

# Spinoza's Ontology Geometrically Illustrated: A Reading of *Ethics* IIP8S

*Valtteri Viljanen*

The *Ethics* is probably the most famous and finest example of a philosophical treatise written in the synthetic geometrical style in which propositions are derived from basic definitions and axioms. This alone leaves little doubt that, for Spinoza, geometry provides the pivotal model for philosophy. However, we should not rush into thinking that *a certain form of exposition* is the only, or even the most important, sense in which geometry informs his philosophy; there are reasons to think that geometricity is ingrained deeper than that in his thought. Most notably, Spinoza's penchant for geometrical examples to illustrate key points of his system signals this. Perhaps the best-known instance of this is the following:

I think I have shown clearly enough (see P16) that from God's supreme power, or infinite nature, infinitely many things in infinitely many modes, i.e., all things, have necessarily flowed, or always follow, by the same necessity and in the same way as from the nature of a triangle it follows, from eternity and to eternity, that its three angles are equal to two right angles. (E IP17S)<sup>1</sup>

In other words, all things as modifications of the single substance follow from the nature (or essence) of that substance, precisely in the way that certain necessary properties follow from the essence of a geometrical figure such as a triangle. This arresting claim is in line with and, I think, the source of Spinoza's no less striking necessitarianism, according to which nothing could have been otherwise since everything takes place with absolute necessity.<sup>2</sup>

In addition to the example concerning (the essence of) a triangle and its properties, I would like to draw attention to three especially prominent illustrations. To take the earliest first, in the *Treatise on the Emendation of the Intellect* Spinoza sets two requirements for a proper definition (of the essence of a finite thing).<sup>3</sup> Here is the first:

The definition . . . will have to include the proximate cause. E.g., according to this law, a circle would have to be defined as follows: it is the figure that is described by any line of which one end is fixed and the other movable. The definition clearly includes the proximate cause. (TIE 96)

In other words, a thing can only be properly defined – and thereby understood – genetically, with geometry showing how this is to be done. The second requirement reads as follows:

We require a concept, or definition, of the thing such that when it is considered alone, without any others conjoined, all the thing's properties can be deduced from it (as may be seen in this definition of the circle). For from it we clearly infer that all the lines drawn from the center to the circumference are equal. (TIE 96)

These two passages are based on the following line of thought: every genuine thing has a definable essence (that constitutes the thing, makes it the thing it is),<sup>4</sup> that essence comes to be generated in a certain way (which is reflected by the first requirement), and from it certain properties necessarily follow (the second requirement latches on to this). All this may – and I think should – be taken to reveal Spinoza's general way of thinking about the fundamental inner structure of all finite things, and, quite characteristically, Spinoza opts for geometrical illustrations to drive his point home.

The second famous example – interestingly in line with the two requirements just mentioned – concerns the way in which our emotions (or affects) have

certain causes, through which they are understood, and have certain properties, as worthy of our knowledge as the properties of any other thing . . . Therefore, I shall treat the nature and powers of the Affects, and the power of the Mind over them, by the same Method by which, in the preceding parts, I treated God and the Mind, and I shall consider human actions and appetites just as if it were a Question of lines, planes, and bodies. (E IIIPref.)

To consider human emotions and actions 'just as if it were a Question of lines, planes, and bodies' may make one think of a mechanistic approach;<sup>5</sup> but since the beginning of the passage refers to causes and properties (which, as we have seen, Spinoza thinks in geometrical terms) and the method is said to be the same as that which Spinoza has applied to God (and thus hardly in any sense 'mechanistic'), it seems evident that he is proclaiming that we are to understand what we feel and do in the same way we understand geometrical objects and their properties.<sup>6</sup>

The third significant geometrical illustration is located in IIP8S of the *Ethics*. In this chapter, I offer an in-depth reading of that illustration and show how it can be used to explicate the whole architecture of Spinoza's system by specifying the way in which all the key structural features of his basic ontology find their analogies in the example. The illustration can also throw light on Spinoza's ontology of finite things and inform us about what is at stake when we form universal ideas. In general, my reading of E IIP8S thus elucidates what it means, for Spinoza, to think geometrically or to consider geometry as a model: fundamentally, geometricity is not a form of exposition but the way in which reality itself is structured.

