

Correspondence

Baruch Spinoza

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[Brackets] enclose editorial explanations. Small ·dots· enclose material that has been added, but can be read as though it were part of the original text. Occasional •bullets, and also indenting of passages that are not quotations, are meant as aids to grasping the structure of a sentence or a thought. Every four-point ellipsis indicates the omission of a brief passage that seems to present more difficulty than it is worth. Longer omissions are reported between brackets in normal-sized type.—Many of the letters have somewhat ornate salutations (e.g. ‘Most excellent Sir, and dearest friend’) and/or signings-off (e.g. ‘Farewell, special friend, and remember me, who am your most devoted. . .’); these are omitted except when there’s a special reason not to.—For a helpful and thoughtful presentation of the letters, see Edwin Curley (ed), *The Collected Works of Spinoza*, vol. 1 for letters 1–28, vol. 2 for letters 29–84. **The editorial notes in the present version derive mostly from those two volumes, the material in vol. 2 having been generously made available by Curley, in advance of its publication, to the preparer of the version.**

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Glossary

affect: A feeling, emotion, attitude, obsession; in Spinoza's usage always a damaging one, but not so on page 66, where the word is used by someone else.

affection: state, quality.

Collegiant: A Dutch sect of Quaker-like dissenters who were persecuted by the dominant Calvinist clergy. Spinoza attended some of their meetings.

deist: Someone who believes there is a God (opposite of 'atheist'), but whose theology is *thin* compared with Christianity—e.g. the deist doesn't think of God as intervening in the world.

eminently: This is a scholastic technical term meaning 'in a higher form'. To say that God has (say) perception 'eminently' is to say that he has perception in some higher form that doesn't involve his straightforwardly, in the ordinary sense, *perceiving* anything. The term is used by Boxel in letter 55, and mocked by Spinoza in 56

fatal: This word is used in connection with the idea of something's being absolutely and utterly bound to happen—the idea of this as somehow laid down in advance.

magistrate: In this work, as in general in early modern times, 'a magistrate' is anyone with an official role in government; and 'the magistrate' is the ruler.

parhelia: Two bright patches flanking the sun, sometimes called 'false suns'.

philosophy: In this correspondence the word usually points more to natural science than to what we would call 'philosophy' these days.

positive: This occurs where the Latin has *positivus*, which in letters 50 and 54 is contrasted with 'negative'. But in fact the main sense of *positivus*—except for one that is irrelevant here—contrasts not with 'negative' but with 'comparative'. The English 'positive' also is a grammatical technical term with that meaning: good-better-best, positive-comparative-superlative. Some of the letters involve Spinoza's view that 'sin is not something positive'; this goes with his saying that what we call 'sin' is really a **privation**. In his and others' usage a privation in *x* is **(i)** a lack of something that **(ii)** *x* ought to have or is normal or natural for things like *x* to have. Now, the statement that a privation is not something 'positive' could mean that

- (i)** a privation is a lack, a case of *not* having something—the concept of privation is *negative*; or that
- (ii)** a privation in *x* is *x*'s lacking something that it *ought* to have; our notion of what *x* ought to have comes from our comparing *x* with other things that we regard as being of the same kind—the concept of privation is *comparative*.

In letters 19–20, 23–24, and 36 sense **(ii)** seems at least as fitting as sense **(i)**, though it could be that both are at work. Those five letters were originally written in Dutch, and *positivus* translates one or other of two different Dutch words; but there's reason to think that in each case the writer was thinking in terms of the standard scholarly language, Latin.

principle: In just two places in the correspondence, 'principle' is used in a sense, once common but now obsolete, in which 'principle' means 'source', 'cause', 'driver', 'energizer', or the like.

salutary: Usually it means ‘conducive to health’, but a secondary meaning, ‘conducive to salvation’, is what’s in play here.

Schools: A standard label for departments of philosophy (including physics) that were pretty entirely under Aristotle’s influence.

vivid and clear: The Latin phrase
clarus et distinctus

is translated here by the phrase
‘vivid and clear’.

The more usual translation for it and (in Descartes’s French works) for the French phrase

clair et distinct

has been ‘clear and distinct’; but this is demonstrably wrong for Descartes’s French and Latin. He only once takes the phrase apart to explain it:

‘I call a perception *claram* when it is present and accessible to the attentive mind—just as we say that we see something *clare* when it is present to the eye’s gaze and stimulates it with a sufficient degree

of strength and accessibility. I call a perception *distinctam* if, as well as being *clara*, it is so sharply separated from all other perceptions that every part of it is *clarum*. . . . A perception can be *clara* without being *distincta* but not vice versa. When someone feels an intense pain, his perception of it is *clarissima*, but it isn’t always *distincta* because people often get this perception muddled with something else. (*Principles of Philosophy* 1:45–6)

Of course he is not saying anything as stupid as that intense pain is always *clear*! His point is that pain is vivid, up-front, not shady or obscure. And for an idea to be *distincta* is for every nook and cranny of it to be vivid; which is not a bad way of saying that it is in our sense ‘clear’.—It’s reasonable to think that this also holds for Spinoza’s use of the phrase. The most common use of *clarus* is as meaning ‘bright’ or ‘vivid’ or the like, as in *clara lux* = ‘broad daylight’, though it can also mean ‘clear’ in our sense. But if Spinoza or anyone else used it in that sense in the phrase *clarus et distinctus*, then what is there left for ‘distinctus’ to mean?

letters 1–16: written in 1661–1663

1. from Oldenburg, 26.viii.1661:

When I visited you recently in your retreat at Rijnsburg I found it so difficult to tear myself away from your side that now that I'm back in England I hasten to reunite myself with you as far as I can by correspondence. Knowledge of things of enduring importance, combined with your kindness and graciousness, . . . must win for themselves the love of any honourable and liberally educated man. Let us then come together in unfeigned friendship, cultivating that friendship carefully with every kind of good will and service. What I in my weakness can provide you may consider yours. As for your gifts of mind, let me claim a share in them because that won't involve any loss to you.

In Rijnsburg we talked about God, about infinite extension and thought, about the difference and agreement of these attributes, about how the human soul is united with the body, and about the principles of Descartes's and Bacon's philosophy. But we spoke then as if through a grill, and dealt very briefly with matters of great importance which are now tormenting me; so I now want, on the strength of the friendship we have entered into, to engage you in discussion, and cordially ask you to explain to me more fully your views on the subjects I have mentioned.

I especially want to ask:

- What do you regard as the true distinction between extension and thought?
- What defects do you find in the philosophy of Descartes and Bacon, and how do you think they can be replaced by sounder views?

The more frankly you write to me on these and similar

matters, the more closely you will bind me to you, and strongly oblige me to serve you in return if I can.

[Oldenburg refers to a forthcoming work by Boyle, 'an English nobleman of exceptional learning', which] treats of the nature of air and its elasticity, proved by forty-three experiments; of fluidity, solidity and the like. As soon as it has been printed, I shall see that it is delivered to you. . . .

2. to Oldenburg, ix.1661:

[Spinoza opens with an expression of pleasure at this friendship, and an elaborate declaration that Oldenburg under-rates himself and over-rates Spinoza, who will be the beneficiary in this exchange. But he will address Oldenburg's questions because it would seem unfriendly not to.]

I shall begin, then, by speaking briefly about

·D₁· *God*, whom I define as a Being consisting of infinite attributes, each of which is infinite, or supremely perfect in its kind.

Here it should be noted that

·D₂· By *attribute* I understand whatever is conceived through itself and in itself, so that its concept does not involve the concept of another thing.

For example, extension is conceived through itself and in itself, but motion is not. For it is conceived in something else and its concept involves extension.

That D₁ is a true definition of *God* is clear from the fact that ·D_{1a}· by 'God' we understand 'a being that is supremely perfect and absolutely infinite'. Moreover, it is easy to demonstrate from this definition that such a being exists; but this is not the place to give the demonstration. [It is not

clear whether Spinoza is referring here to D_1 or D_{1a} ; those labels for them are not his, and he says nothing to acknowledge that they are different.] But what I do have to show here, to answer satisfactorily your first question about the true distinction between extension and thought are the following:

• P_1 • Two substances cannot exist in nature unless they differ in their whole essence [i.e. there can't be two substances with something in common];

• P_2 • A substance is not something that can be *produced*; it is of its essence to exist [so that it couldn't be non-existent for a while and then be caused to exist];

• P_3 • Every substance must be infinite, or supremely perfect in its kind.

Once I have demonstrated these, then if you attend to the definition of *God* you'll easily see what I am aiming at, so there's no need to speak more openly about these matters. But I can think of no better way of demonstrating these things clearly and briefly than to prove them in the geometric manner and subject them to your understanding. So I send them separately with this letter and await your judgment regarding them. [We don't have that enclosure. For a fine discussion of what it probably contained, see Curley p. 166 n6.]

