 3-64). This consists largely of letters from various bodies in the University of Cambridge, thanking Cavendish for volumes which she has sent to them.

⁴Reading 'done' for 'bone'.

others: for I love reason so well, that whosoever can bring most rational and probable arguments, shall have my vote, although against my own opinion. But you may say, if contradictions were frequent, there would be no agreement amongst mankind. I answer; it is very true: wherefore contradictions are better in general books, than in particular families, and in schools better than in public states, and better in philosophy than in divinity. All which considered, I shun, as much as I can, not to discourse or write of either church or state. But I desire so much favour, or rather justice of you, *worthy readers*, as not to interpret my objections or answers any other way than against several opinions in philosophy; for I am confident there is not any body, that does esteem, respect and honour learned and ingenious persons more than I do: Wherefore judge me neither to be of a contradicting humor, nor of a vainglorious mind for dissenting from other men's opinions, but rather that it is done out of love to truth, and to make my own opinions the more intelligible, which cannot better be done than by arguing and comparing other men's opinions with them. The authors whose opinions I mention, I have read, as I found them printed, in my native language, except Des Cartes, who being in Latin, I had some places translated to me out of his works; and I must confess that since I have read the works of these learned men, I understand the nuances and terms of art a little better than I did before, but it is not so much as to make me a scholar, nor yet so little, but that, had I read more before I did begin to write my other book called *Philosophical Opinions*, they would have been more intelligible; for my error was, I began to write so early, that I had not lived so long as to be able to read many authors; I cannot say, I divulged my opinions as soon as I had conceived them, but yet I divulged them too soon to have them artificial and methodical.⁵ But since what is past, cannot be recalled, I must desire you to excuse those faults, which were committed for want of experience and learning. As for school-learning, had I applied myself to it, yet I am confident I should never have arrived to any; for I am so incapable of learning, that I could never attain to the knowledge of any other language but my native, especially by the rules of art: wherefore I do not repent that I spent not my time in learning, for I consider, it is better to write wisely than learnedly; nevertheless, I love and esteem learning, although I am not capable of it. But you may say, I have expressed neither wit nor learning in my writings: Truly, if not, I am the more sorry for it; but

⁵Cavendish's *Philosophical and Physical Opinions* was first published in 1655. A revised edition was published in 1663, one year before the *Philosophical Letters*.

self-conceit, which is natural to mankind, especially so our sex, did flatter and secretly persuade me that my writings had sense and reason, wit and variety; but judgment being not called to counsel, I yielded to self-conceit's flattery, and so put out my writings to be printed as fast as I could, without being reviewed or corrected: Neither did I fear any censure, for self-conceit had persuaded me, I should be highly applauded; wherefore I made such haste, that I had three or four books printed presently after each other.

But to return to this present work, I must desire you, *worthy readers*, to read first my book called *Philosophical and Physical Opinions*, before you censure this, for this book is but an explanation of the former, wherein is contained the ground of my opinions, and those that will judge well of a building, must first consider the foundation; to which purpose I will repeat some few heads and principles of my opinions, which are these following: first, that nature is infinite, and the eternal servant of God: next, that she is corporeal, and partly self-moving, dividable and composable; that all and every particular creature, as also all perception and variety in nature, is made by corporeal self-motion, which I name sensitive and rational matter, which is life and knowledge, sense and reason. Again, that these sensitive and rational parts of matter are the purest and subtlest parts of nature, as the active parts, the knowing, understanding and prudent parts, the designing, architectonical and working parts, nay, the life and soul of nature, and that there is not any creature or part of nature without this life and soul; and that not only animals, but also vegetables, minerals and elements, and what more is in nature, are endued with this life and soul, sense and reason: and because this life and soul is a corporeal substance, it is both dividable and composable; for it divides and removes parts from parts, as also composes and joins parts to parts, and works in a perpetual motion without rest; by which actions not any creature can challenge a particular life or soul to it self, but every creature may have by the dividing and composing nature of this self-moving matter more or fewer natural souls and lives.

These and the like actions of corporeal nature or natural matter you may find more at large described in my aforementioned book of *Philosophical Opinions*, and more clearly repeated and explained in this present. It is true, the way of arguing I use, is common, but the principles, heads and grounds of my opinions are my own, not borrowed or stolen in the least from any; and the

first time I divulged them, was in the year 1653,⁶ since which time I have reviewed, reformed and reprinted them twice; for at first, as my conceptions were new and my own, so my judgment was young, and my experience little, so that I had not so much knowledge, as to declare them artificially and methodically; for as I mentioned before, I was always unapt to learn by the rules of art. But although they may be defective for want of terms of art, and artificial expression, yet I am sure they are not defective for want of sense and reason: and if any one can bring more sense and reason to disprove these my opinions, I shall not repine or grieve, but either acknowledge my error, if I find myself in any, or defend them as rationally as I can, if it be but done justly and honestly, without deceit, spite, or malice; for I cannot choose but acquaint you, *noble readers*, I have been informed, that if I should be answered in my writings, it should be done rather under the name and cover of a woman, than of a man, the reason is, because no man dare or will set his name to the contradiction of a lady; and to confirm you the better herein, there has one chapter of my book called *The World's Olio*, treating of a monastical life, been answered already in a little pamphlet, under the name of a woman, although she did little towards it; wherefore it being a hermaphroditical book, I judged it not worthy taking notice of.⁷ The like shall I do to any other that will answer this present work of mine, or contradict my opinions indirectly with fraud and deceit. But I cannot conceive why it should be a disgrace to any man to maintain his own or others' opinions against a woman, so it be done with respect and civility; but to become a cheat by dissembling, and quit the breeches for a petticoat, merely out of spite and malice, is base, and not fit for the honour of a man, or the masculine sex. Besides, it will easily be known; for a philosopher or philosophers is not produced on a sudden. Wherefore, although I do not care, nor fear contradiction, yet I desire it may be done without fraud or deceit, spite and malice; and then I shall be ready to defend my opinions the best I can, whilst I live, and after I am dead, I hope those that are just and honorable will also defend me from all sophistry, malice, spite and envy, for which heaven will bless them. In the mean time, *worthy readers*, I should rejoice to see that my works are acceptable to you,

⁶In 1653 Cavendish published her *Poems and Fancies* and also her *Philosophicall Fancies*.

⁷The book criticized is Suzanne Du Verger's 1657 *Du Vergers humble reflections upon some passages of the Right Honorable the Lady Marchionesse of Newcastles Olio*. I follow Narramore (2013) in this identification, although Sarasohn (2010, 127 n.4) claims that the work criticized has not survived.

for if you be not partial, you will easily pardon those faults you find, when you do consider both my sex and breeding; for which favour and justice, I shall always remain,

Your most obliged servant,
M.N.

Section 1

1.1

Madam,

You have been pleased to send me the works of four famous and learned authors, to wit, of two most famous philosophers of our age, Des Cartes, and Hobbs, and of that learned philosopher and divine Dr. More, as also of that famous physician and chemist Van Helmont. Which works you have sent me not only to peruse, but also to give my judgment of them, and to send you word by the usual way of our correspondence, which is by letters, how far, and wherein I do dissent from these famous authors' opinions in *natural philosophy*. To tell you truly, Madam, your commands did at first much affright me,⁸ for it did appear, as if you had commanded me to get upon a high rock, and fling myself into the sea where neither a ship, nor a plank, nor any kind of help was near to rescue me, and save my life; but that I was forced to sink, by reason I cannot swim: So I having no learning or art to assist me in this dangerous undertaking, thought, I must of necessity perish under the rough censures of my readers, and be not only accounted a fool for my labour, but a vain and presumptuous person, to undertake things surpassing the ability of my performance; but on the other side I considered first, that those worthy authors, were they my censurers, would not deny me the same liberty they take themselves; which is, that I may dissent from their opinions, as well as they dissent from others, and from amongst themselves: And if I should express more vanity than wit, more ignorance than knowledge, more folly than discretion, it being according to the nature of our sex, I hoped that my masculine readers would civilly excuse me, and my female readers could not justly condemn me. Next I considered with my self, that it would be a great advantage for my book called *Philosophical Opinions*, as to make it more perspicuous and intelligible by the opposition of other opinions, since two opposite things placed near each other, are the better discerned; for I must confess, that when I did put forth my philosophical work at first, I was not so well skilled in the terms or expressions usual in *natural philosophy*; and therefore for want of their knowledge, I could not declare my meaning so plainly and clearly as I ought to have done, which may

⁸'Affright' meaning frighten.

be a sufficient argument to my readers, that I have not read heretofore any *natural philosophers*, and taken some light from them; but that my opinions did merely issue from the fountain of my own brain, without any other help or assistance. Wherefore since for want of proper expressions, my named book of *philosophy* was accused of obscurity and intricacy, I thought your commands would be a means to explain and clear it the better, although not by an artificial way, as by logical arguments or mathematical demonstrations, yet by expressing my sense and meaning more properly than I have done heretofore: But the chief reason of all was, the authority of your command, which did work so powerfully with me, that I could not resist, although it were to the disgrace of my own judgment and wit; and therefore I am fully resolved now to go on as far,⁹ and as well as the natural strength of my reason will reach: But since neither the strength of my body, nor of my understanding, or wit, is able to mark every line, or every word of their works, and to argue upon them, I shall only pick out the ground opinions of the aforementioned authors, and those which do directly dissent from mine, upon which I intend to make some few reflections, according to the ability of my reason; and I shall merely go upon the bare ground of *natural philosophy*, and not mix divinity with it, as many philosophers use to do, except it be in those places, where I am forced by the authors' arguments to reflect upon it, which yet shall rather be with an expression of my ignorance, than a positive declaration of my opinion or judgment thereof; for I think it not only an absurdity, but an injury to the holy profession of divinity to draw her to the proofs in *natural philosophy*; wherefore I shall strictly follow the guidance of *natural reason*, and keep to my own ground and principles as much as I can; which that I may perform the better, I humbly desire the help and assistance of your favour, that according to that real and entire affection you bear to me, you would be pleased to tell me unfeignedly, if I should chance to err or contradict but the least probability of truth in any thing; for I honor truth so much, as I bow down to its shadow with the greatest respect and reverence; and I esteem those persons most, that love and honor truth with the same zealous zeal and fervour, whether they be ancient or modern writers.

Thus, Madam, although I am destitute of the help of arts, yet being supported by your favour and wise directions, I shall not fear any smiles of scorn, or words of reproach; for I am confident you will defend me against all the mischievous and poisonous teeth of malicious detractors. I shall besides,

⁹Reading 'resolved' for 'resoved'.

implore the assistance of the sacred church, and the learned schools, to take me into their protection, and shelter my weak endeavours: For though I am but an ignorant and simple woman, yet I am their devoted and honest servant, who shall never quit the respect and honor due to them, but live and die theirs, as also,

Madam,
Your Ladyship's
humble and faithful servant.

1.2

Madam,

Before I begin my reflections upon the opinions of those authors you sent me, I will answer first your objection concerning the ground of my philosophy, which is infinite matter: For you were pleased to mention, that you could not well apprehend, how it was possible, that many infinities could be contained in one infinite, since one infinite takes up all place imaginary, leaving no room for any other; also, if one infinite should be contained in another infinite, that which contains, must of necessity be bigger than that which is contained, whereby the nature of infinite would be lost; as having no bigger not less, but being of an infinite quantity.¹⁰

First of all, Madam, there is no such thing as all in infinite, nor any such thing as all the place, for infinite is not circumscribed nor limited: Next, as for that one infinite cannot be in another infinite, I answer, as well as one finite can be in another finite; for one creature is not only composed of parts, but one part lies within another, and one figure within another, and one motion within another. As for example, animal kind, have they not internal and external parts, and so internal and external motions? And are not animals, vegetables and minerals enclosed in the elements? But as for infinities, you must know, Madam, that there are several kinds of infinities. For there is first infinite in quantity or bulk, that is such a big and great corporeal substance, which exceeds all bounds and limits of measure, and may be called infinite in magnitude. Next there is infinite in number, which exceeds all numeration and account, and may be termed infinite in multitude; again there

¹⁰Reading 'nature' for 'nater'.

is infinite in quality; as for example, infinite degrees of softness, hardness, thickness, thinness, heat and cold, etc[;] also infinite degrees of motion, and so infinite creations, infinite compositions, dissolutions, contractions, dilations, digestions, expulsions; also infinite degrees of strength, knowledge, power, etc. Besides there is infinite in time, which is properly named eternal. Now, when I say, that there is but one infinite, and that infinite is the only matter, I mean infinite in bulk and quantity. And this only matter, because it is infinite in bulk, must of necessity be divisible into infinite parts, that is, infinite in number, not in bulk or quantity; for though infinite parts in number make up one infinite in quantity, yet they considered in themselves, cannot be said infinite, because every part is of a certain limited and circumscribed figure, quantity and proportion, whereas infinite has no limits nor bounds: besides it is against the nature of a single part to be infinite, or else there would be no difference between the part and the whole, the nature of a part requiring that it must be less than its whole, but all what is less has a determined quantity, and so becomes finite. Therefore it is no absurdity to say, that an infinite may have both finite and infinite parts, finite in quantity, infinite in number. But those that say, if there were an infinite body, that each of its parts must of necessity be infinite too, are much mistaken; for it is a contradiction in the same terms to say one infinite part, for the very name of a part includes a finiteness, but take all parts of an infinite body together, then you may rightly say they are infinite. Nay reason will inform you plainly, for example: Imagine an infinite number of grains of corn in one heap, surely if the number of grains be infinite, you must grant of necessity the bulk or body, which contains this infinite number of grains, to be infinite too; to wit, infinite in quantity, and yet you will find each grain in it self to be finite. But you will say, an infinite body cannot have parts, for if it be infinite, it must be infinite in quantity, and therefore of one bulk, and one continued quantity, but infinite parts in number make a discrete quantity. I answer it is all one; for a body of a continued quantity may be divided and severed into so many parts either actually, or mentally in our conceptions or thoughts; besides nature is one continued body, for there is no such *vacuum* in nature, as if her parts did hang together like a linked chain; nor can any of her parts subsist single and by it self, but all the parts of infinite nature, although they are in one continued piece, yet are they several and discerned from each other by their several figures. And by this, I hope, you will understand my meaning, when I say, that several infinities may be included or comprehended in one infinite; for by the one infinite, I understand infinite in quantity, which includes infinite

in number, that is infinite parts; then infinite in quality, as infinite degrees of rarity, density, swiftness, slowness, hardness, softness, etc[;] infinite degrees of motions, infinite creations, dissolutions, contractions, dilations, alternations, etc[;] infinite degrees of wisdom, strength, power, etc[;] and lastly infinite in time or duration, which is eternity, for infinite and eternal are inseparable; all which infinites are contained in the only matter as many letters are in one word, many words in one line, many lines in one book. But you will say, perhaps, if I attribute an infinite wisdom, strength, power, knowledge, etc to nature; then nature is in all coequal with God, for God has the same attributes: I answer, not at all; for I desire you to understand me rightly, when I speak of infinite nature, and when I speak of the infinite deity, for there is great difference between them, for it is one thing a deistical or divine infinite, and another a natural infinite; you know, that God is a spirit, and not a bodily substance, again that nature is a body, and not a spirit, and therefore none of these infinites can obstruct or hinder each other, as being different in their kinds, for spirit being no body, requires no place, place being an attribute which only belongs to a body, and therefore when I call nature infinite, I mean an infinite extension of body, containing an infinite number of parts; but what does an infinite extension of body hinder the infiniteness of God, as an immaterial spiritual being? Next, when I do attribute an infinite power, wisdom, knowledge, etc to nature, I do not understand a divine, but a natural infinite wisdom and power, that is, such as properly belongs to nature, and not a supernatural, as is in God; for nature having infinite parts of infinite degrees, must also have an infinite natural wisdom to order her natural infinite parts and actions, and consequently an infinite natural power to put her wisdom into act; and so of the rest of her attributes, which are all natural: But God's attributes being supernatural, transcend much these natural infinite attributes; for God, being the God of nature, has not only nature's infinite wisdom and power, but besides, a supernatural and incomprehensible infinite wisdom and power; which in no ways do hinder each other, but may very well subsist together. Neither does God's infinite justice and his infinite mercy hinder each other; for God's attributes, though they be all several infinites, yet they make but one infinite.