## The Illustration and its Background

As our main geometrical example is designed to illustrate E IIP8 and its corollary, they should be quoted in full. Here is the proposition itself:

The ideas of singular things, *or* of modes, that do not exist must be comprehended in God's infinite idea in the same way as the formal essences of the singular things, *or* modes, are contained in God's attributes. (E IIP8)

The demonstration is brief in the extreme: 'This proposition is evident from the preceding one [IIP7], but is understood more clearly from the preceding scholium.' E IIP7, in turn, presents what has come to be called Spinoza's parallelism: 'The order and connection of ideas is the same as the order and connection of things.' Discussing this proposition, as difficult as it is central, would take us too far afield; we must simply note that we are indeed in deep Spinozistic waters and move on to the corollary of E IIP8:

From this it follows that so long as singular things do not exist, except insofar as they are comprehended in God's attributes, their objective being, *or* ideas, do not exist except insofar as God's infinite idea exists. And when singular things are said to exist, not only insofar as they are comprehended in God's attributes, but insofar also as they are said to have duration, their ideas also involve the existence through which they are said to have duration. (E IIP8C)

The proposition and its corollary have been the subject of a prolonged discussion,<sup>7</sup> but I think it is safe to make two main points here, one being ontological, the other epistemological. The ontological point is that formal essences are atemporally contained in their attributes; the epistemological point is that this enables us to have adequate ideas of non-existing things, that is, of things that are not actual at the moment.

The key illustration reads as follows:

If anyone wishes me to explain this further by an example, I will, of course, not be able to give one which adequately explains what I speak of here, since it is unique. Still I shall try as far as possible to illustrate the matter: the circle is of such a nature that the rectangles formed from the segments of all the straight lines intersecting in it are equal to one another. So in a circle there are contained infinitely many rectangles that are equal to one another. Nevertheless, none of them can be said to exist except insofar as the circle exists, nor also can the idea of any of these rectangles be said to exist except insofar as it is comprehended in the idea of the circle. Now of these infinitely many [rectangles] let two only, viz. [those formed from the segments of lines] D and E, exist. Of course their ideas also exist now, not only insofar as they are only comprehended in the idea of the circle, but also insofar as they involve the existence of those rectangles. By this they are distinguished from the other ideas of the other rectangles. (E IIP8S)

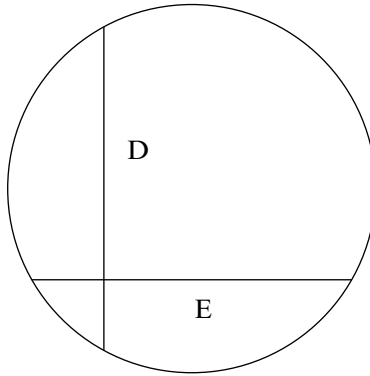


Figure 1.1

The background of the illustration is not difficult to discern: it is in fact proposition 35 of the third part of Euclid's *Elements*:

*If in a circle two straight lines cut one another, then the rectangle contained by the segments of the one equals the rectangle contained by the segments of the other.*

For in the circle  $ABCD$  let the two straight lines  $AC$  and  $BD$  cut one another at the point  $E$ . I say that the rectangle  $AE$  by  $EC$  equals the rectangle  $DE$  by  $EB$ . (Euclid 1908: 71)

For our purposes there is no need to go into Euclid's lengthy demonstration of the proposition. It suffices to note that we can derive an infinite number of rectangle pairs by drawing intersecting lines in a circle and that the resulting rectangles are always equal (that is,  $AE \times EC = DE \times EB$ ). To connect this to Spinoza's epistemological concerns, there is nothing preventing us having true ideas of the rectangles thus produced, *should they actually exist or not*. This