You ask next what errors I find in the philosophy of Descartes and of Bacon. I'm not given to exposing the errors of others, but I do want to comply with your wishes. Their greatest error is **(1)** to have wandered so far from knowledge of the first cause and origin of all things. Also **(2)** they didn't know the true nature of the human mind, and **(3)** they never grasped the true cause of error. . . . That they have wandered from knowledge of the first cause and of the human mind can easily be inferred from the truth of P_1 - P_3 ; so I restrict myself to showing the wrongness of **(3)** their view about the cause of error.

I shan't say much about Bacon, who speaks quite confusedly about this, and merely *says* things without *proving* anything much. He supposes that errors occur because:

(1) In addition to the deceptiveness of the senses, the human intellect is deceived simply by its own nature; the stories it tells about things are based on the analogy of its own nature, not the analogy of the universe; so that it is like an uneven mirror that mixes its own nature with the nature of things ·it is supposed to be reflecting·. [Bacon, *New Organon* I.41.]

(2) The human intellect is inherently inclined to abstractions, and takes fleeting things to be constant, etc. [I.51.]

(3) The human intellect is unquiet; it can't stand still. [I.48]

The other causes ·of error· that he assigns all come down to the one that Descartes gives:

(4) The human will is free and wider than the intellect, or—as Bacon himself says, more confusedly (I.49)—the intellect is not a dry [here = 'uncontaminated'] light, but is fueled by the will.

(Notice that Bacon often takes the intellect to be the mind; Descartes doesn't.)

Disregarding the other ·alleged· causes ·of error· as being of no importance, I shall show that **(4)** is wrong. To see its wrongness Bacon and Descartes only needed to attend to the fact that

- the will differs from this or that volition in the same way as
- whiteness differs from this or that white thing, or
- humanity differs from this or that man.

So the will couldn't cause this or that volition any more than humanity could cause Peter and Paul! Thus, Descartes's thesis that

errors are caused by the will, and are free is wrong because •according to Descartes our errors are particular volitions, so that ·like every event· they have to have external causes and are as those causes determine them to be, and anyway •the will is only a being of reason, so that it can't possibly be a cause of anything. This is what I promised to demonstrate.

3. from Oldenburg, 27.ix.1661:

I have received your very learned letter, and read it through with great pleasure. I approve of your geometric style of proof, but I'm having trouble following the things you teach so exactly; no doubt it's due to my stupidity. Please let me give you evidence of my slowness by putting some problems to you and asking you to solve them.

(1) Do you understand clearly and without doubt that your definition of *God* is all you need to demonstrate that such a being exists? When I reflect that definitions contain only our mind's concepts, and that our mind conceives many things that don't exist and is fruitful in multiplying and increasing things once they have been conceived, I don't see how I can infer God's existence from my concept of him. From the mental collection of all the perfections I find in men, animals, plants, minerals, etc. I can form a conception of some one substance that really has all those excellences; indeed my mind can multiply and increase them to infinity, so that it can conjure up in itself a totally perfect and excellent being. But the existence of such a being doesn't follow from this.

(2) Are you certain that body is not limited by thought or thought by body? It is ·generally regarded as· still an open question whether thought is •a corporeal motion or •some spiritual act entirely different from the corporeal.

(3) Do you regard the axioms you communicated to me as indemonstrable principles, known by the light of Nature and requiring no proof? Perhaps the first of them is of that kind, but I don't see how the other three can be so regarded. The second supposes that nothing exists in Nature except substances and accidents, but many people hold that time and place are neither substance nor accident. As for your third axiom—things that have different attributes have nothing in common with one another—I'm so far from conceiving this clearly that the whole universe of things seems to prove its contrary. For all the things we know differ from one another in some respects and agree in others. And the fourth axiom—If things have nothing in common with one another, one can't be the cause of the other—is not so evident to my dull intellect that it doesn't need more light shed on it. Surely God has nothing in common with created things, yet nearly all of us regard him as their cause.

Since I don't find these axioms to be beyond any shadow of a doubt, you'll easily guess that ·for me· the propositions you have built on them are shaky. And the longer I think about them the more doubts come flooding in. Regarding the first: I regard two men as two substances each of which has the attribute *capacity to reason*; from which I conclude that there are two substances with the same attribute. Regarding the second—that a substance can't be produced, even by another substance—I don't see how this can be true, because nothing can be its own cause. This proposition sets up every substance as its own cause, making them all independent of one another—making them so many gods. In this way it denies the first cause of all things.

Frankly, I can't grasp this unless you do me the favour of •revealing to me, more straightforwardly and fully, your opinion about this lofty matter, and •teaching me what is the origin and production of substances, things' dependence on

one another, and their subordination to one another. I beg you, by the friendship we have entered into, to deal openly and confidently with me in this matter. You can be absolutely confident that everything you choose to share with me will be safe, and that I'll take care that it doesn't become known to your harm or disadvantage.

In our philosophical group we energetically devote ourselves to making experiments and observations, and are much occupied with putting together a history of the mechanical arts. [This was an informal group of scientists which, soon after this, was officially incorporated as the Royal Society.] For we regard it as settled that •the forms and qualities of things can best be explained on mechanical principles, that •all Nature's effects are produced by various combinations of motion, shape, and texture, and that •there's no need for us to seek a refuge for our ignorance in inexplicable 'forms' and 'occult qualities'.

I shall pass along to you the book I promised as soon as your Dutch ambassadors here send a messenger to The Hague (as they often do), or as soon as some other friend to whom I can safely entrust it goes that way.

Please excuse my prolixity and frankness; in particular, I ask you to take in good part, as friends do, the objections I have freely put to you without any glossing over or courtly refinements.

4. to Oldenburg, x.1661:

While I was preparing to go to Amsterdam for a week or two I received your very welcome letter and saw your objections to the three propositions I sent you. I'll try to satisfy you just on those points, omitting the rest for lack of time.

(1) I don't say that from the definition of **any thing** the thing's existence follows; it follows only (as I demonstrated

in the note I attached to the three propositions) from the definition or idea of **some attribute**, i.e. of a thing that is conceived through itself and in itself. (I explained this clearly in relation to the definition of God.) In the note just mentioned, I stated the reason for this difference—stating it clearly enough for a philosopher, who is supposed to know the difference between a fiction and a vivid [see Glossary] and clear concept, and the truth of the axiom that *every definition, or vivid and clear idea, is true*. Once these things are noted, I don't see what more is lacking for the solution to the first problem.

(2) You seem to concede that if thought doesn't pertain to the nature of extension then extension won't be limited by thought. . . . But if someone says that extension is limited not by extension but by thought, isn't that the same as saying that extension is infinite not •absolutely but only •considered as extension?. . . .

But, you say, perhaps thought is a corporeal act. I don't think that it is; but even if you think this, you won't deny that extension considered as extension is not thought; and that's all I need for my definition and demonstration of my third proposition.

(3) You say that the axioms I proposed ought not to be counted as known by the light of Nature and requiring no proof. I have no quarrel with that. But you also doubt their truth; indeed you seem to want to show that their contrary is more likely. So please attend to the definitions I gave of *substance* and *accident*, from which all these •axioms• are derived:

substance: what is conceived through itself and in itself, i.e. something whose concept does not involve the concept of another thing;

modification or *accident*: what is in another thing and is conceived through that other thing.

From this it is clear that:

(A1) substance is by nature prior to its accidents, for without it they can't be or be conceived.

(A2) Except for substances and accidents, nothing exists in reality (i.e. outside the intellect),

because whatever exists is conceived either through itself or through something else, and its concept either does or does not involve the concept of something else.

(A3) Things that have different attributes have nothing in common with one another,

for I have explained that an attribute is that whose concept doesn't involve the concept of another thing.

(A4) If two things have nothing in common with one another, one cannot be the cause of the other,

for since there would be nothing in the effect that it had in common with the cause, whatever the effect had it would have *from nothing*.

As for your contention that God has nothing in common with created things etc., I have maintained the complete opposite of this in my definition of *God* as a being consisting of infinite attributes, of which each is infinite, i.e. supremely perfect in its kind.

As for your objection to the first proposition, please consider this: men are not created, but only generated, and their bodies already existed before, though formed differently. It may indeed be inferred, as I cheerfully acknowledge, that if one part of matter were annihilated the whole of extension would also vanish at the same time. [For an explanation of that astonishing statement, see section 6 of www.earlymoderntexts.com/jfb/spinmet.pdf.] Also, the second proposition doesn't make many gods, but only one, consisting of infinite attributes.

5. from Oldenburg, 21.x.1661:

Here is the little book I promised you. Do let me know your judgment of it, particularly regarding the experiments he [Boyle] has included on nitre, and on fluidity and solidity.

Thank you for your learned second letter, which I received yesterday. I'm sorry, though, that your trip to Amsterdam prevented you from answering all my doubts. I beg you to send me what you then omitted as soon as you have time. Your letter illuminated much for me, but not enough to dispel all the darkness—which I believe *will* be dispelled when you instruct me clearly and vividly regarding the true and first origin of things. As long as I'm not clear about how and by what cause and things have come into existence, and by what connection they depend on the first cause (if there is any first cause), everything I hear and read seems to be thrown into confusion. So *please* hold out a torch for me in this, and don't doubt my loyalty and gratitude.

