



## Causation and the Geometric Method in the Philosophy of Spinoza (I).

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CAUSATION AND THE GEOMETRIC METHOD IN THE  
PHILOSOPHY OF SPINOZA (I).

DESCARTES'S suggestion that the geometric method be applied to the exposition and demonstration of philosophic doctrines, and Spinoza's attempt to apply it, are not the first evidences in the history of thought of the hope that the methods of mathematics might profitably be extended to non-quantitative fields. It might be urged that the devices of the dialectical and scholastic methods are often similar in operation and achieve a rigor comparable to mathematical deduction. Even apart from such broad and general similarities of method, however (and notwithstanding the silence of historians of mathematics concerning extensions of method beyond the proper subjects of quantitative designation), the demonstrations of at least Alan of Lille and Nicholas of Amiens are avowedly geometric, and Bishop Bradwardine's systematic attempt in the *De Causa Dei* to deduce all things in geometric sequence from two primary postulates (stated as *suppositiones*) is conducted in full awareness of the exigencies of mathematical deduction. And if Spinoza's use of the geometric method is not without precedents, still less are his speculations on the peculiar aptitude of mathematics to reveal the intimate nature of things new to philosophers. From Plato through Nicholas of Cusa to Descartes the thought is recurrent that mathematics may indicate changeless mathematical objects, which by their characteristics determine thought and which are the proper objects of philosophy or speculative theology. None the less, no single method was developed from these various attempts to discover in mathematics, not the method peculiar to one subject-matter, but a method applicable to all things and fecund in implications concerning them; nor was any single conception of metaphysics formed, adumbrated by the method. The similarities of theory are often striking, but it is not impossible that they are evidence only of a platonic tradition in the evolution of which such similarities recur; certainly the differences cannot escape attention. Plato's

dialectical examination of being, motion, rest, the same, the other, non-being, develops notions broadly similar to those which Nicholas of Cusa discovered in his inquiries according to the mathematical method. Yet Nicholas was led by mathematics to the *non-aliud*, the *maximum*, and the *minimum* which coincides with it, and which is beyond laws of reason such as the law of contradiction, but on which nevertheless the processes of reason depend, much as the processes of sensation are found to depend on reason. Nor are the methods or the metaphysics of either easily confused with Descartes's "long chains of reasons, very simple and easy", which will lead, if followed in their proper order of deduction, to the most removed and hidden truths.

It seems, therefore, scarcely sufficient explanation for Spinoza's use of the geometric method to discover a tradition of mathematical demonstrations or speculations in which his thought may be fitted. Doubtless Spinoza derived the interest in the mathematical method which led him to his meticulous demonstrations *in more* and *in ordine geometrico* from Descartes. The fragment of geometric demonstration appended to the *Short Treatise* appears, in comparison with the fragment of geometric demonstration which Descartes appended to the *Replies to the Second Objections* to his *Meditations*, to follow the same method, though Spinoza may have attempted a different approach to the same or a different truth. Certainly the first extended use which Spinoza made of the method, in the demonstration of the *Principles of Descartes's Philosophy*, is cartesian in inspiration; significantly too it is a use of the method not in the infallible demonstration of truth, but in the demonstration of a philosophy which Spinoza considered erroneous. His reiterated and specific insistence that his differences from the philosophy he detailed be stated in the preface to his work, and his promise through the author of the preface that many things which Descartes believed to surpass human knowledge, and other things even more subtle and sublime, could be clearly and distinctly conceived if the human mind were led in a way other than that set forth by Descartes, form the best philosophic commentary on the unquestioned wealth of historical evidence to show that this method of philosophy was clearly borrowed from Descartes. In that preface, moreover, its author, Dr.

Meyer, gives his version of the history of the application of the mathematical method to philosophy. Some authors, distressed by the plight of philosophy, had left to posterity parts of philosophy other than mathematics demonstrated according to the mathematical method and with mathematical certainty. Not until Descartes, however, was the attempt successful, and it remained only, Dr. Meyer felt, to restate the philosophy, which Descartes had stated in analytic form, in synthetic order and geometric demonstration; indeed he had been tempted to undertake the task himself.<sup>1</sup> He had no occasion to add, of course, that Thomas Hobbes, too, in the *De Cive* had remarked the force of the geometric method and its services to physics, and suggested its application to moral philosophy;<sup>2</sup> it is significant that there was a copy of the *De Cive* in the library of Spinoza.