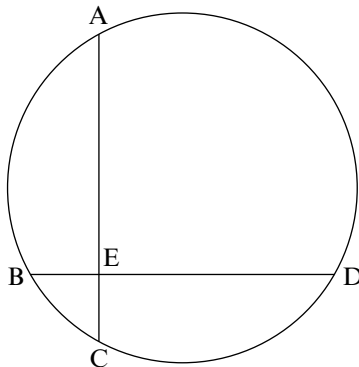


Figure 1.2

reflects an important idea that Spinoza voices in a forceful manner early in his philosophical career:

If some architect conceives a building in an orderly fashion, then although such a building never existed, and even never will exist, still the thought of it is true, and the thought is the same, whether the building exists or not. (TIE 69)

Spinoza arguably finds Euclid's proposition particularly apt for illustrating that we can form an adequate idea of whatever can be construed 'in an orderly fashion' – for this, the actual (durational) existence of the object is simply irrelevant.

## Monistic Ontology and the Geometrical Illustration

The epistemological point is certainly noteworthy; it is, after all, what Spinoza ostensibly wants to convey with the example. But we can go further and show how deeply entrenched the illustration is in Spinoza's system, which bestows upon it explicatory force of a completely different level. The illustration is built on a specific geometric architecture. And that architecture – when given a slight interpretative twist – captures strikingly faithfully *the basic structural features of Spinoza's whole ontology*. I assume that Spinoza himself was at least partly aware of this, for it is, in the end, clear that the illustration contains many central elements of his ontology. But let us consider this again when I have presented my case.

### *From the Infinite to the Finite*

The single substance, the monistic God-or-Nature without which 'nothing can be or be conceived' (E IP15), is of course the most basic element in Spinoza's ontology. We have seen that, for Spinoza (as for so much of the Western philosophical tradition), any genuine thing is endowed with its essence, that which makes it the thing it is. This is no less true of the absolutely infinite substance than it is of finite things. Spinoza calls that which constitutes the essence of substance an *attribute*.<sup>8</sup> A substance can have many attributes (E IP9), each infinite 'in its own kind' (E ID6), but there cannot be an attributeless substance, only, for instance, substance as thinking or substance as extended. In our illustration, *the circle clearly represents an attribute*: after all, the scholium is supposed to help us understand how essences of singular things are contained in their attribute, so the circle as the starting point of the illustration represents the latter.<sup>9</sup> We know only two attributes,<sup>10</sup> thought and extension, and can thus regard the circle as the thinking substance or the extended substance.

What about the lines from which rectangles are formed? Spinoza says that the rectangles are *comprehended* or *contained* in the circle, but it is not immediately clear what this means. The following claim by Charlie Huenemann is, I believe, helpfully correct: '[W]hen X geometrically contains Y, it means that X has sufficient features for producing Y, *in accordance with sanctioned means*

of construction.<sup>11</sup> To give an example of this, recall how Spinoza describes the production of a sphere (in TIE 96). I believe he would approve of the following method of constructing it from extension: first move a point rectilinearly (in extension), then rotate the resulting line by holding its one end fixed and moving the other.<sup>12</sup> In line with this, it is important to note how central *motion* is for the Spinozistic extended substance:

In examining natural things we strive to investigate first *the things most universal and common to the whole of nature: motion and rest, and their laws and rules*, which nature always observes and through which it continuously acts. From these we proceed gradually to other, less universal things. (TTP ch. 7/G III 102, emphases added)

In other words, extended God-or-Nature produces everything ‘less universal’ – including rocks, trees, dogs, and human bodies – *through law-obeying motion*. This contention is completely consistent with Spinoza’s doctrine of infinite modes, or modes that ‘follow from the absolute nature of any of God’s attributes’ and ‘have always had to exist and be infinite, or are, through the same attribute, eternal and infinite’ (E IP21).<sup>13</sup> In his correspondence, Spinoza tells us that the immediate infinite mode – the mode most directly rooted in its attribute – of extension is *motion and rest* (Ep. 64 to Schuller).<sup>14</sup> And the early *Short Treatise* explains that ‘each and every particular thing that comes to exist becomes such through motion and rest’ (KV II.Pref.), which all amounts to the claim that extended substance produces particular corporeal things through its infinite immediate mode, namely motion and rest.<sup>15</sup> Thus, I think it is well warranted to say that the immediate infinite mode is the fundamental mode of generation or production within its attribute, and that in the extended substance this mode is lawful motion (and rest).<sup>16</sup>