6. to Oldenburg, iv.1662:

[Throughout this letter Boyle is usually referred to as *vir clarissimus* = 'the very distinguished man' or by some other such phrase. In this version the name alone will be used.]

I have received Boyle's book [the Latin translation of *Certain Physiological Essays*] and read as much of it as time allowed. Thank you for this gift. I see that I was not wrong to conjecture. . . . that you would trouble yourself so only about matters of great importance. You ask for my judgment of what he has written; and I shall provide it, as far as my modest capacities allow, by noting certain things which seem to me obscure or inadequately demonstrated. But because of my other occupations I have not yet been able to read through—let alone examine—everything in the book.

·ON BOYLE'S EXPERIMENT WITH NITRE·

[The experiment was meant to •support the thesis that all physical events are explainable in terms of the shapes, sizes, and movements of colliding bits of matter, and thus to •count against the rival view that each material kind of stuff has a 'form' which somehow dictates its properties. In this experiment he processed some nitre so as to divide it into two portions of stuff each with properties different from those of nitre; he then recombined them to form nitre, which had the properties that it had originally. This is what you'd expect if Nature worked the way Boyle thought it does, and shows up the non-empirical and almost mystical 'forms' as having no work to do. In what follows, '[A]' etc. are to aid in connecting this letter with Boyle's replies (via Oldenburg, letter 11, page 13.)

[**[A]**] Several pages of this letter are devoted to criticising Boyle's accounts of what was going on at different stages in his experiment; and to describing experiments with nitre that Spinoza has conducted, with results that he says confirm his rival account of what was happening in Boyle's laboratory. (He isn't challenging the basic mechanistic approach to physics, and hasn't the faintest interest in 'forms'.) The present version will by-pass all this and proceed to parts of the letter that are of more philosophical interest.]

If I'd had the opportunity to experiment further, I would have added other things that might make the matter completely clear. But because I am entirely occupied with other matters, please let me put this off till another time and proceed to the other things to be noted.

[**[B]**] In a passing remark about the shape of the particles of nitre, Boyle finds fault with modern writers for having misrepresented it. I don't know whether he means Descartes also, but if he does he may be criticising Descartes because of what others have said. Descartes wasn't speaking of particles that can be seen with the naked eye. . . . But perhaps Boyle

is referring to some of those chemists who admit nothing but what they can see with their eyes or touch with their hands. . . .

[**[C]**] Boyle tries to show that all the tangible qualities depend only on motion, shape, and the other mechanical states. Since he doesn't present these demonstrations as mathematical, there's no need to examine whether they are completely convincing. Anyway, I don't know why he strives so anxiously to infer this from his experiment, since it has already been more than adequately demonstrated by Bacon and later by Descartes. And I don't see that this experiment offers us more illuminating evidence than others that are readily enough available.

[**[D]**] In the course of his experiment Boyle had noted changes relating to 'secondary qualities' (as he called them)—heat, sound, colour, taste—explaining each in mechanistic terms. Spinoza remarks that there are much more ordinary events that serve as well as Boyle's fancy experiment to illustrate how movements of particles of matter can produce such changes. He adds:] So I would judge all these things to be superfluous. I say this because I fear that others, who love Boyle less than they should, may judge him wrongly.

[Then further discussion of Boyle's experiment in relation to Spinoza's, and further remarks about the explanation of secondary qualities.]

·ON BOYLE'S DISCUSSION OF FLUIDITY·

Boyle writes: 'It is manifest enough that ·fluidity and firmness [= 'solidity']· are to be reckoned among the most general states of ·physical things·. . . ., there being hardly any distinct portion of matter in the world that is not either •fluid or else •stable or consistent.' [This version follows Curley in filling in Spinoza's fragmentary quotations from Boyle.] I would think

that notions derived from ordinary usage—ones that explain Nature not as it is in itself but as it is •related to human sense-perception—ought not to be counted among the chief kinds, or to be mixed (not to say confused) with pure notions that explain Nature as it is •in itself. Of the latter kind are motion, rest, and their laws; of the former are visible, invisible, hot, cold, and—to come right out with it—fluid and solid, etc.

Boyle writes: ‘The first is the smallness of the bodies that compose it, for certainly in larger. . . . parcels of matter, besides the greater inequalities or roughnesses that are usual upon their surfaces, and may hinder the easy sliding of those bodies along one another, . . . the bulk itself is apt to make them so heavy that they can’t be agitated by the power of those causes (whatever they be) that make the minute parts of fluid bodies move so freely up and down among themselves. . . .’

[In this passage Boyle is opposing the theory of fluidity of the Epicureans, who held that fluid bodies are composed of smooth, round atoms that can easily be separated from one another. He allows that this might be correct for some liquids, but that for others it is wrong. He suggests three conditions of fluidity: **(i)** smallness of the component particles, **(ii)** the existence of empty spaces or ‘some yielding matter’ around the component particles, and most importantly **(iii)** the motion of the component particles.—note based on Curley.]

Even small bodies can have surfaces that are uneven and rough. Hence if large bodies moved in such a way that the proportion of their motion to their bulk is the same as that between the motion and bulk of tiny bodies, they too would have to be called ‘fluid’, if that word hadn’t been taken over from ordinary usage to apply only to moved bodies whose smallness and intervals escape human sense perception. So dividing bodies into ‘fluid’ and ‘solid’ is on a par with dividing them into ‘visible’ and ‘invisible’.

In the same section: ‘It would hardly be believed how much the smallness of parts can contribute to their being easily moved and kept moving if we couldn’t confirm it by chemical experiments.’ No-one will ever be able to ‘confirm’ this by chemical or any other experiments, but only by demonstration and computation. It’s by reasoning and calculation that we divide bodies to infinity, and consequently also the forces required to move them. But we can never ‘confirm’ this by experiments; ‘the infinite divisibility of bodies is not an experimental question, so neither is the calculation that effective forces may be indefinitely small.’

[Spinoza now discusses in some detail the experiments that Boyle says confirm that fluidity is mainly due to the smallness of particles; in each case, Spinoza says that other interpretations of the results are better. At one point he addresses this statement by Boyle:

‘It is not altogether absurd to question the thesis that there is a portion of matter consisting of parts so minute and so agitated—and consequently so easy to be either crumbled into yet smaller parts, or squeezed into any shape as occasion requires—that they can incessantly change places among themselves, and thereby constitute a most fluid body without any vacua or receptacles or yielding matter around them.

This was aimed at Descartes. Spinoza responds that it is absurd to question that thesis:] The affirmative must be maintained unless we are willing instead •to embark on an infinite regress or •to grant (what is the height of absurdity) that there is a vacuum.

[Spinoza offers counter-examples to some of Boyle’s statements about what kinds of surface repel water and what kinds don’t. Concerning ‘the feathers of ducks, swans and other waterfowl’, Boyle writes: ‘Since nature has designed them both for flying and for swimming, she makes their

feathers of such a texture that they don't. . . .admit water, which if admitted would make them unfit for flying.' Spinoza comments sharply:] He seeks the cause in the purpose.

[Boyle's experiments to show that the 'insensible parts of visible liquors can be every way agitated' without our seeing their motion are superfluous, Spinoza says, citing everyday experiences that show the same thing well enough. In this vein:] We can infer from the sundial and the sun's shadow that motion is often too slow for us to see it, and from a lighted piece of tinder moved swiftly in a circle that it is often too fast for us to see it. In the latter case we imagine that the fiery part is at rest at every point on the circumference which it describes by its motion. I would state the causes of this if I didn't judge it superfluous.

Finally, let me say in passing that to understand the nature of a fluid in general it suffices to know that we can move our hand in it in all directions without any resistance, with a motion proportionate to the fluid. This is evident enough to those who attend sufficiently to notions that explain Nature •as it is in itself rather than •as it is related to human sense perception. Not that on that account I scorn this history as useless. [Boyle labels this part of his work as a 'history of fluidity and firmness', using 'history' in Bacon's sense—a collection of experimental data relating to some phenomenon.] On the contrary, if this were done concerning each fluid, as accurately and reliably as possible, I would judge it very useful for understanding their special differences. . . .

·ON BOYLE'S DISCUSSION OF SOLIDITY·

[Boyle writes: 'If two bodies are at rest against one another, it seems consonant to the universal laws of Nature that they should continue in that state of rest until some force capable to overpower their resistance puts them out

of it.' Spinoza remarks:] This is Descartes's demonstration, and I can't see that Boyle brings to light any genuine demonstration drawn from his experiments or observations. . . .

[Boyle argues that the pressure of the air is a probable explanation of the fact that smooth bodies will stick together 'upon bare juxtaposition or contact', e.g. if one piece of flat glass is placed against another, parallel to the ground, the lower piece won't drop down though it will easily slide. The part of all this that Spinoza comments on is Boyle's experiment designed to measure the pressure of the air. He offers a refinement of it designed, he says, to 'obtain, as far as possible the ratio between the pressure of the air along a line parallel to the horizon and that along a line perpendicular to the horizon.' He evidently doesn't realise that these two pressures are the same, though this had been shown by Pascal.]