Possibly Spinoza's indebtedness to Descartes may have been greater than his metaphysical preoccupations permitted him to recognize; it is difficult to know how far it is profitable to inquire into such possibilities. In any case, to balance conjectural influences, his correspondence shows a concern with the metaphysical basis of demonstrations and axioms which carries him far from Descartes or Hobbes; and it shows furthermore that he thought that the nexus of demonstration, no less than the method of mathematical investigation, assumed on that metaphysical basis new characteristics. In the letters of those of his correspondents who had heard most of the method it is spoken of as new; and, fortunately, enough is preserved of their correspondence with him to indicate in what they conceived the novelty of it to consist. It is proper therefore to inquire whether Spinoza, in his use of the geometric method, altered it, or whether he saw for the first time in the possibilities of demonstration certain philosophic implications which his philosophy was designed to work out; whether there is therefore a peculiar sequence in the definitions, axioms, propositions and demonstrations of the *Ethics*; whether a greater cogency may derive from that peculiar deduction; or whether the peculiarity has exposed the demonstration, on another score, to

<sup>1</sup> *Prin. Phil., Praef.*; I, 128-129. The references are to the edition of the Heidelberg Academy, edited by Dr. Carl Gebhardt.

<sup>2</sup> Thomas Hobbes, *De Cive, Epistola Dedicatoria* (*Latin Works*, ed. W. Molesworth), vol. II, 137-138.

a criticism of erroneous deduction. Spinoza's correspondents suggest the way of such inquiries. Tschirnhaus devotes one letter largely to his success and uncertainties in experimenting with the new method.<sup>3</sup>

When are we to have your method of controlling reason rightly in acquiring knowledge of unknown truths, and also your general principles in physics? . . . When we were together you indicated to me the method which you use in searching for truths not yet known. I find that this method is most excellent and still very easy; and I can assert that because of this single observation I have made great advances in mathematics; I wish therefore that you would communicate to me the true definition of an adequate, a true, a false, a fictitious and a doubtful idea. I have sought for the difference between a true and an adequate idea, but as yet I have been able to discover nothing except that when I have investigated a thing and a certain concept or idea, then, I say (in order that I might discover whether this true idea was also the adequate idea of something) I ask myself what is the cause of this idea or concept; when I had discovered that, I asked myself again, what in turn is the cause of this concept, and so I proceeded always inquiring into the causes of the causes of ideas, until I found a cause such that I could not see any further cause of it other than that among all possible ideas which I have within me, this one alone of them exists. If, for example, we ask in what consists the true origin of our errors, Descartes will reply, in that we give assent to things not yet clearly perceived; but even if this is the true idea of this matter, I shall still not be able to determine all that it is necessary to know concerning it, unless I have also an adequate idea of it. In order to attain this adequate idea, I inquire again into the cause of this concept, that is, why is it that we give assent to things not clearly perceived, and I reply that this happens because of a lack of knowledge; but here one cannot inquire in turn further, what is the reason that we are ignorant of some things; and accordingly I see that I have uncovered an adequate idea of our errors.

The statement of the problem is not without its novelty. Fortunately it is a statement in which Spinoza's doctrine can be recognized; and we have his answers to the questions Tschirnhaus raises, for the *Improvement of the Understanding* states the distinctions between adequate, true, false, fictitious and doubtful ideas. Tschirnhaus's approach to the problem and the example he uses may be taken as accurate statement of the procedure Spinoza would recommend in examining whether or not an idea is adequate. An idea is recognized to be adequate, and therefore true, when it is connected with a principle on which it can be seen to depend and when the principle in turn depends on no further principle. The "cause" which Tschirnhaus seeks is the principle

<sup>3</sup> *Epistola LIX*; IV, 268-269.

from which the idea follows, not the experience from which it arose. Tschirnhaus's uncertainty turns on whether ideas so determined as adequate are known to be true. On that point Spinoza's answer is categorical.

I recognize no other difference between a true and an adequate idea than that the word *true* refers only to the agreement of the idea with its ideatum, whereas the word *adequate* refers to the nature of the idea in itself; so that there is really no difference between a true and an adequate idea except that extrinsic relation.<sup>4</sup>

He refuses to answer in detail the questions concerning method and the laws of motion, on the plea that he has not yet put anything in order on those subjects. However, he illustrates in an example how a true idea is identical with an adequate idea, and that identity is vouched for, as Tschirnhaus had intimated, by the notion of the cause of the idea.<sup>5</sup>