But you will say, if nature's wisdom and power extends no further than to natural things, it is not infinite, but limited and restrained. I answer, that does not take away the infiniteness of nature; for there may be several kinds of infinites, as I related before, and one may be as perfect an infinite as the

other in its kind. For example: Suppose a line to be extended infinitely in length, you will call this line infinite, although it have not an infinite breadth: Also, if an infinite length and breadth join together, you will call it, an infinite superficies,¹¹ although it wants infinite depth; and yet every infinite, in its kind, is a perfect infinite, if I may call it so: Why then shall not nature also be said to have an infinite natural wisdom and power, although she has not a divine wisdom and power? Can we say, man has not a free will, because he has not an absolute free will, as God has? Wherefore, a natural infinite, and the infinite God, may well stand together, without any opposition or hinderance, or without any detracting or derogating from the omnipotency and glory of God; for God remains still the God of nature, and is an infinite immaterial purity, when as nature is an infinite corporeal substance; and immaterial and material cannot obstruct each other. And though an infinite corporeal cannot make an infinite immaterial, yet an infinite immaterial can make an infinite corporeal, by reason there is as much difference in the power as in the purity: And the disparity between the natural and the divine infinite is such, as they cannot join, mix, and work together, unless you do believe that divine actions can have allay.¹²

But you may say, purity belongs only to natural things, and none but natural bodies can be said purified, but God exceeds all purity. It is true: But if there were infinite degrees of purity in matter, matter might at last become immaterial, and so from an infinite material turn to an infinite immaterial, and from nature to be God: A great, but an impossible change. For I do verily believe, that there can be but one omnipotent God, and he cannot admit of addition, or diminution; and that which is material cannot be immaterial, and what is immaterial cannot become material, I mean, so, as to change their natures; for nature is what God was pleased she should be; and will be what she was, until God be pleased to make her otherwise. Wherefore there can be no new creation of matter, motion, or figure in nature, unless God do create a new nature: For the changing of matter into several particular Figures, does not prove an annihilation of particular figures; nor the cessation of particular motions an annihilation of them: neither does the variation of the only matter produce an annihilation of any part of matter, nor the variation of figures and motions of matter cause an alteration in the nature

¹¹‘Superficies’ meaning surface.

¹²‘Allay’ in the sense of “Something which is mixed with another thing of different character or quality” (OED).

of [the] only matter: Wherefore there cannot be new lives, souls or bodies in nature, for, could there be any thing new in nature, or any thing annihilated, there would not be any stability in nature, as a continuance of every kind and sort of creatures, but there would be a confusion between the old and new matter, motions, and figures, as between old and new nature; in truth, it would be like new wine in old vessels, by which all would break into disorder. Neither can supernatural and natural effects be mixed together, no more than material and immaterial things or beings: Therefore it is probable, God has ordained nature to work in her self by his leave, will, and free gift. But there have been, and are still strange and erroneous opinions, and great differences amongst natural philosophers, concerning the principles of natural things; some will have them *atoms*, others will have the first principles to be *salt, sulphur* and *mercury*; some will have them to be the four elements, as *fire, air, water,* and *earth*; and others will have but one of these elements; some also will have *gas* and *blas, ferments, ideas,* and the like; but what they believe to be principles and causes of natural things, are only effects; for in all probability it appears to human sense and reason, that the cause of every particular material creature is the only and infinite matter, which has motions and figures inseparably united; for matter, motion, and figure, are but one thing, individable in its nature.¹³ And as for immaterial spirits, there is no such thing in infinite nature, to wit, so as to be parts of nature; for nature is altogether material, but this opinion proceeds from the separation or abstraction of motion from matter,¹⁴ *viz.*, that man thinks matter and motion to be dividable from each other, and believes motion to be a thing by it self, naming it an immaterial thing, which has a being, but not a bodily substance: But various and different effects do not prove a different matter or cause, neither do they prove an unsettled cause, only the variety of effects has obscured the cause from the several parts, which makes particular creatures partly ignorant, and partly knowing. But in my opinion, nature is material, and not any thing in nature, what belongs to her, is immaterial; but whatsoever is immaterial, is supernatural, therefore motions, forms, thoughts, ideas, conceptions, sympathies, antipathies, accidents, qualities, as also natural life, and soul, are all material: And as for colours, scents, light, sound, heat, cold, and the like, those that believe them not to be substances or material things, surely their brain or heart (take what place you will for

¹³‘Individable’ meaning indivisible.

¹⁴Reading ‘from’ for ‘form’.

the forming of conceptions) moves very irregularly, and they might as well say, our sensitive organs are not material; for what objects soever, that are subject to our senses, cannot in sense be denied to be corporeal, when as those things that are not subject to our senses, can be conceived in reason to be immaterial: But some philosophers striving to express their wit, obstruct reason; and drawing divinity to prove sense and reason, weaken faith so, as their mixed divine philosophy becomes mere poetical fictions, and romantical expressions, making material bodies immaterial spirits, and immaterial spirits material bodies; and some have conceived some things neither to be material nor immaterial, but between both. Truly, Madam, I wish their wits had been less, and their judgments more, as not to jumble natural and supernatural things together, but to distinguish either clearly, for such mixtures are neither natural nor divine; but as I said, the confusion comes from their too nice abstractions, and from the separation of figure and motion from matter, as not conceiving them indivisible; but if God, and his servant nature were as intricate and confuse in their works,¹⁵ as men in their understandings and words, the universe and production of all creatures would soon be without order and government, so as there would be a horrid and eternal war both in heaven, and in the world, and so pitying their troubled brains, and wishing them the light of reason, that they may clearly perceive the truth, I rest

Madam,
Your real friend
and faithful servant.

1.3

Madam,

It seems you are offended at my opinion, that *nature* is eternal without beginning, which, you say, is to make her God, or at least coequal with God; But, if you apprehend my meaning rightly, you will say I do not: For first, God is an immaterial and spiritual infinite being, which propriety God cannot give away to any creature,¹⁶ nor make another God in essence like to him,

¹⁵‘Confuse’ meaning confused, or perhaps “Blended so that the distinction of elements is lost” (OED).

¹⁶‘Propriety’ meaning, roughly, property.

for God's attributes are not communicable to any creature; yet this does not hinder, that God should not make infinite and eternal matter, for that is as easy to him, as to make a finite creature, infinite matter being quite of another nature than God is, to wit, corporeal, when God is incorporeal, the difference whereof I have declared in my former letter. But as for *nature*, that it cannot be eternal without beginning, because God is the creator and cause of it, and that the creator must be before the creature, as the cause before the effect, so, that it is impossible for *nature* to be without a beginning; if you will speak naturally, as human reason guides you, and bring an argument concluding from the priority of the *cause* before the *effect*, give me leave to tell you, that God is not tied to natural rules, but that he can do beyond our understanding, and therefore he is neither bound up to time, as to be before, for if we will do this, we must not allow, that the eternal son of God is coeternal with the father, because nature requires a father to exist before the son, but in God is no time, but all eternity; and if you allow, that God has made some creatures, as supernatural spirits, to live eternally, why should he not as well have made a creature from all eternity? [F]or God's making is not our making, he needs no priority of time. But you may say, the comparison of the eternal generation of the son of God is mystical and divine, and not to be applied to natural things: I answer, the action by which God created the world or made nature, was it natural or supernatural? Surely you will say it was a supernatural and God-like action, why then will you apply natural rules to a God-like and supernatural action: for what man knows, how and when God created nature? You will say, the scripture does teach us that, for it is not six thousand years, when God created this world. I answer, the holy scripture informs us only of creation of this visible world, but not of nature and natural matter; for I firmly believe according to the word of God, that this world has been created, as described by Moses, but what is that to natural matter? There may have been worlds before, as many are of the opinion there have been men before Adam, and many amongst divines do believe, that after the destruction of this world God will create a new world again, as a new heaven, and a new earth; and if this be probable, or at least may be believed without any prejudice to the holy scripture, why may it not be probably believed that there have been other worlds before this visible world? [F]or nothing is impossible with God; and all this does derogate nothing from the honour and glory of God, but rather increases his divine power. But as for the creation of this present world, it is related, that there was first a rude and indigested heap, or chaos, without form, void and dark; and God said, *Let it be light; let*

there be a firmament in the midst of the waters, and let the waters under the heaven be gathered together, and let the dry land appear; let the earth bring forth grass, the herb yielding feed, and the fruit-tree yielding fruit after its own kind; and let there be lights in the firmament, the one to rule the day, and the other the night; and let the waters bring forth abundantly the moving creature that has life; and let the earth bring forth living creatures after its kind; and at last God said, let us make man, and all what was made, God saw it was good.¹⁷ Thus all was made by God's command, and who executed his command but the material servant of God, nature? [W]hich ordered her self-moving matter into such several figures as God commanded, and God approved of them. And thus, Madam, I verily believe the creation of the world, and that God is the sole and omnipotent creator of heaven and earth, and of all creatures therein; nay, although I believe nature to have been from eternity, yet I believe also that God is the God and author of nature, and has made nature and natural matter in a way and manner proper to his omnipotency and incomprehensible by us: I will pass by natural arguments and proofs, as not belonging to such an omnipotent action; as for example, how the nature of relative terms requires, that they must both exist at one point of time, *viz.* a master and his servant, and a king and his subjects; for one bearing relation to the other, can in no ways be considered as different from one another in formerness¹⁸ or lateness of time; but as I said, these being merely natural things, I will nor cannot apply them to supernatural and divine actions; But if you ask me, how it is possible that *nature*, the effect and creature of God, can be eternal without beginning? I will desire you to answer me first, how a creature can be eternal without end, as, for example, supernatural spirits are, and then I will answer you, how a creature can be eternal without beginning; for eternity consists herein, that is has neither beginning nor end; and if it be easy for God to make a being without end, it is not difficult for him to make a being without beginning. One thing more I will add, which is, that if *nature* has not been made by God from all eternity, then the title of God, as being a creator, which is a title and action, upon which our faith is grounded, (for it is the first article in our creed)¹⁹ has been accessory to God, as I said, not full six thousand years ago; but there is not any thing accessory to God, he being the perfection himself. But, Madam,

¹⁷Cavendish is relating, though not quoting, the creation story in *Genesis* 1.

¹⁸Substituting 'formerness' for Cavendish's 'formiliness'.

¹⁹The Nicene creed begins: "We believe in one God, the Father, the Almighty, maker of heaven and earth, of all that is, seen and unseen".

all what I speak, is under the liberty of natural philosophy, and by the light of reason only, not of revelation; and my reason being not infallible, I will not declare my opinions for an infallible truth: Neither do I think, that they are offensive either to church or state, for I submit to the laws of one, and believe the doctrine of the other, so much, that if it were for the advantage of either, I should be willing to sacrifice my life, especially for the church; yea, had I millions of lives, and every life was either to suffer torment or to live in ease, I would prefer torment for the benefit of the church; and therefore, if I knew that my opinions should give any offence to the church, I should be ready every minute to alter them: And as much as I am bound in duty to obedience of the Church, as much am I particularly bound to your Ladyship, for your entire love and sincere affection towards me, for which I shall live and die,

Madam,
Your most faithful friend,
and humble servant.

1.4

Madam,

I have chosen, in the first place, the work of that famous philosopher Hobbs, called *Leviathan*, wherein I find he says, *that the cause of sense or sensitive perception is the external body or object, which presses the organ proper to each sense (Leviathan, ch.1).*²⁰ To which I answer, according to the ground of my own *Philosophical Opinions*, that all things, and therefore outward objects as well as sensitive organs, have both sense and reason, yet neither the objects nor the organs are the cause of them; for perception is but the effect of the sensitive and rational motions, and not the motions of the perception; neither does the pressure of parts upon parts make perception; for although matter by the power of self-motion is as much composable as dividable, and parts do join to parts, yet that does not make perception; nay, the several parts, betwixt which the perception is made, may be at such a distance, as not capable to press: As for example, two men may see or hear each other

²⁰Chapter 1 of *Leviathan* is “Of Sense”. This is the first of several letters in which Cavendish discusses the work of Thomas Hobbes. In 1.4-1.13 she does so with reference to his *Leviathan*, which was written in English, and first published in 1651. (There was a later Latin version, published in 1668.)

at a distance, and yet there may be other bodies between them, that do not move to those perceptions, so that no pressure can be made, for all pressures are by some constraint and force; wherefore, according to my opinion, the sensitive and rational free motions, do pattern out each other's object, as figure and voice in each other's eye and ear; for life and knowledge, which I name rational and sensitive matter, are in every creature, and in all parts of every creature, and make all perceptions in nature, because they are the self-moving parts of nature, and according as those corporeal, rational, and sensitive motions move, such or such perceptions are made: But these self-moving parts being of different degrees (for the rational matter is purer than the sensitive) it causes a double perception in all creatures, whereof one is made by the rational corporeal motions, and the other by the sensitive; and though both perceptions are in all the body, and in every part of the body of a creature, yet the sensitive corporeal motions having their proper organs, as work-houses, in which they work some sorts of perceptions, those perceptions are most commonly made in those organs, and are double again; for the sensitive motions work either on the inside or on the outside of those organs, on the inside in dreams, on the outside awake; and although both the rational and the sensitive matter are inseparably joined and mixed together, yet do they not always work together, for oftentimes the rational works without any sensitive patterns, and the sensitive again without any rational patterns. But mistake me not, Madam, for I do not absolutely confine the sensitive perception to the organs, nor the rational to the brain, but as they are both in the whole body, so they may work in the whole body according to their own motions. Neither do I say, that there is no other perception in the eye but sight, in the ear but hearing, and so forth, but the sensitive organs have other perceptions besides these; and if the sensitive and rational motions be irregular in those parts, between which the perception is made, as for example, in the two afore-mentioned men, that see and hear each other, then they both neither see nor hear each other perfectly; and if one's motions be perfect, but the other's irregular and erroneous, then one sees and hears better than the other; or if the sensitive and rational motions move more regularly and make perfecter patterns in the eye than in the ear, then they see better than they hear; and if more regularly and perfectly in the ear than in the eye, they hear better than they see: And so it may be said of each man singly, for one man may see the other better and more perfectly, than the other may see him; whereas, if perception were made by pressure, there would not be any such mistakes; besides the hard pressure of objects, in my

opinion, would rather annoy and obscure, than inform. But as soon as the object is removed, the perception of it, made by the sensitive motions in the organs, ceases, by reason the sensitive motions cease from patterning, but yet the rational motions do not always cease so suddenly, because the sensitive corporeal motions work with the inanimate matter, and therefore cannot retain particular figures long, whereas the rational matter does only move in its own substance and parts of matter, and upon none other, as my book of *Philosophical Opinions* will inform you better. And thus perception, in my opinion, is not made by pressure, nor by species, nor by matter going either from the organ to the object, or from the object into the organ.²¹ By this it is also manifest, that understanding comes not from exterior objects, or from the exterior sensitive organs; for as exterior objects do not make perception, so they do neither make understanding, but it is the rational matter that does it, for understanding may be without exterior objects and sensitive organs; And this in short is the opinion of

Madam,
Your faithful friend
and servant.

1.5

Madam,

Your author's opinion is, that *when a thing lies still, unless somewhat else stir it, it will lie still for ever; but when a thing is in motion, it will eternally be in motion, unless somewhat else stay it; the reason is*, says he, *because nothing can change itself* (*Leviathan*, ch. 2);²² to tell you truly, Madam, I am

²¹The Aristotelian view that perception is explained by "species" was attacked by Hobbes in the first chapter of *Leviathan*, which Cavendish cites above: "But the philosophy-schools, through all the universities of Christendom, grounded upon certain texts of Aristotle, teach another doctrine; and say, for the cause of *vision*, that the thing seen, sendeth forth on every side a *visible species* (in English) a *visible show*, *apparition*, or *aspect*, or a *being seen*; the receiving whereof into the eye, is *seeing*" (*Leviathan* 1.5). I give references to *Leviathan* by chapter and paragraph number. I quote Gaskin's Oxford World's Classics edition (Hobbes 1996).