. . . .As for your first questions, when I look through my replies I don't see that I have omitted anything. If I happen to have put something obscurely (as I often do for lack of words), please indicate it to me, and I'll do my best to explain it more clearly.

You now ask about •how things came into existence and •by what connection they depend on the first cause. I have composed a whole short work devoted to this matter and also to the emendation of the intellect. [Curley has a long interesting note on the difficult question of how the work Spinoza refers to here relates to any of his works that we know.] I am engaged in transcribing and emending it, but sometimes I set it aside because I don't yet have any definite plan regarding its publication. I'm naturally afraid that the theologians of our time may be offended and with their usual hatred attack me, who absolutely dread quarrels.

. . . .What does the work contain that might offend the preachers? Well, I say ·in it· that I regard as created

things many ‘attributes’ that they—and everyone, so far as I know—attribute to God. Conversely, other things that they because of their prejudices regard as created I contend are attributes of God, and they have misunderstood this. Also, I don’t separate God from Nature as everyone known to me has done. So I look for your advice on this matter, regarding you as a most faithful friend whose honesty it would be wrong to doubt.

7. from Oldenburg, vii.1662:

It is many weeks since I received your very welcome letter with its learned comments on Boyle’s book. He joins me in thanking you for the reflections you have shared with us. He would have indicated this sooner if he hadn’t hoped soon to be relieved of the mass of business that now burdens him, so that he could send you his answer along with his thanks. But he finds that so far his hope has been in vain; he has been so distracted by public and by private business that for now he can only •convey his gratitude to you and •put off until another time his opinion regarding your notes.

Moreover, two opponents [Hobbes and Franciscus Linus] have attacked him in print and he considers himself bound to reply to them as soon as possible. Those writings are aimed not at his treatise on nitre but at another book of his, concerning the pneumatic experiments through which he proves that air is elastic. As soon as he has freed himself from this work, he will disclose his thoughts regarding your objections; and in the meantime he asks you not to take this delay amiss.

The group of philosophers I had mentioned to you has now, by our King’s favour, been converted into ‘the Royal Society’, protected by a public charter that grants it special privileges. There is great hope that it will be endowed with

the necessary income.

I strongly advise you not to grudge scholars what you have learnedly arrived at—in philosophy and in theology—through the acuteness of your understanding. Let it be published, whatever rumblings there may be among the foolish theologians. Your Republic is very free, and gives great freedom for philosophising. And your own prudence will tell you to express your concepts and opinions as moderately as possible. For the rest, leave the outcome to fate.

Come, then, excellent sir, banish all fear of arousing the pygmies of our time. We have appeased ignorant triflers for long enough. Let us set full sail for true knowledge, and penetrate Nature’s mysteries more deeply than anyone yet has. Among your people, I think, your meditations can be published with impunity, and you shouldn’t fear giving offence to the wise. If you find your patrons and supporters to be wise—and I *promise* that you will!—why should you fear an ignorant self-appointed censor? I won’t leave you in peace until I prevail on you; I won’t—so far as it’s up to me—allow your very important thoughts to be concealed in eternal silence. *Please* tell me, as soon as you conveniently can, what decision you take concerning this.

Things may happen here that will be worth your knowing. Certainly the Society I have mentioned will now press on more vigorously with its work, and perhaps—if peace continues in this land—it will contribute to the learned world with distinction.

8. from de Vries, 24.ii.1663:

For some time now I have been anxious to visit you, but the weather and the long winter have prevented me. Sometimes I complain about my lot because the distance between us keeps us apart for so long. Your companion Casarius is

very lucky to be able to live under the same roof with you, and to talk with you about important matters at breakfast, at dinner, and on your walks. But though our bodies are so far apart, you have often been present in my mind, especially when I meditate on your writings and hold them in my hands. But since not everything is clear enough to the members of our Amsterdam Spinoza study group—which is why we have begun meeting again—and so that you won't think I have forgotten you, I am writing this letter.

As for our group, it is arranged in this way: at each meeting, one of us (we take turns) presents some portion of your work: reads it through, explains it according to his own conceptions, and then proves everything following the sequence and order of your propositions. When it happens that he can't satisfy the others, we make a note of it and decide to write to you. We hope that you'll make it clearer to us if you can, so that under your guidance we can defend the truth against those who are superstitiously religious and Christian, and stand against the attacks of the whole world.

When we first read through and explained the definitions, they didn't all seem clear to us, and it turned out that we didn't agree about the nature of definition. In your absence we consulted a certain author, a mathematician named Borelli. When he discusses the nature of *definition*, *axiom* and *postulate*, he also introduces the opinions of others. His own opinion is this:

'Definitions are used in a demonstration as premises. So they have to be known *evidently*; if they aren't, they can't provide scientific knowledge, i.e. very evident knowledge.'

And elsewhere:

'The basis for a construction—or the essential, first and best known property of a subject—must be chosen not rashly but with the greatest care. If the

construction or the property named is impossible, then a scientific definition won't result. For example, if someone were to say: "Let two straight lines enclosing a space be called 'figurals'," this would be a definition of a nonbeing, and would be impossible. So ignorance rather than knowledge would be deduced from it.

'Next, if the construction or property named is indeed possible and true but is unknown to us or doubtful, then it won't be a good definition; for conclusions drawn from what is unknown and doubtful will also be uncertain and doubtful. They will produce suspicion or opinion, but not certain knowledge.'

Tacquet seems to disagree with this opinion, for (as you know) he maintains that one can proceed directly from a false proposition to a true conclusion.

But Clavius, whose opinion Borelli also introduces, thinks that

'Definitions are invented technical terms, and there's no need to give a reason why a thing is defined in this way or that. All that is needed is this: never assert that the thing defined agrees with something unless one has first demonstrated that the definition given agrees with it.'

So Borelli maintains that the definition of a subject must consist of a property or construction that is first, essential, best known to us, and true; whereas for Clavius it doesn't matter whether it is first or best known or true, as long as the thing we have defined isn't asserted to agree with something unless we have first demonstrated that it does. We prefer Borelli's opinion, but we don't know which of the two you agree with, or whether you agree with neither. Definitions are among the things that drive demonstrations, and there is so much disagreement about what a definition *is*; with that not resolved, it is hard to evaluate demonstrations. So if

we aren't making too much trouble for you, and if you have the time, we would be glad to have your opinion about this matter and also about what the distinction is between axioms and definitions. Borelli thinks that the difference is purely verbal, but I believe that you maintain that there's more to it than that.

Next, the third definition—the definitions of *substance* and *attribute*—is not sufficiently clear to us. As an example, I reported what you said to me at The Hague, namely that

a thing can be considered either •as it is in itself or
•as it is related to something else; for example, the intellect can be considered either •under thought or
•as consisting of ideas.

But we don't see clearly what this distinction would be. We think that if we conceive thought rightly, we must comprehend it in relation to ideas, since if all ideas were removed from it that would destroy thought itself. So since the example is not clear enough to us, the thing itself still remains somewhat obscure, and we require further explanation.

Finally, at the beginning of the note to proposition 10 you write:

From these ·propositions· it is evident that although two attributes may be conceived to be really distinct (i.e. one may be conceived without the aid of the other), they don't on that account constitute two beings or two different substances. The reason is that it is of the nature of a substance that all of its attributes (I mean each of them) should be conceived through themselves, since they have always been in it together.

In this way you seem to suppose that the nature of substance is so constituted that it can have more than one attribute, which you haven't yet demonstrated, unless you depend on the definition of an absolutely infinite substance, or God. Otherwise, if I should say that each substance has

only one attribute, and if I had the idea of two attributes, I could rightly conclude that, where there are two different attributes, there are two different substances. We ask you for a clearer explanation of this too.

Next, I thank you very much for your writings, which Balling passed on to me and which have given me great joy—particularly the note to proposition 28. If I can help you here ·in Amsterdam· with anything that is in my power, I am at your service—you have only to let me know. I have entered an anatomy course, and am about half-way through. When it is finished, I shall begin chemistry, and following your advice go through the whole medical course. I break off now, and await your reply.

9. to deVries, iii.1663:

I have received your letter, which I had long looked for, and I thank you very much for it and for your feeling toward me. The length of your absence has been no less burdensome to me than to you. Meanwhile, however, I'm glad you and our friends are helped by the results of my burning the midnight oil. This enables me to speak to all of you while we are far apart.

There is no need for you to envy Casarius. No-one is more troublesome to me, and there is no-one with whom I have to be more on my guard. So I warn you and all our friends not to communicate my views to him until he has grown up; he is still childish and unstable, more anxious for novelty than for truth. But I hope that in a few years he will correct these youthful faults. Indeed, as far as I can judge from his native ability, I am almost certain that he will. So his talent induces me to like him.

As for the questions proposed in your group (which is very sensibly organised), I see that you are in these perplexities

because you don't distinguish

(1) a definition that serves to explain a thing whose essence only is sought from

(2) a definition which is proposed only to be examined.