Given the aforesaid, when Spinoza says that ‘the circle is of such a nature’ that ‘from the segments of all the straight lines’ are formed rectangles (E IIP8S), he is illustrating the ontological thesis that particular things of any given substantial attribute (such as extension) come to be produced through its immediate infinite mode (such as lawful motion). We can thus say that *the drawing of the lines* corresponds to *the basic mode of production* within the attribute. To put the point colloquially, it is by ‘doing’ motion (in the attribute of extension) or thinking (in the attribute of thought) that Spinoza’s God-or-Nature produces finite bodies and ideas.

An infinite number of lines can be drawn inside a circle so that in it ‘there are contained infinitely many rectangles that are equal to one another’ (E IIP8S). We can next focus on an evident element of the illustration that Spinoza does not himself mention: each pair of lines determines or generates *a cutting point*.<sup>17</sup> Here it is helpful to recall how, according to TIE 96, a definition must state the ‘proximate cause’ that produces the essence; in the illustration, each pair of lines primarily results in a cutting point, which can thus quite naturally be viewed as an essence that constitutes a particular finite thing.<sup>18</sup> The scholium is silent both

about cutting points and essences, but the proposition itself is not: 'the formal essences [*essentiae formales*] of the singular things, or modes, are contained in God's attributes' (E IIP8). The reference to essences is understandable due to their pivotal role in Spinoza's system; moreover, given that the epistemological point of the proposition concerns the atemporal objects of knowledge, it is completely appropriate to refer more precisely to *formal* essences. Already the early *Metaphysical Thoughts* informs us that 'the formal essence . . . depends on the divine essence alone, in which all things are contained. So in this sense we agree with those who say that the essences of things are eternal' (CM I.2). This is not the place for a prolonged discussion of Spinoza's essentialism; it suffices to note that atemporal formal essences are to be contrasted to actual essences and that there are good grounds to consider the former ontologically prior to the latter.<sup>19</sup> Now, Spinozistic particular things are specific, limited ways in which the attribute becomes modified, essences operating as what I would call *attribute modifiers* that constitute those things.<sup>20</sup> Spinoza's geometrical example can help us to grasp the way in which he views the relationship between attributes, immediate infinite modes, and the essences of finite modes: just as line-drawing is the feature of the circle through which are produced specific cutting points, immediate infinite modes (such as motion and rest or infinite intellection) of attributes (such as extension or thought) are the basis for the production of formal essences. These essences, in turn, are manifested differently under different attributes, resulting in such entities as minds and bodies. The so-called Physical Digression of the second part of the *Ethics* indicates that in extension the (formal) essence of a body involves a certain ratio of motion and rest (E IIA2"D); the case of thought is more conjectural, but I would suggest that the formal essence of a mind involves a specific form of affirmation through which objects are conceived.<sup>21</sup>

In addition to the immediate infinite modes, there is one more infinite element in Spinoza's ontology, usually called mediate infinite modes.<sup>22</sup> When asked for an example of them, Spinoza famously gives 'the face of the whole universe' (Ep. 64 to Schuller). This claim is often taken as referring exclusively to extended substance, though it might be intended as attribute-neutral.<sup>23</sup> In any case, I believe the geometrical example can accommodate this idea as well: drawing an infinite number of lines yields an infinite number of cutting points, which can be viewed as an infinite *whole* (of points), just as the face of the whole (mental or physical) universe can be viewed as an infinite whole of formal essences. In this way, the infinite totality of all the cutting points can be used to illustrate the face of the whole physical or mental universe, or mediate infinite modes of their respective attributes.<sup>24</sup> Thereby we have been able to place, proceeding from the infinite to the finite, all the fundamental elements of Spinoza's ontology in one geometrical illustration lifted from Euclid's *Elements*.