²²Chapter 2 of *Leviathan* is "Of Imagination". This is the first of four letters in which Cavendish discusses Hobbes's views on imagination, as found there and in the subsequent chapter, "Of the Consequence or Train of Imaginations".

not of his opinion, for if matter moves itself, as certainly it does, then the least part of matter, were it so small as to seem indivisible, will move itself; it is true, it could not desist from motion, as being its nature to move, and no thing can change its nature; for God himself, who has more power than self-moving matter, cannot change himself from being God; but that motion should proceed from another exterior body, joining with, or touching that body which it moves, is in my opinion not probable; for though nature is all corporeal, and her actions are corporeal motions, yet that does not prove, that the motion of particular creatures or parts is caused by the joining, touching or pressing of parts upon parts; for it is not the several parts that make motion, but motion makes them; and yet motion is not the cause of matter, but matter is the cause of motion, for matter might subsist without motion, but not motion without matter, only there would be no perception without motion, nor no variety, if matter were not self-moving; but matter, if it were all inanimate and void of motion, would lie as a dull, dead and senseless heap; but that all motion comes by pressing or joining of other parts, I deny, for if sensitive and rational perceptions, which are sensitive and rational motions, in the body, and in the mind, were made by the pressure of outward objects, pressing the sensitive organs, and so the brain or interior parts of the body, they would cause such dents and holes therein, as to make them sore and patched in a short time; besides, what was represented in this manner, would always remain, or at least not so soon be dissolved, and then those pressures would make a strange and horrid confusion of figures, for not any figure would be distinct; wherefore my opinion is, that the sensitive and rational matter does make or pattern out the figures of several objects, and does dissolve them in a moment of time; as for example, when the eye sees the object first of a man, then of a horse, then of another creature, the sensitive motions in the eye move first into the figure of the man, then straight into the figure of the horse, so that the man's figure is dissolved and altered into the figure of the horse, and so forth; but if the eye sees many figures at once, then so many several figures are made by the sensitive corporeal motions, and as many by the rational motions, which are sight and memory, at once: But in sleep both the sensitive and rational motions make the figures without patterns, that is, exterior objects, which is the cause that they are often erroneous, whereas, if it were the former impression of the objects, there could not possibly be imperfect dreams or remembrances, for fading of figures requires as much motion, as impression, and impression and fading are very different and opposite motions; nay, if perception was made by impression,

there could not possibly be a fading or decay of the figures printed either in the mind or body, whereas yet, as there is alteration of motions in self-moving matter, so there is also an alteration of figures made by these alterations. But you will say, it does not follow, if perception be made by impression, that it must needs continue and not decay; for if you touch and move a string, the motion does not continue for ever, but ceases by degrees; I answer, there is a great difference between prime self-motion, and forced or artificial motions; for artificial motions are only an imitation of natural motions, and not the same, but caused by natural motions; for although there is no art that is not made by nature, yet nature is not made by art; wherefore we cannot rationally judge of perception by comparing it to the motion of a string, and its alteration to the ceasing of that motion, for nature moves not by force, but freely: It is true, it is the freedom in nature for one man to give another a box on the ear, or to trip up his heels, or for one or more men to fight with each other; yet these actions are not like the actions of loving embraces and kissing each other; neither are the actions one and the same, when a man strikes himself, and when he strikes another; and so is likewise the action of impression, and the action of self-figuring, not one and the same, but different; for the action of impression is forced, and the action of self-figuring is free; wherefore the comparison of the forced motions of a string, rope, watch, or the like, can have no place here; for though the rope, made of flax or hemp, may have the perception of a vegetable, yet not of the hand, or the like, that touched or struck it; and although the hand does occasion the rope to move in such a manner, yet it is not the motion of the hand, by which it moves, and when it ceases, its natural and inherent power to move is not lessened; like as a man, that has left off carving or painting, has no less skill than he had before, neither is that skill lost when he plays upon the lute or virginals,²³ or plows, plants, and the like, but he has only altered his action, as from carving to painting, or from painting to playing, and so to plowing and planting, which is not through disability but choice. But you will say, it is nevertheless a cessation of such a motion. I grant it: but the ceasing of such a motion is not the ceasing of self-moving matter from all motions, neither is cessation as much as annihilation, for the motion lies in the power of matter to repeat it, as oft it will, if it be not overpowered, for more parts, or more strength,

²³A virginal was a kind of keyboard instrument, the same general sort of thing as a harpsichord: “the term was used for all plucked keyboard instruments in England” (Ripin et al, 2014).

or more motions may overpower the less; wherefore forced, or artificial and free natural motions are different in their effects, although they have but one cause, which is the self-moving matter, and though matter is but active and passive, yet there is great variety, and so great difference in force and liberty, objects and perceptions, sense and reason, and the like. But to conclude, perception is not made by the pressure of objects, no more than hemp is made by the rope-maker, or metal by the bell-founder or ringer, and yet neither the rope nor the metal is without sense and reason, but the natural motions of the metal, and the artificial motions of the ringer are different; wherefore a natural effect in truth cannot be produced from an artificial cause, neither can the ceasing of particular forced or artificial motions be a proof for the ceasing of general, natural, free motions, as that matter itself should cease to move; for there is not such thing as rest in nature, but there is an alteration of motions and figures in self-moving matter, which alteration causes variety as well in opinions, as in every thing else; wherefore in my opinion, though sense alters, yet it does not decay, for the rational and sensitive part of matter is as lasting as matter itself, but that which is named decay of sense, is only the alteration of motions, and not an obscurity of motions, like as the motions of memory and forgetfulness, and the repetition of the same motions is called remembrance. And thus much of this subject for the present, to which I shall add no more but rest

Madam,
Your faithful friend,
and servant.

1.6

Madam,

Your author discoursing of imagination, says, *that as soon as any object is removed from our eyes, though the impression that is made in us remain, yet other objects more present succeeding and working on us, the imagination of the past is obscured and made weak* (*Leviathan*, ch.2). To which I answer, first, that he conceives sense and imagination to be all one, for he says, *imagination is nothing else, but a fading or decaying sense*; whereas in my opinion they are different, not only in their matter, but their motions also being distinct and different; for imagination is a rational perception, and

sense a sensitive perception; wherefore as much as the rational matter differs from the sensitive, as much does imagination differ from sense. Next I say, the impressions do not remain in the body of sensitive matter, but it is in its power to make or repeat the like figures; neither is imagination less, when the object is absent, than when present, but the figure patterned out in the sensitive organs, being altered, and remaining only in the rational part of matter, is not so perspicuous and clear, as when it was both in the sense and in the mind: And to prove that imagination of things past does not grow weaker by distance of time, as your author says, many a man in his old age, will have as perfect an imagination of what is past in his younger years, as if he saw it present. And as for your author's opinion, that *imagination and memory are one and the same*, I grant, that they are made of one kind of matter; but although the matter is one and the same, yet several motions in the several parts make imagination and memory several things: As for example, a man may imagine that which never came into his senses, wherefore imagination is not one and the same thing with memory. But your author seems to make all sense, as it were, one motion, but not all motion sense, whereas surely there is no motion, but is either sensitive or rational; for reason is but a pure and refined sense, and sense a grosser reason. Yet all sensitive and rational motions are not one and the same; for forced or artificial motions, though they proceed from sensitive matter, yet are they so different from the free and prime natural motions, that they seem, as it were, quite of another nature: And this distinction neglected is the cause, that many make appetites and passions, perceptions and objects, and the like, as one, without any or but little difference. But having discoursed of the difference of these motions in my former letter, I will not be tedious to you, with repeating it again, but remain,

Madam,
Your faithful friend
and servant.

1.7

Your author's opinion, concerning dreams (*Leviathan*, ch.2), seems to me in some part very rational and probable, in some part not; for when he says, that *dreams are only imaginations of them that sleep, which imaginations*

have been before either totally or by parcels in the sense; and that the organs of sense, as the brain and nerves, being benumbed in sleep, as not easily to be moved by external objects, those imaginations proceed only from the agitation of the inward parts of man's body, which for the connection they have with the brain, and other organs, when they be distempered, do keep the same in motion, whereby the imaginations there formerly made, appear as if a man were waking; This seems to my reason not very probable: For, first, dreams are not absolutely imaginations, except we do call all motions and actions of the sensitive and rational matter, imaginations. Neither is it necessary, that all imaginations must have been before either totally or by parcels in the sense; neither is there any benumbing of the organs of sense in sleep. But dreams, according to my opinion, are made by the sensitive and rational corporeal motions, by figuring several objects, as awake; only the difference is, that the sensitive motions in dreams work by rote and on the inside of the sensitive organs, when as awake they work according to the patterns of outward objects, and exteriorly or on the outside of the sensitive organs, so that sleep or dreams are nothing else but an alteration of motions, from moving exteriorly to move interiorly, and from working after a pattern to work by rote: I do not say that the body is without all exterior motions, when asleep, as breathing and beating of the pulse (although these motions are rather interior than exterior,) but that only the sensitive organs are outwardly shut, so as not to receive the patterns of outside objects, nevertheless the sensitive motions do not cease from moving inwardly; or on the inside of the sensitive organs; but the rational matter does often, as awake, so asleep or in dreams, make such figures, as the sensitive did never make either from outward objects, or of its own accord; for the sensitive has sometimes liberty to work without objects, but the rational much more, which is not bound either to the patterns of exterior objects, or of the sensitive voluntary figures. Wherefore it is not diverse distempers, as your author says, that cause different dreams, or cold, or heat; neither are dreams the reverse of our waking imaginations, nor all the figures in dreams are not made with their heels up, and their heads downwards, though some are; but this error or irregularity proceeds from want of exterior objects or patterns, and by reason the sensitive motions work by rote; neither are the motions reverse, because they work inwardly asleep, and outwardly awake, for madmen awake see several figures without objects. In short, sleeping and waking is somewhat after that manner, when men are called either out of doors, or stay within their houses; or like a ship, where the mariners work all under hatches, whereof you will find more in my

Philosophical Opinions; and so taking my leave, I rest

Madam,
Your faithful friend
and servant.

1.8

Madam,

Your author going on in his discourse of imagination, says, *that, as we have no imagination, whereof we have not formerly had sense, in whole or in parts; so we have not transition from one imagination to another, whereof we never had the like before in our senses* (*Leviathan*, ch.3).²⁴ To which my answer is in short, that the rational part of matter in one composed figure, as in man, or the like creature, may make such figures, as the senses did never make in that composed figure or creature; and though your author reproves those that say, *imaginations rise of themselves* (*Leviathan*, ch.2); yet, if the self-moving part of matter, which I call rational, makes imaginations, they must needs rise of themselves; for the rational part of matter being free and self-moving, depends upon nothing, neither sense nor object, I mean, so, as not to be able to work without them. Next, when your author, defining *understanding*, says that it is nothing else, but *an imagination raised by words or other voluntary signs* (*Leviathan*, ch.3), my answer is, that understanding, and so words and signs are made by self-moving matter, that is, sense and reason, and not sense and reason by words and signs; wherefore thoughts are not like *water upon a plain table, which is drawn and guided by the finger this or that way* (*Leviathan*, ch.3), for every part of self-moving matter is not always forced, persuaded, or directed, for if all the parts of sense and reason were ruled by force or persuasion, not any wounded creature would fail to be healed, or any disease to be cured by outward applications, for outward applications to wounds and diseases might have more force, than any object to the eye: But though there is great affinity and sympathy between parts, yet there is also great difference and antipathy betwixt them, which is the cause that many objects cannot with all their endeavours work such effects upon the interior parts, although they are closely pressed, for impressions of objects do not always

²⁴Chapter 3 of *Leviathan* is “Of the Consequence or Train of Imaginations”.

affect those parts they press. Wherefore, I am not of your author's opinions, that all parts of matter press one another; it is true, Madam, there cannot be any part single, but yet this does not prove, that parts must needs press each other: And as for his *train of thoughts*, I must confess, that thoughts for the most part are made orderly, but yet they do not follow each other like geese, for surely, man has sometimes very different thoughts; as for example, a man sometime is very sad for the death of his friend, and thinks of his own death, and immediately thinks of a wanton mistress, which later thought, surely, the thought of death did not draw in; wherefore, though some thought may be the ring-leader of others, yet many are made without leaders. Again, your author in his description of the mind says, that *the discourse of the mind, when it is governed by design, is nothing but seeking, or the faculty of invention; a hunting out of the causes of some effects, present or past; or of the effects of some present or past cause. Sometimes a man seeks what he has lost, and from that place and time wherein he misses it, his mind runs back from place to place, and time to time, to find where and when he had it, that is to say, to find some certain and limited time and place, in which to begin a method of seeking. And from thence his thoughts run over the same places and times to find what action or other occasion might make him lose it. This we call remembrance or calling to mind. Sometimes a man knows a place determinate, within the compass whereof he is to seek, and then his thoughts run over all the parts thereof in the same manner as one would sweep a room to find a jewel, or as a spaniel ranges the field till he finds a scent; or as a man should run over the alphabet to start a rhyme.*²⁵ Thus far your author: In which discourse I do not perceive that he defines what the mind is, but I say, that if, according to his opinion, nothing moves itself, but one thing moves another, then the mind must do nothing, but move backward and forward, nay, only forward, and if all actions were thrusting or pressing of parts, it would be like a crowd of people, and there would be but little or no motion, for the crowd would make a stoppage, like water in a glass, the mouth of the glass being turned downwards, no water can pass out, by reason the numerous drops are so closely pressed, as they cannot move exteriorly. Next, I cannot conceive how the mind can run back either to time or place, for as for place, the mind is enclosed in the body, and the running about in the parts of the body or brain will not inform it of an exterior place or object;

²⁵Cavendish gives no reference here. But she is quoting again from *Leviathan* chapter 3 (with one small omission, and some changes of punctuation).

besides, objects being the cause of the mind's motion, it must return to its cause, and so move until it come to the object, that moved it first, so that the mind must run out of the body to that object, which moved it to such a thought, although that object were removed out of the world (as the phrase is:) But for the mind to move backward, to time past, is more than it can do; wherefore in my opinion, remembrance, or the like, is only a repetition of such figures as were like to the objects; and for thoughts in particular, they are several figures, made by the mind, which is the rational part of matter, in its own substance, either voluntarily, or by imitation, whereof you may see more in my book of *Philosophical Opinions*. Hence I conclude, that prudence is nothing else, but a comparing of figures to figures, and of the several actions of those figures, as repeating former figures, and comparing them to others of the like nature, qualities, proprieties, as also chances, fortunes, etc. Which figuring and repeating is done actually, in and by the rational matter, so that all the observation of the mind on outward objects is only an actual repetition of the mind, as moving in such or such figures and actions; and when the mind makes voluntary figures with those repeated figures, and compares them together, this comparing is examination; and when several figures agree and join, it is conclusion or judgment: likewise does experience proceed from repeating and comparing of several figures in the mind, and the more several figures are repeated and compared, the greater the experience is. One more thing there is in the same chapter, which I cannot let pass without examination; your author says, that *things present only have a being in nature, things past only a being in the memory, but things to come have no being at all*; which how it possibly can be, I am not able to conceive; for certainly, if nothing in nature is lost or annihilated, what is past, and what is to come, has as well a being, as what is present; and, if that which is now, had its being before, why may it not also have its being hereafter? It might as well be said, that what is once forgot cannot be remembered; for whatsoever is in nature, has as much a being as the mind, and there is not any action, or motion, or figure, in nature, but may be repeated, that is, may return to its former figure, when it is altered and dissolved; but by reason nature delights in variety, repetitions are not so frequently made, especially of those things or creatures, which are composed by the sensitive corporeal motions in the inanimate part of matter, because they are not so easily wrought, as the rational matter can work upon its own parts, being more pliant in itself, than the inanimate matter is; and this is the reason, that there are so many repetitions of one and the same figure in the rational matter, which

is the mind, but seldom any in the gross and inanimate part of matter, for nature loves ease and freedom: But to conclude, Madam, I perceive your author confines sense only to animal-kind, and reason only to mankind: Truly, it is out of self-love, when one creature prefers his own excellency before another, for nature being endued with self-love, all creatures have self-love too, because they are all parts of nature; and when parts agree or disagree, it is out of interest and self-love; but man herein exceeds all the rest, as having a supernatural soul, whose actions also are supernatural; to which I leave him, and rest,

Madam,
Your faithful friend,
and servant.