It's only (1) that there's doubt about, because it has a determinate object, and so it ought to be true, whereas (2) does not require this.

For example, if someone asks me for a description of Solomon's temple, I ought to give him a true description of the temple, unless I want merely to chatter along. But if I have constructed in my mind a temple that I want to build, and if I infer from its description that I must buy land of such-and-such a kind and so many thousand stones and other materials, will anyone in his right mind tell me that I have drawn a bad conclusion because my definition was false (i.e. that I haven't conceived what I have conceived)? Will anyone require me to *prove* my definition (i.e. to prove that I have conceived what I have conceived)? Surely this is trifling.

So a definition either (1) explains a thing as it is outside the intellect—and then it ought to be true, and differs from a proposition or axiom only in that a definition is concerned solely with things' essences or affections [see Glossary], whereas an axiom or proposition extends more widely, to eternal truths as well; or else it (2) explains a thing as we do or can conceive it, and then it differs from an axiom or proposition in that *all* it needs is to be conceived—it doesn't have to be conceived as true, so the only way it can be bad is by not being conceived.

To help you understand this, I shall take Borelli's example. Suppose someone says 'Let two straight lines enclosing a space be called "figurals".' If he understands by 'straight line' what everyone understands by 'curved line', then his

definition will be a good one, provided he sticks to it. . . . But if by 'straight line' he understands what we commonly understand, the thing is completely inconceivable. So it is no definition. Borelli, whose opinion you are inclined to embrace, confuses these things completely.

Here's another example, the one you bring up at the end. If I say that each substance has only one attribute, that is a proposition and requires a demonstration. But if I say 'By "substance" I understand what consists of one attribute only', that will be a good definition, provided I stick to it and don't then apply the label 'substance' to beings consisting of more attributes than one.

You say that I haven't demonstrated that a substance (or being) can have more attributes than one. Perhaps you have neglected to pay attention to my demonstrations. I gave two. (a) Nothing is more evident to us than that we conceive each being under some attribute, and that the more reality or being a being has the more attributes must be attributed to it; so an absolutely infinite being must be defined, etc. (b) The more attributes I attribute to a being the more I am compelled to attribute existence to it; i.e. the more I conceive it as true. It would be quite the contrary if I had feigned a Chimæra, or something like that. (I regard (b) as the better of the two arguments.)

You report that you don't conceive thought except in relation to ideas, because if you remove the ideas you destroy thought. I believe this happens to you because when you 'remove the ideas' you are putting aside all your thoughts and concepts, leaving yourself with nothing to think of. But as far as the thing itself is concerned, I think I have demonstrated clearly and evidently enough that the intellect, though infinite, is not *thought* but a *mode of thought*, not absolutely basic but one level up. [Spinoza expresses this by saying that intellect pertains not to *natura naturans*

but to *natura naturata*, medieval technical terms that he revived in the *Ethics* and used in the correspondence just this once.]

But I don't see what this has to do with understanding the third definition, or why there should be a problem about that. Unless I'm mistaken, the definition I gave you was this:

By 'substance' I understand what is in itself and is conceived through itself, i.e. whose concept does not involve the concept of another thing. I understand the same by 'attribute', except that it is called 'attribute' in relation to the intellect, which attributes such and such a definite nature to substance.

This definition explains clearly enough what I wish to understand by 'substance' or 'attribute'.

You want me to explain by an example how a single thing can be designated by two names (though this isn't necessary). Well, I offer two: **(i)** By 'Israel' I understand the third patriarch; I understand the same by 'Jacob', the name he was given because he had seized his brother's heel. **(ii)** By 'flat' I mean what reflects all rays of light without any change; I understand the same by 'white' except that it is called 'white' in relation to a man looking at the flat surface.

With this I think I have answered your questions. I'll now wait to hear your judgment. If there's still something that you find to be not well or clearly enough demonstrated, don't hesitate to point it out to me.

10. to deVries, iii(?).1663:

You ask me whether we need experience to know whether any definition of an attribute is true. I reply that we need experience only for things that can't be inferred from the definition of the thing—e.g. the existence of modes (for this can't be inferred from the definition of the thing). We don't need experience for things whose existence is not

distinguished from their essence, and therefore is inferred from their definition. Indeed experience *can't* come in here, because experience doesn't teach any essences of things; the most it can do is to affect *which* essences of things our minds think about. So since the existence of the attributes doesn't differ from their essence, we won't be able to grasp it by any experience.

You ask, next, whether even things or their affections are eternal truths. I say certainly. If you should ask why I don't *call* them 'eternal truths', I answer, to distinguish them (as everyone generally does) from ones that don't explain any thing or affection of a thing—e.g. *Nothing comes from nothing*. Propositions like that are called 'absolutely eternal truths', meaning that they have no place outside the mind, etc.

11. from Oldenburg, 3.iv.1663:

I could offer many excuses for my long silence to you, but I'll confine myself to two chief ones: •Boyle's ill health and •the pressures of my own affairs. The former prevented Boyle from answering your comments on nitre more quickly; the latter have kept me so busy for many months that I have hardly been my own master, so that I couldn't discharge the duty I confess I owe you. I rejoice that both obstacles have been removed, for a while at least, enabling me to renew my correspondence with my great friend. . . .

Before I deal with the matters that particularly concern you and me, let me take care of what is due to you in Boyle's name. He has received with his usual kindness the notes you assembled on his *Certain Physiological Essays*, and thanks you very much for your examination of it. He wants me to advise you that his purpose was not so much •to present a truly philosophic and perfect analysis of nitre as •to show that the common doctrine of 'substantial forms

and qualities' accepted in the Schools [see Glossary] rests on a weak foundation, and that what they call the 'specific differences' of things all come down to the size, motion, rest, and position of the parts.

Having noted this first, our author then says that his experiment with nitre was more than enough to show that the whole body of nitre was resolved by chemical analysis into parts differing from one another and from the whole, but that afterwards it was reunited out of the same parts and so reconstituted that only a little of the original weight was lacking. He adds that he has shown *that* the thing occurs thus, but has not discussed *how* it occurs, which seems to be the subject of your conjecture. He hasn't reached any conclusions about *how*, because that was beyond his purpose.

[**A**] Despite that disclaimer, Boyle rejects things Spinoza says about what is going on in the experiments with nitre. Notable in all this is the following:] Boyle doesn't see that any phenomena prove the necessity of 'very fine matter'; he says that you assume it simply from the hypothesis that vacuum is impossible.

[**B**] You think that the noble author is criticising Descartes, but he believes that it's you who are at fault here. He says he hadn't referred to Descartes at all, but to Gassendi and others who ascribe a cylindrical shape to the particles of nitre when it is really prismatic. And he was speaking only about visible shapes.

[**C**] To your comments on sections 13–18 he replies only that he wrote these things primarily to show the usefulness of chemistry for confirming the mechanical principles of philosophy, and that he hadn't found these matters treated so clearly by others. Our Boyle is one of those whose trust in reason is not so great that they have no need for the phenomena to agree with their reason.

[**D**] He says that there is a great difference between •readily available experiments (where we don't know what Nature contributes and what things intervene) and •experiments where it is definitely known what things are brought in. ['Boyle here shows the sophistication about experiments that made him a great scientist. But it is ironic that he did not in fact grasp the contribution made to his experiment by the coal he used to heat the nitre.'—note by Curley]. . . .

[Responding to an implied criticism that isn't included in the present version of letter 6 (with the passing remark that 'none of the other things touch him'), Boyle is said to reply] that he has used the Epicurean principles that hold that motion is innate in the particles because he had to use *some* hypothesis to explain the phenomenon. He doesn't on that account *accept* it; he merely uses it to support his own opinion against the chemists and the Schools, by showing that the matter *can* be well explained on the hypothesis in question. . . .

There hasn't yet been time for the author to consider your comments on fluidity and solidity. I'm sending you these things I have recorded, so as not to be deprived any longer of correspondence with you. *Please* take in good part what I pass on to you in this disjointed and mutilated way; attribute its defects to my haste rather than to the renowned Boyle's ability. I have put it together more from informal conversation than from any written out and methodical reply from him. No doubt I missed many things he said—things perhaps more substantial and more neatly put than those I have here recalled. So I take all the blame on myself, and absolve the author entirely!

I proceed now to things between you and me. First, have you finished that little work of such great importance in which you treat of •things' coming into existence, •their dependence on the first cause, and •the emendation of our

intellect. I am sure that to men who are really learned and wise nothing will be more pleasant or more welcome than a treatise of that kind. A man of your talent and understanding must look to *that* rather than to what pleases the theologians of our age and fashion, for they have an eye more to their own interests than to truth. . . . I urge you not to begrudge or deny us your writings on these matters. And if something of greater importance than I foresee prevents you from publishing that work, I beg you to give me a summary of it in your letters. If you do me this service, you will find me a grateful friend.

Boyle is soon to publish other works, which I shall send you by way of payment! [In 1663 Boyle published his *Considerations touching the usefulness of experimental natural philosophy, and experiments and considerations upon colours.*] And I'll add some other things that will describe the whole purpose of our Royal Society, to whose council I belong (with twenty others) and whose secretary I am (with one other). . . .