These questions, then, propounded after conversation with Spinoza by the man who was perhaps the best equipped and most independent of his correspondents, lead directly to the paradoxes of the spinozist method: an adequate idea is only extrinsically different from a true idea, and since the extrinsic references of ideas cannot in a particular case be judged by the mind, a true idea is its own test; truth reveals itself and falsity; there can be nothing more true by which the truth of a true idea can be shown to us. But the questions indicate too that the recognition of truth does not break up into disintegrated intuitions of individual and unrelated truths. Tschirnhaus propounded questions of method; whatever the answers to them, it is clear that truth is perceived in a system. Ideas which have been determined by an internal standard to be adequate can be shown also to be true, and the metaphysical dogma that true ideas agree with their ideata can be examined, it would seem, by inquiring how ideas are caused and how the world of determined, finite, temporal things is related to the causes on which ideas depend.

Spinoza had probably spoken to Tschirnhaus of the *Improvement of the Understanding*, or at least of the notions he stated in that work; it would be difficult otherwise to explain why Tschirn-

<sup>4</sup> *Epistola LX*; IV, 270.

<sup>5</sup> See below, pages 187-8.

haus's questions fit so nicely the problems discussed there. If, furthermore, the *Improvement of the Understanding* is read to discover the causes of ideas, causes are found employed constantly in its exposition. The fundamental metaphysical schematism of the four ways of knowing which is stated in the *Ethics* is translated here into causal terms. Perception may be by hearsay or from vague experience; in neither of these ways do we have adequate ideas, for in both ideas are caused, not by the mind itself, but by the impact of external things; but perception may also be by reason or by understanding; by both, adequate ideas are known. In the third kind of knowledge, that is, in reason, the essence of one thing is concluded from the essence of another; but not adequately, because either a cause is inferred from some effect or else an inference is made from a general proposition that the thing is always accompanied by some property. In the fourth kind of knowledge, however, in understanding, the thing is perceived through its essence alone or through its proximate cause. The distinction between reason and understanding, in a word, is the medieval distinction between *a posteriori* and *a priori* knowledge: reason is inference from effect to cause, understanding is inference from cause to effect. The latter, moreover, since it involves direct knowledge of the essence of some thing, Spinoza calls intuition.

Intuitive knowledge is the ideal of science. It deals surely and adequately with true ideas, since intuition is knowledge of essences through their generative, or perhaps it is wiser to say their proximate, cause. It may be shown that demonstration according to the geometric method yields knowledge of this sort, and that the *Ethics* was intended by Spinoza to expound knowledge of the highest kind. Certainly the description of intuitive knowledge fits the *Ethics* nicely, and there is in this work, if the description is applied to it, detailed illustration of truths presented in the geometric order which would not be known, or would not be known so surely, if the demonstration had not been from cause to effect. For example, the problems of the strength of the emotions, the passivity of body and mind to external action, the power of the understanding over the emotions, and similar problems, could not be solved or even stated if the relation of the body to the mind were not clear. But the relation of body and mind can be known

either by reason or by understanding. By reason we conclude from one thing to another; from the fact that we feel one particular body we can conclude certainly that the soul or mind is united to the body, and that the union is the cause of the feeling. But we cannot from that conclusion understand either the union or the feeling. It is true knowledge, but incomplete and therefore dangerous. By understanding, on the other hand, we know the essence of the mind, and from that know that the mind is united to the body.<sup>6</sup> The "cause" of the union of mind to body is the nature of the mind, and the nature of the mind is understood, not through itself, but through an attribute of God. If therefore the control of the passions, which is the proper subject of ethics, had been broached without a preliminary examination of the causes of body and mind, which are in turn the causes of adequate and inadequate ideas, we should have reasoned among effects without causes, with, to be sure, the possibility of discovering the true relation between understanding and the passions, but with no great certainty, for we should not have proceeded according to the method of true science. If, on the other hand, the sequence of the demonstration of the *Ethics* is from cause to effect, it may be possible to elucidate from the *Ethics* the nature of this causality which deduction traces among ideas; such analysis will in turn throw light on the nature of the deduction employed in the *Ethics*, no less than the nature of causation.

The problem at the basis of questions of the cogency of the method is apparent in even this partial illustration; it must be examined before an examination of the method is undertaken. Spinoza's method, as Tschirnhaus understood it, was to seek the causes of ideas; the true science is knowledge of effects through their causes. Yet an inquiry into the causes of ideas would be purposeless if there were not a further principle by which it may be known that the examination of the causes of ideas reveals too the causes of things. For a true idea *shows how and why anything is or is made, and its objective effects proceed in the soul in the relation (ratio) of the formality of its object; this is the same as what the ancients said, namely that the true science proceeds from cause to effect.*<sup>7</sup> It is the problem again why an adequate

<sup>6</sup> *Int. Emend.*; II, 11.