### *The Ontology of Finite Things*

We can now begin discussing, in terms of the illustration, the ontology of finite things. Recall the two requirements for a definition of a finite thing (TIE 96): the

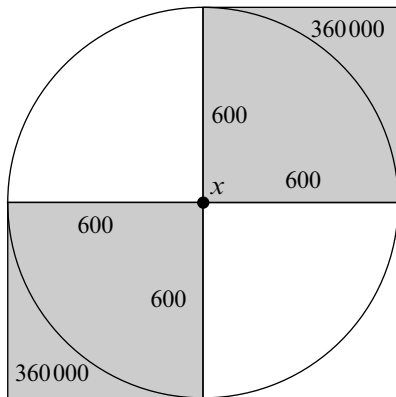


Figure 1.3

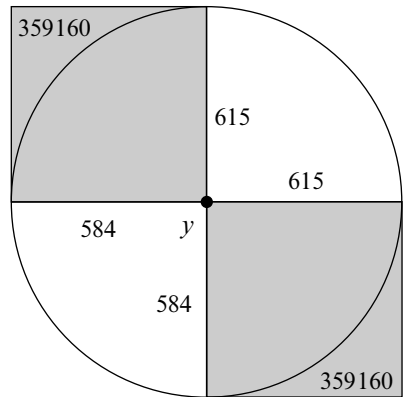


Figure 1.4

definition must designate how the thing is to be generated and what necessary properties it has. In the illustration, we can define a cutting point by stating that 1) it is produced by drawing two lines that intersect each other in a circle and that 2) thereby is set a platform from which other specific properties, such as rectangles of equal area, follow. For instance, a point  $x$  can be produced by drawing two lines so that two pairs of segments result, each segment having the length of 600 units, thus resulting in equal rectangles the area of which is 360,000 square units.

Let us then draw another point,  $y$ , whose segment pairs are both of the length 615 and 584, with the rectangles of 359,160 square units. Points  $x$  and  $y$  are thus very close to each other but still different in an exactly definable way – the mode of generation has been slightly different, with respectively different segments and rectangles. The circle contains an infinite number of points with their corresponding pairs of segments with different lengths; they form a continuum in which each point is nevertheless individual and expressible in an exact manner. I believe that all this applies to Spinoza's formal essences: they are all individual despite the fact that the basic mode of production is the same in each case (it is only varied in each case), and given that there is an infinite number of them, the points form a continuum in which each individual occupies an exact position, capturable by the individual's proper definition.<sup>25</sup> This illustrates quite accurately what Spinoza says in the *Short Treatise*:

[A]ll and only the particulars have a cause, not the universals, because they are nothing.

*God, then, is a cause of, and provider for, only particular things.* So if particular things have to agree with another nature, they will not be able to agree with their own, and consequently will not be able to be what they truly are. E.g., if God had created all men like Adam was before the fall, then he would have created only Adam, and not Peter or Paul. But God's true perfection is that *he*



*gives all things their essence, from the least to the greatest; or to put it better, he has everything perfect in himself.* (KV I.6, emphases added)

This, together with Spinoza's famous contention that 'I say that to the essence of any thing belongs that which, being given, the thing is [NS: also] necessarily posited and which, being taken away, the thing is necessarily [NS: also] taken away; or that without which the thing can neither be nor be conceived, and which can neither be nor be conceived without the thing' (E IID2), gives us good reason to think that finite individuals are endowed with essences unique to their possessors.<sup>26</sup> As depicted above, the illustration can throw light on why and how he thinks like this.

We have seen that things are more than their essences, for certain properties follow from any essence.<sup>27</sup> Properties 'common to all bodies' (E IIP38Dem.) are famously important for Spinoza's epistemological concerns, for what he calls 'reason and the second kind of knowledge' (E IIP40S2) is based on them. This type of property – common to all finite things of a given attribute – can also be expressed in terms of our illustration, for there is a property that follows from *all* the cutting points: rectangles formed from their segment pairs are always equal to each other, be the exact areas of those rectangles what they may. This may be taken to illustrate the way in which, in Spinoza's ontology, all extended things always have a shape and all mental things always involve affirmation (or negation), even though the precise nature of these properties varies immensely, just as do the areas of different rectangles. Taking all the aforesaid together yields what may be called *the full layout of the ontological structure of a finite thing*, which consists of 1) certain causes generating 2) the essence of a thing 3) from which necessarily follow a number of properties. All of these find their analogues in the illustration: 1) drawing of two lines generates 2) a cutting point so that 3) two equal rectangles of a specific area follow.