12. to Meyer, 20.iv.1663:

·ON THE NATURE OF THE INFINITE·

I have received your two letters—of 11.i and 26.iii. Both were very welcome to me, especially when I learned from them that all is well with you and that you often think of me. [After several sentences expressing his devotion to Meyer, Spinoza winds up:] You ask me to tell you what I have discovered about the infinite, which I shall most gladly do.

Everyone has always found the problem of the infinite very difficult, indeed insoluble. That's because they haven't distinguished

- what is infinite as a consequence of its own nature, i.e. by the force of its definition,

from

- what has no bounds not by the force of its essence but by the force of its cause.

And also because they haven't distinguished

- what is called 'infinite' because it has no limits

from

- that whose parts we can't explain or equate with any number, though we know its maximum and minimum.

Finally, they haven't distinguished

- what we can only understand, but not imagine

from

- what we can also imagine.

If people had attended to these distinctions, they would never have been swamped by difficulties. For then they would have understood clearly •what kind of infinite can't be divided into any parts, i.e. can't *have* parts, and •what kind of infinite can be divided into parts without contradiction. They would also have understood what kind of infinite can be conceived to be greater than another infinite without any contradiction, and what kind cannot be so conceived. This will be clear from what I am about to say. But first let me briefly explain these four ·concepts·: substance, mode, eternity, and duration.

The points I want you to consider about **substance** are: **(i)** that existence pertains to its essence, i.e. that from its essence and definition alone it follows that it exists. . . .; **(ii)** (following from **(i)**) that substance is not one of many, but that there exists only one of the same nature; and finally **(iii)** that every substance can be understood only as infinite.

I call the affections [see Glossary] of substance **modes**. Their definition, not being the definition of substance, can't involve existence. Although they exist, therefore, we can conceive them as not existing. From this it follows that when we attend only to the essence of modes, and not to the order of the whole of Nature, we cannot infer from the fact that they

exist now that they will exist later or that they won't, or that they did exist earlier or that they didn't. It's clear from this that we conceive the existence of substance to be entirely different from the existence of modes.

The difference between **eternity** and **duration** arises from this. It's only of modes that we can explain the existence by duration. But we can explain the existence of substance by eternity, i.e. the infinite enjoyment of existing. . . .

From all this it is clear that when we attend only to the essence of modes (as we often do) and not to the order of Nature, we can determine their existence and duration as we please, conceiving it as greater or less and divide it into parts—without this doing any harm to our concept of them. But since we can conceive eternity and substance only as infinite, we can't perform any of these operations on them without destroying our concept of them.

So those who hold that extended substance is put together of parts, i.e. bodies, that are really distinct from one another are talking utter nonsense. It's like putting together many circles in an attempt to create a square or a triangle or something else completely different in its essence. That hotch-potch of arguments by which philosophers commonly try to show that extended substance is finite shakes itself to pieces, because they all suppose that corporeal substance is composed of parts. It's like those who convince themselves that a line is composed of points and can then find many arguments to show that a line is not infinitely divisible!

You may ask 'Why do we have this natural inclination to divide extended substance?' I reply that we conceive quantity

- (1) in the imagination with the aid of the senses, conceiving it abstractly, superficially; or
- (2) in the intellect alone, conceiving it as substance.

So if we attend to quantity (1) as it is in the imagination, which is what we do most often and most easily, we find it

to be divisible, finite, composed of parts, and one of many. But if we attend to it (2) as it is in the intellect, and perceive the thing as it is in itself, which is very difficult, then we find it to be infinite, indivisible and unique, as I have already demonstrated to you well enough.

When we conceive quantity abstracted from substance, we can mark off quantities in any way we please; and when we separate duration from the way it flows from eternal things, we can mark off durations in any way we please; and so we come by **time** and **measure**—time to determine duration and measure to determine quantity—making both easier to imagine. When we separate the affections of substance from substance itself, and put them into classes so as to make them easier to imagine, we come by **number**, which we employ in counting them.

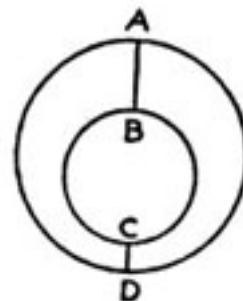
You can see clearly from this that measure, time, and number are nothing but modes of thinking, or rather of imagining. So it's no wonder that those who have tried to understand the course of Nature by such notions—misunderstanding them too!—have worked themselves into tangles that they couldn't undo; they had to *break* out, accepting the most absurd absurdities. There are many things—such as substance, eternity, etc.—that we can't grasp by the imagination but only by the intellect; so anyone who tries to explain such things by notions of this kind, which are only aids for the imagination, will accomplish nothing. . . .

And if the modes of substance themselves are confused with such beings of reason, such aids to the imagination, they can't be be rightly understood either. For when we do this we separate them from •substance and from •how they flow from eternity, without which they can't be rightly understood.

Here is an example. When someone has conceived •duration abstractly, and by confusing it with •time begun to divide it into parts, he'll never understand how an hour can pass. For an hour to pass, its first half must pass; before that, the first quarter; and so on backwards. So if you subtract half from the remainder in this way, to infinity, you'll never reach the end of the hour. This has led many who didn't routinely distinguish •beings of reason from •real beings to go so far as to maintain that duration is composed of moments. In their desire to avoid Charybdis, they have run into Scylla, for composing duration out of moments is on a par with composing number by adding noughts.

This makes it obvious enough that number, measure, and time can't be infinite because they are only aids to the imagination. . . . So it's clear why many who confused these three with the things themselves—i.e. with affections, quantity and duration—because they were ignorant of the true nature of things denied an actual infinite. But let the mathematicians judge how wretchedly these people have reasoned—such arguments have never deterred the mathematicians from the things they perceived clearly and distinctly. For not only have they discovered many things that can't be explained by any number—which shows clearly that numbers can't determine all things—they also know many things that cannot be equated with any number, but exceed every number that can be given. But they don't infer that such things exceed every number because of how many parts they have but because the nature of the thing can't admit number without a plain contradiction.

For example, all the inequalities of the space between two circles, A and B, and all the variations that the matter moving in it must undergo, exceed every number.



That is not inferred from the excessive size of the intervening space. For however small a portion of it we take the inequalities of this small portion will still exceed every number. Nor is it inferred from our not knowing its maximum and minimum. In many cases that *is* the basis for a conclusion about infinity, but not in this example, where we know that AB is the maximum and CD is the minimum. Instead it is inferred simply from the fact that the nature of the space between two non-concentric circles doesn't admit of numerical treatment. To determine all those inequalities by some definite number we'll have to bring it about that a circle is not a circle!

Similarly, to return to our theme, if someone tried to determine all the motions of matter there have been up to now by reducing them and their duration to a definite number and time, he would in fact be trying to deprive corporeal substance. . . .of its affections and bring it about that it doesn't have the nature that it does have. I don't think it is necessary for me to demonstrate this and the other things I have touched on in this letter, though I could.

From everything I have been saying it is clear that

- some things are infinite by their nature and can't possibly be conceived to be finite, that
- others are infinite by the force of the cause in which

they inhere, though when they are conceived abstractly they can be divided into parts and regarded as finite, and that

•yet others are called ‘infinite’—or if you prefer, ‘indefinite’—because they can’t be equated with any number though they can be conceived to be greater or lesser.

·Regarding this last category·: if things can’t be equated with a number, it doesn’t follow that they must be equal. This is obvious enough from the two-circles example and from many others.

So there you have it: I have set out briefly the causes of the errors and confusions that have arisen concerning the problem of the infinite, and I think my explanations also solve—or at least provide the basis for easy solutions of—any problem about the infinite that I haven’t touched on here. So I don’t regard it as worthwhile to detain you any longer with these matters.

But I’d like to mention in passing that the more recent Aristotelians have, as I think, misunderstood the demonstration by which the ancients tried to prove God’s existence. As I find it in a certain Jew, Rab Chasdai, it runs as follows:

If there is an infinite regress of causes, then all things that are will also have been caused; but something that has been caused doesn’t exist necessarily by the force of its own nature; so there is nothing in Nature to whose essence it pertains to exist necessarily.

But the conclusion is absurd, so the premise is also. Thus, the force of this argument doesn’t lie in the impossibility of there being an actual infinite or an infinite regress of causes, but only in the supposition that things that don’t exist necessarily by their own nature are not determined to exist by something that *does* necessarily exist by its own nature.

Because time forces me to hasten, I would now pass to your second letter, but it will be easier for me to answer the things contained in it when you are good enough to visit me. So please come as soon as possible, for the time of my moving approaches rapidly. . . .

12a. to Meyer, 26.vii.1663:

[This letter wasn’t discovered until 1974, so it didn’t get a number in the standard edition of the correspondence.]

Yesterday I received your very welcome letter in which you ask me three questions.