1.9

Madam,

When your author discourses of the use of *speech or words and names*, he is pleased to say, *that their use is to serve for marks and notes of remembrance* (*Leviathan*, ch.4),²⁶ whereof to give you my opinion, I say, that speech is natural to the shape of man; and though sometimes it serves for marks or notes of remembrance, yet it does not always, for all other animals have memory without the help of speech, and so have deaf and dumb men, nay more than those that hear and speak: Wherefore, though words are useful to the mind, and so to the memory, yet both can be without them, whereas words cannot be without memory; for take a bird and teach him to speak, if he had not memory, before he heard the words, he could never learn them. You will ask me, Madam, what then, is memory the cause of speech? I answer, life and knowledge, which is sense and reason, as it creates and makes all sorts of creatures, so also amongst the rest it makes words: And as I said before, that memory may be without the help of speech or words, so I say also, that there is a possibility of reckoning of numbers, as also of magnitudes, of swiftness, of force, and other things without words, although your author denies it: But some men are so much for art, as they endeavour to make art, which is only a drudgery-maid of nature, the chief mistress, and nature her

²⁶Chapter 4 of *Leviathan* is “Of Speech”.

servant, which is as much as to prefer effects before the cause, nature before God, discord before unity and concord.

Again, your author, in his chapter of reason (ch.5),²⁷ defines *reason* to be nothing else but *reckoning*: I answer, that in my opinion reckoning is not reason itself, but only an effect or action of reason; for reason, as it is the chiefest and purest degree of animate matter, works variously and in diverse motions, by which it produces various and diverse effects, which are several perceptions, as conception, imagination, fancy, memory, remembrance, understanding, judgment, knowledge, and all the passions, with many more: Wherefore this reason is not in one undivided part, nor bound to one motion, for it is in every creature more or less, and moves in its own parts variously; and in some creatures, as for example, in some men, it moves more variously than in others, which is the cause that some men are more dull and stupid, than others; neither does reason always move in one creature regularly, which is the cause, that some men are mad or foolish: And though all men are made by the direction of reason, and endued with reason, from the first time of their birth, yet all have not the like capacities, understandings, imaginations, wits, fancies, passions, etc[,] but some more, some less, and some regular, some irregular, according to the motions of reason or [the] rational part of animate matter; and though some rational parts may make use of other rational parts, as one man of another man's conceptions, yet all these parts cannot associate together; as for example, all the material parts of several objects, no not their species, cannot enter or touch the eye without danger of hurting or loosing it, nevertheless the eye makes use of the objects by patterning them out, and so does the rational matter, by taking patterns from the sensitive; and thus knowledge or perception of objects, both sensitive and rational, is taken without the pressure of any other parts, (for no part can be single) yet this joining does not necessarily infer the pressure of objects upon the sensitive organs; whereof I have already discoursed sufficiently heretofore, to which I refer you, and rest

Madam,
Your faithful friend
and servant.

²⁷Chapter 5 of *Leviathan* is "Of Reason and Science".

1.10

Madam,

Understanding, says your author, *is nothing else but conception caused by speech, and therefore, if speech be peculiar to man, (as, for aught I know, it is) then is understanding peculiar to him also (Leviathan, ch.4)*. Where he confines understanding only to speech and to mankind; but, by his leave, Madam, I surely believe, that there is more understanding in nature, than that, which is in speech, for if there were not, I cannot conceive, how all the exact forms in generations could be produced, or how there could be such distinct degrees of several sorts and kinds of creatures, or distinctions of times and seasons, and so many exact motions and figures in nature: Considering all this, my reason persuades me, that all understanding, which is a part of knowledge, is not caused by speech, for all the motions of the celestial orbs are not made by speech, neither is the knowledge or understanding which a man has, when sick, as to know or understand he is sick, made by speech, nor by outward objects, especially in a disease he never heard, nor saw, nor smelt, nor tasted, nor touched; wherefore all perception, appetite, sensation, memory, imagination, appetite, understanding, and the like, are not made nor caused by outward objects, nor by speech. And as for names of things, they are but different postures of the figures in our mind or thoughts, made by the rational matter; but reasoning is a comparing of the several figures with their several postures and actions in the mind, which joined with the several words, made by the sensitive motions, inform another distinct and separate part, as an other man, of their mind's conceptions, understanding, opinions, and the like.

Concerning addition and subtraction, wherein your author says reasoning consists, I grant, that it is an act of reasoning, yet it does not make sense or reason, which is life and knowledge, but sense and reason which is self-motion, makes addition and subtraction of several parts of matter; for had matter not self-motion, it could not divide nor compose, nor make such varieties, without great and lingering retardments, if not confusion. Wherefore all, what is made in nature, is made by self-moving matter, which self-moving matter does not at all times move regularly, but often irregularly, which causes false logic, false arithmetic, and the like; and if there be not a certainty in these self-motions or actions of nature, much less in art, which is but a secondary action; and

therefore, neither speech, words, nor exterior objects cause understanding or reason. And although many parts of the rational and sensitive matter joined into one, may be stronger by their association, and over-power other parts that are not so well knit and united, yet these are not the less pure; only these parts and motions being not equal in several creatures, make their knowledge and reason more or less: For, when a man has more rational matter well regulated, and so more wisdom than another, that same man may chance to over-power the other, whose rational matter is more irregular, but yet not so much by strength of the united parts, as by their subtlety; for the rational matter moving regularly, is more strong with subtlety, than the sensitive with force; so that wisdom is stronger than life, being more pure, and so more active; for in my opinion, there is a degree of difference between life and knowledge, as my book of *Philosophical Opinions* will inform you.

Again, your author says, *that man does excel all other animals in this faculty, that when he conceives any thing whatsoever, he is apt to enquire the consequences of it, and what effects he can do with it: Besides this* (says he) *man has another degree of excellence, that he can by words reduce the consequences he finds to general rules called theorems or aphorisms, that is, he can reason or reckon not only in number, but in all other things, whereof one may be added to, or subtracted from another.*²⁸ To which I answer, that according to my reason I cannot perceive, but that all creatures may do as much; but by reason they do it not after the same manner or way as man, man denies, they can do it at all; which is very hard; for what man knows, whether fish do not know more of the nature of water, and ebbing and flowing, and the saltness of sea? [O]r whether birds do not know more of the nature and degrees of air, or the cause of tempests? [O]r whether worms do not know more of the nature of earth, and how plants are produced? [O]r bees of the several sorts of juices of flowers, than men? And whether they do not make these aphorisms and theorems by their manner of intelligence? For, though they have not the speech of man, yet thence does not follow, that they have no intelligence at all. But the ignorance of men concerning other creatures is the cause of despising other creatures, imagining themselves as petty gods in nature, when as nature is not capable to make one God, much less so many as mankind; and were it not for man's supernatural soul, man would not be more supreme, than other creatures in nature, *But* (says your author) *this*

²⁸Cavendish gives no reference, but is quoting (or closely paraphrasing) chapter 5 of *Leviathan*.

privilege in man is allayed by another, which is, no living creature is subject to absurdity, but only man. Certainly, Madam, I believe the contrary, to wit, that all other creatures do as often commit mistakes and absurdities as man, and if it were not to avoid tediousness, I could present sufficient proofs to you: Wherefore I think, not only man but also other creatures may be philosophers and subject to absurdities as aptly as men; for man does, nor cannot truly know the faculties, and abilities or actions of all other creatures, no not of his own kind as mankind, for if he do measure all men by himself he will be very much mistaken, for what he conceives to be true or wise, an other may conceive to be false and foolish. But man may have one way of knowledge in philosophy and other arts, and other creatures another way, and yet other creatures' manner or way may be as instructive to each other as man's, I mean, in those things which are natural. Wherefore I cannot consent to what your author says, *that children are not endued with reason at all, till they have attained to the use of speech;*²⁹ for reason is in those creatures which have not speech, witness horses, especially those which are taught in the manage,³⁰ and many other animals. And as for the weak understanding in children, I have discoursed thereof in my book of philosophy; The rest of this discourse, lest I tire you too much at once, I shall reserve for the next, resting in the mean time,

Madam,
your faithful friend,
and Servant.

1.11

Madam,

I sent you word in my last, that your author's opinion is this, *that children*

²⁹Cavendish again gives no reference, but is again quoting chapter 5 of *Leviathan*.

³⁰'Manage' refers to a riding school, and also to the movements a horse is trained in there. Cavendish's husband was well known for his equestrian skill. "In contrast to many of his contemporaries Cavendish eschewed the inns of court, preferring instead to enter the Royal Mews. Here in the company of Prince Henry he was trained by the French riding instructor St Antoine in the art of *manège*, a passion that he pursued throughout his life" (Hulse 2011). In exile in Antwerp, he ran a riding school, and in 1658 he published a book, *La méthode nouvelle et invention extraordinaire de dresser les chevaux*.

are not endued with reason at all, until they have attained to the use of speech, in the same chapter (*Leviathan*, ch.5)³¹ he speaks to the same purpose thus: *reason is not as sense and memory born with us, nor gotten by experience only, as prudence is, but attained by industry.* To which I reply only this, that it might as well be said, a child when new born has not flesh and blood, because by taking in nourishment or food, the child grows to have more flesh and blood; or, that a child is not born with two legs, because he cannot go, or with two arms and hands, because he cannot help himself; or that he is not born with a tongue, because he cannot speak: For although reason does not move in a child as in a man, in infancy as in youth, in youth as in age, yet that does not prove that children are without reason, because they cannot run and prate: I grant, some other creatures appear to have more knowledge when new born than others; as for example, a young foal has more knowledge than a young child, because a child cannot run and play; besides a foal knows his own dam,³² and can tell where to take his own food, as to run and suck his dam, when as an infant cannot do so, nor all beasts, though most of them can, but yet this does not prove, that a child has no reason at all: neither can I perceive that man is a monopolist³³ of all reason, or animals of all sense, but that sense and reason are in other creatures as well as in man and animals; for example, drugs, as vegetables and minerals, although they cannot slice, pound, or infuse, as man can, yet they can work upon man more subtly, wisely, and as sensibly either by purging, vomiting, spitting, or any other way, as man by mincing, pounding and infusing them, and vegetables will as wisely nourish men, as men can nourish vegetables; also some vegetables are as malicious and mischievous to man, as man is to one another, witness hemlock, nightshade, and many more; and a little poppy will as soon, nay sooner cause a man to sleep, though silently, than a nurse with singing and rocking;³⁴ but because they do not act in such a manner or way as man, man judges them to be without sense and reason; and because they do not prate and talk as man, man believes they have not so much with as he has; and because they cannot run and go, man thinks they are not industrious; the like for infants concerning reason. But certainly, it is not local motion or speech that makes sense and reason, but sense and reason makes them; neither is sense and reason bound only to the actions of man, but is free to the actions,

³¹In the 1664 text, the reference is (incorrectly) to chapter 4 of *Leviathan*.

³²A dam being a female parent of an animal.

³³Changed from Cavendish's 'monopoler'.

³⁴Hemlock and nightshade are poisonous plants, and 'poppy' is the opium poppy.

forms, figures, and proprieties of all creatures; for if none but man had reason, and none but animals sense, the world could not be so exact, and so well in order as it is: but nature is wiser than man with all his arts, for these are only produced through the variety of nature's actions, and disputes through the superfluous variety of man's follies or ignorances, not knowing nature's powerful life and knowledge: But I wonder, Madam, your author says in this place, *that reason is not born with man*, when as in another place, he says, *that every man brought philosophy, that is natural reason with him into the world*;³⁵ which how it agree, I will leave to others to judge, and to him to reconcile it, remaining in the mean time,

Madam,
Your constant friend
and faithful servant.

1.12

Madam,

Two sorts of motions, I find your author does attribute to animals, viz. *vital and animal, the vital motions*, says he, *are begun in generation, and continued without interruption through their whole life, and those are the course of the blood, the pulse, the breathing, conviction*,³⁶ *nutrition, excretion, etc.[,] to which motions there needs no help of imaginations; but the animal motions, otherwise called voluntary motions, are to go*,³⁷ *to speak, to move any of our limbs, in such manner as is first fancied in our minds: And because going, speaking, and the like voluntary motions, depend always upon*

³⁵*De Corpore* 1.1. Cavendish refers to the 1656 publication *Elements of Philosophy, the First Section, Concerning Body*. This is an English translation of Hobbes's 1655 book, *Elementorum Philosophia Sectione Prime De Corpore*. That is (structurally, though not chronologically) the first part of Hobbes's three volume *Elements of Philosophy: De Corpore* (1655), *De Homine* (1658), *De Cive* (1642). Cavendish's references to the *Elements* are all to *De Corpore*. This book is itself divided into four parts: the first, ch.1-6, on "Computation or Logic"; the second, ch.7-14, on "The First Grounds of Philosophy"; the third, ch 15-24, "Of the Proportions of Motions and Magnitudes"; and the fourth, ch25-30, "Of Physics, or the Phenomena of Nature". I give references to *De Corpore* by chapter and section number.

³⁶Cavendish's book says 'conviction'. Hobbes's says 'concoction', meaning digestion.

³⁷'To go' meaning to walk.

*a precedent thought of whither, which way, and what, it is evident, that the imagination is the first internal beginning of all voluntary motion (Leviathan, ch.6).*³⁸ Thus far your author. Whereof in short I give you my opinion, first concerning vital motions, that it appears improbable if not impossible to me, that generation should be the cause and beginning of life, because life must of necessity be the cause of generation, life being the generator of all things, for without life motion could not be, and without motion not any thing could be begun, increased, perfected, or dissolved. Next, that imagination is not necessary to vital motions, it is probable it may not, but yet there is required knowledge, which I name reason; for if there were not knowledge in all generations or productions, there could not any distinct creature be made or produced, for then all generations would be confusedly mixed, neither would there be any distinct kinds or sorts of creatures, nor no different faculties, proprieties, and the like. Thirdly, concerning *animal motions*, which your author names *voluntary motions, as to go, to speak, to move any of our limbs, in such manner as is first fancied in our minds, and that they depend upon a precedent thought of whither, which way, and what, and that imagination is the first internal beginning of them*; I think, by your author's leave, it does imply a contradiction, to call them voluntary motions, and yet to say they are caused and depend upon our imagination; for if the imagination draws them this way, or that way, how can they be voluntary motions, being in a manner forced and necessitated to move according to fancy or imagination? But when he goes on in the same place and treats of endeavour, appetite, desire, hunger, thirst, aversion, love, hate, and the like, he derives one from the other, and treats well as a moral philosopher; but whether it be according to the truth or probability of natural philosophy, I will leave to others to judge, for in my opinion passions and appetites are very different, appetites being made by the motions of the sensitive life, and passions, as also imagination, memory, etc[,] by the motions of the rational life, which is the cause that appetites belong more to the actions of the body than the mind: It is true, the sensitive and rational self-moving matter do so much resemble each other in their actions, as it is difficult to distinguish them. But having treated thereof at large in my other philosophical work, to cut off repetitions, I will refer you to that, and desire you to compare our opinions together: But certainly there is so much variety in one and the same

³⁸Chapter 6 of *Leviathan* is "Of the Interior Beginnings of Voluntary Motions, commonly called the Passions; And the Speeches by which they are expressed".

sort of passions, and so of appetites, as it cannot be easily expressed. To conclude, I do not perceive that your author tells or expresses what the cause is of such or such actions, only that he mentions their dependance, which is, as if a man should converse with a nobleman's friend or servant, and not know the Lord himself. But leaving him for this time, it is sufficient to me, that I know your Ladyship, and your Ladyship knows me, that I am,

Madam,
Your faithful friend, and humble servant.³⁹

1.13

Madam,

Having obeyed your commands in giving you my opinion of the first part of the book of that famous and learned author you sent me, I would go on; but seeing he treats in his following parts of the politics, I was forced to stay my pen, because of these following reasons. First, that a woman is not employed in state affairs, unless an absolute queen. Next, that to study the politics, is but loss of time, unless a man were sure to be a favourite to an absolute prince. Thirdly, that it is but a deceiving profession, and requires more craft than wisdom. All which considered, I did not read that part of your author: But as for his *natural philosophy*, I will send you my opinion so far as I understand it: For what belongs to art, as to geometry, being no scholar, I shall not trouble myself with.⁴⁰ And so I'll take my leave of you, when I have in two or three words answered the questions you sent me last, which was, whether nature be the art of God, man the art of nature, and a politic government the art of man? To which I answer, is is probable it may be so; only I add this, that nature does not rule God, nor man nature, nor politic government man; for the effect cannot rule the cause, but the cause does rule the effect: Wherefore if men do not naturally agree, art cannot make unity amongst them, or associate them into one politic body and so rule them; but man thinks he governs, when as it is nature that does it, for as nature does unite or divide parts regularly or irregularly, and moves the several minds of

³⁹The valediction is typeset slightly differently here than in previous letters (in which the final clause is on a separate line) but apparently only to fit it all on the same page.