The illustration can not only help us to understand why and how Spinoza considers finite things to be endowed with their individual essences, but it can also, in an indirect fashion, throw light on the way in which he sees the ontological status of species universals (or species-essences). Now there are, of course, innumerable many ways in which certain points can be demarcated from the totality contained in the circle; Figure 1.5 offers one rudimentary example of such demarcation.

In Spinoza's epistemology, this corresponds to forming universal ideas: we can, for instance, mark off a certain group of essences (of bodies and minds) from the rest of the essences (of physical and mental individuals) based on real features they share (bodies can be, for instance, endowed with a similar ratio of motion and rest, minds with the capacity to reason) and then classify their bearers under a term such as 'human being'. Now this kind of idea of a species is grounded in what really exists, which is arguably why Spinoza is quite happy, despite vehemently criticising imaginatively formed universals (E IIP40S1), to refer to such entities as man, horse, and insect.<sup>28</sup> However, his basic ontology does *not* contain species-essences that would make things what they are – deep down everything

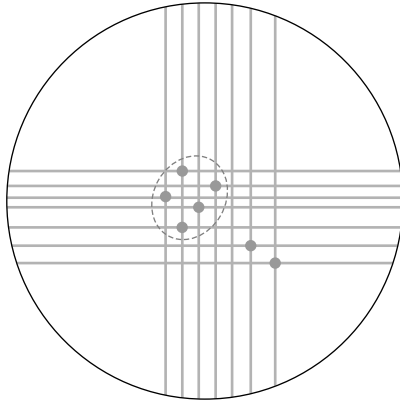


Figure 1.5

finite is, in its (formal) essence, strictly individual. In terms of the illustration, it can be said that the drawing of the lines is uniform in the sense that there is no geometrical reason for classifying different kinds of line-drawings and resulting cutting points (which would correspond to ontologically robust genera and species), even though we can employ different methods to group together points based on, for instance, their position in the circle. Likewise, a universal idea, such as that of the species ‘human’, is a being of reason (*ens rationis*), something that is ‘in our intellect and not in Nature’ (KV I.10). But this does not mean that it could not be a highly useful idea, or that it would have no basis in reality.<sup>29</sup>

I have argued above that the illustration can help us to see how attributes and the (immediate) infinite modes are involved in the generation of finite modes; but more is needed to arrive at finite things.<sup>30</sup> What is needed, in addition, is other finite things: Spinoza famously states that ‘every singular thing, or any thing which is finite and has a determinate existence, can neither exist nor be determined to produce an effect unless it is determined to exist and produce an effect by another cause, which is also finite and has a determinate existence’ (E IP28).<sup>31</sup> I would like to finish this section by considering whether there might be a way of finding a place and a role for this idea within the illustration. Stretching it a bit, there is the following option: we could think about the drawing of the lines and the generation of cutting points being determined *from one point to the next* so that each point determines which point is nearest to it in the order of generation; correspondingly, in Spinozistic extension, finite bodies determine the specific form or path that motion and rest take so that particular bodies come to be generated (and affected).<sup>32</sup> However, as the example offers no geometrical rationale for this determination and as it is generally difficult, to say the least, to place features involving duration into something as atemporal as a geometrical figure, I think we should acknowledge that the illustration has here reached its limits. Then again, we are to expect only so much from an illustration; as Spinoza himself notes, ‘if anyone wishes me to explain this further by an example, I will,

of course, not be able to give one which adequately explains what I speak of here, since it is unique' (E IIP8S). But it does not appear completely impossible to give, within the framework provided by the example, at least the rudiments of an outline of how to understand the way in which finite things are involved in generating other finite things, and in determining each other.

