

SPINOZA AND THE CARTESIAN PHYSICS

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THOUGH Spinoza was deeply indebted to the philosophical conceptions of Descartes, it was rather on the physical side that he felt the latter's power more fully; and this is to be expected for it was through his physical teachings that Spinoza first made his acquaintance. Such being the case, it would be reasonable to assume that the Cartesian physics played no small part in defining his philosophical development; and that this is so can be seen not only by the appearance in *Deo et Homine*, and by traces in the *Ethica*, of Descartes' account of motion, but equally as well by the bearing of the Cartesian theory of dynamics on Spinoza's conception of the material world. Yet, exactly to what extent this influence extended can only be shown by a comparison of various passages in his writings with the second part of Descartes' *Principia Philosophiae*, a work from which Spinoza derived most of his physical ideas.

In several places, Spinoza speaks of "certain things immediately produced by God," in explanation of which he offers the following passage in his essay on *God and Man*: "As pertaining to *Natura naturata* in general, that is, the modes or creatures which immediately depend on God or are created by him, of such we know two and only two, namely, motions in matter, and understanding in the thinking thing. Of these we say that they have been from all eternity, and to all eternity shall remain immutable, a work certainly as great as befits the greatness of the master-worker (part i, cap. 9)."¹ In another passage, he says that extended bodies differ only in "proportion of rest and motion;" and that a body is impelled to motion by the impact of another body possessing motion greater than its rest (*Deo et Homine*, part ii, note ad init. and cap. 19);²

¹ *Vide Eth.* 1. propp. 21, 23, 28, schol.; Ep. 66, No. 8.

² *Cf. Ethica*, 4, 39.

while in the *Tractatus Theologico-Politicus* (c.vii. No. 27) we read of *res maxime universales et toti naturae communes, videlicet motum et quietem, eorumque leges et regulas*. And in a letter of 1675, he gives motion and rest as examples of those "things immediately produced by God." For Spinoza, then, motion and rest were not relative terms but real things.

According to Descartes, matter, or any body considered generally, consists only in extension in three dimensions, and not in hardness, weight or any other such quality; and that all matter is ultimately homogeneous (*in toto universo una et eadem existit*); while the variations in its properties are determined by differences of motion (*omnis materiae variatio, sive omnium eius formarum diversitas, pendet a motu*), the relative nature of which is shown by *nullum esse permanentem ullius rei locum, nisi quatenus a cogitatione nostra determinatur*. Furthermore, he tells us, the quantity of motion in the universe is constant, a proposition which he demonstrates a priori from the perfection of God; and from which we are to assume that God not only maintains a rigid immutability in his operations but that in the beginning he created a certain quantity of motion and rest which he preserves unchanged: *materiam simul cum motu et quiete in principio creavit, iamque per solum suum concursum ordinarium tantundem motus et quietis in ea toto, quantum tunc posuit, conservat*. Rest, however, is not a real thing, and though Descartes did not probably look upon it in that sense, he yet appears to be somewhat confused on this point for he says somewhat later that motion is contrary to rest, and that speed is contrary to slowness "inasmuch as such slowness shares the nature of rest." And though Spinoza speaks of finite existence as "de nihilo participans, "partaking of nullity (*cogit. Met. pt. ii.c. 3. No. 1*), it is clear that he did not view nothing as a real thing. In any case, he accepted without question the conservation of motion as prescribed by Descartes, which principle, though not true, indicates at least that Descartes was not far from a definite truth, only he lacked the patience to carry his speculations to their logical conclusion.

By the term "quantity of motion" Descartes understood what is now known as momentum, a quantity which has direction as well as magnitude, though he failed to take this into consideration for he assumed that the sum of indiscriminately directed quantities was constant, a proposition not only erroneous but incomprehensible as

no method is given by which velocity can be determined. To him, motion is separate from its direction, "the determination of motion towards this or that part;" and further asserts that the total quantity of motion is not only the same after as before a collision of two bodies but remains the same even though the direction is reversed. And though he avers that such two bodies must be viewed as an independent system (*a reliquis omnibus sic divisia ut eorum motus a nullis aliis circumiacentibus impedirentur nec invarerentur*), he mentions cases in which one of them is at rest, as well as of cases in which they move with different velocities. That his results were wrong is beside the point; what is more interesting is that Spinoza accepted all his rules except one.³

What Descartes was after was a principle which would enable him to treat the material universe as a machine self-acting and self-contained; and by postulating an original creative act which furnished the matter of the universe with its fixed "quantity of motion," he was able to effectively meet theological criticism, at that time a no small matter; while Spinoza, fully convinced of the perfect unity of the divine nature and its manifestations, found in his system scientific evidence in proof of that unity and uniformity which speculation had already led him to anticipate in the physical world.