⁴⁰Modernized from Cavendish's 'withal'.

men and the several parts of men's bodies, so war is made or peace is kept: Thus it is not the artificial form that governs men in a politic government, but a natural power, for though natural motion can make artificial things, yet artificial things cannot make natural power; and we might as well say, nature is governed by the art of nature, as to say man is ruled by the art and invention of men. The truth is, man rules an artificial government, and not the government man, just like as a watchmaker rules his watch, and not the watch the watchmaker. And thus I conclude and rest,

Madam,
Your faithful friend
and servant.

1.14

Madam,

Concerning the other book of that learned author Hobbs you sent me, called *Elements of Philosophy*, I shall likewise according to your desire, give you my judgment and opinion of it as I have done of the former, not that I intent to prejudice him any ways hereby,⁴¹ but only to mark those places wherein I seem to dissent from his opinions, which liberty, I hope, he will not deny me; And in order to this, I have read over the first chapter of the mentioned book, treating of philosophy in general, wherein amongst the rest, discoursing of the utility of natural philosophy, and relating the commodities and benefits which proceed from so many arts and sciences, he is pleased to say, that they are *enjoyed almost by all people of Europe, Asia, and some of Africa, only the Americans, and those that live near the poles do want them.*⁴² *But why, says he, have they sharper wits than these? Have not all men one kind of soul, and the same faculties of mind?* (*De Corpore* 1.7).⁴³ To which, give me leave, Madam, to add, that my opinion is, that there is a difference between the divine and the natural soul of man, and though the natural mind or soul is of one kind, yet being made of rational matter, it is dividable and composable, by which division and composition, men may have more or less wit, or quicker

⁴¹'Prejudice' meaning to harm or injure.

⁴²'To want' meaning to lack.

⁴³*De Corpore* 1 is "Of Philosophy".

and slower wit; the like for judgments, imaginations, fancies, opinions, etc. For were the natural rational mind indivisible, all men would have the like degree of wit or understanding, all men would be philosophers or fools, which by reason they are not, it proves the natural rational mind is divisible and composable, making variations of its own several parts by self-motion; for it is not the several outward objects, or foreign instructions, that make the variety of the mind; neither is wit or ingenuity alike in all men; for some are natural poets, philosophers, and the like, without learning, and some are far more ingenious than others, although their breeding is obscure and mean, neither will learning make all men scholars, for some will continue dunces all their lifetime; neither does much experience make all men wise, for some are not any ways advanced in their wisdom by much and long experiences; and as for poetry, it is according to the common proverb; a *poet is born, not made*; indeed learning does rather hurt fancy, for great scholars are not always good poets, nor all statesmen natural philosophers, nor all experienced men wise men, nor all judges just, nor all divines pious, nor all pleaders or preachers eloquent, nor all moral philosophers virtuous; but all this is occasioned by the various motions of the rational self-moving matter, which is the natural mind. And thus much for the present of the difference of wits and faculties of the mind; I add no more, but rest,

Madam,
Your faithful friend,
and servant.

1.15

Madam,

My discourse for the present shall be of *infinite*, and the question shall be first *whether several finite parts, how many soever there be, can make an infinite*. Your author says, that *several finite parts when they are all put together make a whole finite* (*De Corpore* 7.12);⁴⁴ which, if his meaning be of a certain determinate number, how big soever, of finite parts, I do willingly grant, for all what is determinate and limited, is not infinite but finite; neither is there any such thing, as whole or all in infinite; but if his meaning be, that

⁴⁴*De Corpore* 7 is “Of Place and Time”.

no infinite can be made of finite parts, though infinite in number, I deny it; next he says *there can be no such thing as one in infinite, because no thing can be said one, except there be another to compare it withal*;⁴⁵ which in my opinion does not follow, for there is but one God, who is infinite, and has none other to be compared withal, and so there may be but one only infinite in nature, which is matter. But when he says, *there cannot be an infinite and eternal division*, is very true, viz, in this sense; that one single part cannot be actually infinitely divided, for the compositions hinder the divisions in nature, and the divisions the compositions, so that nature, being matter, cannot be composed so, as not to have parts, nor divided so, as that her parts should not be composed, but there are nevertheless infinite divided parts in nature, and in this sense there may also be infinite divisions, as I have declared in my book of philosophy (p. 1, ch.8).⁴⁶ And thus there are infinite divisions of infinite parts in nature, but not infinite actual divisions of one single part; but though infinite is without end, yet my discourse of it shall be but short and end here, though not my affection, which shall last and continue with the life of

Madam,
Your faithful friend
and humble servant.

1.16

Madam,

An *accident*,⁴⁷ says your author, *is nothing else but the manner of our conception of body, or that faculty of any body, by which it works in us a conception of itself (De Corpore 8.2)*;⁴⁸ to which I willingly consent; but yet I say, that these qualities cannot be separated from the body, for as impossible it is that the essence of nature should be separable from nature, as impossible

⁴⁵Again quoting *De Corpore* 7.12.

⁴⁶That is, part 1, chapter 8 of Cavendish's *Philosophical and Physical Opinions* (Cavendish 1663, 6-7), which chapter is titled "Of the Degrees, Changes, Parts, Divisions and Compositions in Infinite Matter".

⁴⁷'Accident' was a technical term for a (non-essential) feature of an object.

⁴⁸*De Corpore* 8, which Cavendish discusses in this and the following letter, is "Of Body and Accident".

is it that the various modes or alterations, either of figures or motions, should be separable from matter or body; wherefore when he goes on, and says, *An accident is not a body, but in a body, yet not so, as if any thing were contained therein, as if for example, redness were in blood in the same manner as blood is in a bloody cloth; but as magnitude is in that which is great, rest in that which rests, motion in that which is moved* (*De Corpore* 8.3); I answer, that in my opinion, not any thing in nature can be without a body, and that redness is as well in blood, as blood is in a bloody cloth, or any other colour in anything else; for there is no colour without body, but every colour has as well a body as anything else, and if colour be a separable accident, I would fain know,⁴⁹ how it can be separated from a subject, being bodiless, for that which is no body is nothing, and nothing cannot be taken away from any thing; wherefore as for natural colour it cannot be taken away from any creature, without the parts of its substance or body; and as for artificial colours, when they are taken away, it is a separation of two bodies, which joined together; and if colour, or hardness, or softness do change, it is nothing else but an alteration of motions and not an annihilation, for all changes and alterations remain in the power of corporeal motions, as I have said in other places; for we might as well say, life does not remain in nature, when a body turns from an animal to some other figure, as believe that those, they name accidents, do not remain in corporeal motions; wherefore I am not of your author's mind, when he says, that *when a white thing is made black, the whiteness perishes* (*De Corpore* 8.20); for it cannot perish, although it is altered from white to black, being in the power of the same matter, to turn it again from black to white, so as it may make infinite repetitions of the same thing; but by reason nature takes delight in variety, she seldom uses such repetitions; nevertheless that does not take away the power of self-moving matter, for it does not, and it cannot, are two several things,⁵⁰ and the latter does not necessarily follow upon the former;⁵¹ wherefore not any, the least thing, can perish in nature, for if this were possible, the whole body of nature might perish also, for if so many figures and creatures could be annihilated and perish without any supply or new creation, nature would grow less, and at last become nothing; besides it is as difficult for nature to turn something into nothing, as to create something out of nothing; wherefore as there is no annihilation or perishing in

⁴⁹'Fain' meaning gladly.

⁵⁰'Several' meaning distinct.

⁵¹That is, that something does not happen does not imply that it cannot.

nature, so there is neither any new creation in nature. But your author makes a difference between bodies and accidents, saying, *that bodies are things and not generated, but accidents are generated and not things*.⁵² Truly, madam, these accidents seem to me to be like Van Helmont's lights, gases, blazes, and ideas; and Dr More's immaterial substances or daemons, only in this Dr More has the better, that his immaterial substances, are beings, which subsist of themselves, whereas accidents do not, but their existence is in other bodies; but what they call accidents, are in my opinion nothing else but corporeal motions, and if these accidents be generated, they must needs be bodies, for how nothing can be generated in nature, is not conceivable, and yet your author denies, that *accidents are something, namely some part of a natural thing* (*De Corpore* 8.2); but as for generations, they are only various actions of self-moving matter, or a variety of corporeal motions, and so are all accidents whatsoever, so that there is not any thing in nature, that can be made new, or destroyed, for whatsoever was and shall be, is in nature, though not always in act, yet in power, as in the nature and power of corporeal motions, which is self-moving matter, and as there is no new generation of accidents, so there is neither a new generation of motions; wherefore when your author says, *that, when the hand, being moved, moves the pen, the motion does not go out of the hand into the pen, for so the writing might be continued, though the hand stood still, but a new motion is generated in the pen, and is the pen's motion* (*De Corpore* 8.21): I am of his opinion, that the motion does not go out of the hand into the pen, and that the motion of the pen, is the pen's own motion; but I deny, that after holding the hand a little while still, and beginning to write again, a new motion of the pen is generated; for it is only a repetition, and not a new generation, for the hand, pen and ink, repeat but the same motion or action of writing: Besides, generation is made by connection or conjugation of parts, moving by consent to such or such figures, but the motion of the hand or the pen is always one and the same; wherefore it is but the variation and repetition in and of the same motion of the hand, or pen, which may be continued in that manner infinitely, just as the same corporeal motions can make infinite variations and repetitions of one and the same figure, repeating it as oft as they please, as also making copy of copy; and although I do not deny, but there are generations in nature, yet not annihilations or perishings, for if any one motion or figure should perish, the matter must perish also; and if any one part of matter can perish, all the

⁵²Cavendish gives no reference here, but is again quoting *De Corpore* 8.20.

matter in nature may perish also; and if there can any new thing be made or created in nature, which has not been before, there may also be a new nature, and so by perishings and new creations, this world would not have continued an age; but surely whatsoever is in nature, has been existent always. Wherefore to conclude, it is not the generation and perishing of an accident that makes its subject to be changed, but the production and alteration of the form, makes it said to be generated or destroyed, for matter will change its motions and figures without perishing or annihilating; and whether there were words or not, there would be such causes and effects; but having not the art of logic to dispute with artificial words, nor the arts of geometry to demonstrate my opinions by mathematical figures, I fear they will not be so well received by the learned; however, I leave them to any man's unprejudiced reason and judgment, and devote myself to your service, as becomes,

Madam,
Your Ladyship's
humble and faithful servant.

1.17

Madam,

Your author concerning place and magnitude says, that *place is nothing out of the mind, nor magnitude any thing within it; for place is a mere phantasm of a body of such quantity and figure, and magnitude a peculiar accident of the body* (*De Corpore* 8.5); but this does not well agree with my reason, for I believe that place, magnitude and body are but one thing, and that place is as true an extension as magnitude, and not a feigned one; neither am I of his opinion, *that place is immovable*,⁵³ but that place moves, according as the body moves, for not any body wants place, because place and body is but one thing, and wheresoever is body, there is also place, and wheresoever is place, there is body, as being one and the same; wherefore *motion cannot be a relinquishing of one place and acquiring another* (*De Corpore* 8.10),⁵⁴ for there is no such thing as place different from body, but what is called change

⁵³Again quoting *De Corpore* 8.5.

⁵⁴The italicized phrase is Cavendish's denial of Hobbes's statement in *De Corpore* 8.10: "Motion, is a continual relinquishing of one place, and acquiring of another".

of place, is nothing but change of corporeal motions; for, say a house stands in such a place, if the house be gone, the place is gone also, as being impossible that the place of the house should remain, when the house is taken away; like as a man when he is gone out of his chamber, his place is gone too; it is true, if the ground or foundation do yet remain, one may say, there stood such a house heretofore, but yet the place of the house is not there really at that present, unless the same house be built up again as it was before, and then it has its place as before; nevertheless the house being not there, it cannot be said that either place or house are annihilated, viz, when the materials are dissolved, no not when transformed into millions of several other figures, for the house remains still in the power of all those several parts of matter; and as for *space*, it is only a distance betwixt some parts or bodies; but an *empty place* signifies to my opinion nothing, for if place and body are one and the same, and empty is as much as nothing, then certainly these two words cannot consist together, but are destructive to one another. Concerning, that your author says, *two bodies cannot be together in the same place, nor one body in two places at the same time* (*De Corpore* 8.8), is very true, for there are no more places than bodies, nor more bodies than places, and this is to be understood as well of the grosser, as the purest parts of nature, of the mind as well as of the body, of the rational and sensitive animate matter as well as of the inanimate, for there is no matter, how pure and subtle soever, but is embodied, and all that has body has place. Likewise I am of his opinion, *that one body has always one and the same magnitude* (*De Corpore* 8.5); for, in my opinion, magnitude, place and body do not differ, and as place, so magnitude can never be separated from body. But when he speaks of *rest*, I cannot believe there is any such thing truly in nature, for it is impossible to prove, that any thing is without motion, either consistent, or composing, or dissolving, or transforming motions, or the like, although not altogether perceptible by our senses, for all the matter is either moving or moved, and although the moved parts are not capable to receive the nature of self-motion from the self-moving parts, yet these self-moving parts, being joined and mixed with all other parts of the moved matter, do always move the same; for the moved or inanimate part of matter, although it is a part of itself, yet it is so intermixed with the self-moving animate matter, as they make but one body; and though some parts of the inanimate may be as pure as the sensitive animate matter, yet they are never so subtle as to be self-moving; wherefore the sensitive moves in the inanimate, and the rational in the sensitive, but often the rational moves in itself. And, although there is no rest in nature,

nevertheless matter could have been without motion, when as it is impossible that matter could be without place or magnitude, no more than variety can be without motion; and thus much at this present: I conclude, and rest,

Madam,
Your faithful friend
and servant.

1.18

Madam,

Passing by those chapters of your author's, that treat of *power and act, identity and difference, analogism*,⁵⁵ *angle and figure, figures deficient, dimension of circles*, and several others, most of which belong to art, as to geometry, and the like; I am come to that wherein he discourses of *sense and animal motion*, saying, *that some natural bodies have in themselves the patterns almost of all things, and others of none at all* (*De Corpore* 25.1);⁵⁶ whereof my opinion is, that the sensitive and rational parts of matter are the living and knowing parts of nature, and no part of nature can challenge them only to itself,⁵⁷ nor no creature can be sure, that sense is only in animal-kind, and reason in mankind; for can any one think or believe that nature is ignorant and dead in all her other parts besides animals? Truly this is a very unreasonable opinion; for no man, as wise as he thinks himself, nay were all mankind joined into one body, yet they are not able to know it, unless there were no variety of parts in nature, but only one whole and indivisible body, for other creatures may know and perceive as much as animals, although they have not the same sensitive organs, nor the same manner or way of perception.