<sup>7</sup> *Int. Emend.*; II, 32.



idea is also true. If the project of the *Ethics* is successful, and if the *Ethics* is true science, it is a deduction, in the peculiar sense of deduction to be examined, from a single substance which is both *causa sui* and cause of all the effects which flow from it. If there is a single cause of the sequence of extended things and the sequence of objective essences, and if that cause is such that the sequence of things and ideas might in reference to their cause be a single, identical sequence, one would be justified in the confidence that an idea known to be adequate would also be true of the formal essence. There are difficulties, however, in the problem of how we know such a cause and in the consequent problem of what it is for the order and connection of ideas to be the same as the order and connection of things. If the nature of the mind, like all other natures, is to be known through its proximate cause, the demonstration of the mind is through God and through certain modifications of the attributes of God.<sup>8</sup> The essence of God, therefore, must be known and, either from it or directly, the nature of the mind itself. Even more, the mind is, in Spinoza's sense of the word cause, the cause of its ideas in all demonstrations. True ideas therefore cannot be known unless the mind is known. Yet the mind has no direct knowledge of its own special essence; indeed, when the nature of the mind is demonstrated by the deductions of the *Ethics*, one of the properties brought out is that it has no adequate idea of itself, of its body or of other bodies. It knows, of course, the modifications of mind and body, but such knowledge is inadequate. Since true ideas can be deduced only from true ideas, the true method must depend on a true knowledge of the understanding. There must be some other starting-point, and therefore some true idea must be found in thought. Yet if the mind does not know itself directly, it can know itself only through its properties or through the true idea of its cause.

The dilemma of the spinozist method is stated starkly by Spinoza himself. The ideas of the understanding must be explained through their cause, that is, through the understanding itself, but to formulate our knowledge of the nature of the understanding is to venture already into the still unguarded realm of ideas.

<sup>8</sup> *Eth.*, II, 10 cor., 11, 13; II, 92, 93, 94, 96.

If, as has been shown in the first part, it pertains to the nature of thought to form true ideas, it must now be inquired what we understand through the forces and power of the understanding. For since the principal part of our method is to understand best the forces of the understanding and its nature, we are necessarily obliged (by what I have dealt with in this second part of the method) to deduce them from the very definition of thought and understanding. But thus far we have had no rules for finding definitions, and as we can not state them if the nature and definition of the understanding and its powers are not known, it follows hence either that the definition of the understanding must be clear of itself or that we can understand nothing. But it is not absolutely clear of itself.<sup>9</sup>

This is full recognition of the paradox: definition and deduction are impossible until the soul is defined, but the soul cannot be defined until the rules of definition are known. The properties and ideas of the soul are to be known by deduction from a definition which states the proximate cause of the soul; to try to know its essence from its properties or its nature as cause from its effects is not true science nor the highest kind of knowledge. Yet the solution of the dilemma must be precisely in some aspect of the mind's knowledge of itself which broadens in its case the general rule. The spinozist intuition is at this point indispensable to the system; the mind must know some essence directly by virtue simply of the fact that it is mind. For Spinoza's statement of the dilemma goes on,

However, inasmuch as its properties [that is, the properties of the understanding], like all things which we have from the understanding, can not be perceived clearly and distinctly, unless its nature is known: the definition of the understanding therefore becomes known of itself, if we consider its properties which we understand clearly and distinctly.

The solution of the problem seems to fit the paradox only by restating it. The problem is in the circumstance that we do not know the understanding, and yet if we do not know it, we can know nothing. The resolution of the difficulty is the statement that if we know anything, the knowledge of the understanding is implicit in that knowledge, and therefore to know anything is to know the nature of the understanding. Not that we know the understanding from a knowledge of other things, for then something else would be better known to us than this fundamental truth, but rather the truth of whatever we know depends, in the

<sup>9</sup> *Int. Emend.*; II, 38.

true method, on some knowledge implicit in it of the understanding itself. Indeed, among the instances of knowledge of the fourth kind (of which Spinoza regrets there are few examples) is that, *from the fact that I know something, I know what it is to know something*.<sup>10</sup> It is not surprising therefore that when the properties of the understanding from which its definition is to be known are listed, the first of eight properties is *that it involves certainty, that is, that it knows things are formally as they are contained in it objectively*.<sup>11</sup> Yet if this is a property of the understanding, the very basis of the cogency of the method, which might therefore be supposed to be most in need of demonstration, seems to be assumed without proof. Spinoza's approach to his method suggests that the nature of the understanding can be known not otherwise than by direct intuition of some sort, and that furthermore the foundation of the method is knowledge of the understanding; doubtless then the method can be justified only if this property of the understanding is understood completely. Perhaps such understanding can be prepared by returning to the examination of the method, since the mind's intuitive knowledge of itself would seem to suggest that the nature of the mind will be known when its properties are understood.