## Conclusion

To conclude, I would like to sum up the ways in which the present interpretation of the key geometrical example can enhance our understanding of Spinoza's thought. First, the illustration depicts the ontological priorities involved – and it is of crucial importance that we grasp those priorities, for they structure much of Spinoza's philosophical system. Second, the illustration shows why finite modes are not really but only modally distinct entities in their attributes. Third, it can throw light on how finite essences – which make things what they are – are generated out of such infinite entities as attributes and immediate infinite modes. Fourth, it illustrates how to understand the individuality of essences: they are slightly but nevertheless precisely different from each other. Fifth, it suggests a way in which the mediate infinite mode may be seen as the totality of the formal essences of finite things. Sixth, starting from the core features of reality, it illustrates the generation/essence/property structure of finite things, which structure must be captured by the proper definition of a finite thing. Finally, it suggests why Spinoza thinks about (the ideas of) species as he does.

Let us finish by taking a step back and returning to the question concerning the status of geometry, and the illustration, for Spinoza. All those ontological features find their analogues in the illustration that is, after all, Spinoza's own. Is this just a coincidence? A mere fluke? Or does this tell us something profound about the principles operative behind his system-building? No definite answer can avoid being conjectural. One suggestion would be that the illustration – together with Spinoza's tendency to present key aspects of his system through geometrical examples – in fact reveals a kind of deep structure of Spinoza's thought; that geometry guides his thinking to the extent that he might well have lifted another example from Euclid's *Elements*, and the one he ended up choosing merely happened to suit his purposes particularly well. However, many would no doubt find this too bold and object to giving too much weight to observations concerning a single example. Whatever one's stand on the issue happens to be, at least this much is certain: the evidence is there, and of the type of clarity Spinoza himself celebrates.<sup>33</sup>

## Notes

1. I am using Curley's translations.
2. I will here set aside the much-debated question whether Spinoza is a necessitarian or merely a determinist. However, a number of contributions since Garrett (1991) have shown that Spinoza endorses necessitarianism; for a recent discussion of the topic, see

- Jarrett (2009).
3. It is important to note that, as E IP8S2 states, 'the true definition of each thing neither involves nor expresses anything except the nature of the thing defined'. In other words, Spinozistic definitions concern precisely *essences* or *natures* of things.
  4. Cf. especially: 'Understand the definite nature, by which the thing is what it is, and which cannot in any way be taken from it without destroying it, as it belongs to the essence of a mountain to have a valley, or the essence of a mountain is that it has a valley' (KV I.1).
  5. See, for example, Marshall (2013: 3).
  6. For more on this, see Viljanen (2011: 149–57).
  7. See, for example, Gueroult (1974: 100–2); Jarrett (1990: 162); Koistinen (1998: 74–5).
  8. E ID4 states that 'by attribute I understand what the intellect perceives of a substance, as constituting its essence', which has given rise to a perennial debate as to whether attributes are only subjective ways of perceiving the substance (see esp. Wolfson 1961 [1934] I: 142–57) or are objectively constitutive of the substance (see esp. Gueroult 1968: 428–61). Fortunately, this issue has no bearing on the present interpretation and can thus be left aside.
  9. Given the nature of the illustration, it is certainly easier to think of extended than thinking substance here, but Spinoza's point is, of course, meant to be attribute-neutral.
  10. Again, I am here leaving aside a traditional topic of discussion and just take Spinoza at his word when he clearly implies in Ep. 56 (to Boxel) that there are more attributes than the two we are acquainted with.
  11. Huenemann (1999: 233, emphasis added). See also Marshall (2008: 74 n.54).
  12. For the production of a line, see TIE 108.
  13. Spinoza's doctrine of infinite modes is notoriously difficult; for a recent helpful discussion, see Melamed (2013: ch. 4).
  14. Correspondingly, the immediate mode of thought is the 'absolutely infinite intellect' (Ep. 64 to Schuller). For discussion, see Melamed (2013: 134 n.54).
  15. However, as Yitzhak Melamed (2013: 116) points out, according to the *Ethics* (but obviously not the *Short Treatise*), only infinite modes can follow from infinite modes. As a consequence, given that the *Ethics* is the authoritative work here, something in addition to infinite modes must be operative when finite modes are produced through an infinite mode; I discuss this topic below.
  16. Spinoza famously treats motion together with rest, talking often about motion and rest as a package in which 'rest is certainly not Nothing' (KV II.21). This issue has no bearing on the present interpretation, so I will not attempt to analyse it further; for some discussion, see Melamed (2013: 135).
  17. Here, of course, we have to assume that lines are drawn only horizontally and vertically, otherwise a point could be drawn in infinite different ways, and so the point could be defined in infinitely many different ways.
  18. As will become clear in what follows, I regard essences of finite things as individual, unique to their possessors; as the useful survey by Martin (2008) shows, this is the dominant view in the literature. See also Hübner (2016).
  19. I argue for these (not particularly contentious) claims especially in Viljanen (2011: 23–4; 2014: 264–5). See also Garrett (2009: 285–6).
  20. See especially Viljanen (2011: 75).
  21. E IIP49S states that we are not to consider ideas 'as mute pictures on a panel' because