In naming *motus et quies* as being those things not only infinite in their kind but necessary to the existence of finite things of the same kind, looking upon water as merely figured extension, Spinoza's views of motion and rest, though derived from the most confused part of the Cartesian physics, become, in a sense, intelligible. For by substituting energy of motion and energy of position a rather happy result is attained. Beside being the most fundamental property of the physical world, energy is continually passing, in all natural phenomena, from one portion of matter to another; while equally as well the sum of kinetic energy and potential energy is constant. From which it follows, that if energy is taken as this sum, it becomes that which is infinite and immutable.

Spinoza, besides being indebted to Descartes for his physical ideas, derived from him, as well, his starting-point for human psychology and ethics. According to Descartes (*Princ. Phil.* 2.c. 37), "everything, in so far as it is simple and undivided, remains in the same condition and undergoes no change unless from external causes," a proposition which is repeated by Spinoza in much

³ Epistle 15, No. 10.

the same words of his "Principles of Cartesian Philosophy:" *Unaquaeque res, quatenus simplex et indivisa est, et in se sola consideratur, quantum in se est, semper in eodem statu perseverat*, though the demonstration he offers is couched in such language as to indicate that to him it was something more than merely physical:⁴ while in the *Cogitata Metaphysica* appears the idea of the self-preserving effort of things, "conatus quo res in statu suo perseverare conatur," this effort being merely the thing itself, in illustration of which Spinoza gives the first law of motion: "Motion has the power of persisting in its actual condition. Now this power is nothing but the motion itself, that is, the fact that such is the nature of motion."⁵ While furthermore, *Unaquaeque res, quantum in se est, in suo esse perseverare conatur*, (Everything, so far as it is in itself, endeavours to persist in its own being)⁶ and *Conatus, quo unaquaeque res in suo esse perseverare conatur, nihil est praeter ipsius rei actualem essentiam*, (The endeavour wherewith everything endeavours to persist in its own being is nothing else than the actual essence of the thing itself)⁷ expressed in physical terms simply means that no change can take place in a system without work being done.

Yet, despite all he owed to the physical conceptions of Descartes, Spinoza, towards the end of his life, became deeply dissatisfied with them, as can be seen from his letters to Tschirnhausen in 1676. Asked how we would prove a priori the existence of bodies figured and in motion,⁸ Spinoza answers that "From extension as conceived by Descartes, i. e. an inert mass (*molem quiescentem*) it is difficult if not impossible to prove the existence of bodies. For matter at rest will, so far as in it lies, persist in its rest, and, as well, will not be impelled to motion unless by a more powerful external cause; for this reason, I did not hesitate to affirm long ago that the Cartesian principles of natural philosophy are useless, if not absurd." According to Tschirnhausen, Descartes, as he supposed motion to have been given to matter by a creative act, did not view the material universe as a product of inert matter; to which Spinoza replied somewhat as follows: "As to your question if the

⁴ To Descartes it was the most general law of physical action *Princ. Phil.* 2. c. 43.

⁵ *Cogit. Met.* pt. i. c. 6. No. 9.

⁶ *Ethica* iii. 6.

⁷ *Ethica* iii. 7.

⁸ *Epistle* 69.

diversity of things can be proved a priori from the conception of extension, I believe I have already sufficiently shown that it is impossible; and that, therefore, matter is ill-defined by Descartes as identical with extension (*materiam a Cartesio male defini per extensionem*), but must rather be explained by an attribute which expresses an eternal and infinite nature." And though he hoped to be able to make himself clearer on this point, the opportunity never came. But what is clear at least is that Spinoza did not accept, in his last days, the Cartesian conception of material substance as consisting purely in extension.