(i) In part 1, chapter 2 of *Metaphysical Thoughts* have you correctly indicated all the propositions, etc. that are cited there from part 1 of the *Principles*? Yes, everything you have indicated in chapter 2 of the work you have indicated correctly. But in chapter 1 you have indicated the note to proposition 4, and I would prefer you to have indicated the note to proposition 15, where I explicitly discuss all modes of thinking. Also, on the next page you have written in the margin ‘why negations are not ideas’—in this ‘negations’ should be replaced by ‘beings of reason’, for I am speaking of beings of reason in general.

(ii) Shouldn’t the statement in part 2 that the son of God is the father himself be deleted? I think that this statement follows very clearly from the axiom *Things that agree in a third thing agree with one another*. But this matter is of no importance to me, so if you think this can offend certain theologians, do what seems best to you.

(iii) Shouldn’t my statement that I don’t know what the theologians mean by ‘personality’ be changed? What theologians mean by the term personality escapes me, but not what philologists understand by it. Anyway, you have the manuscript. Change whatever you think should be changed.

13. to Oldenburg, 27.vii.1663:

At last I have received the letter I had long desired from you, and also have an opportunity to answer it. First let me sketch what prevented me from writing to you earlier.

When I moved my furniture here [Voorburg] in April, I went to Amsterdam, where some friends asked me to make them a copy of •my treatise in which I give a geometrical demonstration of Part 2 of Descartes's *Principles*, and of •the main points treated in metaphysics. I had dictated this to a certain young man [Casearius] to whom I didn't want to teach my own opinions openly. Then they asked me to prepare Part 1 also by the same method, . . . and I immediately undertook to do this and finished it in two weeks. I delivered it to my friends who eventually asked me to let them publish the whole work. They easily won my agreement, on condition that one of them would, with me beside him, provide it with a more elegant style and add a short preface warning readers that

I didn't acknowledge all the opinions contained in this treatise as my own, since many things in it were the very opposite of what I held,

and illustrating this by one or two examples. One of my friends to whom I have entrusted the publishing of this little book promised to do all this, and that is why I stayed on for a while in Amsterdam. Since I returned to this village where I am now living I have hardly been my own master because of the friends who have been kind enough to visit me.

Now at last, dearest friend, I have some time to myself to tell you these things, and to tell you why I am letting this treatise see the light of day. It's with the thought that the book may induce some who hold high positions in my country to want to see other things I have written—things I acknowledge as my own—so that they would see to it that I can publish without running any risks. If this happens, I'm

sure I'll publish certain things immediately. If not, I shall be silent rather than flouting the wishes of my country by forcing my opinions on men and making them hostile to me. Please, dear friend, be willing to wait for that. Then you will have either the printed treatise itself or a summary of it, as you request. And if you would like to have a copy or two of the work now in the press, I'll get them to you as soon as I find a convenient way to do so.

I turn now to your letter, and thank you and Boyle for the kindness and generosity you have clearly shown me. . . . I am grateful to Boyle for being so good as to reply to my notes, even if he does so in passing and as if doing something else. My notes are not so important that this most learned gentleman should waste in replying to them the time he can spend on higher thoughts.

I didn't enter my head that this most learned gentleman had no other object in his treatise on nitre than to show the weak foundations of that childish and frivolous doctrine of 'substantial forms and qualities'. I had persuaded myself that he wanted to explain the nature of nitre to us, showing it to be a heterogeneous body with fixed and volatile parts. So I wanted by my explanation to show—and I think I did show more than adequately—that we can easily explain all the phenomena of nitre (or anyway all the ones I know) while regarding it as homogeneous and not heterogeneous. [From there Spinoza goes through Boyle's responses to his comments, contending in each case that the comment was reasonable given Spinoza's understanding of what this was all about. What follows are a few excerpts from the letter, ones that are of more general interest.]

. . . .When I said that the particles of nitre in the larger passages are surrounded by a finer matter, I inferred that from the impossibility of a vacuum, as Boyle notes. But I don't know why he calls the impossibility of a vacuum a

'hypothesis'; it follows very clearly from the fact that *nothing has no properties*. And I'm surprised that Boyle doubts this, because he seems to maintain that there are no real accidents. If there were quantity without substance, wouldn't that be a real accident?

[In case you need help with that extremely compressed passage: An 'accident' is a property; and a 'real accident' = 'thing-like accident' (from Latin *res* = 'thing'), if there were such an item, would be a property-instance that existed independently of anything's *having* it. Now, Spinoza is following Descartes in assuming that if there were a *vacuum* it would be a *nothing*; if a vacuum had a size and shape those would be properties of that nothing, i.e. properties that aren't properties of anything, i.e. real accidents.]

In the fifth section I thought Boyle was criticising Descartes, which he has certainly done elsewhere (of course without denigrating Descartes in any way). Perhaps other readers of Descartes's *Principles* and Boyle's writings will make the same mistake if they aren't expressly warned.

...Boyle says he has not found these things to be so clearly taught and discussed in others. Perhaps he has something that I can't see to allege against the reasonings of Bacon and Descartes by which he thinks he can refute them. I don't recount their reasonings here because I don't think Boyle is unfamiliar with them. But I will say this: they too wanted the phenomena to agree with their reason; if they sometimes erred, they were men, and I think nothing human was alien to them.

He says that there's a great difference between •the experiments (the readily available and doubtful ones I cited) in which we don't know what Nature contributes and what things intervene, and •those in which it is established with certainty what things are contributed. But I don't yet see that Boyle has explained to us the nature of the things used in this matter, the calx of nitre and its spirit. These seem

just as obscure as those I have adduced, ordinary lime and water. I grant that wood is *more* composite than nitre; but when I don't know the nature of either, or how heat arises in each, what does that matter?

...I shouldn't detain you any longer on these matters. If I have been burdensome, despite trying to be as brief as possible, I beg you to overlook it and to take in good part what is said freely and sincerely by a friend. I thought it would be unwise, now that I'm writing to you again, to be completely silent on these matters. To praise to you things that didn't please me much would be sheer flattery, and I don't think anything is more harmful in friendships than that. So I decided to state my views as frankly as possible, and thought nothing would be more welcome to philosophers than that.

But if it seems to you more advisable to consign these thoughts to the fire rather than passing them on to Boyle, do as you please, provided you believe me to be very devoted and loving to you and to him. I am sorry my slender means prevent me from showing this otherwise than by words.

14. from Oldenburg, 10.viii.1663:

I must tell you how glad I was to receive your letter of 27.vii, especially since it •gives evidence of your well-being and •makes me more certain of your friendship towards me. If that were not enough, you report that you have entrusted to the press your *Parts 1 and 2 of Descartes's 'Principles', demonstrated in the Geometric style*, and generously offer me one or two copies of it. I accept the gift willingly. Please send the Treatise now in the press via Serrarius of Amsterdam. I have instructed him to receive such a package and forward it to me by a friend traveling in this direction.

For the rest, permit me to tell you that I bear impatiently your continued suppression of those writings you acknowledge as your own, especially in a Republic so free that there you are permitted to think what you will and say what you think. I wish you would break through those barriers, particularly since you can conceal your name, and so put yourself beyond any chance of danger.

Boyle has gone away. As soon as he is back in London I shall communicate to him that part of your letter that concerns him and tell you his opinion of your views as soon as I have obtained it. I think you have already seen his *The Sceptical Chemist*, which for some time now has been published in Latin and distributed abroad. It contains many chemico-physical paradoxes, and subjects the so-called 'hypostatic principles' of the spagyrist to a severe examination. [That is, he severely criticises the emphasis that a certain sect of alchemists place on the principles [see Glossary] salt, sulphur, and mercury.]

Recently he has published another booklet that may not yet have reached your booksellers. So I send it to you enclosed with this letter, and ask you cordially to take this little gift in good part. As you will see, this booklet contains a defence of the elastic power of air against Franciscus Linus who tries to explain the phenomena Boyle recounts in his *New Physico-mechanical Experiments* by a certain little thread which escapes the intellect as much as it does all sense perception! Read this booklet, weigh it, and tell me what you think.

Our Royal Society is vigorously pursuing its goal with all its power, keeping itself within the bounds of experiments and observations, and not getting tangled in disputations.

Recently an excellent experiment has been performed which greatly distresses those who affirm a vacuum, but very much pleases those who deny one. It proceeds as follows.

[He describes in detail an experiment involving glass jars, water, and a vacuum pump. The account is long and not very interesting, and how it supposed to encourage those who say there is no vacuum is unclear. We can spare ourselves all this, because it is a scientific dead end. [In a note on this passage Curley writes: 'Experiments of this perplexing kind were much discussed at the time (Huygens had performed one). Most of them depended on the then unknown properties of surface tension and capillarity.']]

I had meant to add more here, but friends and business call me away. I can't conclude this letter without urging you once again to publish your own meditations. I shall never stop exhorting you until you agree! Meanwhile, if you were willing to share with me some of the main results, how much would I love you! how closely I would judge myself to be bound to you! May everything prosper with you. . . .