⁵⁵Chapter 13 of *De Corpore* is "Of Analogism or the Same Proportion". There Hobbes says: "Two equal proportionals are commonly called *the same proportion*, and it is said, that the proportion of the first antecedent to the first consequence is the *same* with that of the second antecedent to the second consequent. And when four magnitudes are thus to one another in geometrical proportion, they are called *proportionals*, and by some more briefly *analogism*" (*De Corpore* 13.4). This passage from Hobbes is the first example given in the *OED* of the use of 'analogism' to mean mathematical proportion, or a proportional.

⁵⁶*De Corpore* 25 is "Of Sense and Animal Motion". Though the language of patterning is associated perhaps particularly with Cavendish, this is indeed a quote from Hobbes.

⁵⁷'Challenge' here meaning to claim or lay claim to, so the idea is that no part of nature can say it is the only part that contains sensitive and rational matter.

Next your author says, *the cause of sense or perception consists herein, that the first organ of sense is touched and pressed; for when the uttermost part of the organ is pressed,*⁵⁸ *it no sooner yields, but the part next within it is pressed also, and in this manner the pressure or motion is propagated through all the parts of the organ to the innermost. And thus also the pressure of the uttermost part proceeds from the pressure of some more remote body, and so continually, till we come to that, from which, as from its fountain, we derive the phantasm or idea, that is made in us by our sense: And this, whatsoever it be, is what we commonly call the object; sense therefore is some internal motion in the sentient, generated by some internal motion of the parts of the object, and propagated through all the media to the innermost part of the organ. Moreover there being a resistance or reaction in the organ, by reason of its internal motion against the motion propagated from the object, there is also an endeavour in the organ opposite to the endeavour proceeding from the object, and when that endeavour inwards is the last action in the act of sense, then from the reaction a phantasm or idea has its being* (*De Corpore* 25.2). This is your author's opinion, which if it were so, perception could not be effected so suddenly, nay I think the sentient by so many pressures in so many perceptions, would at last be pressed to death, besides the organs would take a good deal of hurt, nay totally be removed out of their places, so as the eye would in time be pressed into the centre of the brain; and if there were any resistance, reaction or endeavour in the organ,⁵⁹ opposite to the endeavour of the object, there would, in my opinion, be always a war between the animal senses and the objects, the endeavour of the objects pressing one way, and the senses pressing the other way, and if equal in their strengths, they would make a stop, and the sensitive organs would be very much pained; truly, madam, in my opinion, it would be like that custom which formerly has been used at Newcastle, when a man was married; the guests divided themselves, behind and before the bridegroom, the one party driving him back, the other forwards, so that one time a bridegroom was killed in this fashion; but certainly nature has a more quick and easy way of giving intelligence and knowledge to her creatures, and does not use such constraint and force in her actions; neither is sense or sensitive perception a mere phantasm or idea, but a corporeal action of the sensitive and rational

⁵⁸'Uttermost' meaning outermost.

⁵⁹'Indeavour' and 'endeavour' are both reasonable seventeenth-century spellings of 'endeavour'. Perhaps Cavendish means to signal the difference between the inward and outward pressures by her use of the two different spellings here.

matter, and according to the variation of the objects or patterns, and the sensitive and rational motions, the perception also is various, produced not by external pressure, but by internal self-motion, as I have declared heretofore; and to prove, that the sensitive and rational corporeal motions are the only cause of perception; I say; if those motions in an animal move in another way, and not to such perceptions, then that animal can neither hear, see, taste, smell, nor touch, although all his sensitive organs be perfect, as is evident in a man falling into a swoon,⁶⁰ where all the time he is in a swoon, the pressure of the objects is made without any effect; wherefore, as the sensitive and rational corporeal motions make all that is in nature, so likewise they make perception, as being perception itself, for all self-motion is perception, but all perception is not animal perception, for after an animal way; and therefore sense cannot decay nor die, but what is called a decay or death, is nothing else but a change or alteration of those motions. But you will say, Madam, it may be, that one body, as an object, leave the print of its figure, in the next adjoining body, until it comes to the organ of sense, I answer that then soft bodies only must be pressed, and the objects must be so hard as to make a print, and as for rare parts of matter, they are not able to retain a print without self-motion; wherefore it is not probable that the parts of air should receive a print, and print the same again upon the adjoining part, until the last part of the air print it upon the eye; and that the exterior parts of the organ should print upon the interior, till it come to the centre of the brain, without self-motion. Wherefore in my opinion, perception is not caused either by the printing of objects, nor by pressures, for pressures would make a general stop of all natural motions, especially if there were any reaction or reticence of sense; but according to my reason, the sensitive and rational corporeal motions in one body, pattern out the figure of another body, as of an exterior object, which may be done easily without any pressure or reaction; I will not say, that there is no pressure or reaction in nature, but pressure and reaction does not make perception, for the sensitive and rational parts of matter make all perception and variety of motion, being the most subtle parts of nature, as self-moving, as also dividable, and composable, and alterable in their figurative motions, for this perceptive matter can change its substance into any figure whatsoever in nature, as not being bound to one constant figure. But having treated hereof before, and being to say more of it hereafter, this shall suffice for the present, remaining always,

⁶⁰‘Falling into a swoon’ meaning fainting.

Madam,
Your constant friend,
and faithful servant.

1.19

Madam,

To discourse of the world and stars, is more than I am able to do, wanting the art of astronomy and geometry; wherefore passing by that chapter of your author, I come to that (*De Corpore* 27) wherein he treats of light, heat and colours;⁶¹ and to give you my opinion of light, I say, it is not the light of the sun, that makes an animal see, for we can see inwardly in dreams without the sun's light, but it is the sensitive and rational motions in the brain that make such a figure as light; for if light did press upon the eye, according to your author's opinion, it might put the eye into as much pain as fire does, when it sticks its point into our skin or flesh. The same may be said of colours, for the sensitive motions make such a figure, which is such a colour, and such a figure, which is such a colour; wherefore light, heat and colour, are not bare and bodiless qualities, but such figures made by corporeal self-motions, and are as well real and corporeal objects as other figures are; and when these figures change or alter, it is only that their motions alter, which may alter and change heat into cold, and light into darkness, and black colour into white. But by reason the motions of the sun are so constant, as the motions of any other kind of creatures, it is not more subject to be altered than all the world, unless nature did it by the command of God; for though the parts of self-moving matter be alterable, yet all are not altered; and this is the reason, that the figure of light in our eye and brain is altered, as well as it is alterable, but not the real figure of the sun, neither does the sun enter our eyes; and as the light of the sun is made or pattered in the eye, so is the light of glow worms' tails, and cats' eyes, that shine in the dark, made not by the sun's, but by their own motions in their own parts; the like when we dream of light, the sensitive corporeal motions working inwardly, make the figure of light on the inside of the eye, as they did pattern out the figure of light on the outside of the eye when awake, and the objects before them; for the sensitive motions of the eye pattern out the figure of the object in the

⁶¹*De Corpore* 27 is "Of Light, Heat, and of Colours".

eye, and the rational motions make the same figure in their own substance. But there is some difference between those figures that perceive light, and those that are light themselves; for when we sleep, there is made the figure of light, but not from a copy; but when the eye sees light, that figure is made from a copy of the real figure of the sun; but those lights which are inherent, as in glow worms' tails, are original lights, in which is as much difference as between a man and his picture; and as for the swiftness of the motions of light, and the violence of the motions of fire, it is very probable they are so, but they are a certain particular kind or sort of swift and violent motions; neither will all sorts of swift and violent motions make fire or light, as for example the swift and violent circular motion of a whirlwind makes neither light nor fire; neither is all fire light, nor all light fire, for there is a sort of dead fire, as in spices, spirits, oils, and the like; and several sorts of lights, which are not hot, as the light which is made in dreams, as also the inherent light in glow worms, cats' eyes, fish bones, and the like; all which several fires and lights are made by the self-moving matter and motions distinguishable by their figures, for those motions make such a figure for the sun's light, such a figure for the glow worms' light, such a figure for the cats' eyes' light, and so some alteration in every sort of light; the same for fire, only firelight is a mixed figure, as partly of the figure of fire, and partly of the figure of light: Also colours are made after the like manner, viz. so many several colours, so many several figures; and as these figures are less or more different, so are the colours.

Thus, Madam, whosoever will study nature, must consider the figures of every creature, as well as their motions, and must not make abstractions of motion and figure from matter, nor of matter from motion and figure, for they are inseparable, as being but one thing, viz. corporeal figurative motions; and whosoever conceives any of them as abstract, will, in my opinion, very much err; but men are apt to make more difficulties and enforcements in nature than nature ever knew. But to return to light: There is no better argument to prove that all objects of light are figured in the eye, by the sensitive, voluntary or self-motions, without the pressure of objects, but that not only the pressure of light would hurt the tender eye, but that the eye does not see all objects according to their magnitude, but sometimes bigger, sometimes less: as for example, when the eye looks through a small passage, as a perspective glass,⁶² by reason of the difficulty of seeing a body through a small hole, and the

⁶²A perspective glass was an optical instrument for looking through, such as a telescope.

double figure of the glass being convex and concave, the corporeal motions use more force, by which the object is enlarged, like as a spark of fire by force is dilated into a great fire, and a drop of water by blowing into a bubble; so the corporeal motions do double and treble their strength, making the image of the object exceeding large in the eye; for though the eye be contracted, yet the image in the eye is enlarged to a great extension; for the sensitive and rational matter is extremely subtle, by reason it is extremely pure, by which it has more means and ways of magnifying than the perspective glass. But I intend to write more of this subject in my next, and so I break off here, resting,

Madam,
Your faithful friend
and servant.

1.20

Madam,

Some perhaps will question the truth or probability of my saying, that light is a body, objecting that if light were a body, when the sun is absent or retires under our horizon, its light would leave an empty place, or if there were no empty place but all full, the light of the sun at its return would not have room to display itself, especially in so great a compass as it does, for two bodies cannot be in one place at one time. *I answer*, all bodies carry their places along with them, for body and place go together and are inseparable, and when the light of the sun is gone, darkness succeeds, and when darkness is gone, light succeeds, so that it is with light and darkness as with all creatures else; for you cannot believe, that if the whole world were removed, there would be a place of the world left, for there cannot be an empty nothing, no more than there can be an empty something; but if the world were annihilated, the place would be annihilated too, place and body being one and the same thing; and therefore in my opinion, there be no more places than there are bodies, nor no more bodies than there are places.

Secondly, they will think it absurd that I say, the eye can see without light; but in my opinion it seems not absurd, but very rational, for we may see in dreams, and some do see in the dark, not in their fancy or imagination,

but really; and as for dreams, the sensitive corporeal motions make a light on the inside of the organ of sight really, as I have declared in my former letter. But that we do not see ordinarily without exterior light, the reason is, that the sensitive motions cannot find the outward objects to pattern out without exterior light, but all perception does not proceed from light, for all other perception besides animal sight requires not light. Neither in my opinion, does the perception of sight in all creatures but animals, but yet animals do often see in the dark, and in sleep: I will not say but that the animate matter which by self-motion does make the perception of light with other perceptive figures, and so animal perceptive light may be the presenter or ground perceptive figure of light; yet the sensitive corporeal motions can make other figures without the help of light, and such as light did never present: But when the eye patterns out an exterior object presented by light, it patterns also out the object of light; for the sensitive motions can make many figures by one act, not only in several organs, but in one organ; as for example, there is presented to sight a piece of embroidery, wherein is silk, silver and gold upon satin in several forms or figures, as several flowers, the sensitive motions straight by one and the same act,⁶³ pattern out all those several figures of flowers, as also the figures of silk, silver, gold and satin, without any pressure of these objects, or motions in the medium, for if they all should press, the eye would no more see the exterior objects, than the nose, being stopped,⁶⁴ could smell a presented perfume.

Thirdly, they may ask me, if sight be made in the eye, and proceeds not from the outward object, what is the reason that we do not see inwardly, but outwardly as from us? I answer, when we see objects outwardly, as from us, then the sensitive motions work on the outside of the organ, which organ being outwardly convex, causes us to see outwardly as from us, but in dreams we see inwardly; also the sensitive motions do pattern out the distance together with the object: But you will say, the body of the distance, as the air, cannot be perceived, and yet we can perceive the distance; I answer, you could not perceive the distance, but by such or such an object as is subject to your sight; for you do not see the distance more than the air, or the like rare body, that is between grosser objects; for if there were no stars, nor planets, nor clouds, nor earth, nor water, but only air, you would not see any space or distance; but light being a more visible body than air, you might figure the body of

⁶³'Straight' meaning directly or immediately.

⁶⁴'Stopped' meaning blocked.

air by light, but so, as in an extensive or dilating way; for when the mind or the rational matter conceives any thing that has not such an exact figure, or is not so perceptible by our senses; then the mind uses art, and makes such figures, which stand like to that; as for example, to express infinite to itself, it dilates its⁶⁵ parts without alternation, and without limitation or circumference; likewise, when it will conceive a constant succession of time, it draws out its parts into the figure of a line; and if eternity, it figures a line without beginning and end: But as for immaterial, no mind can conceive that, for it cannot put itself into nothing, although it can dilate and rarify itself to a higher degree, but must stay within the circle of natural bodies, as I within the circle of your commands, to express myself,

Madam,
Your faithful friend,
and obedient servant.

1.21

Madam,

Heat and cold, according to your author's opinion, are made by dilation and contraction: for says he, *when the motion of the ambient ethereal substance makes the spirits and fluid parts of our bodies tend outwards, we acknowledge heat, but by the endeavour inwards of the same spirits and humours we feel cold: so that to cool is to make the exterior parts of the body endeavour inwards, by a motion contrary to that of calefaction,*⁶⁶ *by which the internal parts are called outwards. He therefore that would know the cause of cold, must find by what motion the exterior parts of any body endeavour to retire inwards* (*De Corpore* 28.1).⁶⁷ But I desire you to consider, madam, that there be moist colds, and dry heats, as well as dry colds, and moist heats; wherefore all sorts of cold are not made by the retiring of parts inwards, which is contraction or attraction; neither are all sorts of heat made by parts tending outwards, which is dilation or rarefaction; for a moist cold is made by dilation, and a dry heat by contraction, as well as a moist heat is made

⁶⁵Changed from Cavendish's "it dilates it parts".

⁶⁶'Calefaction' meaning warming or heating.

⁶⁷*De Corpore* 28 is "Of Cold, Wind, Hard, Ice, Restitution of Bodies bent, Diaphanous, Lightning and Thunder; and of the Heads of Rivers".

by dilation, and a dry cold by contraction: But your author makes not this difference, but only a difference between a dilated heat, and a contracted cold; but because a cold wind is made by breath blown through pinched or contracted lips, and a hot wind by breath through opened and extended lips, should we judge that all heat and cold must be made after one manner or way? The contracted mouth makes wind as well as the dilated, but yet wind is not made that way, as heat and cold; for it may be, that only the air pressed together makes wind, or it may be that the corporeal motions in the air may change air into wind, as they change water into vapour, and vapour into air; or it may be something else that is invisible and rare, as air; and there may be several sorts of wind, air, heat, cold, as of all other creatures, more than man is capable to know. As for your author's opinion concerning the congealing of water, and how ice is made, I will not contradict it, only I think nature has as easier way to effect it, than he describes; wherefore my opinion is, that it is done by altering motions; as for example, the corporeal motions making the figure of water by dilation in a circle figure, only alter from such a dilating circular figure into a contracted square, which is ice, or into such a contracted triangle, as is snow: And thus water and vapour may be changed with ease, without any forcing, pressing, raking, or the like. The same may be said of hard and bent bodies; and of restitution,⁶⁸ as also of air, thunder and lightning, which are all done by an easy change of motion, and changing into such or such a figure is not the motion of generation, which is to build a new house with old materials, but only a transformation; I say a new house with old materials; not that I mean there is any new creation in nature, of any thing that was not before in nature; for nature is not God, to make new things out of nothing, but any thing may be called new, when it is altered from one figure into another. I add no more at this time, but rest,

Madam,
Your faithful friend
and servant.