each idea 'involves an affirmation or negation'. This reveals, I think, what is essential to the mind as it actively forms ideas 'because it is a thinking thing' (E IID3). Even though Spinoza says nothing about this, for systematic reasons the ideas resulting from the mind's essential affirmative activity can be viewed to stand in a certain interrelationship with each other just as the parts of our bodies 'communicate their motions to each other in a certain fixed manner' (E IIA2"D).

22. See E IPP22–23. For a discussion of terminology concerning the infinite modes, see Melamed (2013: 114–16).
23. For discussion, see Melamed (2013: 134 n.54, 136).
24. This being said, I agree with Melamed (2013: 136) that the issue of mediate infinite modes is 'pretty foggy'. Moreover, my interpretation is not far removed from Melamed's (2013: 136) assessment concerning extension: 'It thus seems quite plausible that the face of the whole universe is indeed this infinite individual that contains all bodies as its parts.' In other words, whereas Melamed sees the face of the whole (extended) universe as containing all bodies, I see it as containing all the formal essences of bodies.
25. For the purposes of the illustration we can disregard the fact that the sectors of the circle mirror each other in a way that produces identical segment pairs.
26. I examine the connection between the *Short Treatise* and E IID2 in more detail in Viljanen (2015: 186–7). For a very helpful recent account of E IID2 and individual (or particular) essences, see Hübner (2016: 64–5, 68–9). I discuss below what are usually called species-essences.
27. See Ep. 83 to Tschirnhaus for Spinoza's discussion of whether there are things from whose definition only one property can be derived.
28. 'For example, a horse is destroyed as much if it is changed into a man as if it is changed into an insect' (E IVPref.).
29. This view of universal ideas and species-essences squares very well with, and lends some additional support to, the recent account presented by Karolina Hübner. She sums up her interpretation as follows: '(i) only particulars and their essences have formal reality; (ii) the essences of such actually-existing particulars are unique; however (iii) Spinoza's metaphysics also allows for more general species-essences; (iv) such species-essences are only insofar as they constitute ways that finite minds spontaneously think of certain genuinely similar particulars as the same in some respect, when they abstract and compare their properties' (Hübner 2016: 74). To my mind, this is basically right, and in fact considerably less speculative than Hübner (2016: 80) herself thinks.
30. See note 15 above.
31. As E IP11S states, finite things 'come to be from external causes'; for discussion, see Viljanen (2011: 71).
32. The order of generation is temporal in character, so how could temporal features be related to the illustration? The determinations between points would (somehow) need to be convertible into determinations of time and place, through which durational existence – a causal process unfolding in time – could come to be formed (see also Marshall 2008: 74; Viljanen 2014: 268). This would mean that interdeterminations of formal essences determine the nature (time and place, and thus duration) of actual existence. However, not even the third kind of (intuitive) knowledge captures this; as the young Spinoza states, 'it would be impossible for human weakness to grasp the series of singular, changeable things' (TIE 100).
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