15. to Meyer, 3.viii.1661:

The preface you sent me by our friend de Vries I return to you by him. As you will see, I have noted a few things in the margin, but a few others I thought it better to tell you of by letter.

First, when you tell the readers about the occasion on which I composed the first part, I wish you would also tell them, somewhere, that I composed it within two weeks. That will warn them not to think that I have set these things out so clearly that they couldn't be explained more clearly, so that they won't be held up by a word or two if occasionally they find something obscure.

Second, please point out to them that •I demonstrate many things differently from how Descartes did, not to correct Descartes but to retain my own order better and not increase the number of axioms so much; and that for the same reason •I demonstrate many things that Descartes

asserts without any demonstration, and have had to add others that Descartes omitted.

Finally, my dear friend, I ask you most urgently to omit—to delete entirely—what you have written at the end against that petty man [We don't know who that is]. Many reasons incline me to ask this of you, but I shall mention only one. I want everyone to find it easy to believe that these things are published for the benefit of everyone, that in publishing this little book your only wish is to spread the truth, that you are taking the greatest care to make it pleasing to everyone, that you are generously and with good will inviting men to study the true philosophy, and are aiming at the advantage of all. Everyone will easily believe this when he sees that no-one is injured and that nothing is put forward that could be offensive to anyone. If afterwards, however, that man wants to show his malice, *then* you'll be able to portray his life and character, and not without approval. Please wait until then. . . .

Our friend de Vries had promised to take this with him, but because he doesn't know when he will return to you I'm sending it by someone else. With it I enclose part of the note to proposition 27 of part 2, for you to give to the printer so that it can be set again. What I am sending you here must be printed again, and 14 or 15 lines must be added. These can easily be inserted.

16. from Oldenburg, 4.viii.1663:

Only a few days have passed since I sent you a letter by the ordinary post. In it I mentioned a booklet by Boyle that I wanted to send you; and now, sooner than I had expected, someone has turned up who can take it. So receive now what I couldn't send then, together with the courteous greetings of Boyle, who has now returned to London from the country.

He asks you to consult the Preface to his experiments on nitre, to understand the real goal he had set himself in that work: to show that the teachings of a more solid philosophy that is now appearing again can be illustrated by clear experiments, and that these experiments can be explained very well without the 'forms', 'qualities' and futile 'elements' of the Schools.

[Boyle welcomed the revival of Epicureanism by writers like Gassendi. The atomists disagreed with the Cartesians 'about the notion of body in general, and consequently about the possibility of a true vacuum, as also about the origin of motion, and the indefinite divisibleness of matter', but Boyle thought that because they agreed 'in deducing all the phenomena of nature from matter and local motion. . . ., they might be thought to agree in the main'. Hence, Oldenburg's stress below on the basic agreement between Boyle and Spinoza.—note derived from Curley)] But he did not at all take it on himself to teach the nature of nitre or even to reject what anyone can maintain about the homogeneity of matter and about the differences of bodies arising only from motion, shape, etc. He says he had only wished to show that the various textures of bodies produce their various differences, that from these proceed quite different effects. . . . I shouldn't think there is any fundamental difference between you and Boyle here. . . .

With regard to the reasoning you use to overthrow a vacuum, Boyle says he is familiar with it and has seen it before, but is not at all satisfied with it. He says there will be an opportunity to speak about this elsewhere. . . .

He asks that you consider carefully whether you have made a proper comparison between ice and water on the one hand, and nitre and its spirit on the other. Ice is resolved only into water, and when the odourless ice becomes water again it remains odourless. But spirit of nitre and the fixed salt of nitre are found to have different qualities, as the printed Treatise abundantly teaches.

I gathered these and similar things from conversation about this with our illustrious author, though I'm sure that with my weak memory I recollect them to his disadvantage rather than to his credit. Since the two of you agree on the main point, I don't want to go on about this. I would rather encourage you both to unite your abilities in cultivating a genuine and solid philosophy. May I advise you especially to continue to establish the principles of things by the acuteness of your mathematical understanding, as I constantly urge Boyle to confirm and illustrate this philosophy by experiments and observations, repeatedly and accurately made.

You see what I am striving for. I know that in this kingdom our native philosophers will not shirk their experimental duty; and I'm equally sure that you in your country will zealously do your part, however much the mob of philosophers or theologians may snarl, and whatever accusations they may make. I have already urged you to this many times, so I restrain myself now so as not to become tedious.

But I do ask this much: please be so kind as to send me as quickly as possible anything that you have already had printed, whether it is your commentary on Descartes or what you have produced from the resources of your own intellect. You will bind me that much more closely to you. . . .

Notes on the other correspondents

Pieter Balling (c. 1664–1669): A Mennonite and an enemy of dogmatism. He was the agent in Amsterdam of various Spanish merchants, knew Spanish well, and may have come to know Spinoza through that. He was the translator into Dutch of Spinoza's *Descartes' 'Principles'* and *Metaphysical Thoughts*, and perhaps of other works as well.

Willem van Blijenbergh (1632–1696): A grain broker by profession, but also an ardent would-be theologian and metaphysician. Spinoza's initial warm welcome to him would have been more cautious if he had known that van Blijenbergh had already published a work entitled

Theology and Religion defended against the views of Atheists, wherein it is shown by natural and clear arguments that God has implanted and revealed a Religion, that God wants to be worshipped in accordance with it. . . etc.

In 1674 he wrote another such book, including 'a refutation of Spinoza's *Treatise on Theology and Politics*—'that blasphemous book'. Spinoza's final letter to him (27) is notably gentle and temperate.

Johannes Bouwmeester (1630–1680): A close friend of Meyer and of Spinoza. Trained in medicine and philosophy at the University of Leiden, he was a fellow member with Meyer of the society *Nil volentibus arduum* [Latin: Nothing is difficult for the willing] and codirector of the Amsterdam theater in 1677.

Hugo Boxel: High-level bureaucrat and then governor of his native city Gorkhum.

Robert Boyle (1627–1691): Son of an Earl, and the leading British scientist of the period between Bacon and Newton. He

belonged to a group of Baconians that was later incorporated as the Royal Society. His reputation as a scientist is most securely based on work that led him to the law relating the pressure and volume of gases. He held that science was not only compatible with Christianity but encouraged an appreciation of God's works, and he wrote extensively against atheism.

Albert Burgh: Son of an influential member of the governing classes. When he converted to Roman Catholicism, his parents asked their friend Spinoza to intervene, which he did, though unsuccessfully.

J. Ludovicus Fabritius (1632–1697): Professor of philosophy and theology at the University of Heidelberg. The Elector Palatine, on whose behalf he wrote letter 47, was Karl Ludwig, brother of Queen Christina of Sweden, Descartes's patroness.

Johan George Graevius (1632–?): Professor of rhetoric in the university of Utrecht.

Johannes Hudde 1628–1704: A student at the University of Leyden in the 1650s; joined a research group that translated Descartes's *Geometry* into Latin and published it with three appendices, one by Hudde. Did significant work in mathematics, optics, and probability theory. Mayor of Amsterdam (1672–1702).

Jarig Jelles (?–1683): A spice merchant in Amsterdam, he entrusted his business to a manager and devoted himself to the pursuit of knowledge. He was one of those who persuaded Spinoza to publish his *Descartes's 'Principles'*, and he paid the cost of publication.

Gottfried Leibniz (1646–1716): The most distinguished European philosopher of the generation after Spinoza's.

Lodewijk Meyer (1629–1681): Studied philosophy and medicine at the University of Leiden, where he became an ardent Cartesian. After receiving doctorates in both subjects he practised medicine in Amsterdam and figured in the literary world—wrote poems and plays, assisted with an important dictionary, directed the Amsterdam theater.

Henry Oldenburg (c. 1618–1677): Born in Bremen, where he studied theology. Most of his adult life was spent in England, where he was occupied partly in diplomatic work, partly in teaching (one of his pupils being a nephew of Boyle), but mainly with the secretaryship of the Royal Society, a position he held from 1662 until his death.

Jacob Ostens (1625–1678): A Collegiant [see Glossary] and surgeon.

G. H. Schuller (1631–79): A medical practitioner in Amsterdam. Spinoza consulted him medically sometimes, including during his final illness; and Schuller was with Spinoza when

he died.

Nicholas Steno (1638–1687): Physician and research biologist; converted to Roman Catholicism in 1667.

Ehrenfried Walther von Tschirnhaus (1631–1708): A German Count who studied in Holland and served as a volunteer in the Dutch army. He had many scientific activities and interests, and is also credited with being the first European to find out how to make porcelain.

Lambert de Velthuysen (1622–1685): Studied philosophy, theology and medicine at the University of Utrecht, and practised medicine there. His liberal views in religion brought him into conflict with the dominant church, but he couldn't see his way to agreeing with Spinoza.

Simon de Vries (c. 1633–1667): An Amsterdam merchant and Collegiant [see Glossary]. When his death was approaching, de Vries wanted to make Spinoza his sole heir; Spinoza declined, because the money ought to go to de Vries's brother, though he did eventually accept a small annuity—half the amount offered—from the brother.