⁶⁸In *De Corpore* 28.12 Hobbes discusses the reasons why some bodies return to their previous shapes after being bent.

1.22

The generation of sound, according to your worthy author's opinion, is as follows: *as vision*, says he, *so hearing is generated by the medium, but not in the same manner; for sight is from pressure, that is, from an endeavour, in which there is no perceptible progression of any of the parts of the medium, but one part urging or thrusting on another, propagates that action successively to any distance whatsoever; whereas the motion of the medium, by which sound is made, is a stroke; for when we hear, the drum of the ear, which is the first organ of the ear, is stricken, and the drum being stricken, the pia mater⁶⁹ is also shaken, and with it the arteries inserted into it, by which the action [is] propagated to the heart itself, [and] by the reaction of the heart a phantasm is made which we call sound (De Corpore 29.1)⁷⁰* Thus far your author: To which give me leave to reply, that I fear, if the ear was bound to hear any loud music, or another sound a good while, it would be soundly beaten, and grow sore and bruised with so many strokes; but since a pleasant sound would be rendered very unpleasant in this manner, my opinion is, that like as in the eye, so in the ear the corporeal sensitive motions do pattern out as many several figures, as sounds are presented to them; but if these motions be irregular, then the figure of the sound in the ear is not perfect according to the original; for if it be, that the motions are tired with figuring, or the object of sound be too far distant from the sensitive organ, then they move slowly and weakly, not that they are tired and weak in strength, but with working and repeating one and the same object, and so through love to variety, change from working regularly to move irregularly, so as not to pattern outward objects as they ought, and then there are no such patterns made at all, which we call to be deaf; and sometimes the sensitive motions do not so readily perceive a soft sound near, as a stronger farther off. But to prove it is not the outward object of sound with its striking or pressing motion, nor the medium, that causes this perception of sense, if there be a great solid body, as a wall, or any other partition between two rooms, parting the object and the sensitive organ, so, as the sound is not able to press it, nevertheless the perception will not be made; and as for pipes to convey sounds, the perception is more fixed and perfecter in united than in dilated or extended bodies, and then the sensitive

⁶⁹“The innermost of the three meninges, consisting of a thin, vascular, fibrous membrane which is closely applied to the surface of the brain and spinal cord” (OED).

⁷⁰*De Corpore* 29 is “Of Sound, Odour, Savour, and Touch”. Hobbes consistently gave the reaction of the heart this central role in his account of perception (see *Leviathan* ch.1).

motions can make perfecter patterns; for the stronger the objects are, the more perfect are the figures and patterns of the objects, and the more perfect is the perception. But when the sound is quite out of the ear, then the sensitive motions have altered the patterning of such figures to some other action; and when the sound fades by degrees, then the figure or pattern alters by degrees; but for the most part the sensitive corporeal motions alter according as the objects are presented, or the perception patterns out. Neither do they usually make figures of outward objects, if not perceived by the senses, unless through irregularities as in mad men, which see such and such things, as when these things are not near, and then the sensitive motions work by rote, or after their own voluntary invention. As for reflection, it is a double perception, and so a double figure of one object; *like* as many pictures of one man, where some are more perfect than others, for a copy of a copy is not so perfect as a copy of an original. But the recoiling of sound is, that the sensitive motions in the ear begin a new pattern, before they dissolved the former, so as there is no perfect alteration or change, from making to dissolving, but pattern is made upon pattern, which causes a confusion of figures, the one being neither perfectly finished, nor the other perfectly made. But it is to be observed, that not always the sensitive motions in the organs take their pattern from the original, but from copies; as for example, the sensitive motions in the eye, pattern out the figure of an eye in a glass, and so do not take a pattern from the original itself, but by another pattern, representing the figure of the eye in a looking glass; the same does the ear, by patterning out echoes, which is but a pattern of a pattern; but when as a man hears himself speak or make a sound, then the corporeal sensitive motions in the ear, pattern out the object or figure made by the motions of the tongue and the throat, which is voice; by which we may observe, that there may be figures made by several motions from one original; as for example, the figure of a word is made in a man's mouth, then the copy of that figure is made in the ear, then in the brain, and then in the memory, and all this in one man: Also a word being made in a man's mouth, the air takes a copy or many copies thereof; but the ear patterns them both out, first the original coming from the mouth, and then the copy made in the air, which is called an echo, and yet not any strikes or touches each other's parts, only perceives and patterns out each other's figure. Neither are their substances the same, although the figures be alike; for the figure of a man may be carved in wood, then cut in brass, then in stone, and so forth, where the figure may be always the same, although the substances which do pattern out the figure are several, viz. wood, brass,

stone, etc[.] and so likewise may the figure of a stone be figured in the fleshy substance of the eye, or the figure of light or colour, and yet the substance of the eye remains still the same; neither does the substantial figure of a stone, or tree, patterned out by the sensitive corporeal motions, in the flesh of an animal eye, change from being a vegetable or mineral, to an animal, and if this cannot be done by nature, much less by art; for if the figure of an animal be carved in wood or stone, it does not give the wood or stone any animal knowledge, nor an animal substance, as flesh, bones, blood, etc[;] no more does the patterning or figuring of a tree give a vegetable knowledge, or the substance of wood to the eye, for the figure of an outward object does not alter the substance that patterns it out or figures it, but the patterning substance does pattern out the figure, in itself, or in its own substance, so as the figure which is patterned, has the same life and knowledge with the substance by and in which it is figured or patterned, and the inherent motions of the same substance; and according as the sensitive and rational self-moving matter moves, so figures are made; and thus we see, that lives, knowledges, motions and figures are all material, and all creatures are endowed with life, knowledge, motion and figure, but not all alike or after the same manner. But to conclude this discourse of perception of sound, the ear may take the object of sound afar off, as well as at a near distance; not only if many figures of the same sound be made from that great distance, but if the interposing parts be not so thick, close, or many as to hinder or obscure the object from the animal perception in the sensitive organ; for if a man lays his ear near to the ground, the ear may hear at a far distance, as well as the eye can see, for it may hear the noise of a troop afar off, perception being very subtle and active; also there may several copies be made from the original, and from the last copy nearest to the ear, the ear may take a pattern, and so pattern out the noise in the organ, without any strokes to the ear, for the subtle matter in all creatures does inform and perceive. But this is well to be observed, that the figures of objects are as soon made, as perceived by the sensitive motions in their work of patterning. And this is my opinion concerning the perception of sound, which together with the rest I leave to your Ladyship's and others' wiser judgment, and rest,

Madam,
Your faithful friend
and servant.

1.23

I perceive by your last, that you cannot well apprehend my meaning, when I say that the print or figure of a body printed or carved, is not made by the motions of the body printing or carving it, but by the motions of the body or substance printed or carved; for say you, does a piece of wood carve itself, or a black patch of a lady cut its own figure by its own motions?⁷¹ before I answer you, madam, give me leave to ask you this question, whether it be the motion of the hand, or the instrument, or both, that print or carve such or such a body? Perchance you will say, that the motion of the hand moves the instrument, and the instrument moves the wood which is to be carved: Then I ask, whether the motion that moves the instrument, be the instrument's, or the hand's? Perchance you will say the hand's; but I answer, how can it be the hand's motion, if it be in the instrument? You will say, perhaps, the motion of the hand is transferred out of the hand into the instrument, and so from the instrument into the carved figure; but give me leave to ask you, was this motion of the hand, that was transferred, corporeal or incorporeal? If you say, corporeal, then the hand must become less and weak, but if incorporeal, I ask you, how a bodiless motion can have force and strength to carve and cut? But put an impossible proposition, as that there is an immaterial motion, and that this incorporeal motion could be transferred out of one body into another; then I ask you, when the hand and instrument cease to move, what is become of the motion? Perhaps you will say, the motion perishes or is annihilated, and when the hand and the instrument do move again, to the carving or cutting of the figure, then a new incorporeal motion is created; truly then there will be a perpetual creation and annihilation of incorporeal motions, that is, of that which naturally is nothing; for an incorporeal being is as much as a natural no-thing, for natural reason cannot know nor have naturally any perception or idea of an incorporeal being: besides, if the motion be incorporeal, then it must needs be a supernatural spirit, for there is not any thing else immaterial but they, and then it will be either an angel or a devil, or the immortal soul of man; but if you say it is the supernatural soul, truly I cannot be persuaded that the supernatural soul should not have any employment than to carve or cut prints, or figures, or move in the hands, or heels, or legs, or arms of a man;

⁷¹The wearing of black patches on one's face was a notable fashion at around this time. Samuel Pepys remarks on them several times in his diary. For example, when in the Hague on 15 May 1660: "The women, many of them very pretty and in good habitt, fashionable, and black spots" (Pepys 1970, 1.139).

for other animals have the same kind of motions, and then they might have the same kind of supernatural soul as well as man, which moves in them. But if you say, that these transferrable motions are material, then every action whereby the hand moves to the making of or moving of some other body, would lessen the number of motions in the hand, and weaken it, so that in the writing of one letter, the hand would not be able to write a second letter, at least not a third. But I pray, Madam, consider rationally, that though the artificer or workman be the occasion of motions of the carved body, yet the motions of the body that is carved, are they which put themselves into such or such a figure, or give themselves such or such a print as the artificer intended; for a watch, although the artist or watchmaker be the occasional cause that the watch moves in such or such an artificial figure, as the figure of a watch, yet it is the watch's own motion by which it moves; for when you carry the watch about you, certainly the watchmaker's hand is not then with it as to move it; or if the motion of the watchmaker's hand be transferred into the watch, then certainly the watchmaker cannot make another watch, unless there be a new creation of new motions made in his hands; so that God and nature would be as much troubled and concerned in the making of watches, as in the making of a new world; for God created this world in six days, and rested the seventh day, but this would be a perpetual creation; wherefore I say that some things may be occasional causes of other things, but not the prime or principal causes; and this distinction is very much to be considered, for there are no frequenter mistakes than to confound these two different causes, which make so many confusions in natural philosophy; and this is the opinion of,

Madam,
your faithful friend
and servant.

1.24

Madam,

In answer to your question, what makes echo, I say, it is that which makes all the effects of nature, viz. self-moving matter; I know, the common opinion is, that echo is made like as the figure of a face, or the like, in a looking glass, and that the reverberation of sound is like the reflection of light in a looking

glass; but I am not of that opinion, for both echo, and that which is called the reflection in a looking glass, are made by the self-moving matter, by way of patterning and copying out. But then you will ask me, whether the glass takes the copy of the face, or the face prints its copy on the glass, or whether it be the *medium* of light and air that makes it? I answer, although many learned men say, that as all perception, so also the seeing of one's face in a looking glass, and echo, are made by impression and reaction; yet I cannot in my simplicity conceive it, how bodies that come not near, and touch each other, can make a figure by impression and reaction: They say it proceeds from the motions of the *medium* of light, or air, or both, viz. that the *medium* is like a long stick with two ends, whereof one touches the object, the other the organ of sense, and that one end of it moving, the other moves also at the same point of time, by which motions it may make many several figures;⁷² but I cannot conceive, how this motion of pressing forward and backward should make so many figures, wherein there is so much variety and curiosity. But, say light and air are as one figure, and like as a seal do print another body;⁷³ I answer, if any thing could print, yet it is not probable, that so soft and rare bodies as light and air, could print such solid bodies as glass, nor could air by reverberation make such sound as echo. But mistake me not, for, *I do not say*, that the corporeal motions of light or air, cannot, or do not pencil, copy, or pattern out any figure, for both light and air are very active in such sorts of motions, but I say, they cannot do it on any other bodies but their own. But to cut off tedious and unnecessary disputes, I return to the expressing of my own opinion, and believe, that the glass in its own substance does figure out the copy of the face, or the like, and from that copy the sensitive motions in the eyes make another copy, and so the rational from the sensitive; and in this manner is made both rational and sensitive perception, sight and knowledge. The same with echoes; for the air patterns out the copy of the sound, and then the sensitive corporeal motions in the ear pattern again this copy from the air, and do make the perception and sense of

⁷²That sensation is made by impression *and reaction* is Hobbes's view. The example of the stick is used by Descartes in his 1637 *Optics*: "I would have you consider the light in bodies we call 'luminous' to be nothing other than a certain movement, or very rapid and lively action, which passes to our eyes through the medium of the air and other transparent bodies, just as the movement or resistance of the bodies encountered by a blind man passes to his hand by means of his stick" (Descartes 1984, 1.153).

⁷³A seal is an emblem imprinted on wax, and might be used to show the authenticity of a document.

hearing. You may ask me, Madam, if it be so, that the glass and the air copy out the figure of the face and of sound, whether the glass may be said to see and the air to speak. I answer, I cannot tell that, for though I say, that the air repeats the words, and the glass represents the face, yet I cannot guess what their perceptions are, only this I may say, that the air has an elemental, and the glass a mineral, but not an animal perception. But if these figures were made by the pressures of several objects or parts, and by reaction, there could not be such variety as there is, for they could but act by one sort of motion: Likewise is it improbable, that sounds, words or voices, should like a company of wild geese fly in the air, and so enter into the ears of the hearers, as they into their nests: Neither can I conceive, how in this manner a word can enter so many ears, that is, be divided into every ear, and yet strike every ear with an undivided vocal sound; you will say, as a small fire does heat and warm all those that stand by; for the heat issues from the fire, as the light from the sun. I answer, all what issues and has motion, has a body, and yet most learned men deny that sound, light and heat have bodies: But if they grant of light that it has a body, they say it moves and presses the air, and the air the eye, and so of heat; which if so, then the air must not move to any other motion but light, and only to one sort of light, as the sun's light; for if it did move in any other motion, it would disturb the light; for if a bird did but fly in the air, it would give all the region of air another motion, and so put out, or alter the light, or at least disturb it; and wind would make a great disturbance in it. Besides, if one body did give another body motion, it must needs give it also substance, for motion is either something or nothing, body or no body, substance or no substance; if nothing, it cannot enter into another body; if something, it must lessen the bulk of the body it quits, and increase the bulk of the body it enters, and so the sun and fire with giving light and heat, would become less, for they cannot both give and keep at once, for this is as impossible, as for a man to give to another creature his human nature, and yet to keep it still. Wherefore my opinion is for heat, that when many men stand round about a fire, and are heated and warmed by it, the fire does not give them any thing, nor do they receive something from the fire, but the sensitive motions in their bodies pattern out the objects of the fire's heat, and so they become more or less hot according as their patterns are numerous or perfect; and as for air, it patterns out the light of the sun, and the sensitive motions in the eyes of animals pattern out the light in the air. The like for echoes, and any other sound, and for the figures which are presented in a looking glass. And thus millions of parts or creatures may

make patterns of one or more objects, and the objects neither give nor lose any thing. And this I repeat here, that my meaning of perception may be the better understood, which is the desire of,

Madam,
Your faithful friend,
and servant.