In practice the method consists in the deduction of the properties of a thing from a definition which states its proximate cause. There is repeated indication in Spinoza's works that Tschirnhaus stated the device central to Spinoza's method. The *Improvement of the Understanding* illustrates the operation of the true method with the definition of a circle. If there were a choice between the definition of a circle as a figure of which all the lines drawn to the center are equal and the definition of it as a figure generated by a line of which one extremity is fixed and the other movable, the latter would be preferable; for the first states a property of a circle, not its essence, while the second states its proximate cause, and therefore all properties can be deduced from it.<sup>12</sup> The letter in response to Tschirnhaus's query uses the same illustration. The idea of a circle as a figure made up of an in-

<sup>10</sup> *Int. Emend.*; II, 11.

<sup>11</sup> *Int. Emend.*; II, 38.

<sup>12</sup> *Int. Emend.*; II, 34-35.

finitude of right-angled triangles is rejected because it is impossible to deduce the other properties of the circle from it. Once more the definition of a circle as the space described by a line of which one point is fixed and the other movable is preferred, but this time the reason for the preference is that the latter definition expresses the efficient cause of the circle.<sup>13</sup> Again in the *Principles of Descartes's Philosophy* much the same example is used, but there the explanation is concerned with phenomena of nature, and the statement of cause is called an hypothesis, not a definition. Spinoza adds, moreover, that the cause given to account for the thing need not be the cause which actually brought it into being.

We said finally that we might assume an hypothesis from which we are able to deduce as from a cause the phenomena of nature, although we know perfectly that they did not so take place. But that this may be understood, I shall use the following example. If any one should find drawn on a paper the curved line which we call a parabola and should wish to investigate its nature, it does not matter whether he supposed that the line was previously cut from some cone and then stamped on the paper, or that it was generated from the movement of two straight lines, or that it was derived in some other way, provided that he demonstrate all the properties of the parabola from that which he supposes. Even more, although he knows that it appeared on the paper from the impression of the cut cone, he will be able nevertheless to feign any other cause which seems to him best suited to explain all the properties of the parabola. So too in explaining the delineaments of nature, we may assume any hypothesis at all, provided we deduce from it through mathematical consequences all the phenomena of nature.<sup>14</sup>

A good definition, then, states the efficient or the proximate cause indifferently, and the explanation of the phenomena of nature is conducted in the same way as the investigation of mathematical natures, for in it any definition of the phenomena may be assumed hypothetically. Whether it be called efficient or proximate, however, it is not supposed that the cause stated is descriptive of actual processes or of existent things. It would be difficult, indeed, to raise the question of the correspondence of idea to thing here save as a general metaphysical question. To be sure, a definition, since it states the essence from which all the properties of a thing may be deduced, must, in a general sense, involve references to processes by which the thing might be produced. But efficient causes are absorbed in essences and definitions, and such considerations

<sup>13</sup> *Epistola LX*; IV, 270-271.

<sup>14</sup> *Princ. Phil.*, III; I, 227-228.

do not involve the comparison of idea to thing. At most they are further exemplification of how that first property of the understanding, by which it knows that things exist formally as they are contained in it objectively, is to be recognized. Though the nature of the thing is single and its history unique, the ideas which the mind forms of that single nature, that is, of the causes which might account for it, are many. Indeed, the seventh property of the understanding is that

the mind can determine in many modes the ideas of things which the understanding determines from other ideas, as, for example, in order to determine the plane of an ellipse it feigns that a pencil fixed to a cord is moved about two centers, or it conceives an infinity of points having always a certain and identical relation to some straight line, or a cone cut by an oblique plane such that the angle of inclination is greater than the angle of the vertex of the cone, or in infinite other ways.<sup>15</sup>

The problem, therefore, however approached, is the problem of the nature of the understanding, not how definitions duplicate things, since they can in no sense be said to do that, but rather how a definition, certified in the principles of the understanding, involves too the nature of things.

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*(To be concluded)*

<sup>15</sup> *Int. Emend.*; II, 39.