1.25

Madam,

I perceive you are not fully satisfied with my former letter concerning echo, and a figure presented in a looking glass; for you say, how is it possible, if echo consists in the ears' patterning out of a voice or sound,⁷⁴ but that it will make a confusion in all the parts of the air? My answer is, that I do not say that echo is only made by the patterning out of voice or sound, but by repeating the same voice or sound, which repetition is named an echo, for millions of ears in animals may pattern out a voice or words, and yet never repeat them, and so may millions of parts of the air; wherefore echo does not consist in the bare patterning out, but in the repetition of the same sound or words, which are patterned out, and so some parts of the air may at one and the same time pattern out a sound and not repeat it, and some may both pattern out, and repeat it, but some may neither pattern out, nor repeat it, and therefore the repetition, not the bare patterning out is called echo: Just as when two or more men do answer or mock each other, and repeat each other's words, it is not necessary, if there were a thousand bystanders,⁷⁵ that they should all do the same. And as for the figure presented in a looking glass, I cannot conceive it to be made by pressure and reaction; for although there is both pressure and reaction in nature, and those very frequent amongst nature's parts, yet they do neither make perception nor production,⁷⁶ although both pressure and reaction are made by corporeal self-motions; wherefore the figure presented in a looking glass, or any other smooth glassy body, is, in my opinion, only made by the motions of the looking glass, which do both pattern

⁷⁴Or possibly "the ear's patterning out of a voice or sound": there is no apostrophe in the original.

⁷⁵Changed from Cavendish's 'standers by'.

⁷⁶Reading the punctuation as a comma, although it looks like a full stop.

out, and present the figure of an external object in the glass: But you will say, why do not the motions of other bodies pattern out, and present the figures of external objects as well as smooth glassy bodies do? I answer, they may pattern out external objects, for any thing I know; but the reason that their figures are not presented to our eyes, lies partly in the presenting subject itself, partly in our sight; for it is observed, that two things are chiefly required in a subject that will present the figure of an external object; first it must be smooth, even and glassy, next it must not be transparent: the first is manifest by experience; for the subject being rough and uneven, will never be able to present such a figure; as for example, a piece of steel rough and unpolished, although it may perhaps pattern out the figure of an external object, yet it will never present its figure, but as soon as it is polished, and made smooth and glassy, the figure is presently perceived. But this is to be observed, that smooth and glassy bodies do not always pattern out exterior objects exactly, but some better, some worse; like as painters have not all the same ingenuity; neither do all eyes pattern out all objects exactly; which proves that the perception of sight is not made by pressure and reaction, otherwise there would be no difference, but all eyes would see alike.⁷⁷ Next I say, it is observed, that the subject which will present the figure of an external object, must not be transparent; the reason is, that the figure of light being a substance of a piercing and penetrating quality, has more force on transparent, than other solid dark bodies, and so disturbs the figure of an external object patterned out in a transparent body, and quite over-masters it. But you will say, you have found by experience, that if you hold a burning candle before a transparent glass, although it be in open sunlight, yet the figure of light and flame of the candle will clearly be seen in the glass. I answer, that it is another thing with the figure of candlelight, than of a duskish or dark body;⁷⁸ for a candlelight, though it is not of the same sort as the sun's light, yet it is of the same nature and quality, and therefore the candlelight does resist and oppose the light of the sun, so that it cannot have so much power over it, as over the figures of other bodies patterned out and presented in transparent glass. Lastly, I say, that the fault oftentimes lies in the perceptive motions of our sight, which is evident by a plain and concave glass; for in a plain looking glass, the further you go from it, the more your figure presented in the glass seems to draw backward; and in a concave glass, the nearer you

⁷⁷Reading a full stop for Cavendish's comma, which she follows with a capital letter.

⁷⁸'Duskish' meaning somewhat dark.

go to it, the more seems your figure to come forth: which effects are like as a house or tree appears to a traveller, for, as the man moves from the house or tree, so the house or tree seems to move from the man; or like one that sails upon a ship, who imagines that the ship stands still, and the land moves; when as yet it is the man and the ship that moves, and not the house, or tree, or the land: so when a man turns round in a quick motion, or when his head is dizzy, he imagines the room or place, where he is, turns round. Wherefore it is the inherent perceptive motions in the eye, and not the motions in the looking glass, which cause these effects. And as for several figures that are presented in one glass, it is absurd to imagine that so many several figures made by so many several motions should touch the eye; certainly this would make such a disturbance, if all figures were to enter or but to touch the eye, as the eye would not perceive any of them, at least not distinctly; wherefore it is most probable that the glass patterns out those figures, and the sensitive corporeal motions in the eye take again a pattern from those figures patterned out by the glass, and so make copies of copies; but the reason why several figures are presented in one glass in several places, is, that two perfect figures cannot be in one point, nor made by one motion, but by several corporeal motions. Concerning a looking glass, made in the form or shape of a cylinder, why it represents the figure of an external object in another shape or posture than the object is, the cause is the shape and form of the glass, and not the patterning motions in the glass. But this discourse belongs properly to the optics, wherefore I will leave it to those that are versed in that art, to enquire and search more after the rational truth thereof. In the mean time, my opinion is, that though the object is the occasion of the figure presented in a looking glass, yet the figure is made by the motions of the glass or body that presents it, and that the figure of the glass may perhaps be patterned out as much by the motions of the object in its own substance, as the figure of the object is patterned out and presented by the motions of the glass in its own body or substance. And thus I conclude and rest,

Madam,
Your faithful friend
and servant

1.26

Madam,

Since I mentioned in my last that light did disturb the figures of external objects presented in transparent bodies; you were pleased to ask, whether light does penetrate transparent bodies? I answer, for anything I know, it may; for when I consider the subtle, piercing and penetrating nature of light, I believe it does; but again, when I consider that light is presented to our sight by transparent bodies only, and not by dusky and dark bodies, and yet that those dusky bodies are more porous than the transparent bodies, so that the light has more passage to pass through them, than through transparent bodies; but that on the contrary, those dark bodies, as wood, and the like, do quite obscure the light, when as transparent bodies, as glass, etc transmit it, I am half persuaded that the transparent bodies, as glass, rather present the light by patterning it out, than by giving it passage: Also I am of a mind, that the air in a room may pattern out the light from the glass, for the light in the room does not appear so clear as in the glass; also if the glass be in any way defective, it does not present the light so perfectly, whereas, if it were the penetration of light through the glass, the light would pass through all sorts of glass alike, which it does not, but is more clearly seen through some, and more obscurely through others, according to the goodness or purity of the glass. But you may say, that the light divulges the imperfection or goodness of the glass; I answer, so it does of any other objects perceived by our sight; for light is the presenter of objects to the sense and perception of sight, and for any thing I know, the corporeal optic motions make the figure of light, the ground figure of all other figures patterned out by the corporeal optic motions, as in dreams, or when as some do see in the dark, that is, without the help of exterior light. But you may say, that if the glass and the air in a room did pattern out the figure of light, those patterns of light would remain when light is absent: I answer, that is not usual in nature; for when the object removes, the pattern alters; I will not say but that the corporeal optic motions may work by rote without objects, but that is irregular, as in some distempers. And thus, Madam, I have given you my opinion also to this your question; if you have any more scruples, I pray let me know of them, and assure yourself that I shall be ready upon all occasions to express myself,

Madam,

Your humble and faithful servant.

1.27

Madam,

Your desire is to know, why sound is louder in a vault, and in a large room than in a less? I answer, a vault or arched figure is the freest from obstruction, as being without corners and points, so as the sensitive and rational corporeal motions of the ear can have a better perception; like as the eye can see farthest from a hill than being upon a level ground, because the prospect is freer from the hill, as without obstruction, unless it be so cloudy that the clouds do hinder the perception; and as the eye can have a better prospect upon a hill, so the ear a stronger perception in a vault; and as for sound, that it is better perceived in a large, than in a little close room or place, it is somewhat like perception of scent, for the more the odorous parts are bruised, the stronger is that perception of scent, as being repeated double or treble, which makes the perception stronger, like as a thick body is stronger than a thin one; so likewise the perception of sound in the air; for though not all the parts of the air make repetitions, yet some or many make patterns of the sound; the truth is, air is as industrious to divulge or present a sound, by patterns to the ear, as light does objects to the eye. But then you may ask me, why a long hollow pipe does convey a voice to the ear more readily, than any large and open place? My answer is, that the parts of the air in a long pipe are more confused and not at liberty to wander, so that upon necessity they must move only to the patterning out of the sound, having no choice, which makes the sound much stronger, and the perception of the ear perfecter; but as for pipes, vaults, prospects,⁷⁹ as also figures presented in a room through a little hole, inverted,⁸⁰ belongs more to artists than to my study, for though natural philosophy gives or points out the ground, and shows the reason, yet it is the artist that works; besides it is more proper for mathematicians to discourse of, which study I am not versed in; and so leaving it to them, I rest,

Madam,

⁷⁹Perhaps an abbreviation for ‘prospect glasses’ or ‘prospective glasses’, meaning telescopes.

⁸⁰That is, a camera obscura.

Your faithful friend
and servant.

1.28

Madam,

From sound I am come to scent, in the discourse whereof your author is pleased to set down these following propositions: *1. That smelling is hindered by cold and helped by heat: 2. That when the wind blows from the object, the smell is the stronger, and when it blows from the sentient towards the object, the weaker, which by experience is found in dogs, that follow the track of beasts by the scent: 3. That such bodies as are least pervious to the fluid medium, yield less smell than such as are most pervious: 4. That such bodies as are of their own nature odorous, become yet more odorous, when they are bruised: 5. That when the breath is stopped (at least in man) nothing can be smelt: 6. That the sense of smelling is also taken away by the stopping of the nostrils, though the mouth be left open (De Corpore 29.12).* To begin from the last, I say, that the nose is like the other sensitive organs, which is they be stopped, the corporeal sensitive motions cannot take copies of the exterior objects, and therefore must alter their action of patterning to some other, for when the eye is shut and cannot perceive outward objects then it works to the sense of touch, or on the inside of the organ to some phantasms; and so do the rest of the senses. As for the stopping of breath, why it hinders the scent, the cause is, that the nostrils and the mouth are the chief organs, to receive air and to let out breath: but though they be common passage for air and breath, yet taste is only made in the mouth and tongue, and scent in the nose; not by the pressure of meat, and the odoriferous object, but by patterning out the several figures or objects of scent and taste, for the nose and the mouth will smell and taste one, nay several things at the same time, like as the eye will see light, colour, and other objects at once, which I think can hardly be done by pressures; and the reason is, that the sensitive motions in the sensitive organs make patterns of several objects at one time, which is the cause, that when flowers, and suchlike odoriferous bodies are bruised, there are as many figures made as there are parts bruised or divided, and by reason of so many figures the sensitive knowledge is stronger; but that stones, minerals, and the like, seem not so strong to our smell, the reason is, that

their parts being close and united, the sensitive motions in the organ cannot so readily perceive and pattern them out, as those bodies which are more porous and divided. But as for the wind blowing the scent either to or from the sentient, it is like a window or door that by the motion of opening or shutting, hinders or disturbs the sight; for bodies coming between the object and the organ, make a stop of that perception. And as for the dogs smelling out the track of beasts, the cause is, that the earth or ground has taken a copy of that scent, which copy the sensitive motions in the nose of the dog do pattern out, and so long as that figure or copy lasts, the dog perceives the scent, but if he does not follow or hunt readily, then there is either no perfect copy made by the ground, or otherwise he cannot find it, which causes him to seek and smell about until he has it; and thus smell is not made by the motion of the air, but by the figuring motions in the nose: Where it is also to be observed, that not only the motions in one, but in millions of noses, may pattern out one little object at one time, and therefore it is not, that the object of scent fills a room by sending out the scent from its substance, but that so many figures are made of that object of scent by so many several sensitive motions, which pattern the same out; and so the air, or ground, or any other creature, whose sensitive motions pattern out the object of scent, may perceive the same, although their sensitive organs are not like to those of animal creatures; for if there be but such sensitive motions and perceptions, it is no matter for such organs. Lastly, it is to be observed, that all creatures have not the same sense of smelling, but some smell stronger, some weaker, according to the disposition of their sensitive motions: Also there be other parts in the body, which pattern out the object of scent, besides the nose, but those are inferior parts, and take their patterns from the nose as the organ properly designed for it; neither is their resentment the same,⁸¹ because their motions are not alike, for the stomach may perceive and pattern out a scent with aversion, when the nose may pattern it out with pleasure. And thus much also of scent; I conclude and rest,

Madam,
Your faithful friend,
and servant.

⁸¹‘Resentment’ meaning something like a sensation or a feeling.

1.29

Madam,

Concerning your learned author's discourse of density and rarity, he defines *thick to be that, which takes up more parts of a space given; and thin, which contains fewer parts of the same magnitude: not that there is more matter in one place than in another equal place, but a greater quantity of some named body; wherefore the magnitude and paucity of the parts contained within the same space do constitute density and rarity (De Corpore 30.1).*⁸² Whereof my opinion is, that there is no more nor less space or place than body according to its dilation or contraction, and that space and place are dilated and contracted with the body, according to the magnitude of the body, for body, place and magnitude are the same thing, only place is in regard of the several parts of the body, and there is as well space betwixt things distant a hair's breadth from one another, as betwixt things distant a million of miles, but yet this space is nothing from the body; but it makes, that that body has not the same place with this body, that is, that this body is not that body, and that this body's place is not that body's place. Next your author says, *he has already clearly enough demonstrated, that there can be no beginning of motion, but from an external and moved body, and that heavy bodies being once cast upwards cannot be cast down again, but by external motion (De Corpore 30.2).* Truly, madam, I will not speak of your author's demonstrations, for it is done most by art, which I have no knowledge in, but I think I have probably declared, that all the actions of nature are not forced by one part, driving, pressing, or shoving another, as a man does a wheelbarrow, or a whip a horse; nor by reactions, as if men were at footballs or cuffs,⁸³ or as men with carts meeting each other in a narrow lane. But to prove there is no self-motion in nature, he goes on and says; *to attribute to created bodies the power to move themselves, what is it else, than to say that there be creatures which have no dependence upon the creator?* To which I answer, that if man (who is but a single part of nature) has given him by God the power and a free will of moving himself, why should not God give it to nature? Neither can I see, how it can take off the dependence upon God, more than eternity; for

⁸²*De Corpore* 30 is "Of Gravity".

⁸³Cavendish's work predates the formalization of the various popular modern football games by a couple of hundred years, but there were football games played. To be at cuffs is to be fighting.

if there be an eternal creator, there is also an eternal creature, and if an eternal master, an eternal servant, which is nature; and yet nature is subject to God's command and depends upon him; and if all God's attributes be infinite, then his bounty is infinite also, which cannot be exercised but by an infinite gift, but a gift does not cause a less dependence. I do not say, that man has an absolute freewill, or power to move, according to his desire; for it is not conceived, that a part can have absolute power: nevertheless his motion both of body and mind is a free and self motion, and such a self motion has every thing in nature according to its figure or shape; for motion and figure, being inherent in matter, matter moves figuratively. Yet I do not say, that there is no hindrance, obstruction and opposition in nature; but as there is no particular creature, that has an absolute power of self moving; so that creature which has the advantage of strength, subtlety, or policy,⁸⁴ shape, or figure, and the like, may oppose and overpower another which is inferior to it in all this; yet this hinderance and opposition does not take away self motion. But I perceive your author is much for necessitation, and against freewill, which I leave to moral philosophers and divines. And as for the ascending of light, and descending of heavy bodies, there may be many causes, but these four are perceivable by our senses, as bulk, or quantity of body, grossness of substance, density, and shape or figure, which make heavy bodies descend: But little quantity, purity of substance, rarity, and figure or shape make light bodies ascend. Wherefore I cannot believe, that there are *certain little bodies as atoms, and by reason of their smallness, invisible, differing from one another in consistence, figure, motion and magnitude, intermingled with the air* (*De Corpore* 30.3), which should be the cause of descending of heavy bodies. And concerning air, *whether it be subject to our senses or not* (*De Corpore* 30.14), I say, that if air be neither hot, nor cold, it is not subject; but if it be, the sensitive motions will soon pattern it out, and declare it. I'll⁸⁵ conclude with your author's question, *what the cause is, that a man does not feel the weight of water in water?* (*De Corpore* 30.6) and answer, it is the dilating nature of water. But of this question and of water I shall treat more fully hereafter, and so I rest,

Madam,
 Your faithful friend
 and servant.

⁸⁴'Policy' meaning perhaps prudent conduct or shrewdness.

⁸⁵For what appears to be "I'll".

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